

Texas Natural Resource Conservation Commission
ADOPTION PREAMBLE TO CHAPTER 350 - TEXAS RISK REDUCTION PROGRAM
Rule Log No. 96106-350-WS
Adopted September 2, 1999
Effective September 23, 1999

The Texas Natural Resource Conservation Commission (TNRCC, commission or agency) adopts new §§350.1-350.5, 350.31-350.37, 350.51-350.55, 350.71-350.79, 350.91-350.96, 350.111, and 350.131-350.135, concerning the requirements for off-site properties and leased lands; the required actions when substantial changes in circumstances occur at an affected property; the assessment of property affected by chemicals of concern (COCs); the development of protective concentration levels for human and ecological receptors; the performance of response actions necessary to restore a property to active and productive use; the performance of post-response action care; the establishment and maintenance of financial assurance for post-response action care in certain circumstances; the reporting requirements; the use of institutional controls and requirements for Facilities Operations Areas. Sections 350.2-350.4, 350.31-350.37, 350.51-350.55, 350.71-350.79, 350.91, 350.92, 350.94-350.95, 350.111, 350.131-350.135 are adopted with changes to the proposed text as published in the March 26, 1999 issue of the *Texas Register* (24 TexReg 2208), and will be republished. Sections 350.1, 350.5, 350.93, and 350.96 are adopted without changes and will not be republished.

SUMMARY

A. Introduction

As part of the commission's regulatory reform goals, the commission is adopting new rules to establish requirements for corrective actions at sites where a release of a chemical of concern has impacted the environment. The adopted rule, commonly referred to as the Texas Risk Reduction Program (TRRP) rule, has been in development since 1995 and is the culmination of an unprecedented level of public input for a waste-related rulemaking in the state.

The adopted rule outlines a comprehensive program that addresses the investigation of contaminated sites, establishes reasonable standards for notice, provides flexibility in calculating site-specific cleanup levels, and sets forth appropriate response actions to address the environmental contamination. The adopted program will provide a consistent corrective action process directed toward protection of human health and the environment balanced with the economic welfare of the citizens of this state. The adopted rule uses a tiered approach incorporating risk assessment techniques to help focus investigations, to determine appropriate protective concentration levels, and to set reasonable response objectives that will protect human health and the environment.

The programs affected by the adopted rule are, for the most part, regulated by the commission's Office of Waste Management. These programs include State Superfund, Voluntary Cleanup Program (VCP), Petroleum Storage Tank (PST), Industrial & Hazardous Waste, and Underground Injection Control (UIC). Currently these programs operate under several different corrective action programs. In addition, other programs such as the Municipal Solid Waste (MSW), Composting, and Wastewater treatment programs are affected.

The commission emphasizes that the provisions of this chapter do not prohibit actions which should be taken by the person to mitigate emergency situations, to abate an on-going release, or to stabilize or abate the spread of released chemicals of concern. Additionally, the adopted rule does not establish reporting or requirements for action, as such; persons are still required to follow program-specific guidelines for reporting discovered releases of COC to the agency.

B. Location of Documents Associated With the Adopted Rulemaking

The executive director has established a record of the rulemaking so that documents used during the development of the rule can be easily accessed by the public. Persons interested in reviewing these documents may view them at the following locations. Documents generated prior to July 22, 1998, are housed at the Texas State Library & Archives, State & Local Records Management Division, State Record Center, 4400 Shoal Creek Boulevard, Austin, Texas 78756, (512) 454-2751. Documents generated since July 22, 1998, may be viewed at Texas Natural Resource Conservation Commission, Building D, Room 190, 12100 Park 35 Circle, Austin, Texas 78753, (512) 239-2920. The commission has also established a web page for the TRRP at <http://www.tnrcc.state.tx.us/waste>.

C. Organization of the Preamble to the Adopted Rule

The commission has subdivided the preamble of the adopted rulemaking to better assist persons in understanding the purpose of the adopted rule, the history of the proposed rule, differences between the adopted rule and existing programs, and the requirements of the rule. The preamble is ordered as follows:

I. EXPLANATION OF ADOPTED RULE

- A. History of the Rulemaking
- B. Terminology for the Preamble and Rule
- C. Reason for the adopted Rule
- D. Short summary explaining the requirements of the adopted rule
- E. The adopted rule in detail

II. FINAL REGULATORY IMPACT ANALYSIS - An analysis addressing whether the adopted rule is a major environmental rule and the costs and benefits anticipated from implementation of the adopted rule required by Texas Government Code, §2001.0225.

III. SMALL BUSINESS IMPACT - An analysis of the impact of the adopted rule on small businesses required by Texas Government Code, §2006.002.

IV. TAKINGS IMPACT ASSESSMENT - An assessment of the impact of the adopted rule on private real property required by Texas Government Code, §2007.043.

V. COASTAL MANAGEMENT PROGRAM CONSISTENCY REVIEW - A review of the adopted rule to assess the applicability of the Texas Coastal Management Plan (CMP), and, if applicable, whether the adopted rule is consistent with the applicable goals and policies of the CMP required by 31 Texas Administrative Code (TAC), §505.22 of the rules of the General Land Office.

EXPLANATION OF ADOPTED RULE

A. History of the Rulemaking

The commission began development of the TRRP in 1995. Acknowledging the scope and impact of the adopted rule, the commission has sought public input throughout the rulemaking process. The agency has released two versions of a conceptual document setting forth the agency's vision of the adopted program. The first version was released May 15, 1996, and the second was released December 16, 1996. In addition, a draft ecological risk assessment guidance document was released in November 1996. The commission received comment from a large number of interested parties on all three documents. In addition to the public comment periods, the commission discussed the TRRP at commission work sessions on February 22, 1996, and September 18, 1997. Each step in the development of the adopted program represented a refinement over the previous step.

Following publication of the second conceptual document and review of comments on that document, the commission proposed the TRRP rule and associated conforming rulemakings on May 15, 1998, in the *Texas Register*. The proposed rule was open for public comment until July 22, 1998. Two public hearings on the proposed rule were conducted. The first public hearing was on July 6, 1998, in Austin, and the second public hearing was on July 9, 1998, in Houston. Eighty seven people commented on the proposed rule submitting approximately 800 pages of comment. Based on the comments received, it was clear that significant revisions to the rule were necessary to make the rule more "user-friendly" so that it would be easier to follow and understand. In addition, key technical and policy issues were raised by the commenters which warranted further analysis. Finally, the commission determined that it was necessary to revisit certain procedural issues, notably the Fiscal Note, the Draft Regulatory Impact Analysis (DRIA), and the Small Business Impact Statement. The commission withdrew the proposed rulemaking on August 26, 1998, and remanded the rule to agency staff. The Notice of Withdrawal was filed with the *Texas Register* on September 15, 1998, and was effective on that date. The Notice of Withdrawal was published in the October 2, 1998, issue of the *Texas Register* (23 TexReg 9969).

Following withdrawal of the proposed rule, the agency set about refining the draft rule and associated rulemaking documents. On March 26, 1999, the commission repropoed the TRRP. The public comment period ended on May 11, 1999. Public hearings were held in Houston and Austin. Persons wishing to examine the list of commenters, copies of the written comments and the public hearing transcripts may view those documents in the public record of the rulemaking located in TNRCC Central Records, Building D, Room 190.

B. Terminology for the Preamble and Rule

As explained later in the preamble, many new terms are used in the adopted rule due to the convergence of several different programs. For example, "person" is used instead of "responsible party" or "responsible persons" because not everyone is a responsible party. Under the Voluntary Cleanup Program, the agency often receives applications from non-responsible parties to clean up a site. In those situations, it is inaccurate to refer to the Voluntary Cleanup Program applicant as a responsible party. In addition, other terms have been developed to more accurately reflect their meaning. An example is "Chemical of Concern." The term is used in place of "contaminant," because the mere presence of a contaminant would not imply that unprotective situations exist. Rather, the term chemical of concern is intended to relate specifically to those contaminants at concentrations which may not be protective should exposure occur. A similar concept was addressed in the preamble to the 30 TAC Chapter 335 TRRP which introduced the term "contaminated media" to refer to an environmental media which contains contaminants at levels that pose a substantial present or future threat to human health and the environment.

The commission understands that the use of the new terminology may initially challenge readers of the adopted rule. For this reason, the preamble to the adopted rule uses both the new and traditional terms to help persons understand the rule. The following is a list of new rule terms and the corresponding terms that are sometimes used in the preamble. The new term is followed in parentheses with other terms used in the preamble to mean the same thing: chemical of concern (chemical, contaminant); affected property (property, contaminated property, site); protective concentration levels (cleanup levels); protective concentration level exceedence zone (contaminated soil, contaminated groundwater, affected soil, affected groundwater); groundwater protective concentration level exceedence zone (plume, contaminated plume); response action (remedial action, cleanup).

C. Reason for the Adopted Rule

The commission initiated this rulemaking as the next logical step in the development of a risk-based program. The agency currently administers several different sets of corrective action regulations. Corrective actions regulated under the agency's Industrial & Hazardous Waste (including Resource

Conservation and Recovery Act (RCRA)) and State Superfund Programs must comply with 30 TAC Chapter 335 (current TRRP). Corrective actions regulated under the agency's PST Program must comply with 30 TAC Chapter 334 (PST rule). Further, corrective actions conducted under the agency's Voluntary Cleanup Program (VCP) must comply with either the current TRRP or the current PST rule, depending on the regulatory authority applicable to the affected property, but also must comply with corrective action provisions contained in 30 TAC Chapter 333 (VCP rule) which supercede portions of the current TRRP. Operating landfills in the MSW Program comply with yet a fourth set of corrective action requirements specific to landfills, but corrective action at other MSW and composting facilities is case-specific.

The adoption of the 30 TAC Chapter 335, TRRP in 1993 and the risk-based corrective action (RBCA) portion of the PST rule in 1995 established the commission's philosophy that risk-based cleanups are an acceptable remedial response to affected environmental media (i.e., soil, groundwater, etc.) because RBCA ensures protection of human health and the environment while making response actions more economically feasible. Prior to the adoption of the current TRRP in 1993, the commission's industrial and hazardous waste programs required all affected media to be restored to background levels or to be closed as a landfill with post-closure care. With regard to the waste program areas, the agency recognized for the first time in the current TRRP that a limited quantity of COC could remain within an environmental medium and not present an unacceptable risk to human health or the environment. However, the current TRRP has a remedy standard which is based upon the attainment of background conditions (i.e., Risk Reduction Standard 1) and requires a notice to be placed in the property deed records for all sites where contaminants remain in environmental media above background levels. This deed notice effectively drives cleanups toward the background standard.

The implementation of risk-based rules since 1993 has proven successful in encouraging remediation of contaminated sites in a timely and cost-effective manner compared with the historical practice of complete cleanups. However, the current TRRP, the PST rule, and the VCP rule contain different, and in some respects, contradictory regulatory approaches, requirements and cleanup objectives. The net effect is that the agency and the regulated community have been responsible for learning, implementing and complying with different regulations which address releases of COC into the environment. Having different corrective action regulations for different programs can cause inconsistent results under comparable circumstances. For example, assume two almost identical releases of benzene occur in two separate areas of a single property. Assume further one release is regulated by the current TRRP and the other release is regulated by the PST rule. Because the two rules set different requirements for the investigation, cleanup levels, soil and groundwater response objectives, and reporting, under the current rules the two releases must be investigated to different degrees, cleaned up to different standards, and be addressed under different administrative procedures and time frames. Different concentrations of benzene would be allowed to remain on a single property under the two sets of rules. These kinds of differences are difficult to justify, cause unnecessary confusion and frustration, and unnecessarily burden the public and private resources that must learn, implement, and comply with different corrective action regulations.

In addition, the previously applicable regulations do not in all situations provide clear, consistent or complete requirements for some critical policy matters such as the minimum degree of assessment required for release sites, notification of affected landowners, acceptable protectiveness benchmarks, conditions where exposure prevention remedies are allowable in lieu of pollution cleanup remedies, current and future land use, and consideration of ecological impacts. The lack of clear positions on critical corrective action policy matters has been the reason for many of the inconsistencies between the different corrective action rules, has resulted in inconsistent application of the individual rules on a day-to-day basis, and has been a cause of delay and disagreement in the corrective action process. Based on the experience of the corrective action programs since adoption of the current TRRP in 1993, the commission believed these policy issues need to be addressed in new regulations.

Since the adoption of the current TRRP in 1993 and the PST rule in 1995, continued advances in science have progressed beyond the scope of the current rules. The new rule incorporates new and more scientifically sound corrective action methods that have developed nationally. By incorporating updated standards in risk reduction, the commission anticipates the TRRP rule will improve protection of human health and the environment while enhancing flexibility and cost-containment for the regulated community.

The goals of the new program are: to create a unified performance-based approach to corrective action which will be the same regardless of which of the agency's program areas review the adequacy of a response action; to complete the movement away from background as a regulatory standard; and to implement a consistent, streamlined approach that will expedite remediations of affected properties. The commission also addresses in the adopted rule a number of technical, legal, risk assessment and risk management policy questions which have arisen and were insufficiently or inconsistently addressed in the previously promulgated risk-based rules.

Specifically, among legal and policy issues the final rule addresses include: landowner consent to deed notification; notification to owners of affected property; and land use determinations.

Technical issues addressed include: requirements to demonstrate completion of post-response action care; requirements to provide certainty as to when exposure prevention remedies are and are not acceptable alternatives; useable quantities of groundwater/minimum groundwater yield to represent a usable groundwater; site assessment requirements; and groundwater classification. Lack of specificity regarding what exposure pathways must be evaluated and when, and the ecological risk assessment are among the risk assessment policy issues addressed.

Risk management policy issues the commission addresses in the adopted rule include the following: criteria for setting points of exposure; groundwater restoration (natural resource protection) versus exposure prevention; and financial assurance for exposure prevention remedies.

Some of the commentors to the rule urged in their comments that the rule, and certain provisions of the rule, not be adopted. The commission in responding to the comments stated its reasons for overruling the considerations urged against adoption. The commission states here that it overrules the considerations urged against adoption, in addition to reasons offered in its comment responses, because the commission finds that the rule as adopted--compared to all the alternatives considered and rejected--will result in the best combination of effectiveness in obtaining the desired results and of economic costs not materially greater than the cost of any alternative regulatory method considered."

D. Summary of the Adopted Rule

The adopted rule is organized so that persons using the rule can follow a logical progression in assessing their site, in developing human health and/or ecological-based cleanup levels, and in conducting response actions. Subchapter A of the adopted rule provides general information about the purpose and applicability of the adopted rule, including definitions and acronyms. This subchapter describes who must comply with the TRRP and how they must comply. Generally, persons will be required to comply with the adopted rule because they have been referred to this rule by other agency programs. However, the adopted rule does not establish chemical of concern release reporting requirements for any agency program, nor supersedes program-specific trigger levels for notification and corrective action. Sites in the State Superfund, VCP, PST, Industrial & Hazardous Waste, UIC, MSW, and Composting, and Wastewater Treatment programs and the Spill Response Program (in certain instances) will be directed to the TRRP. For example, sites entering the VCP or the State Superfund Program will be directed by those programs to the TRRP for the technical and additional procedural requirements necessary to remediate the site to levels protective of human health and the environment.

Once a person has been referred to the TRRP, the person must comply with all requirements of the adopted rule unless otherwise stated in another agency rule or unless a federal standard or state statutory requirement is more stringent. For example, public participation (public meeting to receive public comment) during remedy selection is necessary for many sites regulated under federal programs or other state programs. Although generally not required by the TRRP, federal or state regulations may require the remedy selection for a site to be presented at a public meeting where comments are received.

The remedy standards in Subchapter B of the adopted rule clarify the cleanup goals at the beginning of the remedial action so that persons know the desired end points before starting the site assessment. As explained below, there are two remedy standards, Remedy Standard A and Remedy Standard B. The person conducting the response action has the flexibility to determine the most effective remedy standard for the situation considering issues such as exposure, risk, cost, timing, liability and technical complexity. Thus, cost-effectiveness decisions are left to the person and not the agency.

To attain Remedy Standard A, the affected environmental media (surface water, groundwater, surface and subsurface soil, and sediment) shall be removed and/or decontaminated to protective concentrations such that physical controls (such as caps, slurry walls) or institutional controls (such as restrictive covenants or deed notices) are not necessary to protect human beings and ecological receptors (animals, plants) from exposure to unprotective levels of the chemicals of concern. In other words, the affected property must be cleaned up. Remedy Standard A can be thought of as a “walk away” remedy so that once the property is cleaned, no additional actions are needed. An example of this type of remedy is one in which contaminated soils are excavated and replaced with clean soil. Due to the reduced need for oversight, response actions under Remedy Standard A are self-implementing. Persons only need to submit a notice to the agency that they are undertaking a Remedy Standard A response action, and submit an update on progress every three years until the site is adequately clean. Upon completion of the response action, persons will submit a report for agency review to confirm completion. Once the agency confirms that the response action is completed, the agency will send a No Further Action letter.

On the other hand, if the person conducting the response action wants to eliminate exposure to a chemical of concern through the use of a control measure rather than by cleaning the property, the person must comply with the requirements of Remedy Standard B. Controls can be either physical controls such as a cap or an institutional control such as a deed notice which identifies the problems with the affected property. Instead of cleaning the soil to protective concentrations as might happen under Remedy Standard A, a cap such as a parking lot, could be placed over the contaminated soil to eliminate or severely restrict exposure to the contamination. Unlike Remedy Standard A, Remedy Standard B is not self-implementing. Persons are required to submit a response action plan to the agency and receive agency approval before commencing with the response action. As with Remedy Standard A, persons are required to update the agency on the progress of the response action every three years until completion. A Response Action Completion Report will be submitted to the agency upon completion of the response action. If a Remedy Standard B response action includes a physical control, post-response action care will be required. The adopted rule sets a 30-year default time period for the post-response action care; however, a lesser time period may be provided if the need for it is demonstrated. If physical controls are used, financial assurance for post-response action care will also be required. Subsequent post-response action care periods may be necessary if the COC continue to present a potential hazard to human health or the environment. Under Remedy Standard B, the agency will prepare a conditional No Further Action letter if post-response action care is necessary. Upon completion of the post-response action care period, the agency will issue a final No Further Action letter. If post-response action care is not necessary for an affected property under Remedy Standard B, then the agency will prepare a final No Further Action letter upon approval of the final report.

When conducting a response action under Remedy Standard A or Remedy Standard B, the adopted rule requires that the property be made safe for residential or commercial/industrial use. To ensure that future

owners and interest holders are notified of the limitations on affected properties, the person must file an institutional control (deed notice, VCP Certification of Completion, or restrictive covenant) for any site attaining Remedy Standard A-commercial/industrial, Remedy Standard B-residential, or Remedy Standard B-commercial/industrial. An institutional control is not required for a response action under Remedy Standard A-residential. If the property is subject to a zoning or governmental ordinance equivalent to the deed notice or restrictive covenant that would otherwise be required, then a deed notice or restrictive covenant would not be required, as that zoning or governmental ordinance is the institutional control.

Subchapter C sets forth the affected property assessment requirements. Upon entry into the TRRP, persons are required to conduct an affected property assessment to characterize the site. COC identified for a particular site are set by the specific program area. With the exception of the Facility Operations Area, outlined in Subchapter G, the TRRP, in and of itself, does not establish an obligation to extend the assessment to additional COC or to other areas of a facility that may be unrelated to the affected area under investigation. Thus, the initial threshold issue of whether a site needs to be assessed will continue to be determined by the criteria of the respective programs. Once it is determined that a site needs to be addressed, the adopted rule will apply.

The assessment identifies chemicals of concern, locates human and ecological receptors, and characterizes the geological and hydrogeological features of the site. Following completion of the affected property assessment, there should be a clear understanding of the COC present, the environmental media impacted by each COC, and the nature of any exposure to human and ecological receptors posed by the COC. To complete the affected property assessment, the person conducting the assessment may be required to take samples on land owned by another person or on land where an interest such as an easement exists. In these cases, the person must notify the owner that the information is available at the time it is submitted to the agency. If the land owner requests the information, then the person must provide it to the owner. If persons are determined to be actually or probably exposed to COC in excess of risk-based levels, then those persons must be notified and offered critical information within timeframes established by the rule.

To determine protective concentration levels for humans and ecological receptors, persons will follow the methodology described in the Subchapter D of the adopted rule. A process has been established in the adopted rule based on the RBCA model of the American Society of Testing and Materials (ASTM). The RBCA model establishes a three-tiered approach to calculating cleanup levels (i.e., protective concentration levels). The three-tiered process provided in the adopted rule aids the development of appropriate protective concentration levels. The tiers represent increasing levels of evaluation where site-specific information is factored into the process. The first tier is based on conservative, generic models that do not account for site-specific factors. The agency will publish and regularly update tables specifying the Tier 1 protective concentration levels. Under Tier 2, persons may apply site-specific data and use agency-specified equations. Tier 3 allows for more detailed and complex evaluations, and user specified fate and transport models. In all cases, the ability to use more complex evaluations continues to ensure the protective concentration levels are appropriate for the site conditions. In addition to developing protective concentrations for human health, persons will also be required to evaluate each affected property for impact to ecological receptors and possibly conduct an ecological risk assessment. If ecologically protective concentration levels are lower than the human health protective concentration levels, it is possible that ecological risks may drive the site remediation.

The tiered approach to developing protective concentration levels and the two available remedy standards are the cornerstones of the TRRP. This process establishes a clear, scientifically defensible methodology for developing protective concentration levels while providing persons with the flexibility to balance cost considerations for their sites. As one moves through the tiers, assessment costs increase due to increased analysis and data needs. However, the result of the increased analysis may be a reduction in the area to be addressed which, in turn, could be an even more significant reduction in overall project costs for remediation.

Subchapters E and F provide the reporting requirements and institutional control requirements, respectively.

The Facility Operations Area provisions outlined in Subchapter G provide the option for certain facilities to use an area-wide approach to address chemicals of concern. If a facility chooses the Facility Operations Area approach, areas within the Facility Operations Area are placed under an area-wide corrective action management plan and are subject to the Facility Operations Area provisions of the adopted rule. At the termination of the Facility Operations Area, the former Facility Operations Area is subject to the standard provisions of the adopted rule.

E. The Adopted Rule in Detail

This section of the preamble provides a section-by-section overview of the adopted TRRP rule by presenting the key aspects of each adopted section in a narrative format. The intent of this section of the preamble is to provide a more clear understanding of each component of the final rule. This section also contains a summary of some major rule changes made as a result of comments on the proposed rule. Other changes were also made throughout Subchapters A, B, C, D, E, F, and G of the rules to correct punctuation, capitalization, grammar, and cross references. These editorial changes are to conform with rule format requirements. Specific substantive changes to each subchapter are discussed in the following paragraphs.

The adopted rule contains Subchapters A-G. Subchapter A, General Information, consists of §§350.1-350.5 and sets forth the general requirements of the adopted TRRP rule. Subchapter B, Remedy Standards, §§350.31-350.37, establishes the desired goals and the end results of the corrective action process. Subchapter C, Affected Property Assessment, §§350.51-350.55, sets forth criteria for classifying groundwater and land use, establishes performance standards for property assessments, data quality, and notifications. Subchapter D, Development of Protective Concentration Levels, §§350.71-350.79, directs persons to evaluate exposure pathways and determine the concentration of the chemical of concern which is protective for human and ecological receptors at the point of exposure. This concentration is referred to as risk-based exposure limits. Persons then derive protective concentration levels that, when met in the source areas, will achieve the risk-based exposure limits. Subchapter E, Reports, §§350.91-350.96 sets forth the necessary information for each report required by the TRRP rule. Subchapter F-Institutional Controls, §350.111, sets forth requirements for various types of institutional controls. Subchapter G, Establishing a Facility Operations Area, §§350.131-350.135, provides an option for responding to multiple releases on an area-wide basis at certain industrial facilities under a hazardous waste permit or corrective action order. Provided a facility meets the qualifying criteria and application requirements, the Facility Operations Area portion of the facility can be addressed with an interim response action, such that a final response action may be deferred to the end of active manufacturing operations.

SUBCHAPTER A. GENERAL INFORMATION.

Subchapter A contains §§350.1-350.5.

§350.1. Purpose.

Section 350.1 sets forth the purpose of the TRRP rule. The purpose of the adopted rule, as noted earlier, is to establish a reasonable, consistent, risk-based, performance-oriented approach applicable to most waste program areas regulated by the commission with the goal of balancing protection of human health and the environment with the economic welfare of the citizens of the state. The commission emphasizes that the provisions of the adopted rule do not establish reporting requirements nor prohibit actions that should be taken by the person to mitigate emergency situations, to abate an on-going release, or to stabilize or abate the spread of released chemicals of concern. This section was adopted with no change.

§350.2. Applicability.

Section 350.2 discusses those programs that must comply with the requirements of the adopted rule. As adopted, the rule will affect the following agency programs (all in Title 30 TAC): Chapter 327 relating to Spill Prevention and Control; Chapter 330 relating to MSW; Chapter 331 relating to UIC; Chapter 332 relating to Composting; Chapter 333 relating to the VCP; Chapter 334 relating to Underground and Aboveground Storage Tanks (i.e., PST program); and Chapter 335 relating to Industrial Solid Waste and Municipal Hazardous Waste including State Superfund Sites. The commission is proposing conforming amendments to Chapters 327, 331, 332, 333, 334, and Chapter 335 to clarify the applicability of Chapter 350 in those chapters. A conforming rulemaking to Chapter 330 will be coordinated with anticipated future rulemakings to that Chapter. Other facilities that may utilize the TRRP include municipal wastewater treatment facilities and used oil facilities. The executive director may reference this chapter in permits and registrations issued under 30 TAC Chapter 312 when specifying closure provisions to address unauthorized releases of COC from municipal wastewater treatment plants. The commission also expects used oil facilities (30 TAC Chapter 324) to enter the TRRP through other program areas such as the Spill Response Program, the VCP, and the PST program.

In addition to those programs identified in the previous paragraph, the commission is also proposing to provide the executive director with the discretion to require the use of this chapter to address other unauthorized releases of chemicals of concerns subject to Texas Water Code, Chapter 26.

Except for substantial changes in circumstances as addressed in §350.35, the commission emphasizes that the TRRP rule does not establish the requirement for a person to take a response action at an affected property. Further, the adopted rule does not establish action levels or requirements for reporting releases. In other words, the adopted rule, in and of itself, does not place an affirmative obligation on persons in Texas to determine if their property is contaminated, although the statutes relating to various subject matters often do. The adopted rule will be used to review the adequacy of a property assessment and a response action once the obligation to respond has occurred via the agency rules for one of the covered program areas, by statute, or by other agency order or permit. In addition, COC identified for a particular site are set by the specific program area or by commission order.

Except for the Facility Operations Area approach, the TRRP, in and of itself, does not establish an obligation to extend the assessment to additional COC or to other areas of a facility that may be unrelated to the affected area under investigation. If a facility chooses the Facility Operations Area approach, areas within the Facility Operations Area are placed under an area-wide corrective action management plan and are subject to the Facility Operations Area provisions of the adopted rule. At the termination of the Facility Operations Area, the former Facility Operation Area is subject to the standard provisions of the adopted rule.

In some cases, minimum standards are established by federal rule or state statute. The commission emphasizes that the TRRP rule will supplement but will not replace any requirements for closure or response actions specified in the regulations in programs where these minimum standards exist.

The following is a summary of the specific program areas and how facilities in those programs will be integrated with the TRRP:

Chapter 327 - For spills and discharges under Chapter 327, the responsible person has the option at any time following discovery of the spill or discharge to enter the TRRP rather than develop a site-specific response action in consultation with the TNRCC Regional Office. However, if a site-specific response action is chosen, the response action must be completed within six months of discovery. If the responsible party cannot complete the response action within six months, the responsible person will be required to enter the TRRP.

Chapter 330 - MSW Landfills subject to the federal regulations in 40 Code of Federal Regulations (CFR) Parts 257 and 258 must comply with 30 TAC Chapter 330, Subchapter I rather than the TRRP for corrective action. Subchapter I incorporates prescriptive federal minimum criteria for corrective action at landfills. However, under limited circumstances, the federal MSW rules allow for the development of risk-based protective concentration levels for landfills. In these instances, the TRRP would serve as the guidance for developing these risk-based concentrations. Corrective action concerning groundwater, surface water, and soil at all other MSW sites including old landfills, non-federally regulated construction/demolition landfills, transfer stations, waste incinerators, etc. will be subject to the TRRP. Requirements for closure and post-closure care of permitted MSW landfills remain in Chapter 330. However, persons will be required to comply with the post-response action care requirements in the TRRP when corrective action is performed at non-permitted (i.e., old, abandoned, or unauthorized) MSW facilities under the program. Management of landfill gases for all MSW facilities is addressed in Chapter 330 rather than Chapter 350.

Chapter 331 - UIC. Persons must address unauthorized releases of COC from associated tankage and equipment under the TRRP, but excursions of injected mining solutions at in-situ mining properties or injection of waste that is confined below all underground sources of drinking water is subject to Chapter 331.

Chapter 332 - Composting. Persons must conduct corrective action under the adopted TRRP rule to address unauthorized releases of COC at land application sites subject to the requirements of Chapter 332 and at all composting/mulching facilities. Persons conducting any of the operations governed under Chapter 332 should be aware that “chemicals of concern” do not include biological COC such as salmonella; therefore, corrective action to address biological contamination is not addressed under the TRRP.

Chapter 333 - VCP. Persons in the VCP will be required to comply with the requirements of the TRRP for the assessment of the affected property, notice to affected persons, development of protective concentration levels, and response actions. In addition to the requirements of Chapter 350, persons are also required to comply with all requirements in 30 TAC Chapter 333, Subchapter A and Texas Health and Safety Code Chapter 361, Subchapter S. These two subchapters specifically address eligibility, contents of the VCP application, issuance of certificates, release of liability and other procedural aspects of the VCP.

Chapter 334 - PST Program. Like the VCP, persons in the PST Program will be required to comply with the requirements of Chapter 350 for the assessment of the affected property, notice to affected persons, development of protective concentration levels, and response actions. Texas Water Code, Chapter 26, Subchapter I also affects the PST Program. The effective date for sites in the PST Program to comply with the TRRP is September 1, 2003. Any persons notifying the agency of releases and intent to conduct response actions for sites prior to that date may use the procedures outlined in Chapter 334 to develop Plan A or Plan B target concentration criteria.

Chapter 335 - Industrial and Hazardous Waste Program. The adopted TRRP rule applies to any discharges of COC from entities regulated under Chapter 335 into environmental media, either as a part of closure or at any time before or after closure. Closure of facilities, regulated under Chapter 335, will be addressed entirely in Chapter 350, unless grandfathered. Language has been added to establish a performance standard for closure of waste management facility components and to clarify what a person must do to address removal of wastes and response to releases during closure. The only provision in Chapter 335 that applies to new closures is the requirement to close, which will refer the person to Chapter 350 for details. The current TRRP will remain in Chapter 335 for an interim period for use by grandfathered facilities. Texas Health and Safety Code, Chapter 361, also establishes requirements for the Industrial and Hazardous Waste Program.

Chapter 335, Subchapter K - State Superfund Program. Persons in the State Superfund Program will be required to comply with the requirements of Chapter 350 for the assessment of the affected property, development of protective concentration levels, and requirements for response actions. In addition, other requirements for the State Superfund Program in Subchapter K and Texas Health & Safety Code, Chapter 361, Subchapter F will continue to apply and will supercede the TRRP if a conflict should arise. A notable change for the State Superfund Program is the removal of the requirement to perform a baseline risk assessment.

Chapter 336 - Radioactive Substances. Persons must comply with Chapter 336 when addressing releases of material containing radioactive substances. When releases involve radioactive substances and non-radioactive chemicals of concern, protective concentrations for the radioactive substances must be determined under Chapter 336 while the protective concentrations for non-radioactive substances will be determined under the TRRP.

Chapter 312 - Sludge Use, Disposal, and Transportation. Although the Water Quality program, rather than the Waste Program, regulates the processing and discharging of municipal and industrial wastewater, permits and registrations for wastewater treatment facilities require closure of facilities in accordance with the current TRRP in 30 TAC Chapter 335. Because the TRRP will replace the current TRRP, wastewater permits and registrations will require closure under Chapter 350. Industrial wastewater facility closures have and will continue to be sent to the Remediation Division of the Waste Program for approval of closure. On the other hand, the executive director has allowed municipal facilities to choose between closing under the current TRRP or undertaking a site-specific “clean” closure approved by the Water Quality Program. Historically most municipal facilities have chosen the clean closure alternative. The agency will continue to allow municipal facilities this option.

Persons may begin to use the rule upon the date it becomes effective. However, §350.2 also presents grandfathering provisions to promote an effective transition between the TRRP on or after the implementation date of the rule (May 1, 2000). Section 335.8 of the current Chapter 335, TRRP requires persons to submit a notice to the TNRCC regional office 10 days before commencing remedial action under Risk Reduction Standards 1 and 2. If a person submits this notice to the agency prior to the effective date of the TRRP, the person may continue under the old rules, but the person must within one year of the effective date of the TRRP rule resubmit a notification letter or provide other documentation that timely notification had been made unless the agency by letter acknowledges receipt of the initial notification. To remain under the provisions of the Chapter 335, the Remedy Standard 1 or 2 response action must be completed within five years of the implementation date of the TRRP rule. In the interest of regulatory certainty, the commission is setting a bright line of applicability regarding these self-implemented actions and intends to place a degree of “urgency” into the completion of these self-implemented actions. The commission determined that five years is generally an adequate time period to address small sites using the agency’s experience with the PST program. For longer actions, the commission prefers that they move into the TRRP rule to expedite the phase out of the current TRRP. A person who has submitted a final remedial investigation report under Standard 3 to the agency up to one year after the implementation date of the TRRP rule may elect to continue under the current TRRP or to convert to the TRRP rule.

Workplans submitted to address unauthorized releases of COC approved as part of a permit issued prior to the effective date of Chapter 350 but not implemented at the time of permit renewal must be compliant with the TRRP at the time of permit renewal. At any time, persons may revise plans or reports to comply with the requirements of Chapter 350 except in instances where resubmittal of revised plans and reports would result in varying from a previously-approved schedule of compliance. The commission also emphasizes that persons eligible to choose between the new and old rules are bound by the rules they choose until such time as they are required to move to the new rules. The commission is prohibiting mixing and matching of the two rules to avoid implementing a piece-meal approach that would likely prove confusing and

inefficient. However, corrective action will be given consideration on a case-by-case basis considering its quality.

The commission amended to §350.2 to include the May 1, 2000 implementation date of the rule, and extended the implementation date for the PST program to September 1, 2003. The commission also provided clarification on its expectation for the subject of grandfathering. The commission approved several simple revisions to the section to be consistent with other changes in the proposed rule.

§350.3. Process.

Section 350.3 sets forth the process for the TRRP in an outline format so that persons in the program can more easily understand the logical progression for demonstrating compliance with the requirements of Chapter 350. The process will generally proceed as follows. An affected property assessment will be conducted to determine the vertical and horizontal extent of COC and to classify groundwater and land use. An owner of affected property and persons actually or probably exposed to the COC in excess of risk-based levels will be notified as necessary. The assessment should be conducted in light of the remedy standard that will likely be pursued, if one is necessary, so that the proper information is obtained to support development of a response action. Protective concentration levels will be developed as part of or following the affected property assessment. Following development of the protective concentrations, a remedy standard is chosen and a response action to achieve the remedy is developed, implemented, and completed if the protective concentrations are exceeded. Then, if necessary, persons conduct post-response action care. Necessary reports must be submitted as required. Although the process is described in steps for clarity, persons should understand that steps in the process may be integrated. Protective concentration levels may be calculated as part of the affected property assessment, and the remedy standard may figure into the development of protective concentration levels. The commission did not receive any comments on this subchapter. This section was adopted with no substantive changes.

§350.4. Definitions and Acronyms.

Section 350.4 contains definitions, acronyms, and risk-based nomenclature. Because the TRRP brings together several different programs into one set of standards, many terms will be new to the reader. To avoid confusion with requirements of existing programs, the agency has attempted to use generic terms which do not have pre-existing meanings within the covered program areas. In numerous instances the commission has developed new terms, since the old terms may be used by several program areas but do not have the same definitions. For example, the adopted rule refers to "affected property" rather than "site" because site does not have the same meaning within the covered program areas.

The commission is also adding definitions to more comprehensively explain the process for defining risk-based exposure limits, protective concentration levels, exposure pathways, and points of exposure to environmental media. For example, a critical protective concentration level is the lowest protective concentration level for a chemical of concern within a source medium considering all of the applicable exposure pathways for that source medium. Also, the assessment level is the level of required assessment where the human health protective concentration levels are established under Tier 1 and where the protective concentration levels established for the soil to protect groundwater may be determined under any tier.

The commission adopted amendments to §350.4 amending several proposed definitions and adding four new definitions: community, deed notice, ecological hazard index, and restrictive covenant. Most notable, the definition of institutional control was amended to include VCP Certificates of Completion, and zoning and governmental ordinances which are equivalent to the deed notice or restrictive covenant that would otherwise have been required. In addition, the commission identified several grammatical changes that were necessary, and the definitions were renumbered to comply with Secretary of State rules.

§350.5. Severability.

Section 350.5 states that the provisions in Chapter 350 are severable. Therefore, if certain provisions of this chapter are rendered unenforceable by a court of competent jurisdiction or other appropriate authority, all other remaining provisions will continue to be enforceable. In other words, if a court of law rules that one section of the TRRP rule is invalid and remands that section to the commission, the person must still comply with the other sections of the rule. The commission has included the severability clause in the adopted rule because it believes negating an entire rule due to limited concerns could delay corrective action at contaminated sites and possibly place members of the public, site workers, and ecological receptors at greater risk. This commission did not receive comments on this section. This section was adopted with no changes.

SUBCHAPTER B. REMEDY STANDARDS.

Subchapter B contains §§350.31-350.37.

§350.31. General Requirements for Remedy Standards.

Section 350.31 specifies the general requirements that apply to Remedy Standards A and B. The section requires the person to use either Remedy Standard A or Remedy Standard B, at their own discretion, to guide their response actions at affected properties. The section also specifies the performance standard to be used to distinguish between a treatment process that achieves decontamination and a treatment process that is a physical control measure. This distinction is important because physical control measures require institutional controls, post-response action care, and financial assurance while treatment remedies do not. This section also requires that remaining concentrations of volatile COC in the soil or groundwater be protective against explosive vapor concentrations; persons notify the executive director and the agency's regional office at least ten days before confirmation sampling to demonstrate that a response action is complete and a remedy standard has been attained; and persons submit a Response Action Completion Report upon completion of the response action. Until a Response Action Completion Report is submitted, the person must submit a Response Action Effectiveness Report at least every three years to document the progress made toward completion of the response action. The section also requires persons attaining Remedy Standard A for commercial/industrial use or Remedy Standard B to have an institutional control in place within 90 days of the executive director's approval of the Response Action Completion Report. The institutional control informs others of limits on the use of the property that are necessary to protect human health and the environment. In addition, section provisions may be used to require the placement of an institutional control to provide notice of ongoing long-term response actions (i.e., take greater than 15 years to complete). Finally, the section requires the owner or affected property to inform any prospective buyer or tenant of the property of any current or future limitations on the property until such time as an institutional control is in place. The person must secure the written permission of the landowner in accordance with §350.111 prior to filing, or causing to be filed, any institutional control within the real property records for leased lands or off-site properties.

Proposed rule language in §350.31(b) was amended to include monitored natural attenuation. In §350.31(c), the commission amended the rule to focus evaluations primarily on existing structures, and future construction in proximity of volatile non-aqueous phase liquids (NAPLs) or other sufficiently high concentration of COCs. Section 350.31(g) and (h) were amended to accommodate the expanded definition of institutional control. A clarification was also made to information owners of affected property must inform others.

§350.32. Remedy Standard A.

Section 350.32 sets forth the performance standards to meet Remedy Standard A. To attain Remedy Standard A, a person must within a reasonable time frame remove any listed hazardous waste as defined in 40 CFR Part 261, Subpart D that is contained within a waste management facility component or that is separable using simple mechanical removal processes; remove and/or decontaminate any waste or environmental media that is characteristically hazardous due to ignitability, corrosivity, reactivity, or toxicity characteristic as defined in 40 CFR Part 261, Subpart C; and remove and/or decontaminate the soil and groundwater protective concentration level exceedance zones, other environmental media, and non-hazardous waste to achieve concentration levels protective for human and ecological receptors. Remedy Standard A must result in *permanent* risk reduction at an affected property. The person may not use physical controls under Remedy Standard A; as such, persons must remediate the site to the critical protective concentration levels. The remedial method could include the use of monitored natural attenuation. Remedy Standard A uses only exposure pathways where the human or ecological receptor comes into contact with COC directly within, above, or below a source and does not allow the point of exposure to be assumed to be at a location outside of the source area (other than to ensure that an off-site resident on residential property is protected when the receptor is assumed to be a commercial/industrial worker). The adopted rule allows self-implementation for Remedy Standard A under §350.32(d). To self-implement, the person must submit a Self-Implementation Notice at least ten days prior to conducting a response action to notify the executive director and the agency's office in the region where the affected property is located, and then submit a Response Action Completion Report when the remedy has been completed that demonstrates that all the requirements of Standard A have been attained. If a person chooses not to self-implement, the person must submit a Response Action Plan for review and approval by the executive director and then submit a Response Action Completion Report when the remedy has been completed. Technical impracticability demonstrations may not be used under Remedy Standard A, and the person must prevent COC above the critical groundwater protective concentration levels from migrating beyond the existing extent. There are no post-response action care or financial assurance requirements for Remedy Standard A response actions, provided the person adequately documents attainment of the Standard A remedy requirements. When considered warranted, the executive director may require the person to monitor environmental media to verify the models used under a Tier 2 or Tier 3 evaluation of protective concentration levels.

The rule is adopted with minimal amendment, except to replace the word "soil" with "subsurface soil and subsurface soil" to be more exact in §350.32(a)(3) and (b)(2), and to add clarifying language in §350.32(c) regarding the limited use of lateral transport considerations.

§350.33. Remedy Standard B.

Section 350.33 sets forth the performance standards to meet Remedy Standard B. To attain Remedy Standard B, a person must remove, decontaminate, and/or control the affected environmental media, and hazardous and non-hazardous waste such that human or ecological receptors will not be exposed to concentrations of COC in excess of protective concentration levels. Because the TRRP requires the protection of the environment in addition to protection of people, it is possible that concentrations of COC at an affected property may be protective of human health but not certain ecological receptors. There is also the possibility that a response action to address minimal threats to human health may have a significant and highly disproportionate effect on ecological receptors. In these instances, the rule provides two options. The first option requires persons to perform a response action to achieve the ecological protective concentration level as they would perform a response action to achieve human health protective concentrations. The second option, subject to approval on a site-specific basis by the executive director and after consultation with the Natural Resource Trustees, is the use of an ecological services analysis to consider the present and predicted ecological services of the affected property as well as the beneficial and/or detrimental effects on services associated with potential response actions to address residual ecological risk. The ecological services analysis may include a plan to provide compensatory ecological restoration that may also be combined with some type of active response action (e.g., hot spot removal) or

passive response action (e.g., monitored natural attenuation) for the affected property. The ecological services analysis serves as a basis for determining the degree of compensatory ecological restoration that may be warranted and provides scientific justification for leaving COC in place above ecologically-protective concentration levels. These considerations may be a factor in the selection of Remedy Standard A or B, because they may have costs.

Under this rule, the person must demonstrate to the satisfaction of the executive director that the response action that they propose to use, including monitored natural attenuation, will attain the Standard B remedy requirements within a reasonable time frame given the particular circumstances of an affected property. Due to the complex nature of the response actions used to attain Remedy Standard B, Remedy Standard B is not be a self-implementing standard. Persons must submit a Response Action Plan for review and approval by the executive director before commencing response actions with the exception of interim measures, investigation, or emergency action.

Persons conducting a Remedy Standard B response action to address affected soils may use: (1) removal and/or decontamination; (2) removal and/or decontamination with institutional or physical controls; or (3) use of physical and/or institutional controls only to achieve soil response objectives. Persons choosing removal and/or decontamination without the use of controls should not have to rely upon post-response action care and are not required to provide financial assurance. A person employing the use of physical and/or institutional controls must meet other requirements in addition to fulfilling the post-response action care obligations described in the approved Response Action Plan. First, the person must demonstrate that any physical control or combination of measures adopted to be used (e.g., waste control unit, cap, slurry wall, treatment that does not attain decontamination, or a landfill) will reliably contain COC from the affected surface and subsurface soil zone over time. Second, financial assurance is required to assure post-response action maintenance of physical controls.

Under Remedy Standard B for class 1, 2, and 3 groundwater, the person may shall: (1) use either an active restoration approach or monitored natural attenuation to reduce the concentration of COC to the critical groundwater protective concentration levels; (2) while achieving the first objective, prevent COC at concentrations above the critical groundwater protective concentration levels from migrating beyond the existing boundary of the affected groundwater; (3) remove non-aqueous phase liquids to the maximum extent practicable (certain exceptions apply); (4) prevent COC from migrating to air at concentrations above the protective concentration levels for air; (5) prevent COC from migrating to surface water at concentration levels above the protective concentration levels for groundwater discharges to surface water; and (6) prevent human and ecological receptor exposure to the affected groundwater. A person must achieve these groundwater response objectives, unless the person demonstrates that an affected property meets the qualifying criteria for use of one, or a combination, of waste control units to exclude the groundwater beneath the waste control units as a point of exposure, technical impracticability demonstrations, and plume management zones. The use of waste control units and plume management zones requires institutional controls and post-response action care obligations to be fulfilled as described in the approved Response Action Plan. Also, financial assurance is required if physical controls are used.

To be able to use waste control unit, the person must give notice in the Response Action Plan and receive executive director approval. The commission emphasizes that beyond the perimeter of the engineered waste control unit, the groundwater response objectives must be met. A person may submit a technical impracticability demonstration for executive director approval when it is not possible to cleanup class 1, 2 or 3 groundwater to protective concentration levels.

To use technical impracticability, the person must demonstrate that reducing concentrations of COC to the critical protective concentrations within a reasonable time frame is not feasible from an engineering perspective using currently available remediation technologies. If the technical impracticability is approved by the executive director, then the person may establish a plume management zone, and must then meet the

requirements for a plume management zone, except that the point of exposure cannot be set beyond the existing health-based limits of the COC in the groundwater. The benefit of a technical impracticability demonstration is that the person is allowed to establish a plume management zone when one would not otherwise be authorized.

A technical impracticability demonstration is not always required to establish a plume management zone. Plume management zones may be established for affected class 2 and 3 groundwater when with executive director concurrence that the plume management zone can be maintained in a protective manner over time and that exposure to the COC in the groundwater can be prevented.

As stated earlier, the default post-response action care period is 30 years and begins upon approval of the Response Action Completion Report. On a case-by-case basis, the executive director may consider reducing the 30-year period if the person demonstrates that a shorter period will be appropriate. The type, method, and extent of post-response action care will be a function of the long-term effectiveness of the response action, the nature and design of any physical controls, the physical and chemical characteristics of the COC, the geology and hydrogeology of the affected property, and the adjacent land use. The post-response action care period is considered complete when the person demonstrates that a threat to human health or the environment no longer exists. If this demonstration cannot be made during the 30-year period, a person will be required to continue post-response action care for additional 30-year periods until the demonstration is made. The adopted rule presents detailed criteria for determining when post-response action care may be discontinued. If the person submits a demonstration that documents that post-response action care is no longer necessary, then upon written approval by the executive director the remainder of the post-response action care period will be canceled and the financial assurance will be returned to the person. In addition to standard recordkeeping requirements, persons must submit Post-Response Action Care Reports in accordance with the approved Response Action Plan and must notify the executive director in writing within 30 days after an unexpected event occurs, or a condition is detected, which indicates that additional response actions will be required.

The financial assurance covers the cost of a third party to operate and maintain all physical controls during the post-response action care period. The commission is aware that this is a new requirement for many sites; however, the commission is concerned that the State of Texas, and thus the taxpayers of Texas, could incur operation and maintenance costs without this financial assurance provision. Sites in programs where existing federal and state financial assurance requirements exist (i.e., permitted MSW landfills, hazardous waste facilities) must still meet the financial assurance requirements of the specific programs. The person must prepare and include in the Response Action Plan a written cost estimate, in current dollars, of the cost of the post-response action care activities for the entire 30-year post-response action care period. The person must comply with the financial assurance requirements in Chapter 37 of the commission's rules when demonstrating financial assurance for post-response action care.

The commission recognizes that the overall risk regarding annual monitoring and maintenance costs on sites with a 30-year post response action care cost estimate under \$100,000 is low. Accordingly, it has included a provision in the adopted rule that persons may be exempted by the executive director from providing financial assurance if the 30-year post-response action care cost estimate is under \$100,000. The rule allows small businesses the opportunity to demonstrate financial assurance for one third of the 30-year cost estimate during each ten-year period. It is defined as any person, firm, or business which employs, by direct payroll and/or through contract, fewer than 100 full time employees and has net annual receipts of less than \$3 million. Net annual receipts are defined as annual gross receipts less returns, discounts, and adjustments. A business that is a wholly-owned subsidiary of a corporation will not qualify as a small business if the parent organization does not qualify as a small business. To request this option, the owner or authorized officer of a business must demonstrate that it meets the definition of a small business and submit an affidavit stating such. It must notify the agency when the business no longer meets the definition.

The commission significantly amended portions of proposed §350.32. Section 350.33(a)(3)(B) has been amended to require executive director consultation with the Natural Resource Trustees, rather than Natural Resource Trustee approval for the person to conduct an ecological services analysis. The rule revision makes it clear that the executive director provides or denies approval for the completion of an ecological services analysis. The commission has deleted the NAPL provisions of §350.33(f)(1)(C) from the rule as they were extraneous, and has redesigned subparagraphs (D)-(F) as (C)-(E), respectively. The commission also made clarifying changes regarding the relationship between the use of technical impracticability and plume management zones in §350.33(f)(3). Further, amendments were made to §350.33(f)(4)(E) to clarify commission expectations regarding the recovery of Nonaqueous phase liquids (NAPLs) which are present in a plume management zone. The commission has also amended the rule to conform with the expanded definition of institutional control and corrected topographical errors and made minor editorial changes to the section.

§350.34. No Further Action.

Section 350.34 states that individual agency programs will confirm by letter when a person has completed all necessary response actions and that no further action is required. For Remedy Standard A, such confirmation will be issued after approval of the Response Action Completion Report by the executive director, and, if the response action is protective only for commercial/industrial use, receipt by the agency of proof of an institutional control. For Remedy Standard B, the agency programs will issue a conditional No Further Action letter upon approval of the Response Action Completion Report and the receipt of proof of the required institutional control. Upon termination of the post-response action care period by the executive director, a final No Further Action letter will be issued. The conditional letter is intended to acknowledge that response actions have been completed. This should address concerns that waiting to issue a No Further Action letter upon completion of the post-response action care period will disrupt land transactions and cause undue concern. The commission, though, cannot issue a final No Further Action until post-response action care is complete. Of course, if post-response action care is not necessary at site, then a final No Further Action letter would be issued instead of a conditional No Further Action letter.

Section 350.34 was amended to add a provision authorizing the implementation programs to issue additional letters acknowledging conditional or partial completion ("conditional closure") of response actions.

§350.35. Substantial Change in Circumstances.

Adopted §350.35 addresses changes following completion of a response action that necessitate additional response actions. The section applies to changes undertaken by persons such as changes in land use and "unplanned" conditions which might arise because of new information. The adopted section states that no person shall cause, suffer, allow, or permit a threat to human health or the environment by changing a land use following a response action from commercial/industrial to residential or by removing, altering or failing to maintain a physical or institutional control. A person planning to change land use or modify a control must notify the agency at least 60 days prior to the planned activity, and must follow-up with a reevaluation of the property at least 30 days prior to the planned change of land use. In §350.35(d), four "unplanned" changes are listed: (1) the failure of an institutional or physical control to prevent exposure at the required levels; (2) an actual exposure to unprotective concentration levels is occurring; (3) new information indicates that the affected property was not sufficiently characterized; or (4) the exposure area changes. The section clarifies that a change in numeric cleanup levels or a change in the procedures to calculate those levels does not constitute a substantial change in circumstances unless these changes are of such magnitude to present an unacceptable threat to human health or the environment.

The commission adopted amendments to §350.35 containing a conforming rule change with §350.2. The commission also adopted amendments to §350.35(c) which clarified actions the person can take to respond

to substantial changes in circumstances. Also, §350.35(d) and (e) were amended to clarify that leaking PST (LPST) cases closed under the existing PST rules would not be re-evaluated under the TRRP in the event a substantial change in circumstances occurs. Rather, such LPST cases would continue to be re-evaluated under the existing PST rule. The commission has also amended the rule to conform with the expanded definition of institutional control and corrected topographical errors and make minor editorial changes to the section.

§350.36. Relocation of Soils Containing Chemicals of Concern for Reuse Purposes.

Section 350.36 sets forth standards for soil reuse and affects the relocation of soils at affected properties when the soil contains COC at concentrations above naturally-occurring background concentrations. Additional requirements and restrictions may exist within specific program areas such as the PST and the Industrial and Hazardous Waste program. The commission has included this subsection in the adopted rule because soils containing COC still have a value as a resource and can be used for beneficial purposes. The state has limited landfill capacity and exhausting that capacity with soils which can be effectively used elsewhere is not sound policy. Additionally, use of pristine soils for purposes that could be just as adequately and safely completed with chemical of concern-containing soils (e.g., in asphalt mix, beneath concrete structures or roadways) is not necessarily the best use of limited natural resources. The PST program has had success with a soil reuse program, and, as a consequence, has managed to redirect petroleum-contaminated soils destined for landfilling to beneficial uses such as beneath parking lots and roadways. At the same time, these provisions set up a process for the reuse of soils in a manner which is fully protective of human health and the environment.

Excavated soils containing non-aqueous phase liquids must be treated prior to relocation or managed as solid wastes. The commission notes, though, that excavation of contaminated soils during construction activities (e.g., installation, repair, removal of telephone lines or other utilities, or other construction activities) and the subsequent replacement of those soils back into that same excavation is not considered relocation or reuse in regard to the applicability of this chapter. Therefore such activities are not subject to the requirements of this section.

Soils to be relocated must meet either of the Remedy Standards and, depending on the designated land use, must be protective of human and ecological receptors. In other words, soils intended for reuse at commercial/industrial properties must meet commercial/industrial protective concentration levels, and, if reused under Remedy Standard A, must meet the performance requirement for Remedy Standard A response actions established in §350.32(a). If controls are necessary to prevent exposure, then the soil relocation must meet the same requirements as Remedy Standard B response actions, possibly including post-response action care and financial assurance. Soil reuse under Remedy Standards A and B may also require the filing of an institutional control.

For soil reuse that meets Remedy Standard A requirements, the commission is proposing to not require prior approval for the relocation if it is within the boundaries of the property containing the affected area; however, reuse under Remedy Standard B will require the prior approval of the executive director wherever the relocation occurs.

If soils that contain concentrations of COC above naturally-occurring background levels resulting from an unauthorized releases are to be relocated for reuse on property not owned by the person, then the person must obtain the written consent of the landowner prior to relocation of the soils.

Section 350.36(b)(4) and (c)(4) were amended to conform with the expanded definition of institutional control and rule format requirements.

§350.37. Human Health Points of Exposure.

Adopted §350.37 sets forth the prescribed on-site and off-site human health points of exposure to environmental media under Remedy Standards A and B. The points of exposure are the locations where human receptors are reasonably likely to come into contact with chemicals of concern. Establishing the points of exposure in the rule is integral to the adoption of a consistent, performance-oriented, RBCA rule and will ensure that risks are adequately assessed and identified. Within each environmental medium, the rule prescribes on-site and off-site points of exposure. For both on-site and off-site exposures, persons must use the appropriate receptor for residential or commercial/industrial land use (i.e., a commercial/industrial site worker cannot be considered the receptor if addressing contamination at a residential site). The rule allows the consideration of competent existing physical controls during pathway analysis; however, the existence of a physical control does not negate or supercede the prescribed points of exposure. To establish on-site or off-site points of exposure for commercial/industrial land use, or alternate points of exposure for on-site or off-site properties, the person must comply with the adopted institutional control provisions in §350.111 which require the landowner's written approval for the placement of an institutional control on the property deed record, unless an equivalent zoning or governmental ordinance is in effect for the subject property.

The rule establishes on-site and off-site human health points of exposure for air, soil, class 1, 2, and 3 groundwater, surface water, and sediment. The adopted rule language presents a description of each point of exposure.

With the exception of groundwater, alternate points of exposure are not allowed. For example, the on-site point of exposure for soil is throughout surface soil. For residential properties, surface soil is from the ground surface to a depth of 15 feet or to the top of the upper-most groundwater-bearing unit, whichever is less in depth. For commercial/industrial land use, surface soil is from the ground surface to a depth of five feet or to the top of the upper-most groundwater-bearing unit, whichever is less in depth. A person cannot move the on-site point of exposure to outside the soil zone.

Consistent with the groundwater response objectives discussed previously in the overview of Remedy Standard B, §350.33 which allow plume management zones to be used, this section establishes alternate points of exposure for groundwater which control how big the plume management zone can be. Whenever there is affected groundwater beneath a waste control unit, the person may, with the executive director's approval, exclude the area underlying the waste control unit as a point of exposure to groundwater. Also, as discussed earlier, plume management zones are allowed for class 2 and class 3 groundwater. The point of exposure may be moved to the down gradient boundary of the plume management zone. There are several restrictions on the use of plume management zones. They may not be established for class 1 groundwater or under Remedy Standard A because the commission considers class 1 groundwater to be a critical groundwater deserving of a pollution cleanup approach.

Nor may they be established in uncontaminated class 2 or 3 groundwaters because the commission considers a pollution prevention approach to be appropriate for those uncontaminated groundwaters.

Adopted §350.37(l) contains detailed requirements for the location of groundwater points of exposure which defines the plume management zone. The plume management zone includes the existing affected groundwater plus an additional allowable distance. The additional allowable distance is the lesser of several criteria, but in no case is greater than an additional 500 feet for class 2 groundwater. To preserve important reserves of groundwater, the person must not allow a plume management zone to extend onto off-site property with class 2 groundwater that does not currently contain the contaminated residential-based groundwater plume, unless the person can demonstrate to the satisfaction of the executive director that the existing quality of class 2 groundwater, considering non-point sources of COC and their cumulative impact on the groundwater quality, or the proximity and the withdrawal rates of groundwater users indicates that the groundwater-bearing unit has no reasonably anticipated beneficial use. More flexibility is provided for class 2 groundwater subject to an equivalent zoning or governmental ordinance

prohibiting groundwater use, and for class 3 groundwater regarding how large a plume management zone can be.

Section 350.37 was adopted with some amendments to §350.37(1)(3)(C) and (4) that expand on the proposed rule language to conform with the amended definition of institutional control. The rule was also amended in §350.37(i) to clarify that the point of exposure for groundwater discharges to surface water is in the groundwater at the discharge zone.

SUBCHAPTER C - AFFECTED PROPERTY ASSESSMENT.

Subchapter C consists of §§350.51-350.55 and details the requirements necessary to assess the affected property including the classification of groundwater and land use. In addition, the subchapter provides performance-based standards for quality assurance/quality control of data and notification requirements.

§350.51. Affected Property Assessment.

Under adopted §350.51, persons are required to conduct an affected property assessment in a manner appropriate for the affected property. Other common, and possibly more familiar, terms for “affected property assessment” are site investigations and site assessments. The goal of the assessment is to define the vertical and horizontal extent of contamination. The assessment must be designed to collect information necessary to support notification of affected landowners, to determine whether or not water resources have been affected or are threatened, and to facilitate remedy selection. In addition, the assessment may also evaluate the effectiveness of existing physical controls. When existing physical controls will be used as part of the response action as discussed previously, the health-based assessment may be conducted such that the primary focus is placed beyond the areal limits of the existing physical control. However, some investigation may be necessary to evaluate threats to underlying groundwater within the physical control. Additionally, adequate information must be available to evaluate the exposure pathway and protective concentration level development for the physical control adequacy to be evaluated. This matter is further discussed in relation to adopted §350.71(d). Results of the assessment must be documented in an Affected Property Assessment Report.

Persons are required to investigate vertically and laterally the affected environmental media to the applicable concentration level as specified in subsections (b) - (e). The assessment level, which is used in several instances, is the lowest of the critical Tier 1 human health protective concentration level and the protective concentration level for the soil-to-groundwater exposure pathway that may be established under Tier 1, 2 or 3. The assessment level may also include ecological protective concentration levels when necessary. The commission has based the assessment level within each environmental medium on the Tier 1 human health protective concentrations to facilitate a consistent process of notification to owners of affected land. Allowing persons to base the soil-to-groundwater levels on Tier 1, 2, or 3 evaluations recognizes the great variability of soil and groundwater conditions across the state. Additionally, because this evaluation is not a direct health-based evaluation, it does not compromise the goal of consistent health-based notification to landowners. In some cases, background concentrations will be above the Tier 1 protective concentrations in which case the background concentration becomes the assessment level. There are two exceptions to the requirement to conduct the investigation to the assessment level. First, for on-site soil investigations, a person may limit investigation to the critical Tier 1, 2, or 3 protective concentration level. However, the person is still required to conduct any necessary soil investigation off-site to the residential assessment level. The commission expects the flexibility provided for on-site soil investigations to reduce the cost and time of investigations because the on-site area of investigation at many sites will be reduced. In practice, persons may take samples at the property boundary to determine if off-site concentrations are above the residential assessment levels. Additionally, this can be accomplished without compromising the commission’s goal of consistent landowner notification. On-site receptors will still be protected because the assessment is to the appropriate cleanup level (residential or commercial/industrial),

and off-site receptors will be protected because the investigation must continue off-site to the residential-based assessment level. Second, the vertical soil investigation is to the higher of the method quantitation limit (i.e., laboratory analytical testing limits) or background concentrations, unless an adequate groundwater assessment has been conducted. If an adequate groundwater assessment has been conducted, then the person can investigate soils vertically to the protective concentration level determine under any of the three tiers to be protective of groundwater. The vertical soil investigation may continue past the uppermost groundwater bearing unit on a site-specific basis. The commission intends that the horizontal and vertical extent of assessments be routinely conducted as described in this paragraph. However, the adopted rule provides that the executive director may require investigation to beyond these assessment levels when necessary to ensure receptors are not threatened or to verify the appropriate groundwater classification. For example, the executive director may require the additional assessment to verify classification of a class 3 groundwater due to the presence of water wells nearby in the downgradient direction.

As part of the affected property assessment, the person shall conduct a field survey to locate potential receptors, including water wells and surface waters to at least 500 feet beyond the boundary of the affected property and a records survey to identify all water wells and surface water bodies within 1/2 mile of the limits of groundwater plume. Also, the person must attempt to identify any off-site properties within 1/4 mile of the affected property concerning the availability of environmental information (e.g., soil boring logs, analytical results from samples of environmental media, etc.) that may be useful for the affected property assessment.

Section 350.51(l)-(m) concern determination of concentration of chemicals of concern. Persons may use statistical methods to determine representative concentrations of chemicals of concern. The rule sets general performance standards for the use of statistics rather than prescriptive requirements. This allows for appropriate site-specific considerations. If statistical or geostatistical methods are used, then persons are to use appropriate statistical methods based upon the suitability of the data and an appropriate number of samples. Judgmental sampling may be used as long as it can be demonstrated that the resulting estimated representative concentration is not biased low. The soil exposure area for residential properties must not exceed 1/8 acre or the size of the front or back yard of the existing affected residential lot, unless it is demonstrated that a larger area, not to exceed 1/2 acre, is appropriate. The soil default exposure area for commercial/industrial properties is 1/2 acre but persons are provided the flexibility to use site-specific activity patterns to demonstrate that a larger area is appropriate. If an area larger than 1/8 acre for residential properties or 1/2 acre for commercial/industrial properties is assumed, then this shall be noted through the filing of an institutional control.

The contains provisions to define and address “hot spots.” Hot spots may require a separate evaluation based on the distribution of COC and the information on exposure conditions.

The commission has adopted the Texas-specific median background concentrations for metals. Persons may compare their site concentrations with the background Texas-specific median background concentrations. If the site concentration of a chemical of concern is below the median background concentration for that chemical, then the person can assume that the site concentration is “below” background for purposes of the TRRP rule. Otherwise, the person can always determine background on a site-specific basis.

The adopted rule was amended from the proposal in several notable instances. Section 350.51(b) has been amended to more directly tie soil and groundwater assessments to residential assessment levels, but has provided more site-specificity in the determination of sufficient assessment of COCs in other environmental media. Section 350.51(c) has been amended to clarify the requirements for on-site and off-site soils assessments. Section 350.51(c)(1) has been amended to provide additional flexibility to demonstrate that sufficient characterization of the vertical extent of COC in the soils have been assessed. Section 350.51(l)(3) was modified to allow consideration of larger than 1/2 acre exposure areas for some

residential areas (e.g., parks, hospitals). In addition, persons may be able to make demonstrations that institutional controls are not necessary if the contamination is relatively homogeneous over an area larger than the residential default size. In §350.51(1)(5), the commission has removed the reference to risk levels or hazard quotients and has adopted more performance criteria by which to judge the need to evaluate hot spots.

§350.52. Groundwater Resource Classification.

Adopted §350.52 sets forth the groundwater resource classification system under the TRRP. The section establishes explicit performance standards for defining groundwater as class 1, class 2, or class 3 groundwater resources. Each groundwater-bearing unit that contains COC at concentrations equal to or greater than the residential groundwater assessment level must be classified. If a groundwater-bearing unit meets the criteria for more than one of the classifications, then, generally, the person must assign the higher quality classification of the two classifications (e.g., if a groundwater-bearing unit contains groundwater described by the definitions for both class 1 and class 3, it will be classified as class 1). To be considered a class 1 primary groundwater resource, the groundwater-bearing unit must meet one of the following conditions: (1) a groundwater-bearing unit which contains chemical of concern concentrations above the residential assessment level within 1/2 mile of an existing well used to supply drinking water to a public water system and the COC are likely to migrate to the groundwater production zone; (2) a groundwater-bearing unit is the only reliable source of water, is not more than 800 feet below the land surface, has a total dissolved solids (TDS) content of less than 1,000 milligrams per liter (mg/l), and has a sustainable rate greater than 5,000 gallons per day (gpd) to a well with a four inch diameter casing; or (3) a groundwater-bearing unit has a TDS content of 3,000 mg/l, a sustainable rate greater than or equal to 144,000 gpd to a well with a 12 inch diameter casing, and the natural quality meets all primary drinking water standards as defined in 40 CFR Part 141. Class 2 groundwater resources include: (1) any groundwater-bearing unit which is a groundwater production zone for an existing well located within 1/2 mile of the affected property and which is used to supply groundwater for human consumption, agricultural purposes or any purpose that could result in exposure to human or ecological receptors; or (2) any groundwater-bearing unit with a naturally occurring TDS content of less than 10,000 mg/l and which is capable of producing groundwater at a sustainable rate greater than 150 gpd to a well with a four inch diameter casing. A class 3 groundwater resource includes any groundwater-bearing unit that produces water with a naturally occurring TDS content of greater than 10,000 mg/l or at a sustainable rate less than 150 gpd to a well with a four inch diameter casing. The commission selected 150 gpd criteria as it is based on the average daily water use of a family of three and is, therefore, a reasonably conservative production criteria that should satisfy most minimum domestic water uses.

The commission adopted amendments to §350.52(1)(B) and (C), (2)(B), and (3) altering the text to allow equivalency to the well size specified by use of different size wells. Changes have also been made to better reflect the vulnerability of particular groundwater resources.

§350.53. Land Use Classification.

Section 350.53 requires persons to determine the current land use of the affected properties. The rule sets forth two types of land use: residential and commercial/industrial. Definitions for residential land use and commercial/industrial land use are included in §350.4. Residential land use is property used for dwellings such as single family houses and multi-family apartments, children's homes, nursing homes, and residential portions of government-owned lands (local, state, or federal). Because of the similarity of exposure potential and the sensitive nature of the potentially exposed population, day care facilities, educational facilities, hospitals, and parks (local, state, or federal) will also be considered residential. Commercial/industrial land use is essentially any land use not defined as residential and must be reinforced with an institutional control. Therefore, land use classification is dependent on two factors: conformance

of the affected property with residential and commercial/industrial land use definitions, and the willingness of the landowner to consent to an institutional control for commercial/industrial land use.

To illustrate how these two factors would work, two examples are provided. If a property is currently used as a commercial/industrial property, but the landowner will not consent to the deed notice or restrictive covenant and zoning or a governmental ordinance which is equivalent to the deed notice or restrictive covenant is not present, then the land use is residential for the purpose of this rule. If a person claims commercial/industrial land use, but someone is living at the property (or other such residential use) at the time a Response Action Plan or a Response Action Completion Report is submitted to the agency, the agency will not concur with commercial/industrial land use.

If land use changes during the remedial process, the final response action must be protective of the new use. If off-site property or leased affected property is determined to be commercial/industrial, the person must provide written landowner concurrence for the associated deed notice or restrictive covenant required to assure that commercial/industrial use continues, unless equivalent zoning or governmental ordinances already exists or will be implemented.

The commission adopted amendments to §350.53 to reference §350.111, to make certain persons are aware of the requirements in this section when making land use determinations and removes any specifics as to the timing of the land use determination relative to the affected property assessment. Further, the rule was amended to conform with the expanded definition of institutional control.

§350.54. Data Acquisition and Reporting Requirements.

Adopted §350.54 sets forth requirements for quality assurance/quality control of data submitted to the agency. The adopted rule establishes a set of performance standards that must be met by persons in the program. Because the section outlines these standards, it is not necessary for this preamble to repeat them. The commission would like to emphasize two key points though. Under §350.54(d), it is the responsibility of the person submitting the data to ensure that the laboratory performing the analysis has an adequate and documented quality assurance program in place that is consistent with the International Organization of Standardization “Guide 25: General Requirements for the Competence of Calibration and Testing Laboratories ” or the National Environmental Laboratory Accreditation Program. Under §350.54(h), the person is responsible for having all documentation readily available to demonstrate that the sample integrity has not been compromised and that an appropriate analytical method has been used. In addition, the persons must provide all information reasonably requested by the executive director.

Section 350.54(b) was amended to make the use of data quality objectives a recommendation rather than a requirement. Section 350.54(d)(2) was amended to expand the National Environmental Laboratory Accreditation Program to all of the quality systems outlined, instead of just those outlined in Chapter 5. Section 350.54(e)(3) was amended to clarify that there may be different method sensitivity requirements for COC before and after analysis under §350.71(k). Section 350.54(e)(4) has been amended to revise the requirements for method detection limit studies.

§350.55. Notification Requirements.

Adopted §350.55 requires persons to make environmental sampling data available to the owners of the property where the samples are collected. Persons are also required to notify owners and leaseholders when there are ecological concerns and site concentrations exceed ecological protective concentration levels.

The rule has been amended to only require notice to easement holders or franchisees when analytical results of any samples collected from an area within an easement/franchise exceed Tier 1 human health protective concentration levels (PCLs) (i.e., not ^{GW}Soil). Also, tenants will now receive notice when there is an actual

or probable human exposure to a chemical of concern at a concentration which exceeds the Tier 1 human health PCL, not any time there is an environmental sample collected on property for which they have a lease.

At a minimum, the information made available shall include the analytical results from the sampling along with the critical Tier 1, 2, or 3 human health protective concentration levels (i.e., the cleanup levels) for the applicable land use. If ecological protective concentration levels are developed, the person must make them available also. The information must be made available upon submission of a plan or report to the executive director. In addition, any other information submitted to the executive director regarding their property must be made available to property owners. Within 30 calendar days of the date the notices are due to the parties, persons are required to certify to the executive director that the parties were notified and identify and persons notified directly. If a property owner, leaseholder, or interest holder (e.g., easement holder) requests the information, the person must deliver the information within 14 calendar days after the date of receipt of the request. The rule does not prescribe a form for providing the notice, but the commission will have an example notice available in guidance.

In some instances, a person may discover that an actual exposure exists that presents a threat to human health. In these instances, notice is required under §350.55(d) as soon as possible but not later than 60 calendar days after receipt of the laboratory analysis. Those noticed must include the property owner, those actually or probably exposed, and the executive director. The commission understands that sometimes it is difficult to ensure that everyone required to be contacted has been contacted; therefore, the commission has increased time to do this from the time allotted in the May 15, 1998, proposal of the rule. However, the commission emphasizes that notice for probable or actual exposures is as soon as possible. Every attempt should be made to provide notification immediately upon receipt of the laboratory analysis. If exposure conditions which did not initially exist later develop, then these same notification provisions apply at that point in time.

Section 350.55 was substantially revised in response to public comment. Section 350.55(a) and (b) have been revised to require a notice of availability of information to be provided to the landowner, and to easement holders/franchisees when COC in the easement/franchisee areas exceed Tier 1 human health PCLs. Section 350.55(e) has been amended to require notice to tenants and other parties who are actually or probably exposed to chemicals or concern in excess of Tier 1 human health PCLs. However, the person may provide the actual critical PCLs. The rule has also been amended to allow persons to use legible signs to provide notice where it is appropriate to do so. Also, §350.55(d) and (e) have been amended to allow the person to provide a notarized certification that all required parties have been provided notice in conformance with the rule.

SUBCHAPTER D - DEVELOPMENT OF PROTECTIVE CONCENTRATION LEVELS

Subchapter D contains §§350.71-350.79.

The subchapter establishes the procedures for calculating protective concentration levels for COC at affected properties. In effect, the protective concentration levels are the cleanup levels at a site. Two three-tiered processes are provided to establish human health and ecological protective concentration levels, Tier 1, 2 and 3, for human health evaluations and Tier 1, 2, and 3 for ecological evaluations. Protectiveness benchmarks and exposure pathways for human health are defined in the subchapter. In addition, requirements for ecological risk assessments are also presented.

§350.71 General Requirements

Section 350.71 requires persons to develop protective concentration levels for each chemical of concern for the complete and reasonably anticipated to be completed ecological and human health exposure pathways.

The individual human health exposure pathways are set out in this section are: (1) ingestion of COC in class 1 or 2 groundwater; (2) ingestion of COC in class 3 groundwater (for management of groundwater); (3) inhalation of volatile emissions in outdoor air from COC in groundwater and saturated zones; (4) combined inhalation of volatile emissions and particulates from COC in surface soil, dermal contact with COC in surface soil, ingestion of COC in surface soil, and for affected residential properties, ingestion of above and below-ground vegetables grown in surface soils containing chemicals of concern; (5) leaching of COC in surface and subsurface soils to groundwater; (6) inhalation of volatile emissions from COC in subsurface soils; (7) contact with surface water or sediment containing COC originating from the source area, and (8) other complete or reasonably anticipated to be completed exposure pathways. In the discussion of each human health exposure pathway, the rule clarifies when the pathway should be considered complete or reasonably anticipated to be completed. The commission's goal in establishing the evaluation of specific exposure pathways in the rule is to ensure a consistent approach in the evaluation of exposure pathways and to properly assess the risk associated with contaminated media. Persons are not required to combine exposure pathways across source media (e.g., soil and groundwater) unless directed by the executive director to address situations where receptors are simultaneously exposed to COC present in multiple source media. When establishing protective concentration levels for on-site commercial/industrial land use, off-site residents must also be protected. Ecological risk assessment is addressed in §350.77. The commission recognizes in §350.71(d) that physical controls can limit exposure. Therefore, the adopted rule states that the presence of a competent existing physical control may be used to show that the exposure pathway is incomplete for the area covered by the control. However, if a person chooses to use a physical control in the pathway analysis, the person must meet the requirements of Remedy Standard B including providing proof of an institutional control noting the use of the physical control. As part of a remedy, the adequacy of the physical control must be demonstrated. To make the demonstration, exposure pathways and protective concentration levels must still be evaluated for the physical control area. In this regard, although the pathway is not specifically "screened out," the contamination is already effectively remediated, and, this control is carried into the formal remedy for the site.

Section 350.71(k) describes the conditions when the development of a PCL for COC is not warranted. In these instances the person is not required to develop protective concentration levels for those chemicals of concern. For example, if the chemical of concern is a common laboratory contaminant it may be screened out in certain situations, or if the chemical of concern is below the Texas-Specific median background levels, protective concentration levels are not required to be developed. The adopted rule does not determine which COC must be initially investigated at a site, but once these COC are identified, the adopted rule provides a mechanism to screen out COC that contribute insignificantly to exposure at the site.

The adopted amendments to §350.71 include providing a short explanation of the PCL calculation and application process. This section has also been modified with respect to the provisions for evaluating vapor inhalation pathways to make it more performance-based and in order to give sufficient clarity as to what types of evaluations can be conducted. Specifically, the commission amended the rule to reference the use of appropriate vapor monitoring data or other technically appropriate methods, which could include other vapor emission models. The rule was amended to direct persons to first determine if the sediment exposure pathway is completed or reasonably anticipated to be completed rather than to automatically assume it is complete or will be complete. Subsection (k) was substantially revised to improve the risk-based screen used to determine which COCs must have PCLs established. The amended rule is more performance based and places more emphasis on site conditions as part of the risk-based screening consideration.

§350.72. Carcinogenic Risk Levels and Hazard Indices for Human Health Exposure Pathways.

Adopted §350.72 sets forth the risk levels for carcinogens (i.e., cancer causing substances) and the hazard quotient/hazard indices for noncarcinogens. The commission believes that use of a clear, single protectiveness benchmark will benefit public health and the environment by avoiding confusion and

controversy over the level of protection on which the cleanup levels should be based. Therefore, the commission adopts a carcinogenic risk level of one in 100,000 (1×10^{-5} in scientific nomenclature) for individual carcinogens and a cumulative risk level of one in 10,000 (1×10^{-4}) for multiple carcinogens. For noncarcinogens, the rule sets forth a hazard quotient of one for individual noncarcinogens and a hazard index of ten for multiple noncarcinogens.

It is important to note that if multiple carcinogens or noncarcinogens are present, the individual risk level for each carcinogen or hazard quotient for each noncarcinogen can never exceed one in 100,000 or one, respectively. Therefore, individual risk levels and hazard quotients cannot be upwardly adjusted to meet the cumulative risk levels. Taking carcinogens as an example, when ten or more carcinogens are present at their one in 100,000-based protective concentrations, the allowable one in 10,000 cumulative risk level would be reached. If there are more than ten carcinogens, each at their one in 100,000-based protective concentration level, then the protective concentration level for at least one individual carcinogen will have to be downwardly adjusted to a concentration less than the one in 100,000-based value (e.g., one in 1,000,000) so that the cumulative risk of one in 10,000 is not exceeded.

Modifications to the adopted cumulative risk levels are set forth in adopted §350.72(b). Examples include use of predetermined standards such as United States Environmental Protection Agency (EPA's) maximum contaminant levels (MCLs) and the most currently available federal action levels for drinking water, calculation of protective concentration levels for dioxins, and calculation of the protective concentration level for polychlorinated biphenyls (commonly referred to by their initials "PCBs") when the protective concentration is taken from the Toxic Substances Control Act.

§350.73. Determination and Use of Human Toxicity Factors and Chemical Properties.

Adopted §350.73 directs persons to use a hierarchy of sources to determine the chronic toxicity factors including the following two highest ranked sources: the EPA's Integrated Risk Information System (IRIS) and the EPA Health Effects Assessment Summary Tables. Persons shall first consult the Integrated Risk Information System for the relevant chronic human toxicity factor. Persons may utilize the Health Effects Assessment Summary Tables only if the toxicity factor is not available in the Integrated Risk Information System. Likewise, if the toxicity factor is not available in the Health Effects Assessment Summary Tables, then persons must use the EPA National Center for Environmental Assessment (i.e., Superfund Technical Support Center), and so on. The chronic human toxicity factors that are most current as of the submittal date of the Self-Implementation Notice or the Response Action Plan are presumed to be protective of human health and the environment, unless a person rebuts this presumption by published credible authority.

Recognizing that toxicity factors may change during the course of a response action, the commission is addressing such changes in the adopted rule. Under the adopted rule, the executive director may determine, during review of the Response Action Completion Report, that a change in a toxicity factor since the submittal of the Self-Implementation Notice or the Response Action Plan has been of such a magnitude that the protective concentration levels previously developed would not be protective in such cases. The adequacy of the response action must be re-evaluated. Likewise, if the executive director determines at any time that a subsequent change in a toxicity factor is of such a magnitude that the adopted response action is no longer warranted to protect human health and the environment, then a response action based on that previous chronic toxicity factor consideration shall no longer be required. For COC that do not have chronic toxicity factors provided in the listed sources, the executive director will provide toxicity factors.

In circumstances where neither a EPA unit risk factor nor a EPA reference concentration is available, the person must use the TNRCC Chronic Remediation-Specific Effects Screening Level value as the reference concentration in evaluating the inhalation pathway for both residential and commercial/industrial land use. Effects Screening Levels are recognized as protective standards in the agency's air program, and this requirement establishes consistency between the agency's waste and air programs.

The section also specifies the chemical/physical parameter values for each chemical of concern. Persons must use the prescribed parameters to determine the protective concentration levels unless the executive director approves the use of a more scientifically supportable alternative parameter value. Criteria are also provided by which some site-specific information can be used to select an appropriate chemical/physical parameter. The commission has provided these chemical/physical parameters to ensure consistency in the calculation of Tier 1 protective concentrations and to expedite the calculation and regulatory review of protective concentrations.

To add clarity to the commission's intent, §350.73(e) was amended to clarify that leachate tests may be used, that the COC chemical/physical properties may only be adjusted in accordance with paragraphs (1) and (2) of the subsection to be consistent with Figure 30 TAC §350.75(b)(1) as proposed; and to allow persons to recommend chemical/physical properties for COCs not included in the figure for the commission consideration. Additionally, typographical amendments were made to the figure and the rule text.

§350.74. Development of Risk-Based Exposure Limits.

Adopted §350.74 presents the procedures for the development of human health risk-based exposure limits. The section identifies the specific risk-based exposure limit equations to calculate the exposure limits for the completed and reasonably anticipated to be completed exposure pathways. A risk-based exposure limit is the “safe” concentration of a chemical of concern at the point of human contact (e.g., inhalation, ingestion, dermal absorption). Separate risk-based exposure limits are established for human and ecological receptors. For example, when a volatile organic compound is present in subsurface soils, vapors rise to the surface and are released into the air. The point of exposure to air is where a receptor inhales the vapors. The risk-based exposure limit is the concentration of the volatile organic compound in the air that is safe for the receptor to breathe assuming long-term, chronic exposure.

Beginning with the risk-based exposure limit, persons then derive protective concentration levels. Protective concentration levels are the concentration limits of COC in the source media (e.g., soil and groundwater) that will achieve the risk-based exposure limits in the exposure media. Continuing the example, the protective concentration level is the concentration of the volatile organic compound in the subsurface soil that will, based upon cross-media transfer from subsurface soil to the air, achieve the risk-based exposure limit for breathing the volatile organic compound at the point of exposure in air.

The rule requires risk-based exposure limits to be calculated for residential and commercial/industrial land uses for air inhalation, soil dermal contact, soil ingestion, vegetable ingestion (residential only), groundwater ingestion, class 3 groundwater (for groundwater management purposes) and surface water (ingestion, contact, and aquatic life).

The following paragraphs discuss risk-based exposure limits for each pathway identified previously. The exposure limits are defined in terms of the on-site, off-site, and alternate points of exposure presented in adopted §350.37 for residential and commercial/industrial properties.

Air inhalation. The air inhalation pathway is the protective concentration in air at the point of exposure for human inhalation (i.e., two meters). The person may use occupational inhalation criteria as the risk-based exposure limit for the inhalation pathway at affected commercial/industrial properties provided there is a health and safety plan in place and when that action is deed noticed.

Soil dermal contact. The soil dermal contact risk-based exposure limit is the protective concentration of a chemical of concern in soil based upon direct dermal contact to soil by humans.

Soil ingestion. The soil ingestion risk-based exposure limit is the protective concentration of a chemical of concern at the point of exposure in soil based upon human ingestion.

Vegetable ingestion. The vegetable ingestion risk-based exposure limits are the protective concentrations of chemicals of concerns in aboveground vegetables and below-ground vegetables for ingestion by residents.

Groundwater ingestion. The groundwater ingestion risk-based exposure limit is the concentration of a chemical of concern in class 1 and 2 groundwater that is safe for human ingestion. For the groundwater ingestion risk-based exposure limit, the person shall use the federal primary maximum contaminant levels, commonly referred to by their acronym "MCLs," or the most currently available federal action level for drinking water as the risk-based exposure limit when available for the chemical of concern. When available, the contaminant-specific secondary federal MCL shall be used as the risk-based exposure limit when the COC are present in class 1 groundwater and for class 2 groundwater under certain circumstances specified in the adopted rule. A risk-based exposure limit for ingestion is set only for class 1 and 2 groundwater since class 3 groundwater is presumed to be an undrinkable groundwater.

Class 3 groundwater. The class 3 groundwater risk-based exposure limit is set at a factor of 100 times the risk-based exposure limit established for class 1 and 2 groundwaters. The risk-based exposure limit is set primarily for purposes of managing the affected class 3 groundwater in order to control the extent and potential continued migration of contaminated class 3 groundwater such that unprotective situations do not develop.

Surface water. The surface water risk-based exposure limit is the protective concentration of a chemical of concern in surface water. The surface water risk-based exposure limit is based upon the Texas Surface Water Quality Standards presented at 30 TAC, Chapter 307 of the commission's rules.

The rule contains aesthetics criteria in §350.74(i) for circumstances when a risk-based exposure limit cannot be calculated by the methods outlined in the TRRP rule or the risk-based exposure limit concentration adversely impacts environmental quality, public welfare and safety, or presents objectionable characteristics such as odor or taste. For example, if odors are determined to be a nuisance under the provisions of §101.4 of the commission's air rules, the executive director may require a person to address the odor nuisance.

The adopted rule lists which default risk-based exposure limit exposure factors can be modified and describes the information a person will be required to submit to support such a modification. The section concludes by listing those default exposure factors that must not be modified when determining risk-based exposure limits.

In the case of three default exposure factors for commercial/industrial land use that can be changed, the commission is proposing a more rigorous process to change them. Persons wanting to vary the averaging time, exposure duration, or the exposure frequency for commercial/industrial land use must submit a request for variance to the executive director. The executive director cannot delegate this decision to agency staff. The executive director, not the agency staff, is the decision-making authority in this instance because changes to these factors will be a land use/risk management policy determination rather than a more typical technical decision. Public notice is required, and at the executive director's discretion, a public meeting may also be required. Public comment will be accepted on the requested variance. If a variance is granted for one or more of these three exposure factors, the person must indicate the variance granted by providing proof of an institutional. Persons disagreeing with the executive director's decision may file a Motion for Reconsideration of the executive director's decision. If the commission rules on the motion, the ruling is final. The commission considers public notice to be a very important aspect of the process because alteration of any of these three factors likely could dramatically reduce the current and future use of a property. In turn, this could directly affect other entities such as adjacent landowners, taxing authorities, and others.

In response to comments received the commission has corrected typographical error as needed in §350.74. Also the ABS_{gi} value provided for endrin was amended. The rule was amended to specific reference to the required application of Occupational Safety & Health Administration (OSHA) standards, as OSHA criteria are only meant to serve as an example of what could be applied. Institutional control provisions were modified to conform with the expanded definition of institutional control. Rule language in §350.74(h)(1) was amended to provide flexibility of determining property-specific hardness values. The rule has been amended to reflect the site-specific evaluation of the need for institutional controls and financial assurance for exposure prevention remedies taken to address aesthetics situations. Lastly, §350.72(j)(2) has been amended to allow the executive director to review exposure factor variance requests for administrative completeness before public notice is provided, but clarifies in the rule that the variance request cannot be evaluated for approval until the public notice process has been completed. The commission has also amended §350.72(j)(2) to allow the executive director to determine on a site-by-site basis if public notice for a variance request is warranted in situations where the natural physical conditions of the affected property prohibit full commercial/industrial use (e.g., marshes and cliffs).

§350.75. Tiered Human Health Protective Concentration Level Evaluation.

The next step in the TRRP process is the establishment of human health-based protective concentration levels through a tiered process as set forth in §350.75. The tiered process is patterned after the tiered process of the *ASTM Standard Guide for RBCA Applied at Petroleum Release Sites* ES-1739-95 and *Standard Provisional Guide for RBCA*, PS 104-98. In general, as one moves through the tiered process, the level of technical sophistication necessary for developing protective concentration levels increases. As technical sophistication increases so do the costs of protective concentration level development. However, the result may be that remediation costs decrease because of the additional analysis necessary for the higher tiers.

The adopted rules establishes three tiers to calculate human health PCLs, Tiers 1, 2, and 3, with Tier 3 being the most sophisticated tier. The decision to determine the appropriate tier is left to the discretion of the person except in situations where a lower tier does not address a particular exposure pathway. Also, for state-funded response actions the executive director may specify which tier to use. Tier 1 protective concentration levels incorporate conservative assumptions that do not consider alternate points of exposure or site-specific factors. The Tier 1 levels assume the point of exposure is either within, directly above, or directly below the source area within the source medium. No lateral transport equations may be used for a Tier 1 evaluation other than to ensure that residential receptors at off-site points of exposure are protected when on-site commercial/industrial land use is assumed. In essence, they are protective of human health in any situation. Where standards such as EPA's MCL's or Texas Surface Water Quality Standards exist, those standards will be the Tier 1 protective concentration levels.

If the concentration of a chemical of concern exceeds the Tier 1 protective concentration level, persons may either remediate the affected property to the Tier 1 protective concentration level or proceed to a Tier 2 or Tier 3 assessment. Although the Tier 1 protective concentration levels may be used as cleanup standards, the commission expects them to often be used as screening tools during affected property assessments, provided the cumulative risk and hazard index criteria are met. Tier 2 incorporates lateral transport equations and more property-specific parameters.

If the concentration of a chemical of concern exceeds the calculated Tier 2 protective concentration level, then persons can either remediate the affected property to the Tier 2 protective concentration or proceed to Tier 3. In a Tier 3 evaluation, the person can use field measured natural attenuation factors and/or appropriate natural attenuation factor equations/models other than those prescribed for Tiers 1 and 2. As with Tier 2, persons can use site-specific data in Tier 3.

The adopted rule contains the equations and input parameters for Tier 1, and precalculated Tier 1 PCLs for soil and groundwater will be provided in tables in guidance. Details for calculating Tier 2 and Tier 3 protective concentration levels, including equations and parameters, will also be included in a guidance document. The equations for the risk-based exposure limits are prescribed in the adopted rule for all three tiers. The commission believes the Tier 1 equations and parameters are integral to the consistency of the adopted rule and are crucial for ensuring appropriate notifications; therefore, the equations and input parameters have been included in the rule. Because the Tier 2 and Tier 3 protective concentration level evaluations are alternatives to the Tier 1 protective concentration level evaluation, the commission considers a guidance document to be an acceptable regulatory medium for the fate and transport models and equations that are likely to change.

The use of probabilistic analysis techniques are indirectly disallowed under the rule. The adopted rule continues to rely on only “deterministic” techniques. Deterministic techniques involve using single values for each of the various exposure factors used in calculating protective concentration levels. The use of probabilistic techniques requires a level of sophistication that goes beyond the resources and knowledge base of most federal and state environmental regulatory agencies. As such, probabilistic techniques have only been utilized in this arena on an extremely limited basis in the United States. However, the commission has determined that probabilistic analysis techniques such as Monte Carlo analysis, given adequate supporting data and credible assumptions, may one day be viable statistical tools for determining the need for and degree of remediation necessary at contaminated sites. At present, however, the agency does not have the personnel or expertise that would be necessary to support the use of probabilistic analysis techniques in evaluating contaminated sites. The commission expects that it will take several years for the agency to develop the policy framework and technical expertise necessary to accept and properly review submittals utilizing probabilistic techniques. During this interim period, the agency is interested in working with stakeholders to establish procedures for a sound, defensible framework for the use of probabilistic analysis techniques to be authorized by future rule.

In addition to introducing the tiered approach, adopted §350.75 also establishes the methods for developing the human health protective concentration levels for each soil and groundwater exposure pathway and pathways for air, surface water, and sediments. The soil and groundwater exposure pathways are the same as those identified in the §350.71 discussion.

In §350.75, the commission amended the rule to include the equation for K_{sw} in the Soil-to-Groundwater PCL equation $^{GW}Soil$ in Figure 30 TAC §350.75(b)(1). The commission also amends Figure 30 TAC §350.75(b)(1) Tier 1 in several locations for purposes of internal consistency in the figure, to correctly reference other figures, and to capture the fact that particle density can be determined on a site-specific basis, but Henry’s Law Constant cannot. Section 350.75(f) and (g) have been amended to restate that the objective of the monitoring is to verify an appropriate understanding of site conditions.

§350.76. Approaches for Specific Chemicals of Concern to Determine Human Health Protective Concentration Levels.

Due to the unique nature and toxicity of and/or exposure to certain chemicals of concern, the commission is proposing chemical-specific approaches in §350.76. A person must use the methods prescribed in previous sections of the rule to determine risk-based exposure limits and protective concentration levels unless otherwise directed by this section. COC with a chemical-specific approach include the following: cadmium, lead, polychlorinated biphenyls, polychlorinated dibenzodioxins and dibenzofurans, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons.

The commission amended §350.76 to address various issues with lead and to correct an error in the units listed for the inhalation unit risk factor listed in §350.76(d)(3). Figure 30 TAC §350.76(g)(2) was

amended to reference only surrogates. The commission will now list the specific approved toxicity factors for total petroleum hydrocarbons surrogates in guidance.

§350.77. Ecological Risk Assessment and Development of Ecological Protective Concentration Levels.

Section 350.77 requires the person to conduct an ecological risk assessment. The purpose of the ecological risk assessment is to characterize the ecological setting of the affected property, identify significant and completed and reasonably anticipated to be completed exposure pathways and representative ecological receptors, scientifically eliminate COC that pose little or no risk, and develop protective concentration levels for selected ecological receptors where warranted. Unlike the development of human health protective concentration levels, points of exposure for the selected ecological receptors are established on a site-specific basis. A three-tiered process is adopted for conducting the ecological risk assessment. Like the tiered process for the human health evaluation, the person may begin the evaluation of the affected property at any tier desired. If at any time after Tier 1 it becomes apparent that response actions to protect human health will also protect ecological receptors or if human health protective concentration levels are more conservative than ecological protective concentrations, then the ecological risk assessment may be terminated.

Tier 1 involves the completion of an exclusion criteria checklist contained in the rule. Completion of the Tier 1 checklist should identify any significant and completed or reasonably anticipated to be completed ecological exposure pathways. If the affected property meets the exclusion criteria, then the person has fulfilled their ecological risk assessment requirement and no further ecological evaluation is required, unless changing circumstances result in the affected property not meeting the exclusion criteria.

If the exclusion criteria cannot be met, then the person must perform a Tier 2 screening-level ecological risk assessment or may proceed directly to a Tier 3 site-specific ecological risk assessment. The commission will develop a guidance document to assist the person with conducting both a Tier 2 and Tier 3 assessment; however, other guidance may be used if it meets the performance criteria set forth in the adopted rule. Under Tier 2, a person must conduct a screening-level ecological risk assessment to scientifically eliminate COC that do not pose an ecological risk and to develop protective concentration levels for those COC that do pose an unacceptable risk to selected ecological receptors. Tier 2 ecological protective concentration levels are developed considering reasonable assumptions and available site-specific information. The adopted rule sets forth ten performance measures that must be met in order for the screening-level ecological risk assessment to adequately evaluate ecological risk. However, not all ten of these measures will always be necessary, as there are four points from which the person may show that there is no ecological risk and thus terminate the evaluation.

Following a Tier 2 assessment, a person may choose to conduct a Tier 3 site-specific ecological risk assessment to modify Tier 2 protective concentration levels by incorporating additional site-specific information. The Tier 3 assessment can be any site-specific study that provides a more empirical evaluation of ecological risk at the affected property. The result of the site-specific ecological risk assessment will be the development of site-specific Tier 3 protective concentration levels, a determination that there is no ecological risk, or a conclusion that ecological risk is not apparent based on site-specific information.

After ecological risks have been quantified and final ecologically-protective concentration levels have been established under either Tier 2 or Tier 3 and after it has been determined that the ecological protective concentration level is the critical protective concentration level, the person must conduct a response action under either Remedy Standard A or Remedy Standard B. When, after consultation with the Natural Resource Trustees, it is determined appropriate by the executive director, the person may conduct an ecological services analysis (as described earlier in the discussion of Remedy Standard B-§350.33). The

purpose of the ecological services analysis is to determine the appropriateness of leaving COC in place above ecological protective concentration levels and, where appropriate, to provide compensatory ecological restoration as a means of managing residual ecological risk.

The agency has actively solicited input from State and Federal Natural Resource Trustee representatives (TNRCC, Texas Parks and Wildlife Department (TPWD), Texas General Land Office (GLO), National Oceanic and Atmospheric Administration (NOAA), Department of the Interior (DOI)) in the development of the Ecological Risk Assessment process. The Trustees acknowledge that the potential for continuing injury to ecological resources should be negligible at sites which have undergone corrective actions where remedial decisions were based on an appropriate application of the adopted Ecological Risk Assessment process. It should be noted that natural resource damages liability beyond that associated with injury to biological resources is not addressed within the Ecological Risk Assessment framework.

To facilitate the cooperative natural resource damage assessment process currently practiced in Texas, the Natural Resource Trustees will be provided notification from the TNRCC of those corrective action sites that reach a particular stage of development within Tier 2. The point of notification will be prior to the development of ecologically-protective concentration levels and will be determined in the Memorandum of Understanding (MOU) discussed below. The Trustees at their discretion may or may not become involved at all referred sites. Trustees may choose to participate in the Ecological Risk Assessment process to ensure that natural resources under their jurisdiction are adequately protected and to obtain information that may be utilized in the natural resource damage assessment process. The Trustees plan to develop a MOU that facilitates the coordination of the Trustees and their interaction in the Ecological Risk Assessment and Ecological Services Analysis processes. Persons may benefit from timely Trustee involvement in the Ecological Risk Assessment process through decreased costs associated with the coordination of risk assessment and injury determination, reduction of residual natural resources injury, and timely resolution of natural resource damages liability.

Section 350.77(a) has been amended to clarify the means by which an ecological risk assessment can be terminated for individual COC or entirely. Section 350.77(c)(6), (7), and (8) have been amended to clarify that an evaluation of ecological hazard index is required when multiple members of a class of COC are present which exert additive effects. Section 350.77(c)(10) has been amended to clarify that actions are based on final ecological PCLs and not preliminary PCLs that may have been calculated earlier in the ecological risk assessment. Finally, §350.77(f) has been amended to conform with amended §350.77(a)(3)(B) to clarify that the executive director shall rely on the Natural Resource Trustees for consultation, and not consent, when considering a request from the person to conduct an ecological services analysis.

§350.78. Determination of Critical Protective Concentration Levels.

Methods for determining the critical protective concentration levels are set forth in adopted §350.78. The critical protective concentration level for a COC is the lowest protective concentration level for a COC in a particular environmental medium considering all of the exposure pathways for which a protective concentration, human health and/or ecological, is developed. The section further identifies situations where additional criteria must be met. First, if the critical groundwater protective concentration level or an attenuation action level developed under Remedy Standard B is greater than the solubility limit for the COC in water, then the COC shall be monitored in accordance with the provisions concerning nonaqueous phase liquids set forth under Remedy Standard B. Second, if the critical protective concentration level for a chemical of concern is less than the method quantitation limit, then the greater of the method quantitation limit or the background concentration is the critical protective concentration level. Third, the critical protective concentration level and any attenuation action level must be protective against explosive conditions.

The rule was amended to clarify that COC with PCLs in excess of NAPLs may need to only meet NAPL criteria. The rule was amended to make the explosion criteria less prescriptive and more performance-based.

§350.79. Comparison of COC to Protective Concentration Levels.

Adopted §350.79 establishes the procedures for determining whether a response action is necessary. The determination is made by following either of the two procedures in the section. Under the first option, a person may make a direct comparison between site concentrations in the affected environmental media (e.g. groundwater, soil, sediments, etc.) and the critical protective concentration levels. If the site concentrations exceed the critical protective concentrations, a response action is required.

Under the second option, persons may employ statistics or geostatistics. Persons can make a direct comparison between representative site concentrations determined through statistical or geostatistical methods and the critical protective concentration levels. A response action is required if the representative site concentrations exceed the critical protective concentration levels. Persons may also use statistical methods to determine if concentrations at the affected property are equal to or below site-specific background concentrations. If a person chooses to conduct a statistical analysis to determine background concentrations, the person may use a two-sample one-sided statistical test when comparing the two populations or other alternative method acceptable to the executive director. If concentrations are less than or equal to background, a response action is not required. Alternatively, Texas medium-specific background concentrations may be used to calculate the critical protective concentration level.

The rule was amended to stipulate that the null hypothesis should presume that the affected property has a concentration less than or equal to background and that the alternative hypothesis should be that the affected property has a concentration that, in some sense (depending in the specific statistical model used for testing) exceeds background. The rule has been amended in §350.79(1) to require a statistical test to be performed at a Type I error rate of 5% when determining if chemical of concern concentrations exceed critical PCLs. Section 350.79(2) has been amended to require a statistical test to be performed at a Type I error rate of 20% and a demonstrable power of 80% for an alternative hypothesis equivalent to a 100% difference in populations means in the Student's "t" test when determining if chemical of concern concentrations in the affected property exceed background.

SUBCHAPTER E. REPORTS.

Subchapter E contains §§350.91-350.96, and describes the necessary information for each report required by the adopted rule. Adopted §350.91 establishes the information to be contained in the Affected Property Assessment Report (APAR) required by §350.51. The commission notes that persons are required to provide the latitude and longitude of the affected property so that data may be linked to a geographic information system for data management/retrieval purposes. The commission believes the geographic information system provides a more economical, user-friendly approach to accessing agency information for members of the public, other government agencies, and those regulated by the commission. Adopted §§350.92 - 350.95 prescribe the information to be submitted with the previously discussed Self-Implementation Notice, Response Action Effectiveness Report, Response Action Plan, and the Response Action Completion Report, respectively. In the event post-response action care is necessary under Remedy Standard B, Post-Response Action Care Reports must be submitted. The requirements for Post-Response Action Care Reports are found in adopted §350.96. The requirements for each report are found in the adopted rule and are outlined. The commission considers the required reports to be necessary for effective implementation of the adopted rule. Each report is designed to ensure that the level of detail is sufficient to document that the person has attained the goals of the matter being reported.

Subchapter E was amended to reflect changes made in other portions of the rule and the resulting change in information which should be submitted to the executive director. For example, §350.91(b)(6) has been amended to require identification of exposure pathways evaluated, identification of complete exposure pathways, and the basis for determining that exposure pathways are incomplete; and §350.91(b)(14) and §350.92(a)(4) have been amended to require the person to submit the certification that notice was conducted in accordance with §350.55 instead of proof of receipt by the parties required to receive notice as was proposed.

SUBCHAPTER F. INSTITUTIONAL CONTROLS

Subchapter F consists of §350.111 and establishes the institutional controls to be used in each instance that recordation in the property deed records is required by the adopted rule. In the TRRP in the absence of equivalent zoning of governmental ordinance, deed notices, acceptable VCP certificates of completion and restrictive covenants are the acceptable institutional controls. Deed notices do not restrict the use of the property, but are intended to provide notice and information regarding the property to the owner of the property, prospective buyers, and others. Restrictive covenants do restrict use of the property and its resources and are used to ensure that the use restrictions necessary for the remedy to be protective will be legally enforceable when the person owning the property is an innocent landowner. Under the adopted rule, a restrictive covenant must be enforceable by the state and must be executed by the landowner, unlike deed notices which may be filed by others although to be acceptable as institutional controls under this rule, the deed notice must in most cases, be filed with the landowner's consent. Equivalent zoning or governmental ordinances, VCP certificates of completion, deed notices and restrictive covenants are the only institutional controls allowed under the adopted rule.

Adopted §350.111(a) outlines the information to be included in an institutional control. Adopted subsection (b) describes the specific situations where an institutional control is required and the conditions where the institutional control must be a deed notice, VCP certificate of completion, zoning or governmental ordinance or a restrictive covenant.

As noted in the previous paragraph, the commission is requiring that restrictive covenants be obtained from innocent landowners when an institutional control is necessary in the absence of zoning or governmental ordinance. Texas Health and Safety Code, Chapter 361, Subchapter V, provides that an owner/operator of property that is contaminated as a result of a release or migration from an off-site affected property source may be considered an innocent owner or operator and, as such, is not liable under the Texas Health and Safety Code or the Texas Water Code regarding the COC from the off-site affected property source. The commission is requiring restrictive covenants for innocent landowner situations to ensure that controls are maintained and remain effective because the commission otherwise may not have any corrective action authority over these landowners. The commission emphasizes that in most cases it is the innocent landowner's decision to allow a restrictive covenant to be placed on the landowner's property. The innocent landowner can refuse to consent to the placement of an institutional control which effectively forces a residential-based Remedy Standard A response action.

In addition, §350.111(c) of the adopted rule section details the requirements for landowner concurrence when COC have affected property owned by another person. If an affected property is owned by another person and it is necessary to file an institutional control for that affected property under the TRRP, then the person utilizing deed notification must obtain written landowner consent before the institutional control is placed on the property records. Since restrictive covenants can only be executed by a landowners, consent for them is inherent.

The commission notes that deed notification is not a requirement for every response action. Persons are not compelled to perform a Remedy Standard B response action or a Remedy Standard A-commercial/industrial response. Remedy Standard A-residential, which does not require deed notice, VCP

certificates of completion or restrictive covenants is always available as an option. The commission understands that in some cases it may be technically impracticable to meet Remedy Standard A-residential response objectives. To address this situation, the commission has adopted §350.111(d) to continue requiring landowner consent even if it is technically impractical to achieve a residential-based Remedy Standard A response action unless the person can demonstrate the following new criteria are met: (1) the landowner refuses to grant concurrence for an institutional control; (2) a court of competent jurisdiction has determined the amount of compensation due the landowner as compensation for filing a deed notice in the real property records for that property; and (3) the person has paid into the court registry any compensation determined by the court.

In §350.111(e) the commission sets out requirements to provide a copy of the request for landowner consent as well as proof of landowner consent or agreement.

In new §350.111(f) the commission allows the filing of deed notice without landowner consent if the landowner cannot be found.

In addition to the new §350.111(f), the rule has also been amended to accommodate the use of VCP certificates of completion, and equivalent zoning and institutional controls as acceptable institutional controls.

SUBCHAPTER G : ESTABLISHING A FACILITY OPERATIONS AREA

Subchapter G contains §§350.131-350.135.

§350.131. Purpose.

This section establishes the applicability of the Facility Operations Area. The Facility Operations Area is intended for existing chemical manufacturing plants and petroleum refineries that must conduct corrective action for releases from solid waste management units pursuant to a hazardous waste permit or commission corrective action order.

The Facility Operations Area is defined as a portion of a facility within which is located the infrastructure for the development, manufacture, process, transfer, storage and management of chemical or refinery products, hazardous materials, substances and wastes. The commission has observed that this intensely industrialized land use, over the course of several decades, has resulted in extensive contamination of the soil and groundwater underlying such facilities. Many of the chemical plants and refineries, which make these substances in contrast to just being users of them, are required by hazardous waste permits or commission corrective action orders to conduct corrective action for releases from solid waste management units. The conventional approach has been to investigate each solid waste management unit to determine if a release has occurred and then to determine the extent of the release. These releases may be commingled with and be indistinguishable from other releases from adjacent solid waste management units or from contamination that has resulted from spillage or storage within process areas over the years. Some facilities will be able to complete the corrective action process on a solid waste management unit-by-solid waste management unit basis and will not need to utilize the Facility Operations Area. The Facility Operations Area is being adopted as an option for those facilities for which a consolidated or area-wide approach is appropriate.

There are other options available in the corrective action program's policy and guidance that can aid a facility in designing a corrective action strategy. The commission believes the advantage to the Facility Operations Area option is that all contamination from manufacturing process areas and waste units will be addressed with a response action. The facility must at a minimum apply interim or permanent remedies at and within the Facility Operations Area boundary utilizing exposure prevention such that workers are

sufficiently protected to carry out their normal duties. Physical controls are to be used where necessary to confine COC within the Facility Operations Area. Monitoring must be performed within the interior of the Facility Operations Area to determine if COC are migrating past the Facility Operations Area boundary. Any points of exposure outside of the Facility Operations Area must be protected to levels consistent with this chapter. Another advantage of the Facility Operations Area option is that attainment of remedy standards of this chapter may be deferred to the end of active manufacturing operations so that final remedies can be performed in a more efficient manner. The commission expects that this “brownfields” element will encourage reuse of inactivated portions of facilities since cleanup is not necessary to enable immediate utilization of the land surface. In contrast, the conventional corrective action process addresses only solid waste management units and any releases that have been identified within process areas. Under the conventional process, as opposed to the Facility Operations Area process, there is the potential for releases, likely to exist but not yet identified, to migrate undetected from process areas and thus still pose a threat to human health and the environment.

Section 350.131 has been amended to refer to hazardous waste permits instead of just permits. The same amendments were made in §350.133 and §350.135.

§350.132. Effect.

As stated in this section, the person can propose to modify the provisions of this chapter to develop an interim response action for use in the Facility Operations Area. These modifications will not extend beyond the Facility Operations Area boundary and all other requirements of this chapter will apply to affected property outside of the Facility Operations Area. Further, provisions of this chapter will apply within the Facility Operations Area unless specifically exempted. As an example, a facility must still perform an otherwise required closure of a waste management unit that is located in the Facility Operations Area. The closure of a tank would have to meet the closure performance standard of §350.2(h) for the tank itself and the waste removal provision of Subchapter B of this chapter but the release from the tank to underlying soil or groundwater could be addressed as part of the Facility Operations Area response actions. While authorizing alternative approaches to previous releases from solid waste management units and other areas of contamination within the Facility Operations Area, the commission has specified that response to releases that occur after the Facility Operations Area effective date are not subject to such modifications; instead, facilities must respond in accordance with Chapter 327. This approach is necessary to ensure that the pre-existing contamination is not exacerbated and that facilities do not diminish their diligence to prevent releases.

In establishing a Facility Operations Area, the person will have flexibility in developing an interim response action to achieve protection of human health and the environment. This action may utilize physical and institutional controls to contain releases and prevent exposure to COC within and at the Facility Operations Area boundary. For example, rather than setting points of exposure where this chapter would normally require them, the points of exposure can be set at the Facility Operations Area boundary. The commission recognizes that working in a process area that is likely to be included in a Facility Operations Area can be inherently dangerous and that other regulatory programs address worker health and safety issues. Action levels based on worker health and safety considerations may be used in place of the procedures of Subchapter D for development of protective concentration levels for response to soils containing chemicals of concern. For example, the facility could restrict access to the Facility Operations Area to only workers with appropriate training in industrial hygiene. Although the use of personal protective equipment might be required by health and safety programs to ensure worker safety, it is not the commission’s intent that equipment such as respirators or fully encapsulated suits with supplied air be used to satisfy Facility Operations Area requirements to protect workers from exposure to COC in environmental media as they go about their routine duties. The expectation is that facilities will reduce chemical of concern concentrations with some combination of removal, decontamination or control mechanisms to levels that do not require the use of personal protection equipment. The commission prefers

that property be restored to active and productive use so that site workers and others do not wear personal protection equipment to protect themselves from environmental contamination.

Section 350.132(a) has been amended to authorize the person to establish a prioritization of final response actions that will be initiated and completed to the extent practical during the life of the Facility Operations Area.

§350.133. Duration and Termination.

This section defines the effective period of the Facility Operations Area to the duration of active industrial operations. When the facility ceases industrial operations, the Facility Operations Area interim response action must be replaced by a permanent remedy that fully complies with this chapter. One exception to this requirement is that the response objectives for class 1 and 2 groundwaters may be based solely on class 2 groundwater response objectives. This section also provides that the use of the Facility Operations Area is not automatic. Authorization will be by a hazardous waste permit modification or commission corrective action order. Its continued use is conditional. The Facility Operations Area authorization will be reviewed at time of hazardous waste permit or order renewal for changed conditions that indicate the interim response action is no longer protective. The commission can withdraw the Facility Operations Area authorization at any time that the facility fails to maintain compliance with the qualifying criteria of this subchapter, but not without first affording the facility an opportunity to re-establish compliance.

Although a facility could defer a final remedy within the Facility Operations Area for the duration of its active industrial life, the interim response action is not necessarily a total deferral of all corrective action within the Facility Operations Area. For instance, sufficient action would have to be taken within the Facility Operations Area to identify and abate the primary source of a release that is migrating, or is predicted to migrate past the Facility Operations Area boundary in concentrations exceeding the protective levels normally required by this chapter (i.e., risk-based exposure limits). The commission expects that some amount of containment and/or removal remedies will be necessary to prevent the migration of COC beyond the Facility Operations Area boundary. The commission further expects that such interim measures, some of which will be adequate as permanent remedies, will also satisfy the environmental indicators initiative of the EPA to meet the Government Performance Result Act findings for the Federal RCRA. By being subject to corrective action, the facilities likely to seek Facility Operations Area authorization also are subject to this initiative and must show that human exposures are controlled and that groundwater releases are controlled. Finally, the commission expects that a prudent owner or operator of a facility will utilize a Facility Operations Area to pace out its corrective action obligations over time such that meeting its final remediation objectives would not be as burdensome as waiting to complete all actions.

§350.134. Qualifying Criteria.

This section enumerates ten qualifying criteria that a facility must be able to satisfy at the time of application for a Facility Operations Area. The commission is initially setting a high standard for authorization to use this alternative approach because interim response actions often rely on less conservative exposure prevention techniques and potentially defer for the long-term a final response action. The commission believes the Facility Operations Area concept is most appropriate for facilities with demonstrated track records in good compliance, financial soundness, and diligence towards protection of human health and the environment. The first six criteria are intended to define the universe of facilities for which the Facility Operations Area option is available and to demonstrate their performance in the area of human health protection for workers. The seventh criterion requires the facility to have a program to protect workers from contaminated environmental media. While similar to the preceding ones as to intent, the seventh criterion also may function as the basis for developing action levels to serve in the place of protective concentration levels. The eighth criterion, an agency-approved

pollution prevention program, carries a significant pollution prevention commitment with it. The last two criteria relate to the facility's compliance history and financial condition. The commission recognizes that minor infractions can be found at any complex facility. It is only if a facility has not resolved significant infractions that the commission will consider it a disqualifying condition. Lastly, a facility must be able to provide financial assurance for the final response action in the event the owner or operator is unable to comply fully with this chapter at the end of Facility Operations Area authorization.

The section has been amended in the adopted rule to clarify that operational facilities that have not received a hazardous waste permit as of the effective date of the rule shall obtain authorization of a Facility Operations Area via a corrective action order. The rule has also been modified at §350.134(a)(14) to require the person to demonstrate that the health and safety program meets or exceeds OSHA requirements rather than have the program certified by OSHA as was proposed.

§350.135. Application Requirements.

This section directs the person seeking Facility Operations Area authorization to submit a proposal containing specific information in the form of an application for a hazardous waste permit modification, or to aid in the preparation of a corrective action order. The form and content of the proposal is subject to review and approval by the executive director. The person must respond to requests for information or deficiencies identified by the executive director. In addition to providing documentation that the facility meets the qualifying criteria of §350.134, the person must address 12 other specific requirements itemized in subsection (a). Subsection (b) describes the Facility Operations Area authorization process. When the executive director determines that the proposal is complete and technically adequate, the proposal will proceed to final authorization by the commission in the same manner as other hazardous waste permit applications or orders. The final authorization for hazardous waste permitted facilities will be considered a class 3 hazardous waste permit modification. Public notice of the proposal will be required in accordance with commission rules in Chapters 39 and 305. A facility seeking Facility Operations Area authorization in a commission corrective action order will be required to provide the same type of public notice. Subsection (c) specifies that the facility will have to provide proof of financial assurance within 60 days after receiving authorization for the Facility Operations Area. The mechanisms for financial assurance must satisfy Chapter 37 of the commission's rules, except that a pay-in trust will not be an acceptable mechanism. The amount must be adjusted annually for inflation. Opportunities to revise the amount based on changed conditions at the Facility Operations Area may occur at time of hazardous waste permit or order amendment or renewal.

The rule has been amended at §350.135(a) to clarify that the permit modification is a class 3 modification. The rule has also been amended at §350.135(a)(4) to set the performance expectation that reliance on personal protective equipment will not be necessary to prevent contact with COC within environmental media during normal industrial job duties which are in excess of protective levels §350.135(a)(8) has been amended to reference the preparation of contingency plans, and a prioritization plan with time frames for phased corrective action so that all corrective action is not deferred to the end of the operation life of the facility operations area. Further, §350.135(a)(9) has been amended to clarify the commission's expectations with regard to the recovery of non-aqueous phase liquids. Section 350.135(a)(11) has been amended to conform with the expanded definition of institutional control.

FINAL REGULATORY IMPACT ANALYSIS

The commission has reviewed the rulemaking in light of the regulatory analysis requirements of Texas Government Code, §2001.0225 to assess whether the adopted rule is a major environmental rule and whether any the four applicability criteria of the statute are met.

A “major environmental rule” as defined by the Texas Government Code, §2001.0225(g)(3) means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The adopted rule is intended to protect the environment and reduce risks to human health from environmental exposure to releases of chemicals of concern. The adopted rule as applied will impact the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state. The degree of impact that rises to the level of a material adverse effect is subject to interpretation. The commission is confident the overall effect of the adopted rule will be positive for human health, the environment and the economy, but it may adversely affect in a material way a sector of the economy. Specifically, the commission anticipates a sector of the economy involved with leaking PST s may realize some increased financial burden when the adopted rule begins to apply to it in year 2003. Although debatable, this sector may argue that the adopted rule’s financial impact on them is material and adverse. Other sectors of the economy may believe the same.

A major environmental rule requires a if it: (1) exceeds a standard set by federal law, unless the rule is specifically required by state law; (2) exceeds an express requirement of state law unless the rule is specifically required by federal law; (3) exceeds a requirement of a delegation agreement or contract between the state and an agency or representative of federal government to implement a state and federal program; or (4) is adopted solely under the general powers of the agency instead of under the provisions of a specific state law. The adopted rule does not exceed a state or federal law. Although differing in some individual aspects, the adopted rule does not exceed standards set by federal law or standards set by state law. Federal and state statutes require action to ensure current and future protection of human health and the environment from releases of regulated substances and hazardous waste into the environment. The adopted rule institutes the criteria by which protective response actions will be achieved in Texas. The adopted rule does not exceed the requirements of any delegation agreement between the state and an agency of the federal government. The MSW, UIC, PST, and RCRA programs are the only programs affected by the adopted rule that have received federal delegation or federal approval. The rule was developed to not exceed any federal requirement. Finally, the rule is not being adopted solely under the general powers of the commission.

Because the adopted rule applies to every TNRCC corrective action program, and because different parties may have different beliefs about whether the adopted rule as applied adversely affects them in a material way, the commission will, for the purpose of conducting this RIA pursuant to §2001.0225, treat the adopted rule as a major environmental rule. The final RIA is presented in this issue, which may be found in the *Tables and Graphics Section* under: **Figure 1: 30 TAC Chapter 350 - Preamble**

The full draft Regulatory Impact Analysis (RIA) can also be found at the TNRCC web page located at <http://www.tnrcc.state.tx.us>.

Analysis of comments on the draft RIA.

Concerning the RIA, Craig's Cleaners commented that the financial assurance part of the rules are really burdensome for dry cleaners. Most cleaners will have a hard time complying with financial requirements to meet the TNRCC's requirements. To make them provide for financial assurance for 15 years or more is really unrealistic. Possibly we can achieve all the financial goals or what financial risks are out there or what the requirements will be financially in the future to do all the monitoring and whatever it takes for this ten or 15 years, but we may not have all that money in our pockets right now. We can do it from a year-to-year cash flow sales, and for us to put up a hundred thousand dollars in a CD or some kind of assurance package is pretty unrealistic for us, the dry cleaners.

The commission acknowledged in the March 1999 preamble that some persons subject to the state's environmental programs, notably the PST program, will incur new or greater financial assurance requirements under the proposed TRRP. The commission notes, however, that under the proposed TRRP, financial assurance is required only if physical controls are used as an alternative to actual remediation. Physical controls, such as an impervious cap, can be significantly less expensive than actual remediation. However, because physical controls do not necessarily represent permanent solutions, financial assurance is required in conjunction with physical controls to address on-going risk. Otherwise stated, the aggregate cost of exposure prevention remedies and associated financial assurance can represent a significant savings over more costly "permanent" remediation. Also, for businesses that qualify as a "small business" under Texas Government Code, §2006.001, the proposed TRRP offers such qualifying small businesses the opportunity to seek a reduction in the amount of financial assurance they demonstrate if the post response action care period exceeds ten years.

Concerning the RIA, Greater Houston Cleaners Association commented that one of the biggest issues facing dry cleaners, as well as other small businesses, is not having enough to comply with the rule and it is defeating the purpose to issue the rules without also including some sort of financial assistance as opposed to assurance. Greater Houston Cleaners Association asked why a financial assistance program can't be put together in which under certain qualifying rules a small business can apply for a grant or a long-term low interest loan to comply with the rule. If this were done it will eliminate probably 75% of the problems associated with trying to get small businesses to comply and to cleanup, but when they don't have the money, they don't have the money.

The commission readily acknowledges the environmental cleanup is expensive, and possibly outright cost prohibitive for some small businesses in the regulated community. The commission recognizes this dilemma and has worked to develop this rule which balances this factor with other factors of human health and environmental protection. This adopted rule contains many areas of flexibility, such as the broad shift in remedy standards from "background" to "health-based," that can be exercised to contain costs while at the same time protecting human health and the environment. However, the commission does not possess the authority to establish such a financial assistance program. The commission only has authority to implement such programs when they are appropriated by the Texas Legislature. The TRRP rule does include, however, provisions for small businesses to seek reductions in amounts demonstrated for financial assurance purposes.

Concerning the RIA, Ranger commented that the RIA under the "Fiscal Note" section of the proposed rule package, it is stated that Mr. Stephen Minick of the TNRCC Strategic Planning and Appropriations Division has determined that there will be no increases in cost to state government anticipated for the first five-year period that the proposed rules are in effect. Ranger disagrees with Mr. Minick's conclusions, as discussed below.

The tax-paying public has already incurred significant costs as the TNRCC has recently gone through, and is continuing to go through, a major and expensive reorganization process to combine all commission corrective action groups into one division, in anticipation of the passage of the TRRP rules. Based upon Ranger conversations with TNRCC staff, approximately ten TNRCC employees (at the higher end of the staff pay scale) have been working virtually full-time for nearly three years on these proposed rules. Assuming an average salary of \$40,000/year for these employees, it would appear that just the drafting of the proposed rules has already cost the taxpayers of the state approximately \$1,200,000. The TNRCC has already initiated (and incurred costs for) internal staff training programs related to the draft rules. There will be substantial future costs related to staff training requirements due to the complexity of the rules. A change in the PST RBCA process will also necessitate changes in the TNRCC Reimbursable Cost Guidelines related to the petroleum storage tank remediation (PSTR) Fund, as the proposed rules contain burdensome and expensive new site assessment and other requirements, the costs of

which are not presently included in the reimbursable cost guidelines. A revision of the reimbursement rules/guidelines will cost a significant amount of money to the taxpayers of this state. Due to the tremendous cost increases associated with site investigations and cleanups under the proposed rules, this will undoubtedly result in many more sites going into the TNRCC's State-Lead and Superfund programs.

The commission acknowledges there is a cost to developing the TRRP rules, but the commission notes that the Texas Legislature created the TNRCC as an agency of state government to administer and enforce the state's environmental programs. While the commission tracks its budget and expenditures in a variety of ways, the commission does not track its cost to develop rules, and therefore offers no comment on the dollar amounts cited; however, the commission believes developing the TRRP rules is consistent with its purpose as an agency.

With regard to the Reimbursable Cost Guidelines, the commission disagrees that the Reimbursable Cost Guidelines will be revised as a consequence of this rulemaking. It may compel some additional work, but it is more of the same work completed to date and as such it does not change the corrective action cost structure. Further, this rule is not based on increased sophistication over the existing PST rule. In fact, over the development of this rule, it has become apparent that sophisticated human health site analyses are routinely conducted under the PST program. Further, because of the current PST Reimbursement Fund eligibility deadlines established by the legislature and the timing of the effective date of this rule, this rule is not applicable to any responsible party lead LPST site which is eligible for reimbursement from the PST Remediation Fund.

The commission disagrees with the commentor's assertion that ". . . tremendous cost increases associated with site investigations and cleanups under the proposed rules . . . will undoubtedly result in many more sites going into the TNRCC's State-Lead and Superfund programs." The TRRP rule is designed to apply standards for cleanups after the program area determines that assessment and/or remediation needs to occur. It has not been the commission's experience that sites shift from one program to another simply because of the cleanup standards. The TNRCC does not believe, for instance, that a party seeking a voluntary cleanup certificate will abandon its site because of TRRP' site assessment requirements. It is the commission's opinion that economic factors such as bankruptcies--which come into play well before a site is referred to State Lead Superfund--and potentially responsible parties' resistance to accepting liability will continue to be the predominant reasons for sites being in State Lead Superfund. Regarding the PST state lead program, the commission notes that as of December 1998, owners of PST sites were to have brought their underground storage tanks into compliance with current technical standards as well as obtained private environmental risk insurance. In the event of an unauthorized release, an owner's private insurance would pay the cost of investigation and cleanup. The new technical standards should result in fewer unauthorized releases across the state and the private insurance should obviate the need for funding from the state's PST Remediation Fund.

The commission acknowledges that not all entities will save money under this rule and that there may be costs associated with deed notices and restrictive covenants. The commission has recognized those additional costs in the RIA. However, regarding the state Superfund Program, the commission disagrees with the commentor's assertion that cost increases stem from the TRRP rule, or that the rule will result in more sites going into that program. The TRRP rule offers greater flexibility for meeting health-based standards for most program areas. Overall, the TRRP rule holds the potential for lower costs over the life of a cleanup project. In addition, the VCP will continue to offer a release from liability in exchange for participating in that program.

Concerning the RIA, Ranger commented that in the "Public Benefit" section of the RIA, Mr. Minick makes a number of conclusions concerning the public benefit of the proposed rules. Ranger disagrees with Mr.

Minick's conclusions and, in fact, believes that the proposed rules will have the opposite impact of every benefit asserted by Mr. Minick. The following is an elaboration of these issues.

Mr. Minick has asserted that for the first five years that the rules are in effect, the public will benefit from the "improved consistency and clarity in existing regulations governing the cleanup standards for contaminated properties." Ranger does not believe that the proposed rules are clear at all. Rather, Ranger believes the proposed rules to be unnecessarily voluminous, complex, and inflexible. Any rule package which requires nine pages of acronyms (see §350.2 Definitions and Acronyms) cannot be accurately described as clear. It is Ranger's opinion that these rules will create significant confusion, and will set back environmental protection and site closures for the first several years that they are in effect while the regulated community and TNRCC staff are attempting to learn and interpret them. Mr. Minick has stated that the public will benefit as the proposed rules will be more cost effective than the current cleanup rules utilized by the TNRCC. Mr. Minick did acknowledge that "In some cases, the cost of the analysis and development and justification of a remedy under the proposed rules may be greater than similar costs under existing rules. These cost increases, however, will be justified by owners and operators seeking to determine cost effective cleanup options and should be offset by the cost savings realized by utilizing the risk based options offered under the proposed rules." Ranger does not believe that the above statement was prepared based upon an accurate cost analysis of the proposed rules. Ranger has been made aware of conversations with TNRCC PST Division management personnel who stated that they expect that the new rules will increase the costs of an initial site assessment/risk evaluation for a PST site to increase from the current approximate cost of \$10,000 - \$20,000, to \$60,000 - \$80,000. As the TNRCC is aware, the vast majority of regulated sites are presently closed without any actual cleanup using the existing RBCA rules and guidelines. Only a small percent of sites are currently required to conduct actual site cleanups, and these sites typically contain phase separated hydrocarbons (PSH) or have impacted a usable groundwater resource. Ranger does not believe that the percentage of sites currently requiring cleanup will be lessened under the proposed rules. Thus, the net result of the proposed rules will be to greatly and unnecessarily increase the cost of site corrective actions, without providing any additional benefit to human health and the environment. Mr. Minick stated that "a more general savings in cost is anticipated to result from the overall clarification and simplification of the regulations governing cleanup standards." As stated above, the proposed rules are far more complex and difficult to understand than current TNRCC cleanup requirements. Ranger has had conversations with TNRCC technical staff who stated that due to the length and complexity of the rules, they could not even complete a reading of the rules, much less to understand the portions which they had read. These statements from the TNRCC personnel who will actually be charged with implementing the rules certainly contradict Mr. Minick's statements, and appear to be more accurate than Mr. Minick's statements. Lastly, the TNRCC has stated that "any actual determination of impact of the proposed rules must be made on a site-specific basis and no estimates of the net cost savings to owners and operators of these rules is available." Ranger finds it concerning that the TNRCC is claiming that the proposed rules will be cost-effective, when the TNRCC also states that it has not conducted a study of the estimated cost impacts of the proposed rules. Ranger would like for the TNRCC to explain to the regulated community how they will save money by now having to hire an attorney for virtually every release site (which is not an allowable reimbursable cost for PST sites) to file one or more of the 13 different deed notices/restrictive covenants required in §350.131. Ranger would also like for the TNRCC to explain the cost savings to the regulated community of the financial assurance requirements contained in §350.94(s)-(t). Lastly, Ranger would like for the TNRCC to explain the cost savings to be achieved by the unnecessary litigation that the proposed rules will engender through the unwarranted proposed deed notices/restrictive covenants required in §350.131.

Before getting to this comment, the commission notes that Mr. Minick did not do the fiscal note for the rule adopted herewith. First, the commission has not yet conducted any training and staff have only had limited access to the rule thus far. The rule is comprehensive, but it does not contain nine pages of acronyms. The rule contains less than one page of acronyms. Like any new rule, all involved will experience a learning curve and need to make a specific effort to become educated with

the rule. Further, persons may need to attend training. The purpose of the rule is to impart uniformity to the corrective action process. The rule will do that. The rule may compel some additional work for PST sites over the level of work compelled under the existing program. However, this rule does not represent increased sophistication over the existing PST rule. In fact, over the development of this rule, it has become apparent that sophisticated human health site analyses are routinely conducted under the PST program and agency staff are capable of implementing and comprehending that risk-based program.

The commission has been up front with regard to regulatory and cost implications for the regulated community. The commission also notes on page 24 TexReg 2400 in the second sentence of the first paragraph that the rule will have an impact on sites that may today close without remediation (i.e., low risk sites) . The commission stands behind the basis of cost analysis. The costs are based on demonstrated reimbursable costs, are reflective of costs developed from market surveys and show a clear relative cost relationship between the existing rule and this rule. The cost analysis demonstrates relative costs between the two rules, which is the best that can be done and fully meet the requirements.

Third, cost savings that will more predominantly be recognized in non-PST programs come from the move away from decontamination to background as a remediation objective and the commission's willingness to accept health-based risk levels as appropriate. However, the commentor is taking an overly narrow view in only considering costs to the PST regulated community. The regulated community, although important, are but one facet of the public. The commission is charged with protecting the public, now and in the future, from contamination which has affected the waters, air, sediment and soils of the state. As such, the commission is shifting the long term management strategy of the PST program to resolve inequities between current program areas, to increase the focus on long term natural resource management and protection, to increase the assurance of future notice, and to respond to the legal change resulting from the innocent owner/operator statute. Those parties who have taken ultimate advantage of the existing program will likely not be regulated under this rule, unless they suffer a future release. Those persons who have not yet taken advantage of the existing rule still have four years to do so. If a specter of the rule results in immediate increases in compliance with the existing rule, then the commission considers that an unanticipated benefit.

Fourth, the commission notes that filing deed notices and restrictive covenants is only required when the responsible party chooses not to clean up to residential health-based levels. The commission anticipates persons will compare the costs of cleaning up to residential health-based levels to the costs of using physical and institutional controls and decide on the course most agreeable to the person. As to financial assurance requirements, these again arise from the person's decision to use physical controls. The commission is not convinced its deed notice and restrictive covenant provisions will engender "unnecessary litigation," and assumes that in the overwhelming majority of cases reasonable minds will prevail and persons will be able to work out differences, if any, that arise during the corrective action process. Further, the commission points to the basic fact that it is the COCs that compel notice, and therefore, it is the release of COCs that precipitates costs, not the commission's rule.

Concerning the RIA, Ranger commented that Ranger prepared internal cost estimates to compare the costs for a typical three monitor well site assessment, as well as projected costs for a similar site to be investigated under the proposed TRRP rule sampling requirements (including a laboratory audit and data acquisition and reporting requirements (QA/QC) samples). The cost estimates prepared by Ranger only included costs for field personnel time, drilling, waste management, analytical, equipment/drums, and per diem. The cost estimates did not include any office personnel, management or report preparation costs, nor did they include mob/demo costs or legal costs. The approximate cost to conduct this investigation under the current TNRCC guidelines was determined to be approximately \$8,300. Under the TRRP rules, to

assess the same site was determined to cost approximately \$50,700. The TNRCC must bear in mind that this is primarily only the difference in field- drilling and analytical costs between the present TNRCC requirements and the proposed TRRP rules.

The commission notes that this comment was from the comment letter Ranger originally submitted on July 22, 1998 for §350.34(a)(2)(E)(i) and (ii) which laid out detailed specifics on use of statistics. The commentor misunderstood the 1998 proposal, but nevertheless, those sections were not proposed for this rule making. No details for the three well examples were provided for which a detailed cost analysis can be prepared in response to the comment. However, in the draft RIA for the proposed rule, cost implications for affected property assessments were completed for 12 PST cases. Those analyses indicate that there could be some additional costs associated with defining the full horizontal extent of COCs in groundwater in excess of PCLs. However, the additional costs are not attributable to statistical analysis as was the concern of the commentor. The commission encourages readers to review the PST case examples in the draft RIA included in the proposed rule (see 24 TexReg 2399-2417, and 2425-2426). If statistical methods are used, the person must ensure the data are adequate and appropriate. There is a possibility that the use of statistics could require additional data, but any associated costs are at the direction of the person choosing to use statistics and are a consequence of the method and application. Therefore, any such costs are not solely attributable to this rule making.

Concerning the RIA, Texas Petroleum Marketers and Convenience Store Association (TPCA) commented that one of the PST insurance carriers indicated that they have had 16 claims reported in 1999 with a potential cost in excess of \$13 million. The total premiums collected by the insurer is approximately \$8 million.

This comment is difficult to assess without specific information on the 16 claims, such as the nature of the problems and the remedy selections represented by the potential \$13 million cost. Regardless, the commission acknowledges that the potential claims paid by a private insurer may exceed premiums it receives on a PST policy. The commission recognizes that there is a cost to cleaning up leaks, spills, or other environmental contamination stemming from PST sites, but the TRRP program represents a reasonable balance between cost and protecting human health, the state's water, and other natural resources.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick commented that one of the stated goals of the TRRP is to reduce cost to industries. The new rules, however, will in many cases result in a windfall. If, for example, Company A bought the contaminated site from Company B, Company A paid the value of the property minus the cleanup costs. If the rules now eliminate the cleanup costs, Company A will have received a windfall. This is the most basic example. There are cases that involve complex agreements of insurance, indemnifications and other financial arrangements. TNRCC's rules change the underlying assumptions, and will result in billions of dollars of windfall profits, when that money has already been set aside to protect future generations from the risk of the contamination.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick also commented that the proposed TRRP would result in unjustified windfalls for some responsible parties and in unjustified contamination for future generations. The draft rule constitutes an unjustified change from pollution abatement to exposure reduction, when, in fact, pollution abatement is often reasonable and cost effective. By eliminating the requirement to show that remediation is not feasible or not economically justified, responsible parties will be allowed to leave contamination in place that they otherwise are required to remove. For example, uranium companies promised the landowners, with whom they have minerals leases, to restore the aquifer that is contaminated during mining. The companies may have made millions of dollars and have to spend very little to complete restoration, however, the TRRP would let them walk away with a partial clean-up. Instead of doing what makes economic sense, the TRRP makes the unjustified assumption that all remediations below MCLs are too expensive to be required. As a result, it will be the property owners

who will have to pay for the added clean-up of the contamination left, when the property owners decide to use their groundwater. The burden for clean-up is simply shifted away from the responsible party.

The commission is not willing to be married and bound to past regulatory practices simply because a change may shift an economic balance. Clearly, any shift in regulatory policy will shift economics for some. However, the commission notes that the shift maintains human and environmental protectiveness. Further, this change in regulation does not necessarily disrupt contracts between private parties. In the situation of the A and B illustration, the property must be rendered protective. If that rendering can now be done in a more economic fashion, then the outcome is positive as more persons can now afford to comply. The commission notes that economic principles have come into play when deciding on provisions that will result in the best combination of: (1) effectiveness in achieving the desired result (protecting human health and the environment); and (2) economic costs not materially greater than the costs of alternative regulatory methods the commission considered. The commission finds that the tension cannot be alleviated between achieving complete decontamination and assuring that economic costs are not "materially greater than alternative regulatory methods." Cleanups to risk based levels are effective in achieving the desired results and are not materially more expensive than alternatives. Cleanups under the TRRP rule will protect human health and the environment, and not result in unjustified contamination. The commission believes its decision not to choose the most expensive standard for cleanups will not result in responsible parties receiving economic windfalls, and further notes that a uranium mine mineral lessor may contract for cleanups to background. The commission has determined that remediation below MCLs is unnecessary to address the groundwater ingestion exposure pathway, not due to economic concerns, but because MCLs are federal, enforceable standards for drinking water and are set to be protective of any drinking water scenario. Further remediation in the absence of particular health based concerns at an affected property is not an effective use of limited resources.

Concerning the RIA, Ranger commented that it disagrees with the conclusions of the "Draft Regulatory Impact Analysis" that the proposed rule is not a "major environmental rule." The TNRCC states that a major environmental rule "means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state." Based upon reasons already provided in these comments, such as the tremendous increase in costs to investigate and close sites, Ranger sincerely believes that the implementation of the proposed rules will have adverse effects that qualify the proposed rules as a "major environmental rule." The mere fact of a three- to eightfold increase in the costs to clean up regulated sites should alone qualify the rule as a major environmental rule.

The commission stands by its position that the TRRP rule is not a "major environmental rule" subject to a RIA as defined in the government code, and disagrees with the commentor that it is a matter of fact that costs to clean up regulated sites will increase three to eight fold overall. Nevertheless, the commission recognizes that the phrase "adversely affect in a material way" is open to different interpretations. For instance, some may urge an eight fold increase in costs to attain closure at regulated sites constitutes a material adverse effect, while others may say that such increases at some sites--when viewed in the context of the overall impact of the rule on all sites in all programs--does not constitute a material adverse effect. Still others may urge that leaving above background contamination in place at residential property constitutes a material adverse impact on the public health and safety. In deference to the room for debate on, first, what impact applying the rule will have, and second, whether such impact is materially adverse, the commission has chosen to perform a full RIA even though it does not concede TRRP is a "major environmental rule" subject to a RIA.

Concerning the RIA, Fulbright & Jaworski commented that the Draft RIA does not provide information sufficient to support the cost savings claimed by the TNRCC.

The commission disagrees. The draft RIA at a minimum must identify the benefits that the commission anticipates and describe the benefits anticipated quantitatively, if possible, but also in a qualitative manner when a quantitative description is not feasible. The benefits identified and described are based on information available to the commission and are those the commission believes will result from this rule. The draft RIA meets the requirements of the statute.

Concerning the RIA, Air Force Center for Environmental Excellence (AFCEE) commented that the rules would substantially increase the cost for remediation of class 1 groundwater. Currently there are not many remedial options available for low-level dissolved phase chlorinated hydrocarbon plumes. These rules potentially eliminate the use of pump and treat, interceptor trenches (because of no physical control provision), down gradient reactive walls (because of no plume growth provision), and monitored natural attenuation (because of 15 year stipulation) for class 1 protective concentration level exceedence (PCLE) zones contaminated with chlorinated hydrocarbons not leaving many response alternatives.

The comment regarding the lack of options under the rule to address contamination in class 1 groundwater is addressed in the section of the preamble pertaining to §350.33(f)(4). With specific regard to downgradient reactive walls, they could still be used up to the downgradient limits of the PCLE zone. The commission stipulates in §350.33(f)(1)(B) that the extent of the groundwater PCLE zone cannot increase in extent; it does not specify that COCs within the PCLE zone cannot migrate from the source to a point of destruction at the downgradient limit of the PCLE zone via reactive walls. Reactive walls used to manage the extent of the PCLE zone coupled with source area abatement may be sufficient and effective. Further, with regard to the 15-year limit, the commission notes that a waiver provision is included in the rule at §350.31(h) where satisfactory remedial progress is demonstrated and such waiver is appropriate in the context of circumstances at the affected property. There is no lack of options to respond to class 1 groundwater. Rather, plume management zones are not an option.

Concerning the RIA, Fulbright & Jaworski commented that in its discussion of "benefits and costs anticipated from implementation of the rule" (24 TexReg at 2399-2424), it is demonstrated that the proposed rule will increase costs to persons cleaning up underground storage tank sites. As to industrial and hazardous waste sites (24 TexReg 2417), the analysis purports to show substantial cost savings to stakeholders. However, such savings are speculative because they are based on sites where the remedy selection (remedial investigation, feasibility study and remedial design phases) was completed before implementation of the current rule. Because such remedy selection was done during years of stringent regulation by the EPA pursuant to Superfund, the cleanup costs for those sites are not valid comparison data. Further, it is unclear what assumptions were made by the TNRCC in addressing issues that will be addressed in the pending guidance. Therefore, the TNRCC has not provided information sufficient to meet the requirements for promulgating a major environmental rule or to substantiate its statements that the proposed rule is not subject to those requirements.

The TNRCC disagrees with the commentor and again notes that the requirements for an RIA do not include convincing everyone that the commission used "valid comparison data," but advising the public and the regulated community of the data and assumptions it did use. The RIA provisions leave room for parties to disagree on whether the data and assumptions were appropriate. The commission, however, maintains the comparison is valid.

With regard to the point that this rule was compared to an antiquated regulation model, the commission disagrees and notes that the current TRRP has a remedy evaluation process consistent with the federal superfund remedy evaluation process. In fact, the current TRRP could be

argued to have a more stringent remedy selection process than the federal superfund program. Therefore, the use of these sites is appropriate not only for the remedy chosen but also due to the detailed actual and estimated costs available. It is important to note that the commission rarely has access to cost information when actions are completed by responsible parties but it does have detailed costs information when taking fund lead actions, such as in the federal and state Superfund programs.

Concerning General Tier 3 Flexibility, Fulbright & Jaworski commented that the published record does not report that the TNRCC specifically considered a uniformly administered, site-specific program of setting cleanup standards as an alternative to the proposed rule. In meeting its purpose of harmonizing existing regulations, the TNRCC considered the following alternative regulatory methods: (1) maintain the status quo, (2) maintain existing regulations and develop new guidance, and (3) draft the proposed rule. 24 TexReg at 2429. The TNRCC apparently did not consider drafting a site-specific program of setting cleanup standards that would be administered in uniform fashion across TNRCC programs. Site-specific programs have been adopted in other states. See Exhibit 1. If site-specific risk assessment were allowed under the proposed rule, it could afford greater administrative consistency than afforded by the current rule and afford greater consistency in margins of safety than would be afforded by the proposed rule.

The commission acknowledges that this specific alternative is not explicitly listed as an alternative in the RIA. However, the commission did state that the third alternative was to adopt a new rule. This rule is a site-specific application of a uniform risk assessment-based program. In various sections of the RIA, the commission identified factors for why the commission did not create a background-based program, why the commission did not create a program where every decision is open for discussion, and why the commission did not create a conventional forward calculating/baseline risk assessment program. Therefore, we disagree with the commentor's assertion. The commission was very candid about the problems surrounding the implementation of the current "site-specific" risk assessment programs.

The commission has provided a uniform rule that allows development of PCLs based on site-specific analysis. More site-specificity is allowed for commercial/industrial properties and for residential properties. The factors that are routinely varied on truly site-specific information are allowed to be varied under this rule making. However, the commission interprets the "site-specificity" alluded to by the commentor, based on other comments submitted by this same commentor, as "wide open" risk assessment where every factor (e.g., risk level, exposure factor) or decision point (e.g., point of exposure) is purely a site-specific determination. The RIA discussed the difficulties the commission has faced with consistency and inefficient use of staff implementing the current programs which do not offer quite the level of "site-specificity" this commentor may be seeking. The commission noted the repeating and often unfruitful negotiations between the regulated community and staff over risk levels, exposure scenarios pertaining to reduced land use, and other matters. The commission discussed the need for uniformity and streamlining to bring consistency across program areas and to expedite the corrective action process. The commission directly and indirectly addressed the issue raised by the commentor in the RIA. The issue is really that the commentor takes exception with the level of site-specificity allowed under this rulemaking, for which the commission has identified and provided rationale.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick commented that the fiscal note attached to the proposed rule is clearly inadequate. It does not even begin to evaluate the costs to the environment or public health. Clearly the rule will reduce protection for both and increase future costs, including sampling and monitoring costs for drinking water systems, groundwater treatment cost for those who seek to use water left contaminated, and costs in the form of reduced property values for landowners and lost real estate tax revenues for local governments.

The commission disagrees with the comment that the fiscal note attached to the proposed rule is inadequate because it does not account for costs to the environment, public health, landowners and local governments, and notes that the fiscal note includes a draft RIA that addresses issues of environmental costs and benefits associated with TRRP.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick commented that in the RIA, TNRCC has not prepared the required RIA under §2001.0225 of the Texas Government Code. For example, the RIA justifies the rules on a need to harmonize existing corrective action regulations. The need to equalize the numerical clean-up standard is then justified. There is, however, no explanation of why other parts of corrective action programs need to be harmonized. There is no discussion of problems that currently exist with separate programs that have been developed separately under different laws to address different problems. The entire basis of the rules - uniformity and harmonization is given in the RIA as a justification worthy of creating any other problems. Yet, TNRCC has never been directed by the Texas Legislature to harmonize or make uniform rules for these such distinct or different fact situations. The current rules are not broken, they are just different.

The commission disagrees and believes it has provided sufficient information in its RIA to adequately advise the public and the regulated community of the information and assumptions the commission considered in adopting the TRRP.

Concerning the RIA, Ranger commented that the TNRCC does not appear to have adequately analyzed and weighed the costs and benefits of these proposed rules. In summary, Ranger believes that these rules will have an adverse effect on the State of Texas and its economy.

The commission disagrees and again points out that with respect to the RIA, its mission is to adequately advise the public and the regulated community of the information and assumptions the commission considered in adopting the TRRP. In its final RIA, the commission will include reference to costs associated with notice, variances and institutional controls.

Concerning the RIA, Ranger commented that they strongly recommend that the TNRCC conduct a formal cost benefit analysis of the proposed rules. Ranger believes that any legitimate and factual cost analysis will demonstrate that there is no cost benefit to the proposed rules. The cost of complying with the environmental cleanup regulations will simply be higher, and there will be no added protection to human health, safety or the environment as a result of this.

The commission did prepare as formal a cost benefit analysis as is required by the law for a major environmental rule subject to §2001.0225 of the Texas Government Code, even though the commission does not concede the TRRP rule qualifies for such an analysis.

Concerning the RIA, Chevron and Campbell, George & Strong commented that if the commission elects to keep restrictive covenants in the rule, the RIA should address the distinctions between a deed notice and restrictive covenant and discuss the logistical and legal problems associated with both. The draft RIA only discusses the need for institutional controls (i.e. "to ensure that persons have adequate notice of the conditions under which affected properties must be managed to assure human health and the environment remain protected over the long term," not the types of controls proposed. We consider this to be a significant deficiency in the analysis, as discussed further in Attachment 5 of Chevron's comments.

Chevron and Campbell, George & Strong comment that the RIA should discuss deed notices and restrictive covenants. Deed notices are notices filed in the deed records. By themselves they do not provide mechanism that allows the commission to enforce the necessary restrictions on the use of property that has not been remediated to the extent that it is safe without controls. An additional rule is necessary to fill this gap. The commission has proposed such a rule at §350.35(b). As

discussed in the preamble to the proposed rule at 24 TexReg 2233, the commission is concerned that innocent owners may have a defense to the rule's applicability to them. Therefore the commission believes that restrictive covenants in favor of the state are necessary to provide the commission the assured ability to enforce the controls against the innocent owners.

Restrictive covenants are agreements by a landowner to give the state authority to enforce the controls. This authority "runs with the land" and applies to future owners as well.

Chevron and Campbell, George & Strong also comments that the RIA should discuss the logistical and legal problems associated with deed notices and restrictive covenants. The commission has responded in the adoption preamble, and also refers the commentor to the commission's responses to comments concerning Subchapter F.

Concerning the RIA, Chevron commented that the TRRP exceeds existing state and federal standards as set forth more specifically in Attachment 6 and Attachment 7. Based on findings contained in these attachments, Chevron respectfully disagrees with the TNRCC's position that the TRRP simply "fills in the gaps" but in no way exceeds existing standards. Moreover, Chevron disagrees with the TNRCC's apparent position that the term "law" in Texas Government Code, §2001.0225(a) limits the RIA requirement to only those rules that would exceed a specific State or federal statutory provision.

The commentor disagrees with the commission's position that §2001.0225(a) limits the RIA requirements to only those rules that exceed specific state or federal statutory provisions.

The commission maintains its position that "law" in §2001.0225(a) means statutory law enacted by Congress or the State Legislature. This interpretation is supported by Legislative history on the act adopting §2001.0225. See Hearings on Texas Senate Bill (SB) 633 Before the Senate Committee on Natural Resources, 75th Legislature, Regulatory Session (RS) (February 25, 1997) (audiotapes available from Senate Staff Services Office); Debate on Texas SB 633 on the Floor of the Senate, 75th Legislature, RS (March 17, 1997) (audiotapes available from Senate Staff Services Office); Hearings on Texas SB 633 before the House Committee on Environmental Regulation, 75th Legislature, RS (April 8, 1997) (audiotapes available from Office of the House Committee Coordinator). Although this rule does not exceed a standard set by federal or state statutory law, the commission has nevertheless drafted a RIA in accordance with the Texas Government Code, §2001.0225.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick commented that the proposed rule is clearly a major environmental regulation under the Texas Administrative Procedure Act (APA). The comments above and below provide the basic arguments for why §2001.0225 applies. Moreover, TNRCC has taken over two years to develop the rule. Unlike any other TNRCC rule in the 1990s, this rule package has been the subject of several large and complex concept documents and proposals. The proposed TRRP would apply to almost all environmental programs and, as is explained in these comments, would change both the basic presumptions for future cleanup and the long term impacts on public health and the environment. The TRRP would apply to thousands of sites in Texas. A full cost-benefit analysis is required TNRCC's analysis is flawed and clearly biased to get the answer TNRCC wanted. TNRCC is incorrect in its analysis on every section. There is no law that requires these rules. Instead, TNRCC is relying upon its overall general authority, as reflected in general and specific laws related to management of contamination in the environment. The analyses like those done by TNRCC, including the two analyses included in Attachment 6 make it clear that even TNRCC sees the TRRP as a major environmental regulation.

The commentor states that the rule is a major environmental rule that requires a full cost-benefit analysis under §2001.0225.

Although the commission is uncertain whether the degree of impact the rule might have on the economy, sector of the economy, productivity, competition, jobs and the environment will rise to the level of a material adverse effect, the commission completed a draft RIA that was published with the proposed rule. The draft RIA included a cost-benefit analysis as required by §2001.0225 of the Texas Government Code. The draft RIA also invited public comment relating to it.

The commentor states that the commission's analysis with regard to the applicability standards in §2001.0225(a) of the Texas Government Code is flawed, that no law requires these rules, and that the commission is relying on general authority to adopt these rules.

The commission disagrees with the commentor. The commission has specific statutory authority to adopt these rules. These statutory provisions are listed in the "Statutory Authority" sections of the proposed and adoption versions of the rules. Although this rule does not exceed a state or federal law, exceed a delegation agreement or is adopted solely under the general powers of the commission, a draft and final RIA was prepared in accordance with §2001.0225.

Concerning the RIA, Henry, Lowerre, Johnson & Frederick commented that a full review and preparation of comments on the RIA would take longer than provided by TNRCC for the comment period and that the RIA raised a number of valid issues, but justifies the rules based on the decision sought, rather than providing a valid assessment of the impacts and the alternatives.

The commentor states that a full review and preparation of comments on the RIA would take longer than provided by the comment period for the rule.

The Texas Government Code, §2001.023 requires that a state commission provide at least 30 days notice of its intention of adopting a rule before it adopts the rule. The commission initially provided 30 days and then extended the comment period an additional 15 days.

The commentor states that the RIA raises a number of valid issues, but is concerned that the commission justifies the rule based on the decision sought, rather than providing a valid assessment of the impacts and alternatives.

The commission disagrees. Section 2001.0225(b) requires that the RIA identify the problems the rule is intended to address, determine whether a new rule is necessary to address the problems, and consider the costs and benefits of the proposed rule in relationship to state agencies, local governments, the public, the regulated community, and the environment. Section 2001.0225(c) requires the commission to identify the costs and benefits of the proposed rule, describe the reasonable alternatives, identify data methodology used in performing the analysis, and provide an explanation of whether the proposed rule specifies a single method of compliance. The cost-benefit analysis, both quantitative and qualitative, can be found on pages 15 - 59. Alternatives that were considered by the commission are located on pages 59 - 76. These alternatives include those from the 30 TAC, Chapter 334 and Chapter 335 rules, concept papers, the public, and the comments received from the May 1998 proposal, as well as other sources.

Concerning the RIA, Chevron commented concerning Part A: PST Cost Projections. The TNRCC evaluated 12 PST sites and indicated that the proposed rule generally represents no cost increase when evaluated under existing rules. However, the majority of the case scenarios presented resulted in either additional assessment (on & off-site (& possibly deed recordation)) and/or monitoring for sites that would have closed under the existing "Exit Criteria" or Plan B Risk Assessment. As an example, a Priority 4. One site closed under the exit criteria would cost approximately \$42 million for the assessment, personnel, monitoring, analysis, and reporting activities. Under TRRP, this same site would cost approximately \$129 million for closure under remedy Standard. B. Several of TNRCC's examples indicated that additional

assessment would be required to satisfy the proposed TRRP's horizontal delineation requirements, whereas under current PST, the sites would have closed under Exit Criteria. This alone will result in significant cost increases. Chevron remains willing to work with the TNRCC to further develop the cost scenarios/comparison between existing and proposed rules before finalization of the RIA.

The commentor is not fully characterizing the language in the draft RIA. The RIA very clearly states: "Generally, the proposed rule is often not expected to result in increased costs for remediating contaminated soils. For low risk groundwater remediation, costs may increase for monitoring if plume management zone or natural attenuation remedies are viable. Costs may increase further if plume management zone or natural attenuation remedies are not viable, resulting in active remediation as a default remedy." Further, the commission on page 24 TexReg 2238, left column, paragraph 1, of the March 26, 1999, proposal states: "For participants in the Petroleum Storage Tank program, the cost may or may not increase . . ." Further, on the same page under the Site Assessment the commission states: "Petroleum Storage Tank Remediation Program: Costs are expected to remain level or increase." Under Remediation, the commission states, "Petroleum Storage Tank Remediation Program: Costs are expected to remain level or increase. For groundwater sites, costs may increase if there is no landowner consent for a plume management zone or natural attenuation is ineffective. For soil-only contaminated sites, generally no increase in cost is anticipated." Under Monitoring, the commission states "Petroleum Storage Tank Remediation Program: Costs are expected to remain level or increase. Costs will increase with plume management zone or natural attenuation remedies." Also, on page 24, TexReg 2396 of the draft RIA, second sentence, last paragraph, the commission states: "However, for the PST Program, the proposed rule generally represents no cost increase or a potential increased cost when evaluated for releases typically addressed today under the existing rules." The draft RIA was up front about cost implications to the PST program.

Concerning the RIA, Chevron commented that historic data collected under the existing requirements should be fully eligible for use in future activities performed under the TRRP. Unless historic data can be relied upon, significant resources will be expended on data re-generation and re-verification, without improving the end result quality. Unless significant changes are made to the applicability provisions to alleviate all of these adverse cost impacts, the TNRCC is statutorily required to identify and adequately assess and document the benefit derived from the greater expenditure of resources and time.

The rule does not change the benchmark for data acceptability. The fact of the matter is that not all data will meet performance expectations under TRRP. However, if there is a general concern with data quality under this rule, then it is more likely than not that a legitimate data quality issue exists for that same data under the current rules. Persons to date have often not been generally mindful of performance objectives/requirements or data quality. As the commission moves further into risk-based decision making, then the integrity of the data becomes more and more important. In fact, the commission issued guidance in July 1998 for the current TRRP as a measure to curb frequent unacceptable data quality issues realized under the current rules. The viability of historical data is best evaluated on a case-by-case basis just like the submission of new data. However, the commission understands that reasonable discretion, site risks, prior regulatory review, and performance requirements in place at the time of data collection are factors to consider. The commission also notes that old data that meets TRRP QA/QC requirements may be used.

Concerning the RIA, Chevron commented that as to the scope of the notification process, it does not seem consistent with the agency's purported streamlined approach in the proposed rule. The Draft Regulatory Impact Analysis (Draft RIA) accompanying the proposed rule fails to recognize that the proposed variance process goes far beyond federal requirements under the National Contingency Plan (NCP) and the statutory requirements relating to public involvement at State Superfund sites.

The commission disagrees. First, this rulemaking is not applicable to the federal Superfund program other than that it shall apply as an applicable or relevant and appropriate requirement (ARAR). With that stated, 40 CFR, §300.430, is a regulation, not a statute, and therefore the rule is not beyond the federal statutory requirements. With regard to statute, §9617 of Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA) regarding Public Participation is general in nature and these rules do not exceed that generality. However, speaking to federal rule requirements, 40 CFR, §300.430(c) has only nonspecific performance-based requirements concerning community relations that could be implemented in a fashion more stringent than this rule. Upon a close reading of 40 CFR, §300.430 it is readily apparent that the requirements are very much intended to integrate community involvement into the process. The regulations specifically discuss interviews, formal community relations plans and §300.430(c)(2)(ii)(A) specifically states: "Ensure the public appropriate opportunities for involvement in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of a remedy." Therefore, the variance process in §350.74(j)(2) falls within the federal rule requirements of providing for community input and certainly is no more stringent. Additionally, with regard to timing, the rule has been amended at §350.74(j)(2)(B) to make it clear that the variance request is not required at the front end, but rather at the time approval of the PCLs is requested which could be submitted as part of the response action plan (RAP) similar to the federal Superfund process. The person is also referred to the response to comments regarding §350.74(j)(2)(B).

With regard to the state Superfund process, §361.1855 of the Health and Safety Code provides for public meetings. The commission concedes that the requirement to provide direct notice to adjacent landowners and some of the additional parties as listed in §350.74(j)(2)(E) is in minor aspect more stringent than §361.1855.

Concerning the RIA, Environmental Fuel Systems, and Industry Council on the Environment (ICE) commented that with respect to PST program issues, ICE wishes to register three broad points in general terms. First, TNRCC's Financial Impact Analysis of the proposed rule appears to agree with industry's 1998 evaluation, which indicated that TRRP rule implementation would increase PST-related site assessment costs by a factor of two to three on the average site. Further, TNRCC staff apparently do not recognize the costs associated with such institutional remedies as deed notices, third-party landowner concurrences, and restrictive covenants. ICE believes that the cost of obtaining many of these controls will be prohibitive, and will in fact drive active remediation of soils and ground water to near-background levels.

The RIA provides cost impact analyses which reflect potential cost increases to the PST regulated community. The commission acknowledges that the costs associated with institutional controls will increase costs as they are typically not required under the current PST Rule. The costs for a person to obtain the institutional controls would not be more than the difference between the cost of remediation with controls and the cost of remediation without controls. In some cases this increment could be limited further by the value of the property if it were uncontaminated (i.e., full property value). The commission recognized this cost impact and included provisions in the proposed rule to allow the use of monitored natural attenuation and relaxation of the institutional control provision from a ten-year to a 15-year provision with potential for the institutional control requirement in §350.31(h) to be waived. These provisions provide some opportunities for the PST regulated community to contain costs.

Concerning the RIA, Environmental Fuel Systems, and ICE commented that the agency claims in its regulatory and financial impact analyses that any costs of obtaining deed notices and restrictive covenants, or any diminution of property value, are related to the actual presence of contamination. In the PST program, TNRCC has not enforced requirements for notification, deed notices or consent, whether or not it has the current authority. This could be interpreted as an attempt to safeguard the Reimbursement Fund,

because agency staff probably understands the costs of such activities and their consequences. Yet, when the fund is no longer in play, TNRCC appears to ask for the more aggressive and cost-intensive actions described above - or, by implication, to clean sites up more aggressively than has been done in the last five years.

In light of these points, ICE suggests again that the TRRP Rules-which have been created to harmonize assessment and remedy for all TNRCC waste programs-fail to treat the simplest of these programs, PST, in a fair manner. Since PST was the program used to pioneer risk-based assessment in Texas, why not leave it to continue operating within its current rules and guidance?

The commission notes that the timing of the adoption of this rule and the sunset of the PST Remediation Fund are purely coincidental, albeit it may be unfortunate timing. The commission began this rulemaking in 1995 with an initial goal of adoption within one year. At that time, there was no sunset to the PST Remediation Fund. The rulemaking has taken greatly longer than anticipated and the legislature has since adopted PST Remediation Fund sunset statutes. This rulemaking represents a shift in focus for the PST corrective action program so that the commission can manage all of the corrective action programs in a like fashion for the reasons stated in pages 24 TexReg. 2375 - 2384 of the draft RIA. As to costs, the commission notes that it did not intend that this rule be adopted at the time of the PST Remediation Fund sunset and that, thanks in part to the fund, most PSTs should be in good shape and not leaking by the time this rule becomes applicable to them in 2003.

Concerning the RIA, Environmental Fuel Systems, and ICE commented that it appears that the general requirements for assessment still demand acquisition of significantly larger volumes of data before one can proceed to the next step in the TRRP process. In the rule preamble, a cost analysis of PST-related sites has been performed by TNRCC staff. This indicates that average costs for PST assessment and remediation will increase by at least two to three times, and we contend that staff has underestimated the cost increases for lab work and institutional control remedies.

The commission disagrees that laboratory costs were neglected. Additional laboratory costs were factored in for all additionally required assessment and monitoring. In general, the performance of the PST program on many fronts, including laboratory QA/QC has been better than realized under other program areas and therefore costs are expected to remain approximately the same, with the exception that more samples may need to be collected as a function of further assessment and monitoring. The commission acknowledges that institutional control costs were not specifically addressed in the PST examples as the commission does not have any first hand knowledge of the cost of filing institutional controls. To compensate for the lack of knowledge regarding the cost of institutional controls, the examples did not rely only on institutional controls. The costs for a person to obtain the institutional controls would not be more than the difference between the cost of remediation with controls and the cost of remediation without controls. In some cases this increment could be limited further by the value of the property if it were uncontaminated (i.e., full property value). The draft RIA was soundly completed.

Concerning the RIA, ICE commented that to estimate the costs of keeping an LPST case open and in long-term ground-water monitoring, one might assume annual sampling and gauging of six monitoring wells with a once-yearly report being sufficient. Each of those 15 years a responsible person is going to pay \$2,000 or so, hoping to meet the goal of closing the LPST case through monitored natural attenuation. Without figuring time value of money, that's \$30,000 in direct costs, not including the submittal of reports to TNRCC every third year. A \$40,000 price tag is more realistic, but what is accomplished through that process?

The commission agrees that if annual sampling and reporting are conducted, then such costs may be realized. However, given that the LPST scenario is using a monitored natural attenuation program, the situation must be that it is a low risk site and a plume management zone could not be established for whatever reason. Therefore, the remedial goal is restoration. When assuming a typical LPST benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminant issue, if the BTEX plume is determined to be declining in extent early on (i.e., naturally attenuating), then very infrequent monitoring may be all that is required. Additionally, there would likely be no basis to sample but on an infrequent schedule such as every three years. With this in mind, costs could be greatly less than the conditions noted by the commentor. The frequency of monitoring should reflect the rate at which the plume is attenuating. If it is declining at a slow rate, it would likely make more sense to let a sufficient period of time to lapse between events to allow time for the plume to attenuate. Monitoring may increase in frequency as the concentrations approach the PCL. To compress the remedial life span, source area remediation may prove effective. The commission has acknowledged in the draft RIA that costs and time spans would often be increased for the PST program.

Concerning the RIA, Ranger commented that Mr. Minick has asserted that for the first five years that the rules are in effect, the public will benefit from the "improved consistency and clarity in existing regulations governing the cleanup standards for contaminated properties." Ranger does not believe that the proposed rules are clear at all. Rather, Ranger believes the proposed rules to be unnecessarily voluminous, complex, and inflexible. Any rule package which requires nine pages of acronyms (see §350.2 Definitions and Acronyms) cannot be accurately described as clear. It is Ranger's opinion that these rules will create significant confusion, and will set back environmental protection and site closures for the first several years that they are in effect while the regulated community and TNRCC staff are attempting to learn and interpret them.

Concerning the RIA, Ranger commented that they find it perplexing that the TNRCC has presented the proposed rules as a simple, straightforward and cost savings rule package, while all of the TNRCC technical staff that Ranger has discussed this matter with agree with Ranger that there is nothing simple, straightforward, or cost effective about the proposed rule package. This being the case, these rules can do nothing but harm the economy of the state, with the most severe impacts obviously being upon the small to mid-size businesses that are regulated by the TNRCC in the various program areas.

Concerning the RIA, Ranger commented that Mr. Minick has stated that the public will benefit as the proposed rules will be more cost effective than the current cleanup rules utilized by the TNRCC. Mr. Minick did acknowledge that "In some cases, the cost of the analysis and development and justification of a remedy under the proposed rules may be greater than similar costs under existing rules. These cost increases, however, will be justified by owners and operators seeking to determine cost effective cleanup options and should be offset by the cost savings realized by utilizing the risk based options offered under the proposed rules." Ranger does not believe that the above statement was prepared based upon an accurate cost analysis of the proposed rules. Ranger has been made aware of conversations with TNRCC PST Division management personnel who stated that they expect that the new rules will increase the costs of an initial site assessment/risk evaluation for a PST site to increase from the current approximate cost of \$10,000-\$20,000 to \$60,000-\$80,000 . As the TNRCC is aware, the vast majority of regulated sites are presently closed without any actual cleanup using the existing RBCA rules and guidelines. Only a small percent of sites are currently required to conduct actual site cleanups, and these sites typically contain PSH or have impacted a usable groundwater resource. Ranger does not believe that the percentage of sites currently requiring cleanup will be lessened under the proposed rules. Thus, the net result of the proposed rules will be to greatly and unnecessarily increase the cost of site corrective actions, without providing any additional benefit to human health and the environment.

Concerning the RIA, Ranger commented that Mr. Minick stated that "a more general savings in cost is anticipated to result from the overall clarification and simplification of the regulations governing cleanup standards." As stated above, the proposed rules are far more complex and difficult to understand than current TNRCC cleanup requirements. Ranger has had conversations with TNRCC technical staff who stated that due to the length and complexity of the rules, they could not even complete a reading of the rules, much less to understand the portions which they had read. These statements from the TNRCC personnel who will actually be charged with implementing the rules certainly contradict Mr. Minick's statements, and appear to be more accurate than Mr. Minick's statements.

Concerning the RIA, Ranger commented that under the "Fiscal Note", several presentations are made concerning costs comparisons of current costs on projects versus costs associated with the proposed rule changes. Please note, in our professional opinion and experience regarding the pricing of both current and future jobs, the costs presented are both incorrect and misleading. TNRCC costs were obtained using cost guidelines garnered from the TNRCC Reimbursable Cost Guideline Document. TNRCC staff within the PST reimbursement group state on a regular basis that the costs outlined in this document are not actually costs for what it will take to complete a job; they are simply the costs the TNRCC will reimburse. Therefore, our opinion is that the Fiscal Impact for this rule package is incorrect and therefore, the entire rule package should be rescinded and presented in the future with a true cost analysis.

Mr. Minick's Fiscal Note analysis was not published with the rule proposed in March, 1999. Mr. Minick's analysis covered a previous version of the rule which has been superceded by the proposed rule of March, 1999. The current proposed TRRP Rule includes an updated Fiscal Note analysis.

The commission has not yet conducted any training and staff have only had limited access to the rule thus far. The rule is comprehensive, but it does not contain nine pages of acronyms. The rule contains less than one page of acronyms. Like any new rule, all involved will experience a learning curve and need to make a specific effort to become educated with the rule. Further, persons may need to attend training. The purpose of the rule is to impart uniformity to the corrective action process. The rule will do that.

Mr. Minick did not prepare the fiscal note; however, the commission has been up front with regard to cost implications for the regulated community. The commission also acknowledges on page 24, TexReg 2400 in the second sentence of the first paragraph that the rule will have an impact on sites that may today close without remediation (i.e., low risk sites). The commission stands behind the basis of cost analysis. The costs are based on demonstrated reimbursable costs, are reflective of costs developed from market surveys and show a clear relative cost relationship between the existing rule and this rule. Clearly, there are companies who charge more than others and there are companies who charge more than the costs contained within the Reimbursable Cost Guidelines. The cost may not be actual dollars, but fully demonstrate relative costs between the two rules, which is the best that can be done and fully meets the requirements of the Government Code. The actual dollar amount is only known after money is spent. With regard to the Reimbursable Cost Guidelines, the commission disagrees that the Reimbursable Cost Guidelines will be revised as a consequence of this rulemaking. It may compel some additional work, but it is more of the same work completed to date and as such it does not change the corrective action cost structure. Further, this rule is not based on increased sophistication over the existing PST Rule. In fact, over the development of this rule, it has become apparent that the most sophisticated human health site analyses are routinely conducted under the PST Program. Further, because of the current PST Reimbursement Fund eligibility deadlines established by the legislature and the timing of the effective date of this rule, this rule is not applicable to any responsible party lead LPST site which is eligible for reimbursement from the PST Remediation Fund.

The commission further responds that it appears the commentor is only considering costs to the regulated community, which is only one facet of the public. As to fear of litigation, the commission also responds that the basis of the litigation is the contamination. Without the contamination, there is no basis for this rule to be applied to a site. The commission is charged with protecting the public, now and in the future, from contamination which has affected the waters, air, and soils of the state. As such, the commission is shifting the long term management strategy of the PST Program to resolve inequities between current program areas, to increase the focus on long term natural resource management and protection, increase the assurance of future notice, and respond to the legal change resulting from the innocent owner/operator statute. Those parties who have taken advantage of the existing program will likely not be regulated under this rule, unless they suffer a future release. If those tank systems are properly operated and managed, those future releases will not be as extensive as was the case prior to the advent of the PST Program. Those persons who have not yet taken advantage of the existing rule still have four years to do so. If this specter of the rule results in immediate increases in compliance with the existing rule, then the commission considers that an unanticipated benefit.

Concerning the RIA, Ranger commented that in the cost analysis, no realistic cost comparisons were presented which detail all the anticipated costs for offsite management plans which will include substantial legal and site access costs.

With regard to offsite management plans, the commission surmises that some of the legal cost concerns stem from the required notification. The PST program already requires persons to inform others of the presence of contamination on their property. The commission acknowledges that site access costs have not been considered, so persons should increase the projected costs by a representative amount. The commission also notes that the problem of site access is an inherent part of the corrective action process, and for sites under the current TRRP, costs should be less due to the limiting of assessments to risk-based levels as opposed to background. Costs in regard to institutional controls have been addressed elsewhere.

Concerning the RIA, Environmental Resources Management commented that they believe the proposed TRRP does indeed trigger the Major Environmental Rule and Fiscal Note provisions of the Administrative Procedure Act. We respectfully implore the agency to correct the proposed rules to mitigate their economic impact, and to reinstall in the program the essential incentives for encouraging voluntary cleanup which will protect human health and the natural resources of Texas. More specifically, it appears that TNRCC staff have overestimated the investigation and remediation costs under the existing rules. We believe that the staff have relied on conjectures and assumptions in its recently published risk reduction guidance document instead of the actual requirements of the existing rules as they had been consistently implemented at numerous sites prior to 1999. (For example, for the assumed West Texas Superfund site, it is unlikely that natural attenuation would be allowed with ground water exceeding PCLs in off-site areas.) The guidance document was written theoretically to promote consistency and, in doing so, the agency adopted as guidance the very same flaws included in the proposed rules. In essence, these flaws in the name of "consistency" have eliminated the flexibility in the rules under what are currently referred to as Standards 1, 2 and 3.

The commission indicated in the preamble that this rule was treated as a major environmental rule for purpose of preparing a draft RIA but concluded that the rule did not meet the four criteria of Texas Government Code, §2001.0225(a), any one of which would mandate a RIA. The commission acknowledged that the rule would have impacts to certain sectors of the economy, some more so than others. The commission disagrees that the rule will take away the incentives for encouraging voluntary cleanup. Among other objectives, this rule is intended to remove the uncertainty and inconsistency prevailing in the existing programs. This will lead to a higher degree of predictability for the outcome of a voluntary cleanup. Regarding estimation of investigation and remediation cost

estimates, the staff relied upon data from its own contracting and reimbursing functions for which there is some degree of control over pricing factors. The commentor's assertions regarding the recently published guidance for implementation of the current TRRP are incorrect. The sources for new guidance are well documented and are based on current science. Much of this information was also used as the basis for this rule. Technical appropriateness and correctness should not vary between rules. A methodology is either right or wrong. What the commentor characterizes as flexibility under the existing rules, the commission viewed as deficiencies and shortcomings in guidance, that is, a lack of specificity in any form, guidance or rule, has resulted in staff and users not having known limits of acceptable variability. Considerable flexibility has been carried forward into the new rule with a number of options within the remedy standards and tiers.

Concerning the RIA, Environmental Resources Management commented that the proposed rules will increase site investigation costs and remediation costs for many properties up to 600% or more with no significant benefit. Environmental Resources Management submitted eight case studies to support their claim.

The commission has already stated potential cost implications of this rule in the RIA. The commission has already acknowledged the probability of cost increases within the PST Program and stands behind the draft RIA. Nothing in the analysis by Environmental Resources Management has changed the commission's analysis. The bases for this is noted in the following specific responses to the Environmental Resources Management Case Studies. However, in working through the cost tables again for PST, several mathematical errors were noted. These errors have been corrected in the final RIA, but nothing in those errors changed the conclusions regarding potential costs to the PST community.

Case Study Number1

Potential Effect of Proposed Rule

Site Background:

Prior industrial use of a site in the City of Houston that is proposed to be redeveloped to a community center. Site had underground storage tanks that have been removed. Phase I and II site assessments conducted. Most soils collected were surficial (0-6 inches (in) below ground surface (bgs)). Soils are clayey to about 13 to 15 foot bgs. Ground water at 13 to 17 feet bgs. Sandy clay at 24.5 to 30 foot bgs. Partial excavation of site to one to two feet bgs and removal of buildings before completion of Phase II. Eight deep (15 to 30 foot bgs) borings completed as temporary ground water wells, three of which did not even yield enough water for purging. Conducted a Draft Risk Reduction Evaluation and derived construction worker Cleanup Levels and resident vapor inhalation Cleanup Levels. Main concerns are total petroleum hydrocarbons (TPH) in surficial soil above 950 part per minute (ppm); affected areas are to be excavated. Benzene at 0.9 milligrams per kilogram (mg/kg) at 16 - 18 foot bgs in one sample; benzene at 0.97 mg/L and 1.0 mg/L in two different ground water samples. Site was remediated under VCP. Site was closed as a Risk Reduction Number 3 cleanup by TNRCC in April 1998.

Assumptions under new rule:

1. Assessments of soil have to be done to 15 feet bgs, or depth to ground water if less, for residential land use. Total of 25 new borings.
2. Site will be deemed Class2 ground water for residential use. Will require the setting of points of exposure and protective concentration levels. Remediation scenario will have to include either: 1) plume management zone, 2) remediation by natural attenuation, or 3) active remediation.

3. Additional ground water monitor wells will be needed to define ground water impacts, direction, velocity, plus two will need to be placed in the vicinity of environmental resource management (ERM) 1 and ERM3 (ten total). Quarterly monitoring for all new wells for one year, followed by annual monitoring for natural attenuation and plume management zone options.
4. Excavations will be to five foot bgs because of statistics limitations and 1/8-acre requirements.
5. Active remediation is a pump and treat system, five years of operation and maintenance (O&M).
6. Will need to conduct an ecological risk assessment, \$1,000 for 1st tier.

Conclusions:

The proposed rule would have a significant impact on the scope of work and costs associated with remediation of this site. The most significant changes are due to the change in the definition of surface soil and the classification of ground water, which lead to an estimated increase of \$426,397 to \$506,397 for assessment and remediation, for a total cost of \$827,313-\$907,313. By changing the depth of surface soil, increased costs are incurred with assessment and are assumed to lead to increased excavation requirements. If the site's ground water is classified as Class 2, there are significant assessment and remediation activities because only a very limited sampling of the site's ground water has been conducted to date.

There are no monitoring wells at the site; direction of ground water flow, hydraulic conductivity, ground water velocity, and ground water yield are all unknown. A complete hydrogeological investigation will have to be undertaken as a Class2 site; a moderate amount of hydrogeological characterization would nevertheless be required merely to determine whether a Class3 scenario could be justified (costs not estimated here). There are also some new reporting requirements; depending on their complexity, the aforementioned estimates could be low. In closing, it is doubtful that this site could have attained closure as expeditiously under the proposed rule as under the current TRRP and the VCP.

The commentor's assumptions and conclusions are in error. Specifically, the commentor states that the change in definition of surface soil and the classification of groundwater will lead to a significant increase in costs. First, the commission responds that five of the six assumptions indicate cost increases where there are none. Assumption Number 1 indicates an increase of 25 new borings and provides absolutely no basis for any increase in borings due to rule requirements. The vertical assessment of soils required by the rule does not require that soils have to be assessed to 15 feet below ground surface, or to the depth to groundwater if less, as stated. In fact, in the example provided, groundwater was analyzed and thus the vertical soil assessment requirements could be terminated at the vertical extent of the concentration in soils which is protective of the underlying groundwater. Under the current TRRP (30 TAC 335), vertical soil assessments must be conducted to either the method detection limit or background, whichever is higher so that persons can ensure adequate deed notice. Thus, the TRRP may actually reduce the vertical soil assessment requirements. Under Assumption Number 2, the site is "deemed" class 2 for residential use and it is correctly stated that there are several groundwater response options under the TRRP rule; 1) plume management zone; 2) remediation by natural attenuation; and 3) active remediation. The current TRRP will not allow the "plume management zone" option for residential properties and thus there are only two options under the existing rule for this site: 1) remediation by natural attenuation, and 2) active remediation. Assumption Number 3 states that there will need to be additional wells, however, this is not correct as the assessment requirements for groundwater are the same under the TRRP rule as is required in the VCP. Both require that useable groundwater (e.g., class 2) be assessed to the health-based level. Also, the TRRP rule does not specify monitoring requirements for natural attenuation or plume management zones as the commentor seems to

indicate. In assumption Number 4, there is a reference to the need to excavate to five feet because of statistics limitations and 1/8 acre requirements. The commission is not aware of any statistics limitations in the rule which would require excavation to five feet and further notes that the 1/8 acre requirement is the same under both the TRRP rule and the current TRRP (30 TAC 335) with the Consistency Memorandum. Assumption Number 5 is actually an option chosen by the person responsible for the site and is not a rule requirement thus any associated costs are not due to the TRRP rule. In assumption Number 6, there is a cost estimate to complete a Tier 1 ecological exclusion criteria checklist. The TRRP rule does require that a Tier1 checklist be completed, however, the current TRRP also requires the protection of ecological receptors but does not specify the mechanism. If the person could demonstrate that the actions taken for human health are adequately protective of ecological receptors, then this would satisfy the current TRRP. It is only reasonable to assume some cost to accomplish this requirement for the existing rules.

In conclusion, the commission notes that most of the assumptions which resulted in the increased costs as indicated by the commentor are either not valid or there is no difference between existing rule requirements and those in the TRRP rule. In fact, given the commentor's designation of residential land use and the fact that the current TRRP will not allow the use of a "plume management zone" approach while the new TRRP rule will allow plume management zones on residential property, the TRRP rule may actually result in a cost savings. This is supported by the fact that the potential cost savings of using a plume management zone may greatly exceed the \$1,000 estimated for the Tier 1 ecological exclusion criteria checklist.

Case Study Number 2

Potential Effect of Proposed Rule

Site Background:

Commercial/industrial site in Cleburne, Texas that has manufactured explosive devices. Site had pits (dry) ponds of wastewater, oil-impacted soil. Soils are silty clay; no shallow ground water encountered during investigations that extended to 50 foot bgs. Ground water in region is at greater than 500 foot bgs, so no impacts were considered under the existing rule. Constituents of concern at the site were explosives, volatile organic compounds (VOCs) and TPH. Risk Reduction Evaluation was conducted using an industrial worker scenario. Site was remediated under the VCP. Impacted shallow soils were excavated and placed in burn pit. The burn and disposal pits were then capped. The burn pit and disposal pit were closed under Standard Number 3; the rest of the site was closed under Standard Number 2. Certificate of Completion received from TNRCC in March 1998.

Assumptions under proposed rule:

1. Assessment of surface soil have to be done to 15 foot bg. Site had several borings to this depth already, so only nine additional borings should be necessary.
2. A soil leachate to ground water PCL will not be required, as according to the exception in §350.75(b)(7)C, page 91.
3. Excavation will be to five foot bgs.
4. Will have to conduct an ecological risk assessment, \$1,000 for 1st tier.

Conclusions:

The proposed rule will not have a significant impact on this site, primarily because there is no pervasive shallow ground water at the site and it is highly unlikely that the deep aquifer was affected by past activities. While substantial justification was given for these positions in the Risk Reduction Evaluation Report, the new rules provide no practical mechanism for addressing ephemeral shallow ground water, given the new classifications of ground water in the proposed rule and the classification of yield based on a single well for an area. It is expected the shallow ground water monitoring plan that was submitted as Attachment F to the Risk Reduction Evaluation Report would be required for up to 30 years (we've assumed five years). The plan called for the installation (and sampling if possible) of three wells. The existing risk assessment already considered the industrial worker scenario at the maximum concentration detected in the 0.7-acre exposure area (the burn pit and disposal pit), and the site met those concentrations, so there should be no issue with attaining cleanup criteria. The other areas of impacted soil were considered individually, which is sufficiently close to the exposure area requirement of the proposed rule that there should be no substantial change in conclusions or cost. The major potential cost under the proposed rule would be deeper excavation and deeper soil borings. The proposed rule might increase the cost of chemical analyses by perhaps 5-10% for the increased QA/QC reporting requirements, although that cost was not included in this estimate. Another increase will be the cost of an ecological risk assessment. The total cost for this project may rise by \$22,700 under the proposed rule, to a total cost of \$799,150. Site Number 2 should still be able to attain a Certificate of Completion under the proposed rule as it had under the current TRRP and the VCP.

The commentor makes some correct assumptions about the implementation of the TRRP rules and the resulting cost savings. The ability to not have to develop and assess to a concentration in soils which is protective of the underlying groundwater is a significant cost savings issue. Unfortunately, the commentor makes several assumptions which are incorrect. The surface soils do not have to be investigated to 15 feet as the commentor states. Also, the commentor provides no rationale for excavating to five feet when using the TRRP rule versus capping under the current TRRP (30 TAC 335). The TRRP rule also allows the use of caps and this option could have been chosen for this site. Under either rule, institutional controls would be required. The incorrect assumption which has a significant cost impact is the quarterly monitoring for 30 years. Also, the rule does not state that groundwater classification will be necessarily based upon a single well. The person describes the groundwater at the site as being “ephemeral shallow groundwater” and states that there is no practical mechanism for addressing this kind of groundwater. This is not correct if he means by this that the rule does not clearly state the requirements which pertain to low-yield zones. In order to be a class 1 groundwater resource a groundwater-bearing unit must be capable of yielding groundwater at a *sustainable* rate of greater than or equal to 144,000 gallons per day to a well with a 12 inch diameter casing. Further, in order to be a class 2 groundwater resource a groundwater-bearing unit must be capable of yielding groundwater at a *sustainable* rate of greater than or equal to 150 gallons per day to a well with a four inch diameter casing. Thus, if the groundwater-bearing zone is not capable of yielding at least 150 gallons per day on a sustainable basis throughout the year then it will be classified as Class 3 groundwater with the associated response objectives. If the person had made the demonstration that groundwater is not threatened and that it is unnecessary to develop a protective concentration level for soils to be protective of groundwater, then there does not seem to be any rationale for monitoring groundwater for 30 years as suggested.

In summary, the commission notes that the site can be capped under the TRRP rule in the same manner as indicated under the current Risk Reduction Rule closure and that no additional assessment is necessary assuming the site met the assessment requirements under the current TRRP to define the full nature and extent. The only potential increase in costs may be associated with the Tier 1 ecological criteria checklist and this is suspect, as the person is to protect ecological receptors under the current TRRP also.

Case Study Number 3

Potential Effect of Proposed Rule

Site Background:

Underground storage tanks were removed from an industrial facility. TPH (20,800 ppm) and benzene (2.02 ppm) were detected in the soil and ground water, respectively, as determined through soil borings and monitoring wells. Analyses of on-site surface water indicated no volatile or semivolatile compounds were detected. Additional borings and monitoring wells were placed to estimate the extent of affected soil, bringing the total to 15 borings and nine monitoring wells. Based on the presence and distribution of these constituents, risk assessments indicated that there was no unacceptable risk through potential direct contact with soils using both Trespasser Scenario and Short-Term Excavation Scenario. Based on site-specific conditions, it was unlikely that the ground water would be used as a drinking water source. Therefore, it was assessed that there was no risk to human or aquatic life based on treatment received through natural permeation of the ground water prior to the discharge to a surface water source. The site was closed without remediation. The cost of this assessment, which was part of a much larger project for the client, was \$99,000 .

Assumptions:

1. Investigation of the soil would require dividing, the site into six soil exposure areas of 1/2 acre each. (§350.51 (3)-(4))
2. Due to sampling requirements proposed by the new TRRP, there would be a minimum requirement of five samples, applied to each of the six soil exposure zones. The total number of surficial and subsurface soil samples for the entire property is 30 each. (§350. 51 (1)-(2))
3. The soil contact scenarios chosen for the risk assessment would not have been allowed. Instead, an Industrial Worker Scenario, which is a much more conservative scenario, would need to be implemented for this commercial/industrial site. (§350.71 (b)(4))
4. Under this scenario, and with the revised definition of surficial soil (from 0 - 2 feet under the current TRRP to 0 - 5 feet under the proposed TRRP), the affected soils would have required remedial action. The soils would need to be addressed.
5. The ground water (at 10 - 15 feet, with a hydraulic conductivity of 2.786×10^{-3} cm/sec and a yield greater than 150 gal/day) would have likely been categorized as a class 2 ground water source. (§350.52 (2))
6. To verify this, an investigation of all facilities within 1/4 mile, to unveil any useful environmental information, and a field survey, to locate all water wells and receptors with 500 feet of the facility, would be required. (§350.51 (i) - (1))
7. As a class 2 ground water source, the ground water would have had to meet drinking water MCL requirements (0.005 mg/L for benzene), thus remedial action would have been necessary. (§350.52 (2))
8. There are two options: a) natural attenuation; and, b) active remediation (as proposed in the Cost Analysis section of the proposed TRRP and its associated documents).
9. Under the natural attenuation scenario, the soil would require attention to prevent erosion and migration of constituents of concern off-site. The method chosen is the application of vegetative cover. (§350.33 (e)(2)(A))

10. In consideration of naturally attenuating ground water, a plume management zone would need to be established. Without the benefit of relevant supporting data, it is assumed that the ground water meets all the requirements for a plume management zone outlined in the proposed TRRP. (§350.33 (f)(4)(F)(i))

11. Since this site is not owned by a small business, the owners of this site would be required to demonstrate financial assurance on this site for the entire duration of the monitoring period, estimated by the proposed TRRP to be 30 years. (§350.33 (h))

12. In the case of active remediation, it is proposed that the affected soils be removed and capped, and the ground water be treated through a pump-and-treat system, supplemented by product recovery.

13. For the affected soils, additional depths would be tested and, based on the available data and the presence of constituents of concern in ground water, require action to a greater depth than under the current rules. The assumed depth of affectedness is five feet (as a result of the Industrial Worker Scenario). (§350.71 (b)(4))

14. The affected soils would have to be excavated and treated prior to use anywhere else, on-site or off-site. (§350.36 (b))

15. A geosynthetic clay liner (GCL) cap with bedding and liner, with topsoil and vegetation would be constructed to protect the migration of constituents of concern contained within the subsoil from migrating into the ground water and altering the stability of the plume management zone. (§350.33(f)(3)(c))

16. In terms of ground water remediation, it is not required to establish a plume management zone to implement an active remedial action, however, to fully understand the nature of the affected ground water and to assess whether post-action care standards are to be met, all the necessary steps of establishing a plume management zone are to be implemented. (§350.33 (g)-(m))

17. Based on the extent of the affected area, an 200-foot interceptor trench and a pump-and-treat system would be implemented to contain and remove product to an acceptable concentration.

Proposed rule requirements:

Additional borings and monitoring wells; establishment of six soil exposure zones; additional surficial soil, subsurface soil, sediment, ground water, and surface water samples are required. The scenarios under which the risk analyses are executed are more stringent, especially considering that the surficial soil depth is five feet and all industrial soils require risk assessment with the Industrial Worker scenario. If there were the option granted for natural attenuation given the available data, migration prevention measures would entail a cost of \$227,600. More likely, active remedial actions would be initiated, due to the more conservative state mandates, and the cost for investigation, remedial action and monitoring would be \$1,135,900 million .

This particular case study is very confusing and numerous details presented conflict with each other. However, the commission is attempting to address the issues presented to help the commentor better understand the current Risk Reduction Rule and the TRRP rule. The commission also assumes this case study is a hypothetical example and not an actual contamination event as an actual site so "closed without remediation" would most likely be in violation of existing rules.

A discussion of the assumptions follows:

1. The TRRP rule does not require the use of exposure areas, this is optional and only pertains where the person desires to use statistics to develop representative concentrations. Also, the use of exposure areas is the same under both rules when considering the Consistency Memorandum.
2. There is no minimum sampling requirement in the rule as the commentor suggests.
3. The soil contact scenarios presented are not allowed under either the current Risk Reduction Rule or the TRRP rule.
4. The TRRP rule does extend the depth where it is assumed that a worker may contact soils on commercial/industrial properties from two feet to five feet. This may require additional remediation where the protective concentration in soils is driven by direct contact with soils (i.e., dermal contact, ingestion, and inhalation of volatiles and particulates), rather than protection of the underlying groundwater.
5. The groundwater as described could be classified as class 2 in the TRRP. However, the existing rules also classify this groundwater as useable and require an appropriate response. Proper application of the current TRRP does not allow site-specific conditions to be used to make a determination that it is "unlikely that the groundwater would be used as a drinking water source."
6. The requirements to conduct the receptor survey are stated correctly.
7. The TRRP rule does not require that class 2 groundwater is remediated as stated but allows for the creation of plume management zones, in appropriate situations.
8. The commentor only lists two of the options available for class 2 groundwater. As clarified in Number 7 above, plume management zones may be utilized for class 2 groundwater.
9. The commission clarifies that if it is necessary to address soils to prevent erosion and migration of contaminants off-site, then this should be done under both the current Risk Reduction Rule and the TRRP rule. The discussion on this case study and the documented costs seem to indicate that the commentor's original plan allowed these contaminants to be washed off-site. Clearly, such actions are in violation of State law and should not be allowed.
10. The TRRP rule does not require that a plume management zone be established when natural attenuation is used as a decontamination remedy to obtain Remedy Standard A.
11. Financial assurance is not required at this site and is only required for physical controls.
12. The remedies discussed under this assumption are options which the rule allows but does not compel.
13. The commentor appears to suggest that if contaminants are in groundwater, then the rule requires that soils be cleaned to a greater depth than what would be required under the current Risk Reduction Rule. This is not correct. There is no explanation provided for such action. Even increasing the depth for surface soils under the commercial/industrial land use does not mean that all soils within five feet of the surface have to be excavated. They may be capped as necessary.
14. The rule requirements for soil reuse are meant to increase the ability to reuse soils and in fact, the soils do not have to be treated prior to reuse unless there are more stringent federal requirements, such as the Land Disposal Restrictions. Otherwise, the soils may be placed such that Remedy Standard B is met for the new location.
15. The actions discussed to protect the underlying groundwater are necessary no matter which rule is used.

16. The actions necessary to "fully understand the nature of the affected groundwater and to assess whether post-action care standards are to be met" should be conducted under both rules and therefore there is no cost increase.

17. The actions chosen are certainly available options but are not required per se by the rule. The TRRP rule clearly allows the person to choose the most cost effective response actions.

The additional costs indicated by the commentor are not supported when evaluating what actions should have been conducted at the site under the current TRRP (30 TAC 335). In particular the commentor seems to indicate that as closed under the existing rules, the groundwater plume was left to expand uncontrolled, contaminated soils were allowed to be washed off-site and essentially, the site is only protective for a trespasser or short-term excavation construction worker. The majority of the increased costs indicated by the commentor are the result of actually addressing site risk such that the property is safe for actual use by a site worker and not the result of the new TRRP rule. The costs to address the contamination under the TRRP rule could actually be less than under the current TRRP due to the ability to allow plume expansion within a plume management zone. The policy under the existing rule is to require that the plume not be allowed to expand, which means that groundwater concentrations must be remediated to a concentration which can migrate without controls and not exceed the drinking water level at the current leading edge of the plume. The TRRP rule will allow for additional plume expansion and thus a higher concentration may be allowed to remain within the plume and still not exceed the drinking water level at the new leading edge of the plume. This higher concentration means possibly no remediation in the groundwater or, at least, less remediation will be required. Without more site-specific information, it is not possible to determine if this reduction in costs will offset any increase due to TRRP (i.e., potential additional remediation to address surface soils to five feet and the costs of a receptor survey).

Case Study Number 4

Potential Effect of Proposed Rule

Site Background:

A former gas station was sold to a commercial facility. During the performance of a Phase I Environmental Site Assessment, historical sources of TPH and benzene in subsurface (below five feet) soil and ground water, a six foot deep lens which lies 12 to 15 feet below ground surface. Constituents were detected on the subject property and adjoining properties. Six underground storage tanks were identified and removed. Two hundred fifty cubic yards of affected soil were excavated and disposed at a hazardous waste landfill. Subsequent soil monitoring indicated that levels of constituents remained unacceptable and an additional 250 cubic yards were removed. As a result of this second event, constituents were below levels of detection. A human health risk assessment indicated that levels of constituents in ground water were within acceptable levels. To verify this, an investigation of all facilities within 1/4 mile, to unveil any useful environmental information, and a field survey, to locate all water wells and receptors with 500 feet of the facility, were conducted. Two additional monitoring events occurred over the next six months, indicating the plume had stabilized to an acceptable level. The site was subsequently closed. The cost for the project was \$18,500.

Assumptions:

1. The ground water (TDS < 10,000 mg/L, yield < 150 gal/day) would have likely been categorized as a class 2 ground water source under the new qualifications. (§350.52 (2))
2. As a class 2 ground water source, the ground water would have had to meet drinking water MCL requirements (0.005 mg/L for benzene), thus remedial action would have been necessary. (§350.52 (2))

3. There are two options: a) natural attenuation; and, b) active remediation (as proposed in the Cost Analysis section of the proposed TRRP and its associated documents).
4. Under the natural attenuation scenario, the soil would require attention to prevent erosion and migration of constituents of concern off-site. In the commercial/industrial setting of this site, methods would be limited to isolating affected soils and preventing water moving over exposed soil through the use of impermeable liners. Periodic rotation of the soils would decrease isolation time. (§350.33 (e)(2)(A))
5. In consideration of naturally attenuating ground water, a plume management zone would need to be established. Without the benefit of relevant supporting data, it is assumed that the ground water meets all the requirements for a plume management zone outlined in the proposed TRRP. (§350.33 (0(4)(F)(i))
6. Since this site is owned by a small business, the owners of this site would not be required to demonstrate financial assurance on this site for the entire duration of the monitoring period, estimated by the proposed TRRP to be 30 years. (§350.33 (h))
7. In the case of active remediation, it is proposed that the affected soils be removed and capped as was executed under the current rules. The ground water would be treated through a pump-and-treat system, supplemented by product recovery.
8. For the affected soils, additional depths would be tested and, based on the available data and the presence of constituents of concern in ground water, require action to a greater depth than under the current rules. However, since soils were removed twice and constituents were below levels of detection, no additional work would have been required. (§350.71(b)(4))
9. In terms of ground water remediation, it is not required to establish a plume management zone to implement an active remedial action, however, to fully understand the nature of the affected ground water and to assess whether post-action care standards are to be met, all the necessary steps of establishing a plume management zone are to be implemented. (§350.33(g)-(m))

Proposed rule requirements:

Two additional monitoring wells would be required to establish the vertical and horizontal depth of the plume; additional surficial soil samples are required. The scenarios under which the risk analyses are executed are more stringent in terms of MCLs for ground water categorized as class 2. If there were the option granted for natural attenuation given the available data, migration prevention measures would entail a cost \$181,600. More likely, active remedial actions would be initiated, and the cost for investigation, remedial action and monitoring would be \$238,450.

**The case example contains some errors in the assumptions regarding the application of this rule.
With regard to the specific assumptions:**

1. The groundwater is stated to have a TDS content less than 10,000 mg/l and a yield of less than 150 gpd. Section 350.52(3) specifically states that a groundwater yield less than 150 gpd qualifies as a class 3 groundwater. The only possible modifying factor is if the groundwater COCs are in sufficient proximity to a water well such that the COCs could impact the well (§350.52(2)(A)). The case scenario indicates that a receptor survey was completed for the current rule, as would be required under this rule, but does not indicate that wells were present. Therefore, the commission presumes no wells were present and thus, the groundwater is class 3.

2. From the information provided, the groundwater is class 3, not class 2, and as such the benzene PCL is 0.5 mg/l.

3. No concentration information was provided, and no case reference was provided so there is no way to determine what actual site concentrations are. Therefore, the commission assumes that no further action would be necessitated, and therefore, no additional costs are incurred over that spent. However, if groundwater benzene concentrations do exceed 0.5 mg/l, then further corrective action would be necessitated. However, there are actually three possible options: (1) plume management zones; (2) natural attenuation, or (3) active remediation.

4. The commission is perplexed by this comment. If there are unprotective concentrations eroding from the site, then that is the situation under the current rule as well. This rule would not have any additional increased impact in that regard. It is not acceptable under the current rule (see 30 TAC §334.203(1)(A), (J)(iii), (K), and (O); 30 TAC §334.203(2)(A), (I), (K) and (N)) and PST guidance (see the Site Conditions Section under the Exposure Setting Characterization of page 26 of the PST guidance document *Risk-Based Corrective Action for Leaking Storage Tank Sites*, RG-36, January 1994) to allow unprotective concentrations of COCs in soils to erode from a site. Further, the case scenario description and assumption 8 indicate that contaminated soils have already been excavated to below levels of analytical detection, so it is not apparent why the commentor presumes soil remediation is necessitated under this rule.

5. Plume management zones are the remedial solution. In this rulemaking, monitored natural attenuation is a remedial alternative to remediate the PCLE zone (i.e., to 0.5 mg/l in this case scenario). If a plume management zone is used, then no additional costs are anticipated as the commentor states that sufficient data had already been collected to demonstrate the plume is steady state. Therefore, the plume management zone should be intact and persons could seek no further action under §350.33(i)(1). Given that the case scenario is likely a fuel hydrocarbon plume since the site is a former gasoline station, and such plumes are most commonly steady state or declining in extent based on the 1997 Texas Bureau of Economic Geology Study *Extent, Mass, and Duration of Hydrocarbon Plumes from Leaking Petroleum Storage Tank Sites in Texas*, GC97-1, the commission anticipates alternative monitoring to the three-year standard would be allowed. No details were provided regarding landownership, therefore the commission assumes the groundwater PCLE zone is on-site and that the person owns the property and the person is able to file the necessary institutional controls.

6. Financial assurance is only required when a physical control is used as a remedy under Remedy Standard B. The commission agrees that if the person is a small business, there is a potential reduction in the amount of financial assurance that would need to be demonstrated. However, given the commission's points in response to assumption 4, there is no clear logic as to why a physical control is needed for the soil. Financial assurance is not required for plume management zones unless the plume management zone is maintained by a physical control.

7. Again, given the description of the case scenario, the commission does not understand the basis for additional soils remediation. With regard to groundwater, if the groundwater concentrations exceed 0.5 mg/l, then further corrective action would be required, which could include active remediation. Groundwater pump and treat is a commonly employed remedy, but the commission does not have any basis to evaluate the adequacy with regard to this site. However, the 1997 Texas Bureau of Economic Geology Study *Extent, Mass, and Duration of Hydrocarbon Plumes from Leaking Petroleum Storage Tank Sites in Texas*, GC97-1 does note some general observations about pump and treat. Product recovery is mentioned in assumption 7. No mention of product was made in the analysis. Section 334.79 of the existing PST rule requires the recovery of product to the maximum extent practicable.

8. The commission points out that the soil depth criteria for human health protection at residential sites are the same for the existing PST program and this rule (i.e., 15 feet). However, the human

health soil depth criteria between the two programs are not the same for commercial/industrial sites. Under the PST program, the soil depth for commercial/industrial sites is 15 feet. Under this rulemaking, the default for commercial/industrial sites is five feet (see page 20, of the PST guidance document *Risk-Based Corrective Action for Leaking Storage Tank Sites, RG-36, January 1994* and §350.4(84) and §350.37(c)). For both programs, soils must be protective throughout the soil column for the underlying groundwater. Further, with regard to the requirements for vertical delineation of soil contamination, the two programs are equivalent (see the vertical soils delineation portion of the PST guidance document *Guidance for Judging the Adequacy of Contaminant Delineation for Purposes of Determining if Further Corrective Action Is Needed, February 10, 1997* and §350.51(d)). Given, the commission's points, and the earlier points about the representation that all soils were excavated to non-detect levels, the commission does not understand the basis of the assumptions in item 8.

9. If the goal of the remedial strategy is to restore the groundwater, then no post-closure care is required. Post-closure care is only required for Remedy Standard B, such as for plume management zones. However, as explained in relation to assumption 5, the post-closure care may not be warranted for this site.

For all of the above reasons, the commission does not interpret any additional costs for this case example above that already incurred under the existing PST program.

Case Study Number 5

Potential Effect of Proposed Rule

The subject property is a former underground storage tank (UST) location. Laboratory results from tank removal activities indicated high TPH concentrations in the soil. Twenty soil borings were installed to approximately 20 feet (ground water) to delineate the vertical and horizontal extent of affected soil area. Ground water samples were collected and analyzed from six temporary piezometers onsite. TPH concentrations were detected in the groundwater. Property owners requested approval for closure of the UST site. Five monitor wells were installed in response to the Texas Water Commission's (TWC) request for additional information to assess potential ground water impact. Additional investigation activities included the installation of four monitor wells (downgradient, upgradient, and offsite), six soil borings, soil testing, and sampling ground water for BTEX, water quality parameters, TDS, and TPH.

Analytical results reported low concentrations of BTEX and TPH in the ground water at the site; however, no detectable concentrations of BTEX and TPH were reported from offsite wells. Soil samples from offsite soil borings also indicate no detectable soil TPH or BTEX concentrations. Soil borings below the former tank pit area indicated notable levels of TPH and low levels of BTEX. BTEX concentrations in both soil and ground water were reported to be below the TWCs cleanup criteria for LPST sites. Additional soil borings (at 12-foot depth) taken from the former tank pit area reported high TPH concentrations, although at lower levels than previously reported. Two soil excavation events removed approximately 170 cubic feet of soil (depth = 10 feet). The excavated areas were backfilled with clean fill and capped. Soil gas samples were collected before and after the excavation events to address the TNRCC's concerns with potential indoor air methane levels for a hypothetical building near the former tank pit and to assess whether the TPH concentrations on site indicate the presence of phase separated hydrocarbons. Soil vapor concentrations were estimated to be protective of human health from inhalation and explosive hazards. Calculations and literature reviews indicated that the maximum amount of weathered diesel measured as TPH at the site is insufficient for there to be recoverable PSH. Based on TNRCC guidance, it was suggested that further corrective action was no longer required. The site was closed.

Under the proposed rules, additional samples would be needed for determination of background concentrations, ESA updates for a 500 foot field survey; water well / receptor survey, a 1/4 mile property search for environmental information, and more stringent QA/QC. This amounts to a \$6,000 increase in the cost of the project. A TPH risk assessment would have been required and leaching tests would have failed and triggered additional soil removal to protect ground water since proposed rules require extensive modeling and do not allow historical considerations of time without such modeling, modeling would have required additional investigations and well testing.

The commission does not understand the basis for many of the claims asserted by the commentor with regard to the existing rule. First, the commentor states that background would need to be determined. The commission does not understand this conclusion. Background is only an issue if the person is attempting to demonstrate that the PCL is below background or that site concentrations are not above background. Rarely is background ever considered under a PST case and this rulemaking in no way changes that. In fact, with regard to these organic COCs, natural background is effectively zero. The only other background factor could be in relation to the vertical soils delineation. The current PST program requires the full vertical delineation of soil contamination (see PST guidance document *Guidance for Judging the Adequacy of Contaminant Delineation for Purposes of Determining if Further Corrective Action Is Needed*, February 10, 1997). However, the case scenario indicates that the full extent of soil contamination was determined to the water table, so again there appears to no basis for the background determination.

The current PST program requires a receptor survey as a general requirement, especially when groundwater is affected (see PST guidance document *Guidance for Risk-Based Assessments at LPST Sites in Texas*, RG-175, October 1995). This rulemaking does not change the status quo with regard to the current PST program.

With regard to QA/QC, there is no net change in the QA/QC requirements. PST QA/QC requirements, when properly followed, comply with this rulemaking.

This rulemaking does not mandate the analysis of any particular COC. The program area makes those determinations. The PST program does not currently set cleanup levels for TPH as a normal course of action, but could require such cleanup levels to be established where warranted. However, the PST guidance document *Risk-Based Corrective Action for Leaking Storage Tank Sites*, RG-36, January 1994, does specifically state on page 24, in item 6 of §4.5 that: “Site monitoring data should indicate that TPH values are stable or declining. Sufficient monitoring data must be available to support these determinations.” The adoption of this rule will not in and of itself change the position of PST regarding TPH cleanup levels. Further, the commentor presumes the soil TPH levels are not protective and would fail leachate and modeling evaluations, but provides no basis for this presumption. This automatic presumption concerning the leachate causes some conservation considering that the above requirements for the existing program must be met. However, based on the limited information provided and the fact that TPH cleanup levels have not been established by the agency for diesel using the TRRP methodology, there is no factual basis presented to presume any soil cleanup with regard to TPH would be necessitated should the PST program direct a TPH evaluation at the site.

With regard to the historical data use, the interpretation of the commentor is unfounded. The rule does not state that historical data cannot be relied upon. In fact, the rule language actually implies quite the opposite. Section 350.75(g) specifically requires that where modeling conclusions are inconsistent with site data, site data is given priority. The rule is silent as to if the data is collected before or after the evaluation, but the general assumption in developing the rule is that historical data would often already be available and modelers should verify that modeling conclusions are consistent with what is known about the site.

The commission sees no consequence of this rulemaking that would increase the costs of this site. In fact, the level of site assessment that was conducted for the PST site under the existing rule would probably support a Tier 2 or Tier 3 analysis with regard to the soil vapor pathways. As such, this rulemaking with regard to level of effort in the PST program to set cleanup levels is of the same caliber that this rulemaking will necessitate.

Case Study Number 6

Potential Effect of Proposed Rule

Three USTs were discovered during utility excavations. Soil analyses from tank pull reported a high TPH concentration near the sidewall of the tank hold. Stockpile soils also had TPH concentrations. Seventeen soil borings were completed to assess the vertical and lateral extent of the TPH-affected area. Two 5-foot by 2.5-foot by 7-foot trenches were excavated on the north-central portion of the site to assess surface impacts in areas inaccessible to the drilling rig. Four soil borings were converted to ground water monitor wells to investigate whether the shallow ground water had been affected by hydrocarbons and the possible extent of migration. One well was completed west of the site in the adjacent roadway. Ground water sampling results for three onsite wells and one offsite well had low TPH concentrations. Ground water BTEX and total lead were below detection levels. The apparent extent of affected soils and ground water was determined to be limited to near the tanks. The RBCA evaluation of remedial requirements for the site suggested the residual constituent concentrations in soil and ground water do not pose a significant risk to human health and the environment. Therefore the site required no further remedial activity and the site closed. The affected area was covered with a concrete parking lot. No further ground water monitoring was warranted because the release most likely occurred over 30 years and the residual hydrocarbons were weathered.

Under the proposed rules, additional samples would be needed for determination of background concentrations, ESA updates for a 500-foot field survey, a 1/4 mile property search for environmental information, and more stringent QA/QC and continued ground water monitoring and sampling of two offsite wells. In addition, without an expensive Tier 3 investigation, modeling would not substantiate that natural attenuation would prevent exceedance of MCLs in public right-of-way. Therefore, a low volume pump and treat system with city pots discharge would have been selected as lowest cost alternative. Assume average UST cleanup cost (EPA/UT, 1993) based on Texas Bureau of Economic Geology (TXBEG) average time given initial soil and ground water BTEX levels. This would amount to a \$209,600 increase in the cost of the project.

The commission does not understand the basis for many of the claims asserted by the commentor with regard to the existing rule. First, the commentor states that background would need to be determined. The commission points out that background is only an issue if the person is attempting to demonstrate that the PCL is below background or that site concentrations are not above background. Rarely is background ever considered under a PST case and this rulemaking in no way changes that. In fact, with regard to these organic COCs, natural background is effectively zero. The only other background factor could be in relation to the vertical soils delineation. The current PST program requires the full vertical delineation of soil contamination (see PST guidance document *Guidance for Judging the Adequacy of Contaminant Delineation for Purposes of Determining if Further Corrective Action Is Needed*, February 10, 1997). However, the case scenario indicates that the full extent of soil contamination was determined to the water table, so again there appears to no basis for the background determination.

The current PST program requires a receptor survey as a general requirement, especially when groundwater is affected (see PST guidance document *Guidance for Risk-Based Assessments at LPST*

Sites in Texas, RG-175, October 1995). This rulemaking does not change the status quo with regard to the current PST program.

The case example states all groundwater BTEX data were non-detect. The commission does not understand the basis for assuming future groundwater remediation under this rule. If the groundwater is unaffected, then no response action is required for the groundwater. The fact that the release is very old and groundwater is not affected, lends strong credence to the demonstration that the soils are protective of the groundwater considering physical observations as is allowed in §350.75(i)(7)(C).

With regard to modeling and potential effects on the right-of-way, the rule does not prevent the use of the fact that the release is historical and de minimus in nature in the evaluation. The commission would consider all available information in evaluating the potential for the contamination to spread. The fact that it may be very old and has not spread speaks volumes as to migration potential.

Based on the provided information, the commission does not interpret any need for additional corrective actions costs.

Case Study Number 7

Potential Effect of Proposed Rule

Site Background:

Five soil borings were completed as part of an environmental site assessment. Analytical results suggested the presence of three VOCs in shallow ground water. Additional assessment work was conducted including the installation of eight monitor wells. Subsequent ground water sampling results confirmed the presence of benzene at a maximum concentration of 0.013 mg/L, chlorobenzene at 0.1 mg/L, and one,4-dichlorobenzene at 0.022 mg/L. No off-site property was affected. Five more sampling events were performed. No completed exposure pathways were present, and the site was closed.

Proposed Rule Requirements:

In addition to the above tasks, the proposed rules require a 500 foot receptor survey, a water well and surface water search, a records search and identification of off-site properties within 1/4 mile of the site that have useful environmental information (§350.51 (i)). The proposed rules would also result in the need to collect additional samples to establish background environmental concentrations (§350.51 (1)(2)) and additional QA/QC data and documentation (§350.54). Three additional monitoring wells would be required to delineate the horizontal extent of the plume and three deep monitoring wells would be required for vertical delineation pursuant to §350.51(c)-(e). Additional remediation requirements under the proposed rules would include conducting a plume stability analysis and establishing a Plume Management Zone (§350.33(f)(4)). Three remediation options available for the site include remediation by natural attenuation, active remediation, and remediation by establishing a plume management zone. Remediation by natural attenuation would require a natural attenuation study, which would include one sampling event, basic modeling, and the preparation of a report. This option would also require approximately 12 monitoring events. Active remediation costs for this site are based on capital costs and two years of O&M. The establishment of a plume management zone as the remediation option would require approximately ten years of monitoring under the proposed rule (§350.33(g)).

Anticipated Additional Costs:

Table 1 provides a summary of cost comparisons for required activities under the existing and proposed rules. Costs incurred for closure under the existing rules were approximately \$73,000 (Table 2). The anticipated costs required for closure under the proposed rule range from \$197,500 to \$227,500 (Table 3) dependent upon the remediation option selected. The increase in cost can mainly be attributed to the more stringent exit criteria for benzene, and the requirement for long-term ground water monitoring.

The commentor states that the increase in cost can mainly be attributed to the more stringent exit criteria for benzene, and the requirement for long-term groundwater monitoring. The commission is perplexed by the commentor's reference to "exit criteria" for benzene under the current TRRP (30 TAC 335) as there are no such criteria. The current TRRP requires that if the concentration of benzene exceeds the maximum contaminant level in useable groundwater, then the groundwater be restored. The only exceptions allowed under Standard 3 are a demonstration of technical impracticability or the use an alternate concentration limit on commercial/industrial properties only. The person can utilize natural attenuation if they demonstrate that it is a viable option, and this can be done under the existing rules and the TRRP rule. Therefore, there is no cost difference under the two sets of rules if natural attenuation is the chosen response action. It is important to note that the TRRP rule does not have any specific long-term monitoring requirements which are not appropriate for the same site under the current TRRP. Additionally, there is no requirement under the TRRP rule as it is not a performance standard of assessment or remediation. Background is only required to be determined under the current TRRP rule; however, a person may determine background if he wishes to use it in place of a risk-based value as a medium-specific concentration or PCL, respectively. Moreover, the current TRRP under Remedy Standard 3 requires that a remedy be permanent or, if that is not practicable, achieve the highest degree of long-term effectiveness possible. Thus, instead of demanding more expensive "pollution cleanup" response actions, TRRP states the agency's willingness in appropriate circumstances to accept less expensive "exposure prevention" response actions which are coupled with the necessary post-response action care and associated financial assurance. Therefore, no additional total cost should be realized as a function of this rule making. The commentor is correct that there may be increased costs associated with field survey, however, there should not be increased costs for QA/QC or additional wells if the person was actually correctly assessing the site under the current TRRP Rule. The only potential increases are associated with the site receptor survey.

Case Study Number 8

Potential Effect of Proposed Rule

Site Background:

Eight soil borings were completed and two ground water samples were collected as part of an environmental site assessment. Analytical results suggested the presence of metals in soil and shallow groundwater. Additional assessment work was conducted including the installation of two temporary monitor wells and the collection of nine surficial soil samples. Subsequent analytical results confirmed the presence of arsenic at a maximum soil concentration of 2.0 mg/kg, chromium at 7.8 mg/kg, and lead at 243 mg/kg. Synthetic precipitation leachate procedure (SPLP) tests were conducted to determine the leaching potential of the metals to ground water. The reported concentrations were 7.31 mg/L for arsenic, 8.01 mg/L for chromium, and 0.12 mg/L for lead. Ground water analytical results indicated arsenic and lead were not present in concentrations above the reported detection limits (which were below the Texas Risk Reduction Two (TRRS-2) limit for ground water) based on low flow sampling, for a single sampling event but some wells exceeded MCLs based on total analysis. The chromium concentration was reported to be 0.06 mg/L which was below the TRRS-2 limit of 0.1 mg/L. No off-site property was affected. COC levels in soil were at levels below the TRRS-2 residential scenario and/or background metals

concentrations. The concentration of metals in ground water were also within health-based criteria for residential land use scenarios, and the site was issued a completion certificate.

Proposed Rule Requirements:

In addition to the above tasks, the proposed rules require updates for a 500-foot receptor survey, a water well and surface water search, a records search and identification of off-site properties within 1/4 mile of the site that have useful environmental information (§350.51(i)). The proposed rules would also result in the need to collect additional samples to establish background environmental concentrations (§350.51(1) and (2)) and additional QA/QC data and documentation (§350.54). Five additional monitoring wells would be required to delineate the horizontal extent of the colloidal plume and three deep monitoring wells would be required for vertical delineation pursuant to §350.51(c)-(e). Additional remediation requirements under the proposed rules would include conducting a plume stability analysis and establishing a Plume Management Zone (§350.33). Three remediation options available for the site include remediation by natural attenuation, active remediation, and remediation by establishing a plume management zone. Because SPLP tests failed, excavation to protect ground water would have been required. Remediation by natural attenuation would have been selected to allow monitoring only, would require a natural attenuation study, which would include one sampling event, basic modeling, and the preparation of a report. This option would also require approximately 20 monitoring events. Active remediation costs for this site are based on capital costs for excavation, installation of physical controls, O&M costs, and monitoring. The establishment of a plume management zone as the remediation option would require approximately 15 years of monitoring under the proposed rule (§350.33(g)).

Anticipated Additional Costs:

Table 1 provides a summary of cost comparisons for required activities under the existing, and proposed rules. Costs incurred for closure under the existing rules were approximately \$19,200 (Table 2). The anticipated costs required for closure under the proposed rule range from \$159,000 to \$162,000 (Table 3) dependent upon the remediation option selected. The increase in cost can mainly be attributed to the more stringent exit criteria for residential land use, the expansion of the defined depth of surface soil, and the requirement for long-term ground water monitoring.

In examining this case study, the commentor states that the site was issued a closure letter but also indicates that the SPLP results failed. In fact, the failure of the SPLP tests is provided as the basis to excavate 10,000 cubic yards of soils for a treatment cost of \$480,000. The commission cannot understand how the commentor concluded that the site is protective of the underlying groundwater under the current Risk Reduction Rule but is not protective and requires remediation under the TRRP rule. Also, there is no clear basis provided for why the site requires a natural attenuation remedy under the TRRP rule and not under the current Risk Reduction Rule. The commission can only surmise that the commentor is not clear on the requirements of the two rules. For example, the soil results reported for arsenic and chromium are below Standard 2 MSCs for groundwater protection, and arsenic appears to be close to background values observed elsewhere in Texas. Only lead did not meet the Standard 2 groundwater protection MSC and needed to be evaluated with the SPLP, which it failed. The fact is that there is more flexibility under the TRRP rule than the existing rule when dealing with groundwater contamination and also when determining if soils need remediation to be protective of the underlying groundwater. The commission does agree that there may be increased costs for the field survey, but there should not be an increased cost for QA/QC or additional wells to delineate the plume.

Concerning the RIA, Chevron commented that TNRCC should discuss why, in its opinion, some cost estimates submitted by the regulated community evidence a misunderstanding regarding what the existing

rules allow and, thus, what the cost impacts of the proposed TRRP will be. Chevron continues to stand by its cost estimates set out in its comments on the May 1998 TRRP which predict an over 600% increase in investigation and assessment costs alone over the costs that would be incurred in compliance with the current TRRP Rule. Chevron understands that the TNRCC has rejected other cost impact projections because the TNRCC believes those projections underestimate what would be required by existing rules. If the TNRCC believes the regulated community has misinterpreted the existing rules, the TNRCC should set out the basis for its disagreement with the regulated community in the draft RIA to ensure that the public is fully informed of the TNRCC's interpretation of existing regulations. This point is strengthened by the fact that some of the cost estimates forwarded to the TNRCC since the withdrawal of the May 1998 proposed TRRP were based on actual costs incurred under existing rules at sites in Texas where closures have already been approved by the TNRCC. Unless it is clear to the public what is allowed by existing rules versus the proposed TRRP, the purposes of the RIA process will not be served. This is an issue that certainly warrants the attention of the RIA and a Commissioner Work Session.

The commission chose to place more reliance on cost estimates under commission control, such as the PST reimbursement pricing factors, PST State-lead and State Superfund contracts. The commission recognizes that a large potential for variability exists in the level of stringency of review of reports and work plans. In part this has been due to lack of detailed guidance for implementing the current TRRP Rule. This lack of guidance or rule specificity makes evaluation of compliance and cost estimates more subjective than desired. One of the stated purposes of this rulemaking is to achieve a greater degree of consistency by means of more specific rules and guidance. Lacking this in the interim, the commission has attempted to respond fully in the RIA with the information we felt was reliable, and did identify areas of likely cost increases and decreases.

Concerning the RIA, Chevron commented that TNRCC's cost/benefit analysis is not accurate because it underestimates cost increases and overestimates cost reductions associated with the proposed TRRP. Plume Management Costs should be better quantified under all cost scenarios. As a threshold matter, all the cost projections assume that plume management can be implemented for groundwater. At this time, it is not clear how complicated it will be to obtain approval to use plume management. It may be difficult to demonstrate that COCs will not pose a substantial present or potential hazard to human health or the environment. It is expected that with the proposed rules, post-closure monitoring could be substantially more expensive than represented by the case studies (TNRCC estimates \$4,500 per year). All of these costs associated with plume management should be identified and assessed in all three cost scenarios. Additional soil remedy information is necessary to better appreciate the so-called cost savings in all three cost scenarios. The extremely limited information provided by TNRCC for the soil remedies in the case studies makes it impossible to fully evaluate the quantitative analysis in detail.

For the PST cost examples, the commission did not assume that plume management zones could be used. Instead, the costs provide different scenarios in case plume management zones could not be used. With regard to institutional control costs, the commission agrees that specific costs to file an institutional control are unknown, and as such did not speculate. The costs for a person to obtain the institutional controls would not be more than the difference between the cost of remediation with controls and the cost of remediation without controls. In some cases this increment could be limited further by the value of the property if it were uncontaminated (i.e., full property value). As to the soil remedy estimates, the commission provided what it reasonably could in complying with §2001.0225 of the Texas Government Code.

Concerning the RIA, Chevron commented that in Part B, Case 1 -TNRCC claims a "best case" savings of \$1.5 million based on using the plume management approach as a viable alternative to remediation. As assumed by TNRCC, it is reasonable to assume that if plume management were an acceptable alternative, further remediation costs would be eliminated. In the example, the assumption is made that the remedial

investigation (RI)/feasibility study (FS)/remedial design (RD) would cost the same because the additional site investigation costs to meet the proposed rules would be offset by the elimination of RD costs. There is not enough information provided to independently validate this assumption. In order to meet the requirements of the proposed rules, considerable investigation sampling is required. One can assume that the investigation costs under the proposed rules would be substantially higher than under the current rules due to the rigorous amount of site characterization sampling that is required. Experience in implementing site remediation projects has shown that regulatory agencies typically require substantially more data and analysis to justify a "monitor only" approach than an active remediation approach. Section 350.33(f)(4)(A) states "To use a Plume Management zone, the person must demonstrate that the COCs will not pose a substantial present or potential hazard to human health or the environment ... based on consideration of the following factors..." This statement is followed by a long list of items to be considered prior to gaining acceptance for use of the plume management zone, including many items that are commonly required in an RI/FS (such as hydrogeologic characteristics, potential for migration, proximity of groundwater users, etc.). Included with this list are some requirements that are more difficult to demonstrate and can be controversial such as the future uses of groundwater and surface waters in the area. Prior to being able to use the plume management zone approach, the demonstration must also be approved by the executive director. Because approval is not assured, a person may spend considerable funds to demonstrate that a plume management zone approach is reasonable for their site, and still not be able to obtain approval. In summary, the dollar amount of TNRCC's claimed cost savings is not justified because of the very limited site information provided and the additional amount of investigation to demonstrate that the plume management approach is valid.

The commission disagrees with the commentor's statement, "One can assume that the investigation costs under the proposed rules would be substantially higher than under the current rules due to the rigorous amount of site characterization sampling that is required." The commentor requested that the commission discuss "why, in its opinion, some cost estimates submitted by the regulated community evidence a misunderstanding regarding what the existing rules allow and, thus, what the cost impacts of the proposed TRRP will be." This misunderstanding is the commentor's belief that the current Risk Reduction Rule allows for less investigation than the TRRP rule. As is evidenced by some commentors, this belief is not shared by all persons outside the commission. Others (e.g., Henry, Lowerre, Johnson & Frederick) assert that the commission is providing a "windfall" to persons subject to the TRRP rule due to reduced requirements when compared to the current Risk Reduction Rule. The site assessment requirements under the existing rules require assessment to background, horizontally and vertically, with the only exception being when the method detection limit is greater than background. The TRRP rule allows numerous exceptions to these background requirements for both soils and groundwater.

The commentor states that there is not enough information provided to independently validate the assumption that the RI/FS/RD costs are the same because the additional site investigation costs to meet the TRRP rules will be offset by the elimination of the RD costs. The commission clarifies that the RI/FS/RD costs are assumed to be the same for both rules and that the RD costs are not eliminated under the TRRP rule. The site investigation costs are not changed due to the assumption that the savings from reducing the scope of the investigation from background under the existing rule to a health-based level under the TRRP rule is offset by the increase to gain necessary information to demonstrate that the site is suitable to use a plume management zone. This assumption was considered as a conservative basis. It probably should have not been included in retrospect as that same level of evaluation would be needed to support an alternate concentration limit (ACL) evaluation for the current Risk Reduction Rule. Certain technical information is required to support good decision making under either rule. In this case, it should be exactly the same. It should also be noted that it would certainly cost no more and probably less for the RD for a plume management zone than for a groundwater pump and treat system.

Regarding the approval of the use of plume management zones, the commission notes the TRRP rule will allow persons to have more certainty than exists in the current Risk Reduction Rule that a plume management zone will be approved. The "long list of items to be considered" is in both rules, however, the TRRP rule has a more specific groundwater classification system which allows the increased certainty that a plume management zone will be approved. Essentially, the commission has identified those groundwaters (i.e., class 1 groundwater) which are not suitable for the use of plume management zones and intends that most class 2 groundwater will be suitable for the use of plume management zones. The commission stands by its cost savings evaluation for the Odessa Chromium site and notes once again that, for sites meeting the assessment requirements of the current Risk Reduction Rule, the TRRP rule represents a cost savings.

Concerning the RIA, Chevron commented on Part B, Case 2 - North Cavalcade. This example assumes that the groundwater remedy would be changed from pump and treat to plume management and bioremediation of soils would be changed to placement in an onsite, capped landfill. TNRCC estimates an \$8 million savings over the original remedy. The North Cavalcade-Operable Unit 2 example assumes no change to the RI/FS/RD. The previous example (Case 1 - Odessa Chromium) acknowledges that site investigation costs under the proposed rules will be higher than under the current rules. It is unclear and apparently inconsistent for TNRCC to make the opposite assumption for the North Cavalcade site. On-site landfilling and capping is assumed to be 50% of the bioremediation costs. There is no backup information for that assumption. The example is not clear on whether the bioremediation of soils is taking place in situ, which is typically a very cost-effective approach. Given the typical cost of engineering a landfill for disposal of hazardous waste (as is expected to be present at a Federal Superfund site), the assumption of stockpiling and capping costing 50% less than bioremediation cannot be justified without presentation of detailed costs. Furthermore, it is not clear that the landfill option could not have been pursued under the existing rules at the time, or whether bioremediation was selected because of the Superfund program's policy preference for treatment remedies rather than disposal. The notes for "BEFORE Proposed Rule" indicate that bioremediation has not been effective, and that a new Record of Decision (ROD) will be forthcoming for the site. Thus, a change from bioremediation is not being made based on rule provisions but rather on information about remedy effectiveness that could not have been available at the time of the first ROD. The groundwater portion is similar to Case Number 1. If plume management is acceptable as a remedy, significant savings can be realized by eliminating the remediation (such as pump and treat) while the initial cost of characterization will be significantly higher under the proposed rule. In summary, there is not enough information to support TNRCC's projected cost savings due to stockpiling and capping rather than bioremediation for soils. Moreover, it's not clear that this "most cost-effective remedy" was not possible under existing rules or was just not selected for policy reasons that have no relationship to provisions of the Risk Reduction Standards versus the TRRP.

The commentor states that the treatment of the RI/FS/RD costs is inconsistent between the North Cavalcade site and the Odessa Chromium site. The commission disagrees with the commentor and notes that for both sites, the assumption is made that the RI/FS/RD costs are the same under both rules. This is actually a conservative approach in regards to assessing the potential financial benefits of the TRRP rule, since the RD for a plume management zone and a cap certainly would be less than that for a groundwater pump and treat system and the *ex situ* bioremediation. The backup for the costs associated with the on-site landfill versus the bioremediation of the soils is taken from a feasibility study prepared for the site, using site-specific data and is a reliable estimate of costs for the intended purpose.

Concerning the selection of the cap versus an active treatment, such as bioremediation, it is imperative that readers have an accurate understanding of the current Risk Reduction Rule. The current Risk Reduction Rule has three remedy standards; 1) remove or decontaminate to background, 2) remove or decontaminate to health-based levels, and 3) remove, decontaminate, and/or use controls to achieve health-based levels. When persons use Remedy Standard 3, there are

criteria in the rule which direct the person to choose permanent remedies (i.e., remove or decontaminate) over nonpermanent remedies. If permanent remedies are not available, then the person is directed to choose the remedy with the greatest long-term effectiveness while balancing cost-effectiveness. Thus the existing rule creates the preference for permanent remedies, which a cap is not. The TRRP rule does not state a preference of permanent remedies except for class 1 groundwater and allows the person to make their own cost-effective decision without having to evaluate permanent remedies. The fact that bioremediation failed has nothing to do with the cost evaluation, the point is that the cap would have been acceptable under the TRRP rule from the beginning and thus the cost savings would have been realized.

Concerning the RIA, Chevron commented on Part B, Case 3 - Sikes Disposal Pits. This case shows a \$100 million savings by using the plume management zone approach for groundwater and an onsite landfill with a cap instead of incineration for soil. For groundwater, TNRCC's example states that a plume management zone approach would be applied under the proposed rules. It is not clear, however, what the current remedy for groundwater is under the existing rules. The current remedy appears to be groundwater monitoring; in other words, an approach similar to plume management. It is not clear why the costs of post-closure monitoring would be less under the proposed rules. In fact, monitoring costs for waste left onsite--such as in a landfill--typically are higher because of the potential threat of a release, compared to sites where wastes have been destroyed via incineration. The notes for "AFTER Proposed Rule" indicate that the landfill option was considered as an alternative remedy for the 1986 ROD, but was not acceptable under current rule. This pre-dates the Risk Reduction Standards, so the fact that the remedy was not available under 1986 rules has no relevance to the cost under the TRRP compared to the cost under the Risk Reduction Standards. Moreover, it is highly likely that selection of incineration as the remedy again represents the Superfund policy preference for treatment rather than disposal. It is widely recognized that incineration is much more costly than landfilling, so it is not surprising that a substantial cost savings would be realized if incineration was not the selected remedy. TNRCC has presented no information to support their assertion that this cost savings is a result of closing under the TRRP instead of the Risk Reduction Standards.

Concerning the groundwater, approximately 350 million gallons of contaminated groundwater were actually pumped and treated in conjunction with the soil excavation and incineration. If a cap had been used, then this pump and treat would not have been necessary. The costs of the pump and treat are included in the costs for the soils remediation.

The commentor states, "In fact, monitoring costs for waste left on-site - such as in a landfill - typically are higher because of the potential threat of a release, compared to sites where wastes have been destroyed via incineration." The commission agrees generally, however, the site is subject to ongoing groundwater monitoring because not all of the contaminated groundwater was addressed in conjunction with the soils incineration. The commission does agree that the costs for post-closure monitoring should remain the same, since the site is essentially monitoring a plume management zone currently, thus the costs for monitoring are increased under the TRRP rule.

The commentor notes that the ROD was signed in 1986, before the current Risk Reduction Rule was adopted and thus this site is not relevant as a cost comparison. The commission disagrees and notes that Remedy Standard 3 of the current Risk Reduction Rule is patterned after the remedy selection criteria of the federal superfund program and thus a permanent remedy (e.g., incineration) would be in compliance with Remedy Standard 3. Further, the costs (actual and estimated) are very useful for examining the impact of selecting various remedies. The feasibility study process of federal superfund sites provides many detailed estimates of costs for such comparisons. In closing, the commission once again stresses the preference for permanent remedies under the current Risk Reduction Rule.

Concerning the RIA, Chevron commented that the TRRP is promulgated solely under the general powers of the TNRCC, even though those general powers might be derived from several separate statutory sections. A second, independent basis for applying the RIA requirements to a rulemaking exists where a rule is adopted under the general powers of the agency, such as those set forth in the preamble to the TRRP. The TNRCC has failed to explain or support its statement that the laws cited and summarized in the preamble specifically require the adoption of the TRRP. The fact that multiple Code provisions arguably confer broad authority upon the TNRCC to adopt various rules cannot excuse the agency from its legal duty to identify specific statutory mandates to adopt the rule in question, the TRRP.

Chevron comments that the TRRP is adopted solely under the general powers of the TNRCC. The commission disagrees. Texas Government Code, §2001.0225(a)(4) covers a rule adopted "solely under the general powers of the commission instead of under a specific state law." (emphasis added). The preamble points out at least two "specific state laws" that either directly allow for the adoption of a risk-based program (Texas Water Code, §26.341), or specifically require the adoption of rules when adopting a commission statement of general applicability or describing practice and procedure requirements (Texas Water Code, §5.103 (c)). Thus, the commission believes the TRRP is not adopted solely under the general powers of the commission. Nevertheless, in deference to the importance of TRRP and to persons of the commentor's position - and not as an admission that the commission's position on this point is incorrect - the commission has performed a full RIA.

Concerning the RIA, Chevron commented that eliminating debate over key technical issues should not be quantified as a cost reduction resulting from the TRRP. TNRCC states in the draft RIA that costs, staffing and other resources will be saved because the TRRP will eliminate debate between TNRCC and the regulated community. Characterizing a rule that precludes future debate on policy issues as a "cost-saver" seriously undermines the purposes of §2001.024(a)(4) and §2001.0225(a). Those sections of the APA were designed to ensure that a Texas agency would not make policy choices that place burdens on the regulated community without identifying commensurate benefits to the public, as well as within the agency. It is also inaccurate to characterize a new regulation as a "cost-saver" simply because it will end debate on a policy choice that was debated in the first place due to the potential cost impact of one choice versus another.

Chevron comments that eliminating debate with the regulated community over key technical issues and eliminating future debate over policy issues should not be characterized as a cost saver and undermines the purposes of Texas Government Code, §2001.024(a)(4) and §2001.0225(a). The commission disagrees. The commission points out that the debate it anticipates TRRP will curtail is site-specific, covering matters like sampling criteria and site assessment criteria over which the commission has historically experienced argument that has delayed corrective action. The commission considers expediting corrective action as a legitimate benefit to the public.

Concerning the RIA, Chevron commented that there is also some question as to whether public notice, institutional controls, and variances have been adequately addressed in the agency's Draft Regulatory Impacts Analysis and Takings Impact Analysis, if at all.

Concerning the RIA, Chevron commented that TNRCC's cost/benefit analysis is incomplete because it fails to account for the cost impacts associated with notice, variance, and institutional control requirements. These measures will impose significant costs upon owners of affected property. A partial list of such costs includes: ·Preparation and delivery of notices to interest holders, fielding responses and communicating project data to a myriad of notice recipients, Negotiating control measures during the investigation as opposed to the remediation phase of cleanup. ·Complying with the new institutional control consent and compensation procedures.

Chevron comments that costs related to notice, variance and institutional controls were not sufficiently addressed in the draft RIA. The commission has enhanced its coverage of these issues in the final regulatory analysis.

The commission acknowledges that the cost implications of the proposed provisions for notice and institutional controls were not quantified in the March 1999 RIA. The commission did, however, address these provisions qualitatively in its preamble to the proposed TRRP. The commission's response to these comments will remain qualitative, because actual cost increases or decreases stemming from these new provisions will vary from site to site. Such variables include but are not limited to: value and configuration of neighboring properties; current and likely future uses of neighboring properties; population density in vicinity of affected properties; and soil and groundwater conditions in vicinity of affected properties. Combinations of these variables will vary at sites across the state such that an average or typical cost associated with these new provisions cannot be quantified.

Regarding notice, the rule does not specify the method by which notice is to be provided except in the provision of §350.55(e)(3). Persons are allowed to provide the notice as is best for the situation, so long as it is effective and meets rule objectives. Further, the person is not required to provide proof of notice beyond a notarized statement from the person certifying that the notice has been provided and an identification of any persons notified directly, unless otherwise required by the executive director on a site-specific basis. The commission acknowledges that in situations where notice has not been historically provided, possibly in conflict with existing rule requirements, costs for notice will increase. However, persons have flexibility to conduct the notice in the most cost-effective manner. The commission also acknowledges that costs will be associated with providing information to the affected landowners when requested. This cost could vary from \$.33 postage to \$50 or more per request depending on the volume of material and the method of routing. Additionally, photocopy costs and costs for processing and responding to personnel will also be realized.

Regarding institutional controls, the commission notes that institutional control provisions exist in the current rules and are not wholly new. While the cost implications of the new institutional control provisions will vary from site to site, and therefore cannot be quantified, the commission notes that by shifting the requirement to use institutional controls from background (current rules) in 30 TAC Chapter 335 to health based in the TRRP rule, the threshold for requiring institutional controls is effectively less stringent. Consequently, unless a site is cleaned to background, it would require institutional controls under current rules, whereas cleaning that site to the residential health-based standards under the TRRP rule will not require institutional controls. The TRRP rule thus holds a potential for cost savings over the current rules with respect to institutional controls. By contrast, the commission acknowledges that the proposed process for consent from owners of affected properties is more structured than under current rules, and that owners of adjacent land may seek monetary compensation in exchange for consenting to institutional controls affecting their property value. While the commission has received speculative estimates for how much an affected property's value might decline as a result of an institutional control, the relative amount of any such decline in value is essentially impossible to quantify as conditions will vary from site to site. The costs for a person to obtain the institutional controls would not be more than the difference between the cost of remediation with controls and the cost of remediation without controls. In some cases this increment could be limited further by the value of the property if it were uncontaminated (i.e., full property value).

Concerning the RIA, Chevron commented that the TNRCC should cure deficiencies in the Draft RIA & the Fiscal Note, which fail to completely identify the potential cost impacts of the proposed TRRP.

Chevron's comments on the May 1998 Proposed TRRP endeavored to demonstrate that the TRRP will have significant cost impacts on the regulated community and the Texas economy. These costs simply have yet to be adequately assessed by the TNRCC as required by the Major Environmental Rule and Fiscal Note provisions of the APA. Chevron commends the TNRCC in its efforts to include a Draft RIA and a more thorough Fiscal Note in the current proposal. Before finalizing the TRRP, the cost impacts associated with the proposal must be: (1) thoroughly and accurately assessed, (2) carefully documented and (3) offset with commensurate benefits. Chevron recommends that both the Draft RIA and Fiscal Note be revised to address the concerns discussed in detail in Attachment 5.

Chevron comments that before finalizing the TRRP, the cost impacts associated with the proposal must be: "(1) thoroughly and accurately assessed, (2) carefully documented, and (3) offset with commensurate benefits," and that the draft RIA and fiscal note should be revised. The commission disagrees in part. The commission believes it has complied with the statutory requirements for the fiscal note to show probable economic costs to persons required to comply with the TRRP and has complied with the provisions concerning the draft RIA by advising the public and the regulated community of the information the commission considered. The commission has added cost information related to notice, variance and institutional controls in response to these comments and to the final regulatory analysis.

Concerning the RIA, Fulbright & Jaworski commented that the TNRCC has not met the requirements for promulgating a major environmental rule because the published record does not provide information sufficient to support its RIA. Section 2001.0225(a) of the Texas Government Code requires the agency to conduct a "RIA" of major environmental rules. The analysis reported in the published record (24 TexReg 2369-2448) does not provide information sufficient to support many of the TNRCC's statements regarding regulatory impact. For example, the TNRCC states: "By specifying the exposure pathways, the TNRCC believes the proposed rule will eliminate delays and wasteful expenditure of resources spent in negotiating the exposure pathways that are relevant to the individual affected properties. 24 TexReg at 2387 (emphasis added). This statement is not supported by any specific factual analysis. Additionally, the TNRCC does not address the extent to which the claimed elimination of delays and negotiation expenditures will counterbalance basing cleanup standards on risk overestimates. Further, the TNRCC gives no factual basis for claims of cost savings from compliance with only one set of corrective action standards. These claimed cost savings appear speculative because many regulated persons need only comply with one set of standards under the current rule.

Fulbright & Jaworski comments that the draft RIA does not provide information sufficient to support TNRCC's claimed cost savings. The commission disagrees and notes that the statutory requirement for the content of the RIA does not include a provision that requires the commission to conclusively prove every conclusion the commission makes in the RIA. The commission, instead, must identify the information that was considered by the commission, the information the commission determined to be relevant and reliable, and the assumptions and facts upon which the commission made its regulatory decisions. The commission believes it has met these criteria even though it may not have convinced all commentors of its conclusions. Let's look at the commentator's example from 24 TexReg at 2387, "By specifying the exposure pathways, the TNRCC believes the proposed rule will eliminate delays and wasteful expenditure of resources spent in negotiating exposure pathways that are relevant to the individual affected properties." Here, the public and regulated community are sufficiently advised that the TNRCC is basing its regulatory decision on the assumption that negotiating exposure pathways at each affected property causes delay and wasteful expenditure of resources. As to cost savings from one set of corrective action standards, the commission is taking into consideration not only the regulated community, but other stakeholders and factors as well, such as state agencies and the public and environment. The commission presumes that one set of corrective action standards will increase efficiency for all involved, and that the environment will

suffer reduced “cost” because all corrective action will be appropriately focused on environmental protection.

Concerning the RIA, AFCEE commented that the notice requirements may work adequately for limited notice situations, but will prove to be cumbersome, expensive and provide inadequate time to address situations where broad notice is required. For example, if a fairly expansive release to groundwater is suspected in a downtown, high rise office environment, or in a metropolitan densely populated apartment complex or residential neighborhood, hundreds or even thousands of parties could require notification under each of the various requirements of §350.55. Each time the responding person would be required to notify each party by certified mail, return receipt requested. Each time, assuming a certain percentage of the return receipts were not received from notified parties, a second certified mailing would be sent to a subset of the initial group. After all return receipts were received, and after documentation of two failed attempts to notify non-responding parties, copies would be made of all 10,000 receipts for delivery to TNRCC.

There are several obvious problems with the above scenario. First, it is not uncommon for a certified mail return receipt to take ten days or more to be returned to the sender. When the initial receipt is not received, it could take twice this time to complete verification that notice is undeliverable. If so, it may be impossible to comply with the proposed 30-day TNRCC response requirement. Second, the cost of sending certified mail is approximately \$2.65 per letter. For a large mailing of 10,000 parties, this equates to a cost of \$26,500 for just the initial notice effort. The person would then need to adequately staff the administrative effort of coordinating the return receipts, evaluating which notices need to be re-attempted, and documenting the failed notices. After documentation of the notice, 10,000 thousand return receipts would be copied and forwarded to TNRCC. Note that this cost would be duplicated each time a notice is issued. The AFCEE believes that the best approach for this provision is simply to allow the responding party to certify that notice has been provided in accordance with the rule.

Air Force installations are required by federal law and Executive Order to notify the public of the findings and progress of environmental remedial work. The notices required under the proposed TRRP can be efficiently provided through the AFCEE's existing communication system. The proposed rule should be revised to authorize notice under existing communication systems where applicable.

Finally, we note that the potentially significant cost of notice has not been adequately addressed in TNRCC's RIA or in the Fiscal Note. As described above, the potential cost of the repeated notices, administration, and confirmation notices to TNRCC can be substantial. At the very least, the TNRCC should better inform the public of the potential cost impact of these notice requirements.

Regarding notice, the rule does not specify the method by which notice is to be provided except in the provision of §350.55(e)(3). Persons are allowed to provide the notice as is best for the situation, so long as it is effective and meets rule objectives. Further, the person is not required to provide proof of notice beyond a notarized statement from the person certifying that the notice has been provided and an identification of any persons notified directly, unless otherwise required by the executive director on a site-specific basis. The commission acknowledges that in situations where notice has not been historically provided, possibly in conflict with existing rule requirements, costs for notice will increase. However, persons have flexibility to conduct the notice in the most cost-effective manner. The commission also acknowledges that costs will be associated with providing information to the affected landowners when requested. This cost could vary from \$.33 postage to \$50 or more per request depending on the volume of material and the method of routing. Additionally, photocopy costs and costs for processing and responding to personnel will also be realized.

Concerning the RIA, Chevron commented that the proposed rule exceeds criteria in determining points of exposure per Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (1989). EPA/540/1-89/002; "Land Use in the CERCLA Remedy Selection Process," OSWER Directive

Number 9355.7-04, May 25 1995, which allows that points of exposure should be determined on the basis of reasonably current and future land use as well as site-specific conditions.

The commentor incorrectly interprets EPA guidance documents as a federal law. Guidance is neither law nor rule. However, beyond this point, the commission has explained elsewhere in this preamble that in part the point of exposure (POE) criteria have been established to effectuate a groundwater management strategy. The EPA Superfund program would defer to groundwater protection strategies as an ARAR; therefore, the Risk Assessment Guidance for Superfund (RAGS) guidance would accommodate groundwater management strategies. With regard to soils, the POE criteria are based on current and future assumptions, and existing physical controls can be used as remedies to address POEs; therefore, there is factoring in of site-specific conditions. Further, with regard to alternate groundwater POEs, the rule sets out bounding conditions. The person can site-specifically establish POEs at appropriate locations within those bounding conditions. The commission maintains that no federal law is exceeded.

Concerning the RIA, Chevron commented that this section requires the use of International Standards Organization (ISO) Guide 25 RCRA. This is a voluntary standard and should not be required by rule.

The commission acknowledges the commentor's concern regarding §350.54(d)(1). However, the rule language does not make conformance with ISO 25 or National Environmental Laboratory Accreditation Program (NELAP) a requirement, but rather recommends that the person measure or evaluate the laboratory's quality assurance program against existing international and/or national standards to ensure that data generated by the laboratory will be of known quality.

Concerning the RIA, Chevron commented that §350.33(f)(3)(A) requires that remediation be attempted prior to seeking a TI Waiver; Guidance for Technical Impracticability of Ground-Water Restoration. EPA allows for TI decisions to be made prior to remedy implementation while the TRRP requires implementation of the remedy, even when it is clear that remediation to drinking water standards is impracticable.

The commentor has misread the rule. There is nothing in the rule which compels that "remediation be attempted" before a technical impracticability demonstration. The rule requires a person to "demonstrate . . . that it is not feasible from a physical perspective using currently available remediation technologies due either to hydrogeologic or chemical-specific factors to reduce the concentration of COCs throughout all or a portion of the groundwater PCLE zone to the applicable critical groundwater PCLs within a reasonable time frame." At some affected properties an unsuccessful outcome will be clear from the start and no attempt at remediation will be required. At other affected properties, the commission will be convinced that the groundwater can be restored and, to use this option, will make the person demonstrate that it cannot. Also, this is not an appropriate RIA comparison because EPA's technical impracticability requirements and practices are not set forth in federal statutes, but rather in guidance documents.

Concerning the RIA, Chevron commented that §350.33(f)(3)(C) prohibits the use of natural attenuation or other demonstration that physical controls are not required. RCRA natural attenuation is an accepted and proven methodology for use in groundwater remediation efforts. This section in essence will not allow natural attenuation, even if shown to be protective, in place of physical controls.

The commission disagrees with the commentor's assertion that this provision exceeds existing federal standards of RCRA. This provision requires the use of physical controls to prevent the migration of COCs from the portion of a groundwater PCLE zone for which a technical impracticability demonstration has been made. The commentor contends that natural attenuation, an acceptable remedy for RCRA corrective action, should be allowed in place of physical controls. The commission

notes that there are two EPA policies applicable to situations addressed by this provision. Regarding technical impracticability, the EPA is not relaxing its general goal of returning contaminated groundwater to beneficial uses. Where technical impracticability is determined, the EPA would expect to require an alternative remedial strategy that is technically practicable, consistent with the overall objectives of the remedy, and controls the source of contamination and human and environmental exposures. The commission's approach of requiring a physical control is consistent with the EPA policy. The second EPA policy, regarding natural attenuation, calls for source control or removal where appropriate. The person can first attempt a natural attenuation approach to a PCLE zone, as allowed by this section. If the monitoring program indicates that the natural attenuation remedy is not going to achieve the response objectives, the person can propose alternative remedies or approaches, to include a technical impracticability demonstration. It is fully appropriate at that time to apply a control measure to the portion of the PCLE zone. Natural attenuation could still be a functional remedy outside of the controlled portion. The commission concludes that the approach it has taken in this provision is compatible with the EPA policies of RCRA and does not exceed a federal standard.

Concerning the RIA, Chevron commented that §350.71(c)(4) requires including the dermal absorption pathway in determining soil PCLS. Soil Screening Guidance: Users Guide, EPA Publication 9355.4-23, July 1996, says that data are only adequate to assess the dermal pathway for one chemical, and recommends against including this pathway for other chemicals

Chevron commented that the rule is more stringent than federal requirements, as it requires consideration of dermal exposure for all applicable COCs, whereas the 1996 EPA Soil Screening Guidance suggests that it is only necessary to evaluate dermal exposure for one compound. The commission disagrees with this claim for several reasons. First, the EPA guidance documents are not federal law. Guidance is neither rule nor law. Second and foremost, the abovementioned document reflects guidance issued in 1996, and does not represent the current EPA position on the dermal exposure pathway or the current state-of-the-science. A number of EPA Regional Offices (including Region VI) have incorporated consideration for dermal exposure in their published risk-based soil screening levels. Region VI also has recently released a Draft 1998 RCRA Waste Management Strategy, which includes very stringent requirements for evaluating dermal exposure for all relevant compounds. Further, on a national level, EPA is scheduled to release a finalized EPA Risk Assessment Guidance for Superfund (RAGS): Part E, Supplemental Guidance on Dermal Risk Assessment this summer, which supercedes any discussion on dermal exposure in the Soil Screening Guidance document.

Third, the commission disagrees with the commentor's characterization of what the Soil Screening Guidance concludes in regard to dermal exposure. The guidance assumes that dermal absorption would have to be greater than 10% for dermal exposure to be the main pathway of concern at a site (assuming complete absorption via ingestion), and concludes that only pentachlorophenol had available data suggesting dermal absorption greater than 10%. The rule has a different intent than the EPA guidance, as the commission determined that it was appropriate to consider combined exposures across all relevant pathways, rather than evaluating each pathway independently. Thus, contributions from dermal exposure are considered in setting a final soil PCL, although it may not be the main pathway of concern for a given COC. Additionally, the Soil Screening Guidance assumption regarding complete absorption via ingestion is not representative of actual absorption for many compounds (e.g., metals), which would serve to underestimate the significance of the dermal exposure pathway. Even ignoring the assumptions made by EPA in offering the 10% absorption cutoff, a significant number of compounds in the rule have current data which suggest dermal absorption of 10% or higher. Therefore, it is clear that the Soil Screening Guidance position on dermal exposure has limited applicability to the approach taken in the rule, and does not represent a consistent federal requirement.

Concerning the RIA, Chevron commented that §350.74(j)(2) requires that before the submission of the Affected Property Assessment Report or the Remedial Action Plan (RAP), a person must give notice to the public regarding a request for variance in order to receive input whether the variance will be compatible with existing neighboring land uses and preserve the current uses of the subject property. 40 CFR, §300.430 and Land Use in the CERCLA Remedy Selection Process, OSWER Directive Number 9355.7-04, May 25, 1995, allows that for CERCLA cleanups, EPA promotes early community involvement in considering land use as part of the remedy selection process. This is accomplished through discussions with local land use planning authorities, local officials, and the public as appropriate. The TRRP requirement for public notice, including publishing a notice in the newspaper and holding a public meeting if requested, goes far beyond the requirements of EPA guidance.

The commission disagrees. First, this rulemaking is not applicable to the federal Superfund program other than that it shall apply as an ARAR. With that stated, 40 CFR, §300.430, is a regulation, not a statute, and therefore the rule is not beyond the federal statutory requirements. With regard to statute, §9617 of CERCLA regarding Public Participation is general in nature and these rules do not exceed that generality. However, speaking to federal rule requirements, 40 CFR, §300.430(c) has only nonspecific performance-based requirements concerning community relations that could be implemented in a fashion more stringent than this rule. Upon a close reading of 40 CFR, §300.430 it is readily apparent that the requirements are very much intended to integrate community involvement into the process. The regulations specifically discuss interviews, formal community relations plans and §300.430(c)(2)(ii)(A) specifically states: "Ensure the public appropriate opportunities for involvement in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of a remedy." Therefore, the variance process in §350.74(j)(2) falls within the federal rule requirements of providing for community input and certainly is no more stringent. Additionally, with regard to timing, the rule has been amended at §350.74(j)(2)(B) to make it clear that the variance request is not required at the front end, but rather at the time approval of the PCLs is requested which could be submitted as part of the RAP similar to the federal Superfund process.

The commission acknowledges that TRRP requirements for public notice and a public meeting, if requested, may be construed to be more strict than federal guidance concerning consideration of land use as part of a remedy. However, the commission does not agree that provisions in TRRP that may be more stringent than federal guidance leads to the conclusion that TRRP exceeds requirements of federal law. Guidance is neither rule nor law. Nevertheless, in deference to the importance of this rule and to the differing opinions concerning its impact, the commission has published a full RIA.

Concerning the RIA, Chevron commented that §350.51(l)(5) Identification of Hot Spots RCRA While the hot spot approach is not unusual, the use of the designated hazard quotient of 50 is a new and significantly stricter requirement.

For other reasons, as explained in the responses to comments on §350.51(l)(5), the commission has removed the hazard quotient of 50 from §350.51(l)(5). The commission agrees that the proposal was a new requirement, but disagrees that it necessarily was a strict one.

Concerning the RIA, Chevron commented on the §350.71(c)(3) requirement for using specified equations provided or develop soil vapor monitoring data. Several other equations and models, including EPA's Box Model, have been developed to address this issue. By eliminating use of all other appropriate models, TNRCC is restricting the method of evaluation, beyond current restrictions.

The Box Model is not in any federal regulation or statute; therefore, no federal regulation has been excluded. However, §350.71(c)(3) has been amended to allow other methods. The commission has not listed any restrictions, other than that the method must be technically appropriate.

Concerning the RIA, Chevron commented regarding §350.79(2)(B), Comparison of Chemical of Concern Concentrations to Protective Concentration Levels, and noted that when compared to Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (1989). EPA/540/1-89/002, the null hypothesis is the opposite of the guidance provided by EPA. By specifying the null hypothesis as written the rule requires that site concentrations be significantly below average background concentrations before the person can conclude that no response action is necessary.

The commission agrees with the commentor for the reasons stated that the proposed rule was insufficient and has amended the rule to correct the situation. Readers are referred to responses to comments on §350.79 (2)(B).

Concerning the RIA, Chevron commented regarding §350.51(m) which presents requirements for determining background and comparing site results to background and cited EPA Guidance for Data Quality Assessment (1996), EPA/600/R-96/084; Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (1989), EPA/540/1-89/002, for the proposition that the proposed TRRP comparison method for background that gives a 50% chance of a background area exceeding the criteria unless extensive investigation is performed to develop a site specific background is far more stringent than the requirements of the existing standards.

The commission disagrees with the commentor that the option to use the "Texas-Specific Background Concentration" is a requirement or that it is more stringent than the requirements of existing standards. The TRRP allows persons to use the "Texas-Specific Background Concentration;" it is not a requirement. The TRRP rule provides various options for making comparisons with background levels on a site specific basis. The Texas- specific median default values are intended to provide a reasonable starting point for determining background concentrations and are not intended to represent the range of background concentrations likely to be encountered on each site subject to this rule.

Concerning the RIA, Chevron commented regarding §350.51(m) as compared to current §335.554(d), determination of background and background comparisons respectively. The proposed TRRP comparison method for background that give a 50% chance of a background area exceeding the criteria unless extensive investigation is performed to develop a site specific background. This is therefore far more stringent than the requirements of the existing standards.

The commission strongly disagrees with the errant position taken by the commentor with regard to this provision. Section 350.51(m) is a clear area of flexibility and cost containment over the existing rule. This rulemaking provides persons an option to use tabulated Texas-specific background concentration defaults for those situations where the person can demonstrate that site COC concentrations are below the Texas-specific background concentrations. As such, additional COC sampling may be limited to only those situations where the Texas-specific background concentrations are exceeded. No such provision is provided under the existing rule. Rather, §335.554(d) requires the determination of background to be determined with the site-specific collection of COC samples in all scenarios. Therefore, the existing rule is never less stringent in this regard.

Concerning the RIA, Chevron commented regarding §350.4(a)(20), definition of "Decontaminate" as compared to current §335.552. The definition of decontaminate requires application of a treatment process which can be interpreted to mean that an active treatment process must be used thereby precluding the use of natural attenuation/natural recovery as a potential decontamination remedy. Thereby as written, methodologies allowable under current standards appear to be limited under the new rule, thereby making the new rule more stringent.

The commission has modified the definition of "decontaminate" to include the term "occurrence" so as to remove any possible interpretation that an active treatment method, rather than natural attenuation, is required. Monitored natural attenuation is allowed where it meets all performance objectives, as is the case for any other remedy.

Concerning the RIA, Chevron commented regarding §350.4(a), Definitions, lists 87 definitions, which is 78 more than existing standards. These definitions have the effect of making the regulations more stringent by reducing opportunities for flexibility.

The commission acknowledges that TRRP as proposed lists 87 definitions, which are many more than the current rule. However, the commission disagrees that having more defined terms means less flexibility. Indeed, the need for more terms to be defined arises directly from the commission's efforts to increase flexibility and clarity. From the commission's perspective, the more options available, the broader the universe, and hence the greater the number of terms that need defining to ensure clarity.

Concerning the RIA, Chevron commented regarding §350.4(a)(44), the definition of "Institutional Control," and that narrowing the definition of an institutional control to deed notices and restrictive covenants eliminates the potential use of other controls such as state registries and local ordinances which eliminates flexibility, thereby making the rule more stringent.

The commission agrees that the proposed rule's definition of institutional control did not include potential controls such as state registries and local ordinances. The commission does not believe the omission of these potential options makes the TRRP more stringent than current State Law because no such law currently includes such institutional controls. The commission further notes that it has incorporated VCP Certificates of Completion and equivalent zoning or governmental ordinances into its institutional control paradigm in the final rule.

Concerning the RIA, Chevron commented regarding Subchapter C, Affected Property Assessment, and that the existing standards devote one-half page of text to describing the types of data to be collected, including analytical requirements and statistical methods. The proposed TRRP devotes significantly more pages to a detailed prescriptive approach to site characterization, including analytical data requirements and statistics.

The affected property assessment criteria do not exceed any state standards, as there are no existing state statutory standards related to site assessments. The commission agrees that the proposed rule devotes more pages to affected property assessment than the current rule, but does not agree that the greater number of pages means the proposed rule is more stringent. It could equally be asserted that the lack of provisions in the current rule leave persons in the dark as to what is expected of their property assessments and that being left in the dark is more taxing than being shown a path. The commission notes that the commentor only referenced part of the current Risk Reduction Rule which deals with site assessment and that §335.553(a) and (b)(1) are also applicable. The commission further believes that one of the costs of committing to a purely risk-based program is a competent site assessment.

However, as the commission has discussed previously, the site assessment requirements are less under the TRRP rule than in the current Risk Reduction Rule, which requires assessment to background.

Concerning the RIA, Chevron commented regarding §350.4(a)(9), the definition of "carcinogen" which it asserts has been widened far beyond the EPA classifications in the existing rule, which has the potential to expand the list of chemicals that could be so designated and thus require assessment.

The commentor states that the definition for carcinogen in the proposed rule has been expanded beyond the EPA classification as described in the existing rule. The commentor is concerned that this

expansion has the potential to increase the number of chemicals which would require assessment as carcinogens. As the EPA has proposed eliminating the current carcinogen classification scheme in favor of adopting a narrative approach, the commission believes that it is no longer appropriate to base the definition of a carcinogen on the existing EPA carcinogen classification scheme. In addition, there are several different classification schemes published by different entities (e.g., EPA, National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), American Conference of Governmental Industrial Hygienists (ACGIH)) and the specific classification for a COC may differ under the various schemes. Further, the current EPA carcinogen classification scheme is specific to potency estimates derived by the EPA, yet the hierarchy of sources from which persons should obtain toxicity values specified in §350.73(a) of the rule, is not limited to the EPA. It is the opinion of the commission that if the scientific community determines that a particular study meets the weight-of-evidence requirements such that a cancer slope factor or unit risk factor can be derived and is made available in accordance with the hierarchy of sources provided in §350.73(a), then the COC should in fact be evaluated as a carcinogen.

Concerning the RIA, Chevron commented on §350.74(j)(2), before the submission of the Affected Property Assessment Report or the Remedial Action Plan (RAP), a person must give notice to the public regarding a request for variance in order to receive input whether the variance will be compatible with existing neighboring land uses and preserve the current uses of the subject property. Under current law, notice to and input by the public is during the selection of the final remedy (e.g., at the completion of or during the Remedial Investigation/Feasibility Study), not during the development of the risk-based exposure limit (RBELs) or PCLs (i.e. during the affected property assessment). Accelerating land use decisions in the midst of the affected property assessment phase does not better inform the public of site conditions, will undoubtedly slow down the corrective action process, and may result in an undue economic hardship to parties seeking the variances compared to existing law.

With regard to the state Superfund process, §361.1855 of the Health and Safety Code provides for public meetings. The commission concedes that the requirement to provide direct notice to adjacent landowners and some of the additional parties as listed in §350.74(j)(2)(E) is in minor aspect more stringent than §361.1855.

Concerning the RIA, Chevron commented regarding §350.4(a)(79) definition of "Source Area", and that this definition states that the location of a non-aqueous phase liquid is to be considered a source area regardless of whether the material is actually a source (i.e. releasing a COC). It is possible, and likely, that there are NAPLs which are inert, non-toxic, and basically insoluble materials within Texas. Therefore, this is counter to the Risk Reduction Rule intent which is to provide cost effective evaluation and remediation for areas which are a "risk" to human health and the environment and applies much more stringent requirements to such situations.

With regard to the source area definition, the commission disagrees that because this rule has a definition that the current rule does not have, that this rule is more stringent. Rather, the point only bolsters the commission's position that this rulemaking adds clarity to the corrective action process. Source areas are a real presence at sites, regardless of whether or not a name is given to them in the definitions section of a rule. Further, the commentor seems to be taking things out of context, and does not agree that the rule invokes more stringent requirements than currently employed. The proposed definition of source area is essentially the same definition that is included in the ASTM RBCA Standards. NAPLs are only of concern where the NAPL exceeds a PCL, or causes vapors (§350.31(c)) or causes some other concern, such as sourcing a dissolved-phase plume §350.33(f)(4)(E). The term source area is generally used in the rule as a descriptor of where the primary mass of contaminant is concentrated in the environmental media, generally at or below the primary source (e.g., tank, unit, lagoon, drum). The commission agrees that where the NAPLs are inert, non-toxic, and basically insoluble, they should not be risk drivers. In fact, the commission has struck proposed

§350.33(f)(1)(C) because it seemed to imply that under Remedy Standard A, which did not have such an allowance for non-toxic NAPLs, NAPLs always had to be recovered. That is the case where NAPLs exceed PCLs, but should not be the case where NAPLs do not exceed the PCL, unless there are other concerns. However, the commission points out that the stated qualities, such as inertness, non-toxicity and insolubility are commonly not the case with regard to NAPLs. The rule does not exceed any state standard in this regard.

Concerning the RIA, Chevron commented regarding §350.31(c) demonstration of no explosion hazard. Due to the COC mixtures varying significantly over small distances, the required calculations or monitoring would be extensive and in many cases prohibitively expensive. This is not required under current rule.

The commission disagrees. Similar provisions to §350.31(c) are present and implemented under both §334.203(1)(G) and §335.559(e). Section 334.203(1)(G) specifies that explosive conditions must be prevented. More details are provided in PST guidance document *Risk-Based Corrective Action for Leaking Storage Tank Sites*, RG-36, January 1994. Section 335.559(e) of the current Risk Reduction Rule has an upper vapor limit. All of these rule provisions, though addressed in a different manner, deal with the explosive vapor issue. In fact, the §335.559(e) may actually be a more stringent standard than proposed herein. However, the commission has amended the rule in response to comments submitted for §350.31(c) to make the provision more performance based.

Concerning the RIA, Chevron commented that the requirements for developing PCLs are significantly more stringent and less flexible than the existing requirements for Risk Reduction Standards 2 and 3.

The procedures to calculate PCLs under this rulemaking are based on updated science and are more technically sound than the methods detailed under the current Risk Reduction Rule. For example, the methodology to calculate soil-to-groundwater protection PCLs are more technically sound than the procedure allowed under the current Risk Reduction Rule. As a consequence, comparison of PCLs for this pathway relative to Standard 2 MSCs shows that some are higher and some are lower. Additionally, this rule allows greater flexibility to factor observations into the evaluation of the need to develop PCLs for this same exposure pathway than does the current Risk Reduction Rule (see §350.75(i)(7)(C)). Persons often point out the dermal pathway as a difference between the current Risk Reduction Rule and this rule. The current Risk Reduction Rule at §335.556(b) factors in other exposure pathways. If persons assume ingestion of soil, which the rule requires, then there is no legitimate basis to assume dermal contact with those soils is not equally applicable. In fact, guidance was written in July 1998 for 30 TAC, Chapter 335 which reinforces this point. The commission agrees that this rulemaking may not appear to provide as great flexibility in adjusting exposure factors as 30 TAC, Chapter 335 Remedy Standard 3. However, there are in fact many significant areas of flexibility in the TRRP rule and several examples are noted here. First, the PCLs under this rule for Tiers 2 and 3 can be developed without the necessity of completing a formal remedy selection process as required by §335.562. Second, under this rulemaking PCLs are based on an individual risk level of 1×10^{-5} for carcinogens and a hazard index of ten for non-carcinogens as opposed to a risk level of 1×10^{-6} and a hazard index of one as set forth in §335.563(b) and (c). Third, under this rulemaking, cross-media exposures do not have to be assumed as a default requirement as set forth in §335.563(d)(2). Fourth, the PCLs can be based on the current use (residential or commercial/industrial), whereas under §335.563(e), non-residential land use may only be allowed following the analysis of past, current and future use. In other words, the person must demonstrate why a chemical plant could not become residential property in the future and if the executive director is not convinced, then the cleanup could be based on residential land use because the land *might* be used for that purpose in the future even if the landowner is the responsible person and is willing to place the required institutional control. Under the TRRP rule, if the land is currently commercial/industrial use and the landowner consents to the required institutional control, then the

PCLs can be calculated on commercial/industrial land use. Fifth, exposure factors can only be varied under §335.563(e) when there is compelling site-specific evidence. The commission acknowledges that the current Risk Reduction Rule does not limit the factors that could be varied based on site-specific factors, but rarely is such evidence substantiated. Rather, such variance recommendations have so often been unsubstantiated and random that the commission has had to develop default scenarios in guidance just to propel the process. Sixth, PCLs based on plume management zones can be assumed under this rule for residential and commercial/industrial properties, on-site and off-site. Such considerations can only be factored in for on-site non-residential land use under §335.563(h)(2) and only under Remedy Standard 3 which requires a baseline risk assessment and a remedy selection evaluation. Lastly, the rule provides significant flexibility in allowing the use of the Facility Operations Area (FOA) provisions of Subchapter G, whereby many of the standard provisions of Subchapters B-F can be deferred or amended as provided in Subchapter G. The commission does not agree that in reality this rulemaking is less flexible than existing Remedy Standard 2 or 3. However, given that some take exception to the commissions view, the commission has prepared a full RIA.

Concerning the RIA, Chevron commented that §350.4(a)(71), definition of "residential land use," has been expanded to include daycare facilities, educational facilities, hospitals, and parks.

The commission disagrees with the commentor on two points. First, the definition for "residential land use" does not exceed a standard because there is no existing State standard. Second, the commentor is in error regarding the definition for "residential property" in §335.552. Residential property is defined in §335.552 as any property that does not exclusively meet the definition of non-residential property. The definition further states, "Also, a portion of non-residential property that is used in part for residential activities, such as a day care center, is defined as residential. Thus, this definition clearly includes "daycare facilities." Further, "educational facilities, hospitals, and parks" do not exclusively meet the definition of non-residential property. The commentor is referred to the exclusions of various Standard Industrial Classification codes under the definition for non-residential property, such as, 8051, 8059, 8069, 8211, etc.

Statement of the Effect of the Adopted TRRP Rule on Small and Micro Businesses

Small and micro businesses responsible for corrective action will experience an economic effect from application of the adopted TRRP rule. That economic effect may be an increase in the cost of complying with the adopted rule or may be a cost savings. Assuming in the interest of caution that any negative economic effect falls within the meaning of "adverse economic effect" in §2006.002 of the Texas Government Code, the Texas Natural Resource Conservation Commission ("commission") must "reduce that effect if doing so is legal and feasible considering the purpose of the statute under which the rule is to be adopted."

The statutes, as stated in the statutory authority portion of this chapter, under which the TRRP rule is adopted intend to protect human health and the environment. In light of this substantial purpose, it is difficult to hold any entity responsible for remediating contaminated property to a lesser standard than that which is scientifically determined to be protective of human health and the environment. Thus, allowing small or micro businesses to remediate properties under less stringent conditions because of economic impacts is tantamount to allowing small and micro businesses to endanger human health and the environment while others cannot. The nature of the subject matter with which these rules are dealing makes it difficult to tailor provisions to a particular category of responsible persons like small and micro businesses because, from the commission's perspective, inappropriate risk must be corrected no matter who is responsible for it. Accordingly, because the adopted rule establishes methodologies for removing health risks to the public and the environment resulting from contamination, it is not legal or feasible to broadly reduce the effect of the adopted rule on small or micro businesses because doing so will endanger human

health and the environment. The commission notes, however, that flexibility and performance based standards such as expanded use of exposure prevention remedies are built into the rule where feasible to provide all businesses with more remedial options and more cost containment opportunities than are available under the current rule.

An exception specifically aimed at reducing one potential source of adverse economic impact on small and micro businesses concerns financial assurances. Financial assurances provide funding for the continued maintenance of engineered remedial actions such as a concrete cap covering contaminated soil. Under the adopted rule, small and micro businesses responsible for a remediation may seek to reduce the amount of financial assurance if the post response action care period is greater than ten years. As mentioned above, the adopted rules' flexible framework in which to calculate cleanup levels and performance-based (rather than design) standards apply to all entities responsible for remediating contamination, including small and micro businesses, and allows responsible persons to determine for themselves the most appropriate cleanup level and the least costly means by which a cleanup goal is to be achieved. Finally, clarity is provided in rule provisions to facilitate rule interpretation so that persons, including micro, small and large businesses alike, can make decisions that are likely to be approved by the agency the first time.

Analysis of the Cost of Compliance with the Adopted Rule for Micro Businesses Using the Cost for Each \$100 of Sales, and Comparison of Cost of Compliance With Sample "Largest" Business Affected By TRRP

Benefits and Costs to Small and Micro Businesses:

Taken as a whole, the adopted rule is expected to have a positive economic impact on small and micro businesses subject to the Industrial and Hazardous Waste, Superfund, and the VCP Programs. These positive impacts are primarily expected to take the form of cost savings for remediation and financial assurance. Small and micro businesses actively involved in cleaning up a site, regardless of program, would achieve the same types of cost savings as a large business. However, small and micro businesses participating in the PST Program would face the same potential cost increase under the adopted rule as a large business.

The definition of "small business" is "a legal entity, including a corporation, partnership, or sole proprietorship that: (A) is formed for the purpose of making a profit; (B) is independently owned and operated; and (C) has fewer than 100 employees or less than \$1 million in annual gross receipts." Texas Government Code, §2006.001(1) (Vernon 1998)

A "micro-business" is "a legal entity, including a corporation, partnership, or sole proprietorship that: (A) is formed for the purpose of making a profit; (B) is independently owned and operated; and (C) has not more than 20 employees." Texas Government Code, §2006.001(1) (effective September 1, 1999).

Virtually any small or micro business that has a leaking underground storage tank is potentially subject to cost increases under the adopted rule. Such businesses would more likely than not include small fuel retailers. However, the commission does note that all compliance deadlines have passed for meeting release detection, spill and overflow, tank integrity assessment, cathodic protection standards, and private financial assurance. Therefore, all tanks operating today must meet higher technical standards and theoretically are less likely to suffer a leak in the future.

This analysis will use the information concerning PST remediation discussed in the Regulatory Impact Analysis. What follows is a discussion of the impact of three cost scenarios on estimated costs to small and micro business with varying amounts of income, and a comparison of that impact with the impact on one of the largest businesses affected by the adopted rule.

Of the 12 PST sites in the RIA, the “best case” PST site resulted in an estimated no increase in the cost to assess, remediate, monitor and close the site under the adopted rule. (See LPST site 109688 in RIA; \$34,345 cost under current rule and TRRP). A “middle road” PST site resulted in a potential range of TRRP cost from no increase to a \$10,996 increase. (See LPST site 112399; \$12,717 cost under current rule and potential range of \$12,117 to \$23,713 under TRRP). The worst case PST site resulted in an estimated cost increase of \$187,623 to assess, remediate, monitor and close the site under the adopted rule. (As mentioned earlier in this report, \$187,623 is based on the higher and more conservative \$151,200 estimated groundwater remediation cost rather than the \$107,297 remedial cost actually used in the case examples. (See LPST site 111900). That is an increase over the actual cost of \$24,343 under existing program rules, which would bring the responsible party’s total estimated cost under the adopted rules to \$211,966.

For sites where the costs are the same under the current rule and the adopted rule, small and micro businesses would not be economically impacted by the adopted rule.

For a small or micro business with \$250,000 in annual sales, a \$10,996 estimated cost increase for one site would represent approximately 4.4% of sales or \$4.40 for every \$100 in annual sales. For a small or micro business with \$500,000 in annual sales, a \$10,996 estimated cost increase for one site would represent approximately 2.2% of sales or \$2.20 for every \$100 in annual sales. For a business with \$1,000,000 million in annual sales, a \$10,996 estimated cost increase for one site would represent approximately 1.10% of sales or \$1.10 for every \$100 in annual sales.

For a small or micro business with \$250,000 in annual sales, a \$187,623 estimated cost increase for one site would represent 75% of sales or \$75.04 for every \$100 in annual sales. The commission acknowledges that low revenue small or micro businesses which find themselves having to perform a relatively significant corrective action have the potential to be significantly impacted, particularly where such a business owns a PST and would have been covered by the current rule, but must comply with TRRP. This is one reason why the adopted rule will not apply to cases currently covered by PST rules until September 1, 2003. However, it should be observed that some micro and small businesses can cause pollution problems that are beyond or strain their financial ability to remediate. This is true under the current rules and under the adopted TRRP.

For a small or micro business with \$500,000 in annual sales, a \$187,623 estimated cost increase for one site would represent 38% of sales or \$37.52 for every \$100 in annual sales. For a business with \$1 million in annual sales, a \$187,623 estimated cost increase for one site would represent 19% of sales or \$18.76 for every \$100 in annual sales. For a business with \$2 million in annual sales, that \$187,623 cost increase for one site would represent 9% of sales or \$9.38 for every \$100 in annual sales. For a business with \$3 million in annual sales, that \$187,623 cost increase for one site would represent 6% of sales or \$6.25 for every \$100 in annual sales.

For corporations such as Texaco, with a 1997 revenue of \$46 billion, the \$187,623 estimated cost increase for one site discussed earlier in this section would represent much less than 1% of sales or less than \$.01 for every \$100 in annual sales.

The adopted rule does afford cost savings to responsible parties who are small and micro businesses and who are required to demonstrate financial assurance for post response action care. Under the adopted rule, small business responsible parties (which by definition includes micro businesses because micro businesses never have more than 20 employees) may seek to reduce the amount of financial assurance required if the post response action care period is greater than ten years. Actual cost savings realized by small and micro business responsible parties as a result of this provision will vary with the amount of financial assurance required. However, for estimating purposes only, by assuming post response action cost at \$30,000 per year (based on \$5,000 for lab analysis and \$25,000 for a consultant to collect samples), the cost to

demonstrate for ten years would be \$300,000, substantially less than \$900,000 for 30 years. Further assuming the responsible party uses a bank letter of credit to demonstrate financial assurance and the responsible party's annual cost for a bank letter of credit is 0.75%, demonstrating financial assurance for ten years at \$300,000, would cost an estimated \$2,250 per year ($\$300,000 \times 0.75\%$). In this example, the ten-year demonstration cost represents a \$4,500 annual savings from the 30-year demonstration cost of \$6,750 per year ($\$900,000 \times 0.75\%$). If financial assurance is still required at the end of the first or second ten-year period, the micro business responsible party may again seek to demonstrate financial assurance for the subsequent ten-year period.

As discussed in other parts of this preamble, the commission considered the potential impact the adopted rule will have on the sector of the economy engaged in corrective action due to unauthorized releases from petroleum storage tanks. The principles of consistency of application across corrective action programs, increased focus on natural resource protection, and enhanced notice of limits on future land use when presumptions based on such use are incorporated into the risk based remedy all weighed in favor of not carving out exceptions for the PST sector of the economy.

Despite the potential impact of the adopted rule on small and micro businesses, the commission has found that the adopted rule will result in the best combination of effectiveness in obtaining the desired results of protecting human health and the environment from unacceptable risk and economic costs not materially greater than the costs of any alternative regulatory method selected. The adopted rule will not apply to some impacted PST small businesses until September 1, 2003, incorporates performance standards (rather than design standards) scientifically determined to protect human health and the environment, and includes financial assurance provisions that will reduce the economic impact on small and micro businesses. These features of the rule have the effect of reducing the economic impact of the adopted rule on small and micro businesses.

Analysis of comments on proposed Small Business Impact.

Concerning Small Business Impact, TPCA commented that there are other potential costs that TNRCC did not recognize in their Statement on the Effect of the Proposed Rule on Small Business. The institutional controls as proposed will be an additional expense, as attorney will be needed. This potentially will move more sites to remediation than today because of the expense and possible litigation that will surely result with third-party landowner concurrence and restrictive covenants. These controls will likely drive the remediation activities to near background levels.

The commission recognizes that there will be expenses with respect to institutional controls, but notes that use of an institutional control is the person's choice which the commission presumes is made after determining the most cost effective method of correcting the contamination. The costs for a person to obtain the institutional controls would not be more than the difference between the cost of remediation with controls and the cost of remediation without controls. In some cases this increment could be limited further by the value of the property if it were uncontaminated (i.e., full property value). The commission disagrees that the institutional control provisions will drive remediation activities to near background. The issues arising from off site contamination will be resolved based on case specific factors, and the commission hesitates to quantify costs for these matters.

Concerning Small Business Impact, TPCA commented that the increased cost of insurance was not addressed in the Statement of the Effect on Small Business to the proposed rule. The average cost of the required insurance is \$800 per tank. This is significant to small retailers who may only average \$2,000 a month in gross profit. If the insurance cost should increase the 100% that was predicted in May 1998, many of these small businesses will be negatively affected as a class. The propose rule disproportionately affects these businesses whether they have a release or not because they are mandated by TNRCC rule to provide financial assurance just to operate the PST.

While the commission did not specifically address the cost of private insurance for PST sites in the March, 1999, preamble to the proposed rule, it did note that it is debatable as to whether or not small fuel retailers may be affected as a group by the proposed rule in an adverse or material way. The commission is not familiar with the 100% increase in insurance referenced by the commentor, but the commission notes that with the new, more protective tank technology in place statewide effective December, 1998, the number and severity of unauthorized releases from USTs should lessen, which, the commission presumes, should mitigate purported rising insurance rates.

TAKINGS IMPACT ASSESSMENT

The commission has prepared a Takings Impact Assessment for this rule pursuant to Texas Government Code, §2007.043. This is a summary of the Takings Impact Assessment. The specific purpose of the adopted rule is to create one risk-based rule that will guide affected property assessments, notifications, and response actions through the establishment of a consistent, reliable program that encourages the cost-effective corrective action for affected properties while ensuring the adequate protection of human health and the environment. The adopted rule will substantially advance this specific purpose through the use of a tiered process for the establishment of health-based protective concentration levels, by allowing the use of site-specific data, and by providing flexibility in selection and design of response actions. Because a landowner, except in cases of technical impracticability, zoning or governmental ordinance, or when he or she cannot be located, has the option not to consent to institutional controls such as deed restrictions and because another person, not the TNRCC, chooses the remedy, the adopted rule itself will not limit or restrict the real property rights associated with the affected property. Further, the adopted rule does not burden private real property because it: (1) will set minimum requirements for remediation of affected property; (2) will cause no release of COC onto the affected property; (3) will not prohibit the pursuit of damages by the affected property owners from the responsible parties; and (4) will not cause a diminution in property value. Finally, the adopted rule is promulgated to fulfill federal requirements, prevent or abate public nuisance, is necessary to prevent a grave and immediate threat to life or property resulting from hazardous substances, and the adopted rule is in response to the real and substantial threat to public health and safety resulting from hazardous substances. For these reasons, the adopted rule is exempt from the requirement for a Takings Impact Statement as required by statute; however, the commission has prepared a Takings Impact Assessment which is presented in this issue, which may be found in the *Tables and Graphics Section* under:

Figure 2: 30 TAC Chapter 350 - Preamble

The Takings Impact Assessment can also be found at the TNRCC web page located at <http://www.tnrcc.state.tx.us>

Analysis of comments on the proposed Takings Impact Assessment (TIA).

Concerning the TIA, Fulbright & Jaworski commented that the proposed rule will unnecessarily regulate interests in real property and may result in needless litigation.

Fulbright & Jaworski comments that the provisions concerning deed notices and restrictive covenants will unnecessarily regulate interest in real property and result in needless litigation. The commission responds that notice and enforceability of necessary controls is not unnecessary regulation. The COCs are on or under that land. Deed instruments are particularly appropriate where land is concerned in that they are part of the record commonly consulted by buyers, lenders, insurers, and lessees when any of those persons is evaluating potential uses of the land. Persons can avoid litigation in the usual fashion by settlement or under these rules by remediating to a residential level without controls when technically practicable.

Concerning the TIA, Henry, Lowerre, Johnson & Frederick commented regarding failure to Adequately Assess the Takings Impacts: The analysis in the takings impact assessment is inadequate for both the Texas "takings" law and the Texas Constitution. The proposed TRRP defines the "affected property" subject to the TRRP as the contaminated property on-site and off-site. Clearly, the rules allow the 'taking of private property,' including the trespass on and the reduction of property values of off-site private property by private and governmental entities.

Concerning the TIA, Henry, Lowerre, Johnson & Frederick commented that almost the entire analysis is based on the assumption that the contamination is located on the property of the responsible person. Any evaluations of impacts thus ignore the innocent property owner whose land has been contaminated. Clearly property values are affected. TNRCC even allows responsible parties to condemn such reduced property values, whether the reduced value is greater or less than 25%. Likewise, the provisions of the rules that allow plume growth on to another person's property is not properly evaluated. A short TIA is not appropriate. A full analysis for, at least, the significant part of the rules that affect private property and property rights (including mineral rights) is required by law.

Concerning the TIA, Henry, Lowerre, Johnson & Frederick further commented that they believe that TNRCC is required to prepare a Takings Impact Analysis. The TIA must examine the burdens on landowners who are not responsible parties but who own the land on which contamination has occurred as well as the burdens on surrounding landowners.

Henry, Lowerre, Johnson & Frederick comments that the TIA did not account for the innocent property owner whose land is contaminated. The commission responds that the landowner should be made whole by the rule's requirement for landowner consent. Since landowner consent is required for both deed notices and restrictive covenants, the landowner may seek adequate recompense to cover his damages prior to consenting to the control. If he is made whole, there is little likelihood of a taking by the commission. In the case where it is technically impracticable to remediate without controls and landowner does not consent, the rule provides for a court to set a damage amount to be paid to the court. Again, the impacted landowner should be made whole.

Henry, Lowerre, Johnson & Frederick also comments that the TIA should discuss "takings" in regard to plume growth which is allowed under the rule. The commission responds that plume growth that requires controls on another person's property is subject to the deed notice/restrictive covenant analysis above. However, when COCs are below residential levels and move to another person's property no controls are required under this rule. The commission does not believe that it has engaged in a "taking" should such an event occur, even if the property loses value in the marketplace. The commission emphasizes that by this rule it has not given a person permission to allow COCs at any level to move onto another's property. That is the choice of the person remediating or the inevitable result of a release that occurred prior to the applicability of the rule. In addition, because the levels of COCs will be at or below acceptable residential risk levels, from the commission's perspective, any use of the property is appropriate. A party may still seek compensation for diminution in value should he or she so choose, but such action would be for the alleged trespass and outside the scope of this rule. As stated in the TIA to the proposed rule "Because the proposed rule sets minimum requirements for remediation of affected property, causes no release of COC onto the affected property, does not prohibit the pursuit of adequate compensation by the affected property owners from the responsible parties, and does not cause a diminution in property value, the proposed rule is not a burden on private real property."

Concerning the TIA, Henry, Lowerre, Johnson & Frederick commented that TNRCC had not prepared an adequate assessment of the takings impacts. For example, the assessment mistakenly argues that the rules are taken to fulfill an obligation mandated by federal law. There is no federal mandate for any of the changes that would be made if the TRRP were adopted.

Henry, Lowerre, Johnson & Frederick comments that there is no federal mandate for the rules specifically. This is correct. However, the commission has received delegation of the RCRA and the UIC programs. These delegations require that the commission's rules satisfy federal statutes and regulations. The commission has consulted extensively with EPA concerning the rule and is satisfied that it meets at least minimal requirements for those programs. In this sense, the rule is federally mandated.

Concerning the TIA, Ranger disagrees with the "Takings Impact Assessment of the proposed rules. Contrary to what the TNRCC has presented, Ranger believes the proposed rule will burden private real property which is the subject of the rule by establishing unreasonable and unnecessarily expensive criteria that will apply not only to contamination of environmental media that represents a real and substantial threat to human health and safety, but also to contamination of environmental media that does not represent a real or substantial threat to human health and safety.

Ranger comments that the rule will burden private real property and also will establish "unreasonable and unnecessarily expensive criteria . . ." that apply to both properties that are both above and below appropriate risk levels. The commission disagrees. The commission has stated the reasons for the rules in the proposed and final preambles. It has sought to reduce the costs of remediation and yet perform its mission to protect human health and the environment. For example, it has removed the requirement in the existing rules for deed recordation when COCs are above background but below residential levels without controls. The commission believes that it is not necessary to require deed notice of a cleanup that allows unrestricted use.

This change results in a reduction in costs and a reduced burden on property to persons remediating sites. On the other hand, the commission has extended some additional requirements to PST remediation such as deed notice and restrictive covenants in order to better prevent persons' exposure to excessive levels of COCs, and make the PST program conform with the other programs dealing with the same or equivalent COCs.

COASTAL MANAGEMENT PROGRAM CONSISTENCY REVIEW

The commission has reviewed the adopted rulemaking and found that the rules are subject to the Texas Coastal Management Program (CMP) and must be consistent with all applicable goals and policies of the CMP.

The commission has prepared a consistency determination for the adopted rules pursuant to 31 TAC, §505.22 and has found that the adopted rules are consistent with the applicable CMP goals and policies. The following is a summary of that determination. The CMP goal applicable to the adopted rules is the goal to protect, preserve, restore, and enhance the diversity, quality, quantity, functions, and values of coastal natural resource areas. CMP policies applicable to the adopted rules include the administrative policies and the policies for specific activities related to construction and operation of solid waste treatment, storage, and disposal facilities. Promulgation and enforcement of these rules is consistent with the applicable CMP goals and policies because the adopted rules will establish clear, consistent standards to guide the assessment and cleanup of contaminated properties from site investigation through post-response action care. The rules will require persons conducting response actions to ensure that the concentrations of COC are protective of human and ecological receptors. The new rules will result in an overall environmental benefit across the state, including in coastal areas, by implementing a comprehensive and consistent approach to corrective action that utilizes new and scientifically sound corrective action methods; thereby serving to protect, preserve, restore, and enhance the diversity, quality, quantity, functions, and values of the coastal natural resource areas. In addition, the adopted rules do not violate any applicable provisions of the CMP's stated goals and policies.

HEARING AND COMMENTERS

A public hearing on this proposal was held in Houston, Texas on April 19, 1999, and in Austin, Texas on April 22, 1999. Oral testimony was provided by Craig's Cleaners, Greater Houston Cleaners Association, and McCulley, Frick, & Gilman this proposal. The following commenters submitted written comments: Air Force Center for Environmental Excellence (AFCEE), Amoco Production Company (Amoco), Arcadis, Geraghty & Miller (Arcadis), Association of Electric Companies of Texas, Inc., (AECT), Brown & Caldwell, Brown Carls & Mitchell on behalf of Jack Brown Cleaners, Brown McCarroll & Oaks Hartline, Campbell, George & Strong on behalf of BP Amoco, Chevron, Conoco, & Fina, Campbell, George & Strong on behalf of Chevron, Conoco, & Fina (Eco comments), Chevron, Coastal Corporation (Coastal), Craig's Cleaners, Dow Chemical Co. (Dow), Eastman Chemical Company (Eastman), Environmental Fuel Systems Inc., (EFSI), Environmental Resources Management (ERM), Exxon Chemical Americas (Exxon), Fina Oil & Chemical Company (Fina), Fulbright & Jaworski on behalf of Exxon Company USA and Exxon Chemical Americas, Groundwater Services Inc., (GSI), Gum Springs Water Supply Corp., Harris County Pollution Control Division, Henry Lowerre Johnson & Frederick, Industry Council on the Environment (ICE), IT Corporation (IT), Jenkens & Gilchrist, King & Spalding on behalf of the Lead Industries Association, Koch Industries Inc., (Koch), McCulley Frick & Gilman (MFG) on behalf of itself and CITGO Petroleum Corp., Michelle A. McFaddin Attorney at Law on her behalf and on behalf of the Peoples' Environmental Toxic Reform Organization, Mobil Oil Corporation (Mobil), National Oceanic and Atmospheric Administration (NOAA), Phillips Petroleum Company, Port of Houston Authority, Ranger Environmental Services (Ranger), Reliant Energy (Reliant), Society for Risk Analysis - Lone Star Chapter (SRA), Strasburger & price on behalf of 7-Eleven, Inc., (7-Eleven), Texas Chemical Council (TCC), Texas General Land Office (GLO), Texas Natural Resource Conservation Commission Office of Public Interest Council (PIC), Texas Oil & Gas Association (TXOGA), Texas Parks & Wildlife Department (TPWD), Texas Petroleum Marketers and Convenience Store Association (TPCA), Texas Utilities Service Inc., (TU), TransSystems Corporation (TransSystem), U.S. Fish and Wildlife Service (USFS), United States Environmental Protection Agency Region 6 (EPA Region 6), United States Environmental Protection Agency Region 6 Source Water Protection Branch (EPA), Roy F. Weston, Inc., (Weston). The following comments of others have been incorporated by the commentor Henry Lowerre Johnson & Frederick: EPA's letter of July 11, 1996 from Stephen Gilrein to Mr. Barry Williams, EPA's letter of September 24, 1997 from Allyn M. Davis to Mr. Barry Williams, Texas General Land Office's letter from Diane Hyatt to Clark Talkington with comments dated May 14, 1996, The City of Houston's letter of June 17, 1996 from Mary Ellen Whitworth to Clark Talkington, Comments 1 - 3 of Mark L. Gipson in his e-mail comments of February 24, 1997 to Clark Talkington. A letter from the Environmental Defense Fund and Sierra Club dated June 18, 1998 from Raynom Alvarez and Leslie Fields, The Sierra Club's letter of June 6, 1996 from Neil J. Carman to Clark Talkington, and Comments of the Texas Center for Policy Studies(TCPS): in the TCPS letter of June 17, 1996 and February 24, 1997 from Mary Kelly to Clark Talkington and in the letter from a public citizen on June 18, 1996. Comments on the TRRPs dated July 22, 1998, filed by Clean Water Action, Committee For Environmental Justice Action, East Texas Communities Network, Environmental Defense fund, Henry, Lowerre, Johnson, Hess & Frederick, People Organized in Defense of Earth And Her resources, San Antonio Coalition for Environmental And Economic Justice, Sustainable Energy and Economic Development Coalition, Sierra Club, Lone Star Chapter, Texans United, Texas Center For Policy Studies & The Chemical Connection. TNRCC's Public Interest Counsel comments dated July 22, 1998, and testimony of Charles Lesniak, City of Austin, before the Texas House of Representatives Committee of Environmental Regulation, dated April 12, 1999.

ANALYSIS OF COMMENTS

SUBCHAPTER A - GENERAL INFORMATION

§350.1. Purpose

The commission did not receive any comments on proposed §350.1, and the section is adopted as proposed.

§350.2. Applicability

Concerning §350.2(a), Chevron suggested phase in implementation of the TRRP to allow adequate refinement of Tier 3. Chevron encouraged the TNRCC staff to utilize both stakeholder committees and the Commissioner Work Session process in order to receive adequate stakeholder and policymaking input on key TRRP issues of concern. In addition, Chevron commented that the TNRCC could seek to refine Tier 3 in order to address the issues referenced immediately above and discussed in more detail in Chevron's detailed comments in Attachment 3. Chevron noted that involving Tier 3 issues in those discussions may well result in modest delay in the implementation of the TRRP, but noted that phased implementation of the TRRP is a more prudent step than moving forward with a rule that will have significant adverse impacts on large, complex remediation projects.

The commission intends to implement the rule in whole rather than in a phased manner. The TRRP was developed as an integrated corrective action program; therefore, pieces of the rule are dependent upon other pieces. For example, the affected property assessment is dependent upon the development of protective concentration levels which is dependent upon the location of points of exposure. Rather than a phased-in approach, the commission has established the date of implementation as May 1, 2000, approximately seven months after this rule will become effective. This delayed implementation date will afford the opportunity to address a limited number of important legal and policy issues, such as Tier 3 refinement, in commission work sessions and to establish stakeholder groups to provide input and review on the development of guidance. Additionally, the delayed implementation date, combined with the grandfathering provisions of §350.2(m)(2), should provide sufficient time for persons conducting large complex remediation projects to fully evaluate this final rule and determine its ramifications. The commission is committed to an appropriate level of stakeholder involvement in the development of guidance for the rule, however, regarding work sessions, the commission does not wish to commit itself to any specific issues or schedules at this time.

Concerning §350.2(a), Chevron also commented that subsections (b) - (m) are the list of covered programs, but lead-in text for subsection is omitted. The result is that each subsection starts with a phrase that is not clearly connected to the applicability section. Chevron recommended stating in subsection (b) that the rules in this chapter apply to the following covered programs as specified in subparagraphs (1) - (12). Subsections (b) - (m) would be renumbered as (1) - (12).

The commission disagrees with the commentor's recommendation to restructure this section. The link between the individual programs listed in this section to the TRRP applicability is established in subsection (a) with the sentence "The regulations in this chapter address releases of COCs as defined by various programs subject to this chapter as specified in subsections (b) - (m) of this section."

Concerning §350.2(a), EPA Region 6 commented that TRRP needs to be much more explicit that other federal and state regulations and statutes precede requirements in this rule. If it is deemed impractical in each area of the rule to state which particular governing regulation would not allow a TRRP provision (e.g., reuse of soils would likely violate land disposal restrictions (LDRs) under RCRA), EPA Region 6 noted that it would be helpful to include language which states that each person should consult with their respective regulatory program prior to implementing a TRRP requirement. Confusion on the part of both the regulated community and the agency could result in the misapplication of the rule where it is not intended. In addition to the previous example of reuse of soils, other provisions such as, self-implementation of remedies under Standard A, financial assurance provisions, certain aspects of the FOA, and issuance of no further action letters may conflict with RCRA authorization requirements." Even though this section has now been modified to include language that states "regulations in this chapter do not eliminate the need for the person to meet more stringent or additional requirements found in the particular

rules for the covered program areas or applicable federal requirements," EPA Region 6 commented that it still remains concerned that, persons utilizing the TRRP may inadvertently overlook other program-specific requirements. Provisions within TRRP should cross-reference other program requirements to insure that other programs' requirements are still met by the regulated community. EPA Region 6 asked if this means that all RCRA corrective actions will be performed in accordance with Texas' currently approved RCRA program? This is a particular concern regarding regulated units undergoing corrective actions which have more specific regulatory requirements. These include 40 CFR, §264.90, Subpart F, which establishes requirements for the assessment and closure of regulated units; 40 CFR, §264.92, Groundwater Protection Standards; 40 CFR, §264.97, General Groundwater Monitoring Requirements; 40 CFR, §264.95, which establishes the point of compliance; and 40 CFR, §264.94, which establishes concentration limits in groundwater. The proposed rule establishes a very different approach/process than these regulations. Will the above cited provisions of the RCRA program remain applicable to Texas corrective actions once this rule is passed? EPA Region 6 further commented that the proposed rule states that "The Municipal Solid Waste (MSW), Underground Injection Control (UIC), Petroleum Storage Tank (PST), and Resource Conservation and Recovery Act (RCRA) are the only programs affected by the proposed rule that have received federal delegation or federal approval." In light of this statement, EPA Region 6 asked if Texas anticipates submitting these rules for inclusion in its authorized programs.

With regard to cross-referencing other program requirements, the commission intends to issue guidance to aid users in implementing the TRRP rule within the various program areas to help ensure that other programs' requirements are still met. For example, the RCRA corrective action requirements for regulated units, a subject of particular concern to EPA, will be largely unmodified by this rule, with the exception of alternate concentration limits of 40 CFR, §264.94 for which PCLs developed with the TRRP rule could be proposed. With regard to the financial assurance requirements of the RCRA regulations, the TRRP rule will have little effect on closure and post-closure care and monitoring amounts. Only through §264.117(a)(2) by shortening the post-closure care period could the amount be reduced. The size of the business (large or small) will not change an applicable RCRA-required financial assurance amount. The commission intends for the TRRP rule to be applied in parallel with the federal rules, in much the same way the current Risk Reduction rule of Chapter 335 have been applied. The commission has advised the EPA Region 6 office of the content of this rule and will continue to evaluate the need to submit this rule for authorization.

Also concerning §350.2(a), Henry, Lowerre, Johnson & Frederick commented that the applicability dates for various programs are different and very confusing. There would not appear to be any justification for such wide differences. Henry, Lowerre, Johnson & Frederick also commented that the TRRP provides no specific examples of how the proposed program will mesh with existing federal and state statutory and regulatory requirements. It merely asserts that the program is not intended to replace the mandatory requirements that do exist.

The two most significant differences in time of applicability concern the PST program and the industrial and hazardous waste program. The PST program is mandated by state legislation to conclude the reimbursement program by a specific date. Tank owners had to submit work plans by December 22, 1998, to qualify for reimbursement of expenses. As a result of this deadline, thousands of work plans based on the existing PST requirements of Chapter 334 are being processed by the agency. The commission finds the most efficient way to address this workload to meet the needs of tank owners trying to satisfy the statutory deadlines is to retain this universe of projects under the existing rules. In contrast, the industrial and hazardous waste program does not have a legislatively imposed deadline as does the PST program. The ongoing projects of this program have been addressed with a grandfathering provision to allow certain projects that have advanced sufficiently in the remediation process to continue under the existing rules of Chapter 335. The commission has addressed this issue in more detail in the response to comments for §350.2(m).

Chevron commented that the preamble to the proposed rule expresses an intent for cleanup to TRRP standards to be deemed adequate or replace cleanup under several programs. However, the use of the word "additional" in §350.2(a) of the applicability section suggests that TRRP standards are cumulative and that all "additional requirements" expressed in other rules must also be met. Chevron commented that the rule should express the intent of the agency to consider cleanup under TRRP to be adequate under other covered state programs, and suggested omitting "or additional" or replacing the sentence with a statement expressing the intent that response actions conducted under the TRRP will be considered adequate as specified in subsections (b) - (m). TCC, TXOGA commented that proposed §350.2(a) could be interpreted to inappropriately bring in conflicting substantive requirements from the program areas or federal requirements. As stated in the preamble, the primary intent of this sentence is to allow for incorporation of more stringent or additional administrative requirements that may exist in federal law or within the various program areas. The purpose of developing a consolidated, comprehensive substantive technical program like TRRP should provide the sole basis for determining what is and is not an acceptable level of remediation for any particular affected property. TCC, TXOGA thus recommended modifying the statement to read as follows: "While the regulations of this chapter provide the sole basis for determining how a release covered by the various program areas should be addressed, the person still must meet any more stringent or additional administrative or procedural requirements found in the particular rules for the covered program areas or applicable federal requirements." Henry, Lowerre, Johnson & Frederick commented that the TRRP will force EPA Region 6 to shift the responsibility for remediations at federal facilities from TNRCC to EPA. The numerous conflicts in the proposed TRRP with the requirements and standard practices of RCRA and CERCLA will mean that EPA, Region 6 will not be able to justify allowing the State of Texas to manage cleanups at closing military bases and other federal facilities under RCRA. Instead, EPA will have to do what other EPA regions do and designate the federal facilities as Federal Superfund sites to assure: 1) adequate public participation and 2) appropriate cleanup standards. EPA, Region 6 will then be forced to retain the responsibility for the restoration of these sites.

The commentors recommended either deletion of the sentence in §350.2(a) regarding response to more stringent or additional requirements of the rules of the program areas or federal requirements, or modify the sentence to reflect that this rule provides the sole technical basis for responding to releases and limit the additional requirements to only administrative or procedural actions. Chevron interpreted the word "additional" to mean "cumulative" in that a person would respond to the TRRP rule and all additional requirements of the applicable program rules. TCC/TXOGA thought this provision would bring in conflicting substantive requirements from the program areas. Henry, Lowerre, Johnson & Frederick thought the conflict between the TRRP rule and federal rules and statutes (RCRA, CERCLA) would result in the EPA Region 6 office having to fully conduct the oversight of closing military bases in Texas.

The commission disagrees with the commentors' interpretations and predictions regarding this provision. The commission does not intend this provision to result in "cumulative" application of program rules and statutes. Some obvious areas of conflict between this rule and other program rules are addressed in this section, such as in the state superfund program where direction is given in §350.2(i) as to which rule will prevail. The commission finds it necessary to retain this provision as proposed to address the applicability of federal requirements and delegation of federal programs to the State of Texas, as discussed elsewhere in response to comments. In this way, the commission can link the other rules to a response action so that the procedural requirements of the program can be satisfied. For example, closure of hazardous waste management units must also satisfy the federal requirements for public notice, content of a closure plan, and time frames. A person applying the TRRP rule by itself to a closure would not satisfy these other requirements. Regarding the special situation of closing military bases, the commission points out that both EPA Region 6 and the TNRCC conduct oversight under their respective authorities. Collaboration on review of work plans enables the two agencies to identify areas of possible conflict and then to resolve any issues prior to

giving divergent instructions to the federal facility. The commission does not foresee the outcome predicted by the commentor.

Concerning §350.2(a), TCC, TXOGA commented that TNRCC should clarify that this rule applies only in cases of an "unauthorized" release covered under the referenced programs. Authorized releases are not subject to this rule.

The commission has not distinguished between "unauthorized" and "authorized" releases in the applicability section, with the exception of the UIC program at §350.2(d). The relevant program areas will determine when a release is subject to this chapter. Releases currently authorized by a permit or rule would not normally be subject to this chapter. However, the superfund program is authorized by the CERCLA statute to address releases of any type, including releases that were once "authorized." The commission therefore finds it necessary to retain this provision as proposed.

Concerning §350.2(a), Weston commented that the proposed rules are not clear regarding the selection of COCs at the beginning of the investigation process. It could be interpreted by some agency personnel that all analytes be included in the sample analysis and none excluded until the investigation was completed and the exclusion criteria in §350.51(g) had been met. Weston suggested that it should be clearly stated that the initial selection of potential COCs is to be based on process knowledge and waste management practices at a facility. This is still a significant issue and a significant weakness in the TRRP.

The commentor sought clarification regarding the selection of COCs at the beginning of the investigation process. Subsection (a) does state that this chapter does not establish the release reporting criteria; the implementing programs make this determination. This reflects the commission's original intent for the program areas to determine how or what COCs will be reported as a release. From there it follows which COCs will need to be investigated at an affected property; however, the rule does not provide any details in this section in that regard. The commission expects to address this issue in more detail as part of its implementation guidance to be developed for this rulemaking.

The commission did not receive any comments on proposed §350.2(b) and (c), and the subsections are adopted as proposed.

Concerning §350.2(d), EPA Region 6 commented that it would be helpful to clarify the description regarding the UIC program by stating that the UIC wells are not subject to this chapter. The paragraph, as written, in the draft sent via the August 21 memo was clearer. The EPA Region 6 suggests that the previous language be used.

The commission agrees with the comment that this chapter does not apply to the UIC regulated well itself. Any requirements of a UIC permit will not be affected by this chapter. The applicability of this chapter to activities regulated by Chapter 331 is limited to unauthorized releases from associated tankage and equipment that might occur outside any permitted mining areas or disposal zones. The commission notes that the preamble to the March 26, 1999 proposal used the term "unauthorized release" whereas the rule used only the term release. The commission has restored the word "unauthorized" to this provision to clarify the applicability to UIC activities.

Concerning §350.2(d), EPA Region 6 commented that the preamble indicates the TRRP rule would allow for reduction in the financial assurance obligation for post closure care by operators of facilities permitted by the State's UIC Program. Specifically, the rule gives the TNRCC the ability to exempt operators from demonstrating financial assurance when the total 30-year cost for post-closure care does not exceed \$100,000. In addition, small businesses may seek reduction of the financial assurance obligation if the post-closure care time period exceeds ten years. Post-closure care costs for injection wells are at Title 40

CFR, §146.73. Section 146.73 require that the amount of funds available for post-closure care shall be no less than the estimated actual cost of implementing the post-closure care plan. The post-closure care plan is provided in the permit application and survives the permit. This prohibits any reduction in the financial assurance obligation for UIC post-closure care activities at a facility, unless the post closure plan itself is amended and the financial obligation needed to implement the plan has actually changed. A decision by the director to reduce the financial assurance obligation without an equivalent cost reduction in the plan itself is prohibited.

The commission disagrees with the commentor that financial assurance requirements for UIC permitted facilities can be lowered in response to TRRP applicability. First, as noted above, this chapter will only apply to unauthorized releases at UIC facilities and not to the permitted activities. Second, as stated in §350.2(a), this chapter does not eliminate the need for the person to meet any more stringent or additional requirements found in the covered program areas or applicable federal requirements. If the UIC regulations or permits require financial assurance in amounts greater than that required by this chapter, the person must comply with the more stringent requirements of the UIC program. If the UIC amount is for one purpose (e.g., post closure costs of a UIC well) and the amount for this chapter is for another purpose (e.g., a response action not covered by the UIC requirements), the person would have to satisfy both amounts.

Also concerning proposed §350.2(d), Henry, Lowerre, Johnson & Frederick commented that if adopted, the proposed TRRP would create conflicts with federal and Texas requirements. Changes like those proposed for the UIC and RCRA programs in sections such as §331.5 and §335.551 create clear conflicts with federal requirements. In the UIC program, for example, the proposed rules will conflict with the requirements in Texas Water Code, Chapter 27 and EPA's rules that fresh water be protected. Henry, Lowerre, Johnson & Frederick stated that the proposed TRRP will not protect the freshwater aquifers that are potential sources of drinking water. In addition, Henry, Lowerre, Johnson & Frederick commented that for programs like the Class3 injection well program for mining activities in a freshwater aquifer, the proposed TRRP would allow an operator to leave contamination above baseline in the portion of the ground mined and in adjacent areas contaminated through the migration. Henry, Lowerre, Johnson & Frederick further suggested that the proposed TRRP will also conflict with the plugging and abandonment requirements of the UIC program for all classes of injection wells, as it will allow alternative procedures that allow injection wells to remain as sources of contamination in Class2 and 3 aquifers.

The commission disagrees with the commentor's conclusion concerning conflicts with federal requirements, such as the example regarding the protection of fresh water aquifers that are potential sources of drinking water. The permitting programs, such as the UIC program, are intended to prevent unauthorized releases from happening. The TRRP rule is, in contrast, a response program that would apply to a UIC regulated activity only if there was an unauthorized release not addressed by permit provisions. This rule, through attainment of its remedy standards, does require the restoration of Class 1 groundwater to health and ecological protective levels to enable use of aquifers as a drinking water supply. The commission notes that the commentor's characterization of UIC and TRRP interaction is incorrect. Restoration of Class 3 mining areas and excursions is controlled by a permit that mandates restoration to pre-mining conditions. The TRRP rule will not apply to plugging and abandoning requirements of the UIC program.

No comments were received for §350.2(e); however, the commission has amended this subsection to clarify that this rule would be triggered when a release of COCs to environmental media has occurred at a compost or mulching facility or land application property authorized under Chapter 332. Releases are defined by the program area. The March 26, 1999 proposal instead referred to COCs detected in environmental media in excess of critical PCLs. The proposed language did not conform with the commission's original intent.

The commission did not receive any comment on proposed §350.2(f) and the subsection is adopted as proposed.

The commission received several comments on proposed §350.2(g). Brown & Caldwell commented that this subsection should be revised to allow, but not compel, the use of the TRRP for a release reported prior to September 1, 2001. Strasburger & Price commented that the proposed regulations constitute a major regulatory change from the current PST regulatory scheme. In addition, Strasburger & Price commented that the reliance in the regulations upon the recordation of multiple deeds is cumbersome, and will have a devastating effect on the transferability of property in the State. While these requirements may be appropriate for other TNRCC programs, they are overkill for the remediation of PST sites. For example, notice regarding the status of activities at a property are generally widely available through commercial databases as well as the TNRCC web page, e.g., LPST database. Strasburger & Price suggest that every indication is that the costs for remediation and investigation will greatly increase under the proposed regulations, and are underestimated in the TNRCC's analysis. Fulbright & Jaworski commented that the proposed rule will significantly raise the costs to remediate PST sites. Effectively, the cleanup standard will be set at the residential level for most PST sites. This is because sites generally are located in non-commercial areas. Given such locations, Fulbright & Jaworski will face increased costs for obtaining agreements for deed restrictions or other institutional controls in addition to increased costs of physical cleanup. Chevron and Strasburger & Price commented that the costs will increase, possibly two to three times greater under the proposed rules. Strasburger & Price and TPCA strongly recommended that the PST program continue to be excluded from the applicability of Chapter 350. Fulbright & Jaworski requested that all PST sites eligible for cleanup under the PST fund be exempt from the proposed rule. TPCA recommended extending the effective date for PST sites to September 1, 2003, if TNRCC does not exempt PST sites. Chevron and Environmental Fuel Systems, Inc., recommended delaying the effective date of the TRRP for PST sites until after the sunset date for the PST reimbursement program, which is now September 1, 2003. Groundwater Services on the other hand commented that the rules allow a phase-in period until 2001 for PST sites, reducing the cost impact somewhat for those facilities.

With regard to Brown & Caldwell's comment regarding application of this rule in the PST program prior to September 1, 2001, 30 TAC, Chapter 334 sets forth applicability requirements of the existing PST rule. The commission's intent is that persons would remain under the existing rule until September 1, 2003; however, persons may choose to apply provisions of this rule which would be beyond the requirements of the existing PST rule, but such actions would best be coordinated with the PST program area prior to commencing such actions. The commission amended the rule to clarify that the current rules remain in effect for the PST program. With regard to institutional controls, the commission disagrees with Strasburger's assertion that databases are readily available for public notice purposes. The databases are all tied to the source of the release, with no readily accessible information regarding any off-site impacts or limitations on property uses. The agency acknowledges that, although such databases or registries are desirable, they do not exist at this time and therefore, institutional controls as included in the rule are fully warranted. The rule gives a minimum of a 15 year window for sites to achieve standards before deed recordation would be required under Remedy Standard A or B (see §350.31(h)). This should allow ample flexibility for many sites to avoid the use of institutional controls.

The commission points out that the proposed implementation date of the rule for the PST program has no direct impact on responsible party-lead sites eligible for the PST Remediation Fund. All responsible party-lead confirmed LPST sites had to be discovered and reported to the agency on or before December 22, 1998, to be eligible for the fund. The rule will be implemented in a bright line fashion for the PST program where all confirmed LPST sites discovered and reported to the agency before the implementation date of the rule may remain under the current PST rule. Thus, in specific response to Fulbright & Jaworski's comment, the rule as proposed has no remedial cost implications

for those responsible party-lead LPST sites eligible for the PSTR fund. However, given that LPST sites discovered and reported on or after

December 22, 1998, may enter the state-lead LPST program, the rule could result in cost impacts to the PSTR Fund in this regard. However, in response to these comments, the commission has amended the rule to establish an effective date of September 1, 2003, for the PST program. The commission has also made a conforming rule change to 30 TAC Chapter 334.

Also concerning §350.2(g), Environmental Resources Management commented that the proposed rules abandon the exit criteria developed after extensive research by the Texas Bureau of Economic Research (sic) and, as a result, will substantially and unnecessarily increase the investigation and cleanup costs of every property on which a previously unknown underground petroleum fuel storage tank is discovered. Environmental Resources Management noted that their experience with Sanborn fire insurance maps indicates that thousands of tanks in Texas have yet to be addressed. Ranger commented that the dry cleaning industry and other small to mid-size commercial and industrial businesses will likewise not be able to afford the activities proposed in these rules. Thus, many of these sites will also experience financial difficulties and possible bankruptcies, and many will thus opt into the Superfund program. Ranger expressed concern regarding the timing of the proposed TRRP rules with the upcoming expiration of the Petroleum Storage Tank Remediation (PSTR) Fund. Ranger commented that one of the principle reasons that the PSTR Fund was established was to fulfill financial assurance requirements for tank owners as these requirements were determined to be cost prohibitive for a significant percentage of tank owners. Thus, at the same time that the PSTR Fund is nearing expiration, which in itself will have a tremendous financial impact on tank owners, the TNRCC is now proposing to increase corrective action costs by at least a minimum of three to eight-fold. Ranger stated that the obvious conclusion to this is that many small and mid-size petroleum marketing firms will experience severe financial difficulties, possible bankruptcies, and many PST release sites will thus go into the TNRCC State-Lead cleanup program. TPCA commented that while TPCA recognizes the validity and desire to bring consistency to all the TNRCC's remediation programs, the result still adversely impacts petroleum storage tank owners. PST owners are required by state and federal law to maintain a minimum of \$1 million in financial assurance. The cost of insurance will increase under the TRRP. TNRCC believes that very few tanks will leak now that the December 22, 1998 deadline has passed. TPCA commented that many of these tanks were upgraded rather than replaced. TNRCC field staff visited very few of these while under construction and has no assurance that the upgrade was done in accordance with the rules. There are already instances of failed cathodic protection systems being reported and found by PST contractors. TPCA asked the commission to justify why this rule should be applied to PST sites, and asked what benefit will the owner receive for doubling or even tripling the cost to remediate a site under this rule.

The commission responds that the PST program to date has been extremely sensitive and accommodating to the needs of the regulated PST community. Tank owners and operators have had over ten years to upgrade systems, and major public awareness campaigns have been conducted by the commission to inform the regulated community of the tank standard deadlines, corrective action obligations, and the PSTR fund. Additionally, the current LPST program is likely the most risk-based corrective action program in the nation and was structured as such to contain costs and minimize corrective action lifespan in an attempt to increase voluntary compliance. Therefore, that portion of the regulated community most interested in compliance have or are taking advantage of the current program. Those who are not already inclined to voluntarily comply with the current accommodating program, likely never will be.

The program to date has been protective and successful; however, it is time for the program to shift more focus to the needs of the general public and the environment. The commission is making this deliberate shift recognizing the implications for the PST community and small business. However, with respect to the dry cleaner industry, this rulemaking represents increased flexibility over the current Risk Reduction rule. The shift may not directly benefit the regulated community in all

situations, but it does benefit the general public and natural resources by providing greater incentives to be more pro-active in taking release prevention measures.

The commission acknowledges that the rule may have direct cost implications for those procuring federally-required financial assurance. However, similar to auto insurance rates, which are based at least in part on the personal driving record of the insured and the overall safety history of the insured vehicle, the insurance industry should be considering the sufficiency of tank systems and tank operation and maintenance practices of the owner/operator as these affect corrective action costs. Those in the regulated community who have the most sound tank systems and tank management practices should be least likely to suffer releases and therefore should be able to negotiate the most cost-effective insurance policies. The commission finds it illogical to maintain the current PST rule indefinitely simply because many have not upgraded their systems, have not done so in a satisfactory manner, or are not practicing sufficient release detection/monitoring practices. Further, the rule provides some incentive to maintain vigilant operation of the tank system over time.

The commission also notes that the timing of the adoption of this rule and the sunset of the PSTR Fund are purely coincidental. The commission began this rulemaking in 1995 with an initial goal of adoption within one year. At that time, there was no sunset to the PST Remediation Fund. The rulemaking has taken much longer than anticipated and the legislature has since adopted PST Remediation Fund sunset statutes.

Ranger commented that another major concern associated with the proposed TRRP rules and §350.2(g) are the anticipated adverse impacts associated with real estate transactions and dealings with financial institutions on contaminated properties. Currently, it is typically achievable to secure loans from lending institutions for contaminated properties because the lending institutions have seen the TNRCC cleanup programs over the past several years, such as the Voluntary Cleanup Program (VCP) and the PST risk-based corrective action program, allow for reasonably cost-effective and timely closures on impacted properties. The proposed TRRP rules will dramatically increase the costs of site investigations and closures, as well as significantly slow down the site closure process. Under the proposed TRRP rules, Ranger believes that lending institutions will not want to readily lend money for properties where the site investigation costs alone will be at or near six figures, with no assurance of a timely closure. Once again, these types of properties will be seen by the lending institutions as poor financial investments.

The commission fully acknowledged in the RIA that the TRRP would likely represent a cost increase over the existing PST program for many LPST sites. In light of the concerns about protracted closures, the commission has amended §350.34 to give program areas authority to issue partial completion or conditional no further action letters to address situations where closure under Remedy Standard A is being pursued via monitored natural attenuation and long term monitoring is the only sustained requirement. This should help facilitate real estate transactions.

Concerning §350.2(g), TPCA commented that TPCA is very concerned with the appearance that is left with the public under the proposed TRRP. It appears from the statements in the preamble that the agency believes the current PST program is not being protective enough.

The current rule is protective of human health. However, the commission is adopting this rule to resolve inequities between current program areas, to increase the focus on long term natural resource management and protection, increase the assurance of future notice, and respond to the legal change resulting from the innocent owner/operator statute. The current program was developed as a short term approach to manage the crisis level of sites reported to the agency. Now that the bulk of the work is behind the PST program, the strategy is to shift the focus for the long term. The commission notes that any re-opening of a closed LPST site would trigger this rule for only those sites originally closed under this rule. Section 350.35(d) has been slightly amended to clarify this point about re-

opened cases. The rule was also amended to correct the format for the Chapter 334 Subchapter references.

Concerning §350.2(h), Henry, Lowerre, Johnson & Frederick commented that, if adopted, the proposed changes to the TNRCC RCRA rules appear to create major conflicts with the minimum federal requirements for state programs. The type and number of conflicts could be many. Clearly, the TRRP conflicts with the goals and requirements of EPA's proposed Subpart S rules. If they are passed as proposed, TNRCC will have created serious problems for Texas. Other potential RCRA problems involve conflicts with planning and implementation requirements for hazardous waste management under 30 TAC §335, Subchapter Q and with RCRA deed recordation requirements in 40 CFR, §264.119(b)(1). Henry, Lowerre, Johnson & Frederick stated that the extent of conflicts is not easily determined, in part, because conflict will depend on how TNRCC implements the TRRP. Moreover, because of the size and complexity of the TRRP and of the existing of RCRA program, no detailed comparison could be done in the time available to prepare these comments. Finally, the burden on showing no conflicts lies with TNRCC. Texas relied upon its existing rules and practices in seeking authorizations for the RCRA hazardous waste program, as well as the other "delegated" federal programs. In its applications, TNRCC made representations regarding its rules and its interpretations of Texas law and rules. Among the representations made by the State of Texas are statements that it requires cleanup to background conditions under its programs. If the TRRP rule is adopted, at a minimum, Henry, Lowerre, Johnson & Frederick contended that TNRCC must submit to EPA Region 6 the new TRRP and an explanation of how the new rules change its program. The analysis that will be required should be done before the rules are adopted, when there is still time to change the rules to resolve the conflicts.

The commentor suggests that adoption of this chapter would create major conflicts with the minimum federal requirements for state RCRA programs. The commission disagrees with this supposition. The last sentence of Subsection (a) of this section, dealing with general applicability, states that this chapter does not eliminate the need for the person to meet any more stringent or additional requirements found in the particular rules of the covered program areas or applicable federal requirements. These rules are intended to fill in technical gaps in implementing the federal rules in Texas and are not to be applied in conflict with federal rules. Of the example potential conflicts the commentor provided, the one relating to Subchapter Q of Chapter 335 dealing with pollution prevention, source reduction and waste minimization, the commission does not see any interaction with this chapter. This chapter will only apply to existing facilities with closures or remediation of releases to environmental media and has nothing to do with the management (reduction and minimization) of newly generated hazardous waste. Regarding authorization of these rules by the EPA, the commission will initially use this rule in the same manner as the current Risk Reduction rule, as a supplement to federal rules, however, the commission will continue to explore authorization issues with the EPA.

Regarding §350.2(h), Henry, Lowerre, Johnson & Frederick also asked the commission to address how newly identified Solid Waste Management Units at RCRA permitted facilities will be addressed.

The commentor's suggestion to address how newly identified solid waste management units (SWMUs) are identified at RCRA permitted facilities is not necessary to be included in this subsection. A standard provision of RCRA permits requires the permittee to notify the agency whenever new SWMUs are identified. The basis for this permit requirement is the "omnibus" provision of RCRA, §3005(C)(3).

Concerning §350.2(h), Reliant Energy, AECT, and TU commented that the applicability of the rule involving closure of solid waste management facilities where no release of constituents of concern to the surrounding environmental media has occurred, needs further clarification. The rule states that the person is "subject to this chapter only with regard to this closure performance standard and the removal,

decontamination or control requirements for waste as specified in Subchapter B of this chapter." Based on our experience at various sites in Texas, we believe these requirements are unnecessary for many closures. For example, closure of hazardous waste storage areas where confirmatory sampling indicate no releases has occurred would be unnecessarily subject to all the closure requirements of this chapter. Reliant Energy recommends that the TNRCC develop a simplified mechanism for obtaining Certification of Closure in the guidance document for routine closures of solid waste management units.

The commentors recommended that the TNRCC develop a simplified mechanism in guidance for routine closures of solid waste management units without releases to environmental media so that the full requirements of this chapter do not apply. The commission is willing to clarify in guidance the requirements of this chapter that would apply to such closures. For clarification, the commission points out that the closure performance standard within this subsection will largely govern closures without releases. Removal of wastes is addressed in Subchapter B for Remedy Standard A at §350.32(a)(1) or (2). This approach is directly analogous to the existing requirements for closure under Risk Reduction Standard 2 of Chapter 335. Closure with waste left in place (e.g., "closure as landfill") does not involve removal and would entail a control measure under Remedy Standard B at §350.33(a)(1). This approach is directly analogous to the existing requirements for closure under Risk Reduction Standard 3 of Chapter 335.

Concerning §350.2(h), TCC and TXOGA commented that this rule does not and should not define closure standards. It is, and should be, only applicable to unauthorized releases that must be addressed as part of a closure activity. TCC and TXOGA recommended that the second, third and fourth sentences of this section should be eliminated as they could be interpreted as developing additional narrative closure standards, which is beyond the scope of this rule. As is noted in the applicability section, this chapter specifies "objectives for response actions" . . . "once an obligation is established to take a response action." During closure, such an "obligation" is only going to arise once an unauthorized release has been discovered based on an investigation mandated by existing closure rules.

For the same reason, subsections (1) and (2) of this section can also be eliminated as inappropriate and unnecessary, since closure requirements and obligations are already specified at other locations in the commission's rules.

The commentors asserted that this rule addresses only response actions for releases and should not define closure standards and that text relating to closures should be deleted as these requirements are addressed by other rules. The commission disagrees with this interpretation. In contrast to earlier versions, the commission did place in the rule the requirements for closure that previously were found in the risk reduction standards of Chapter 335. The conforming rule change to §335.8 sets the obligation to perform closures and then, in the case of actions that are not grandfathered (i.e., occur after the effective date of this chapter), directs the person to this chapter for the specific actions to be accomplished. The commission finds it necessary to include closure in this chapter as the risk reduction standards of §335.8 will not apply to new actions. The commentor noted that §350.2(a), general applicability, only refers to "response actions" which they equate to remediations of releases and conclude that it does not include closures. The definition of response action in §350.4(a) states that a response action can occur before, during or after closure. This indicates that the commission contemplated closures as part of response actions. By placing a closure performance standard in §350.2(h), rather than in the general applicability subsection of §350.2(a), the commission is restricting closures to a subset of all response actions or persons. Paragraphs (1) and (2) of this subsection are still relevant to closures and are being retained as proposed. As noted above, the commission is willing to clarify in guidance the requirements of this chapter that would apply to closures.

Concerning §350.2(h), Chevron commented that facilities regulated under RCRA have been undergoing RCRA corrective action for a decade or more. Extensive data have been collected pursuant to that program. Unlike the PST program, the RFI program has not been grandfathered under the TRRP. The proposed rules should be revised to clarify that the data collected in accordance with RCRA before the effective date of these regulations may be fully utilized in reports submitted subsequent to the enactment of the regulations. Otherwise, facilities may have to completely redo all of the work that pre-dated the effective date of these new rules. The cost to the regulated community would be staggering, and it appears that this cost has not been factored into the fiscal analysis. Chevron suggested adding the following: "Notwithstanding anything to the contrary herein, data collected in accordance with a permit or order before the effective date of Chapter 350 of this title may be fully utilized to satisfy the requirements of the permit or order."

The commentor recommended that data collected in accordance with RCRA before the effective date of this chapter may be fully utilized in reports submitted for this chapter. As an example, the commentor cited the RFI (RCRA Facility Investigation) program as one that has not been grandfathered, unlike the PST Program, yet has resulted in considerable expenditures for data collection that would have to be repeated to conform with the new chapter. The commission disagrees with the recommendation on two accounts. First, according to §350.2(m), individual RFI projects at a RCRA facility can be grandfathered if they meet the criteria. This opportunity applies to any closure or remediation projects at RCRA facilities, not just those in the RFI program. Second, the commission does not agree to give a blanket grandfathered status to all data collected prior to the effective date of this chapter such that it may be fully utilized to satisfy the requirements of the permit or order. This could potentially abrogate the commission's ability to evaluate the data for compliance with any performance standards of this or other chapters. Further, the commission does not automatically presume that all data collected is necessarily acceptable under the existing rule. The acceptability of data is in all instances a case-by-case determination.

Concerning §350.2(h)(4), EPA Region 6 stated that the discussion of FOA under the heading of facilities subject to Chapter 335 (Industrial Solid Waste and Municipal Hazardous Waste) appears to include facilities not regulated under Chapter 335 such as VCP and VCA, and as such, would allow a facility to modify provisions of the Chapter in order to establish an interim remedy which would potentially last the duration of active operations. This could be a possible RCRA authorization issue if RCRA requirements are modified or suspended indefinitely.

The commentor, in referring to paragraph (4) of this subsection, is incorrectly concluding that the Facility Operations Area of Subchapter G can be eligible for facilities in the Voluntary Cleanup Program (VCP) or those that perform Voluntary Corrective Action (VCA). If this were to happen, according to the commentor, it could create a possible RCRA authorization issue if RCRA requirements are modified or suspended indefinitely. The TNRCC's VCP precludes facilities that are subject to a permit or order. The FOA concept, entailing long-term control and exposure prevention remedies authorized by permit or order, is incompatible with the eligibility requirements and objectives of the VCP, such as a quick return of Brownfields to productive use and limited release of liability. The commission does not foresee an authorization issue in this regard. Section 350.2(h) was amended to correct the format for the Subchapter B references.

Concerning §350.2(i), Dow commented that this section provides that the person shall comply with all requirements found in Subchapter K of Chapter 335 and the requirements of this chapter (350) for "any release or threatened release of hazardous substances into the environment that may constitute an imminent and substantial endangerment to public health and safety or the environment. Where there is a conflict between the requirements in this chapter and the requirements of Chapter 335, Subchapter K, as amended, the requirements of Chapter 335 shall apply." Since the provisions of TRRP concerning assessment and other areas are both more recently developed than similar provisions of Subchapter K of Chapter 335 and

the TRRP provisions address essentially identical problems, Dow commented that the assessment and other provisions of TRRP should prevail over the equivalent provisions in Subchapter K. Specifically, the TNRCC should provide in §350.2(i) that "Subchapter C: Affected Property Assessment of Chapter 350 should apply in event of any conflict with §335.346 Removal Actions and Preliminary Site Investigations and §335.348 General Requirements for a Remedial Investigations/Feasibility Study." Dow also commented that the TNRCC is to be commended for providing in the preamble to the proposed rule the statement that "Persons in the State Superfund Program will be required to comply with the requirements of Chapter 350 for the assessment of the affected property, development of protective concentration levels, and requirements for response action." However, the next sentence of the preamble appears to restrict this positive change. In order to avoid this possibility, the next sentence should be modified to read as follows: "Other than for the affected property, development of protective concentration levels, and requirements for response action, requirements for the State Superfund Program of Subchapter K and the Texas Health and Safety Code, Chapter 361, Subchapter F, will continue to apply and will supercede the TRRP if a conflict should arise."

The commission agrees that the proposed amendments to Subchapter K should be modified to reflect more specifically where the TRRP provisions prevail over current Subchapter K requirements, specifically concerning affected property assessment, development of protective concentration levels and requirements for response actions. The commentor suggested making these changes in §350.2(i), however, as it is more appropriate and will provide greater clarification, the commission has made the changes in §335.342 and §335.348. The commission has added for clarification the reference to the applicable subchapters in Chapter 361 of the Texas Health and Safety Code and in TAC, Chapter 335(F) and (K), respectively. Also, the commission has removed the reference to public meetings as this is repetitive of the existing requirements in the Texas Health and Safety Code, Subchapter F. The rule was also amended to correct the format for the Chapter 335 Subchapter K reference.

Concerning §350.2(j), Henry, Lowerre, Johnson & Frederick commented that because the rules do not provide for assessments of risks associated with the radioactive component of any waste, the rules need to explicitly state that no wastes with such components are subject to these rules. In addition, any rules need to require the identification of any confirmed or expected component of the contamination that has radioactive characteristics.

The commission disagrees with the commentor's recommendation to exclude all wastes with any radioactive component. Chapters 336 and 350 are meant to be used together if appropriate to the situation. This subsection specifies that Chapter 336 provisions have the lead in responding to the radioactive component. The commentor's second recommendation is better addressed by the rules of Chapter 336.

Also concerning §350.2(j), Henry, Lowerre, Johnson & Frederick commented that the TRRP is applicable to programs like the injection well programs, including Class 3 uranium mining programs, but the TRRP clearly does not then provide for the management of the type of radiological risks associated with in situ uranium mining of drinking water aquifers.

The commentor concludes that the TRRP rule, by virtue of its applicability to Class 3 UIC in situ uranium mining activities, does not provide for the management of radiological risks posed by such sites. The commission notes that such activities are covered by permits that do address radiological risks.

The commission did not receive any comment on proposed §350.2(k), and this subsection is adopted as proposed.

Concerning §350.2(l), Chevron commented that since Chapter 327 was developed pursuant to Texas Water Code, §26.039 (Accidental Discharges and Releases) and §26.039, Subchapter G (Oil and Hazardous Substances Spill Prevention and Control) in order to address unauthorized releases of COCs to the environment. The inclusion of provision §350.2(l) seems to run counter to the agency's statements regarding the rule being a program-oriented rule and is confusing. Chevron recommended removing this provision.

The commission disagrees with Chevron's comment that proposed §350.2(l) is in conflict with the commission's goal of TRRP applicability being program-driven. While the commission expects that almost all affected sites will be directed to the TRRP through the programs identified in §350.2(b) - (k), the commission retains subsection (l) in the final rule to address sites that do not fit neatly into a specific agency program. For example, the commentor suggests that Chapter 327, the Spill Rules, addresses all unauthorized releases of COCs to the environment. This is incorrect. In the preamble to the Chapter 327 rules adopted in 1996, the commission affirmed that the Spill Rules do not apply to historical contamination (21 TexReg, 4229, May 14, 1996). Rather, persons are guided by Texas Water Code, §26.039 and Chapter 26, Subchapter G, the statutory provisions cited by the commentor. In most cases, the commission expects sites with historical contamination to enter the TRRP through an existing program such as the Voluntary Cleanup Program or Corrective Action Program. However, there may be special circumstances such as a voluntary action outside the realm of existing programs or an enforcement case where the person is guided by statute rather than specific program requirements.

Concerning §350.2(m), Chevron and AFCEE commented that existing standards should govern all investigative and remedial activities if formal investigative activities commenced prior to the effective date of the TRRP absent compelling circumstances showing that human health or the environment will be compromised. Chevron stated that costs will significantly increase if site investigations and risk assessments must be totally re-worked because a Remedial Action Plan (RAP) has to be re-submitted. That significant loss of time and money will not do anything to further the remedies at the site or ensure greater health benefits. If the TRRP is "no more stringent" than existing rules, as stated by the TNRCC in the preamble, it certainly does not serve the purpose of "streamlining" the agency technical review process to revisit hundreds of site investigations and risk assessments. The later-discovered "technical inadequacy" of reports is not an appropriate basis to retroactively apply the TRRP in a way that requires the re-investigation of sites. Work and data submitted before the adoption of the TRRP should be left undisturbed. Inequities will follow if the staff takes extended periods of time to review submissions, which triggers TRRP applicability and associated increased costs. KOCH commented that a person should not have to decide on grandfathering on projects or existing sites by the effective date of the proposed rules. The proposed rules will likely change before promulgation. Therefore, a person should have a reasonable period (e.g., 90 days) to review the final rules and decide whether to grandfather a site. Lacking this opportunity to review the final rules, many sites may be preemptively grandfathered under the current Risk Reduction rule. After a person reviews the final TRRP rules, and without conducting any response actions, they may request that a site be transferred to the new TRRP rules. Apparently nothing in the proposed TRRP rules would prevent this preemptive grandfathering and later transfer of sites. However, this approach would likely prove confusing and inefficient. Beyond that, KOCH suggested that a person should have the option of easily grandfathering sites under the current Risk Reduction rule. These projects should be completed on a schedule similar to the proposed rules. Response actions under the proposed rules can extend to at least 15 years. If human health or ecological receptors are not immediately threatened, it serves no clear purpose to unnecessarily expedite response actions at a site. The requirement to achieve risk reduction standards under the existing rules within five years should be removed from the proposed rules. A person should be able to complete these grandfathered projects within a reasonable time frame, consistent with the rules.

Brown McCarroll & Oaks Hartline McCarroll, Chevron and Jenkins & Gilchrist recommended that sites subject to permits or orders be allowed to "stay the course" and complete investigations and closure under existing regulations given that the requirements of those permits or orders. Specifically Brown McCarroll & Oaks Hartline McCarroll recommended adding a new §350.2(m)(4) as follows: "If prior to the effective date of this chapter, the person has entered into an agreed order with the commission to conduct a response action under Subchapters A and S of Chapter 335, the person may elect to continue under those rules or to proceed under this chapter. The person shall give written notice to the executive director if the person elects to use the provisions of this chapter. Such notice shall indicate any changes that need to be made in the agreed order to make it consistent with use of the provisions of this chapter. Once the agreed order is amended to be consistent with the provisions of this chapter, the person will not be allowed to return to Chapter 335." AFCEE commented that clear criteria should be provided for determining when a facility is required to conduct a response under the TRRP because it is unclear in certain situations whether facilities are subject to existing permits or compliance plans, or if they are subject to the TRRP.

Phillips, TCC, TXOGA and Weston commented that the proposed rule needs to clarify the use of existing data. In many instances, facilities have spent significant resources to sample and analyze data approved in work plans and permits. Phillips, TCC, and TXOGA stated that use of this existing data should be allowed when the TRRP is integrated into existing programs, and recommended that a subsection (5) in §350.2(m)(1) - (5) be added that clarifies that all data previously collected in compliance with the terms of a permit, order, or TNRCC-approved plan can be used and relied upon in submittals filed after the effective date of the TRPP.

Concerning §350.2(m)(1), McCulley, Frick, & Gilman supported the provisions for Standards 1 or 2 requiring that an initial notification report be submitted prior to the effective date of the proposed rules in order to allow grandfathering. Brown McCarroll & Oaks Hartline, commented that §350.2(m)(1) should be revised to eliminate a deadline for submittal of a final report. Although TNRCC has improved the provision by allowing five years to submit a final report instead of the previously proposed three years, Brown McCarroll & Oaks Hartline McCarroll believes that any hard deadline is inappropriate. Instead, the qualification for the grandfathering provision should be based upon the person's reasonable continued progress towards project completion. Brown McCarroll & Oaks Hartline McCarroll suggested that the provision be revised to read as follows: "the person who has submitted an initial notification of intent to conduct a Risk Reduction Standard 1 or 2 response action (i.e., §335.8(c)(1) and (2) of this title relating to closures and remediation, as amended) prior to the effective date of this chapter and has submitted a final report within five years (or a later date as agreed by the Executive Director) after the effective date . . ."

Brown McCarroll & Oaks Hartline also requested that the preamble to the final rule clarify that the Executive Director would agree to an extension of the five year deadline when appropriate to allow a person reasonable time to complete a project. Similar to comments it made regarding the overall scope of proposed §350.2(m), AFCEE commented that a facility is already subject to a permit or order, the TRRP should allow the staff to work with the person to determine which set of rules would be most effective at remediating the particular site in an efficient and economical fashion. AFCEE further commented that in the event an initial plan is submitted in good faith by an applicant, and the plan is rejected by TNRCC the applicant should be allowed a reasonable time, e.g., one year, to resubmit the plan. The rule should contain clear guidance that if the initial notification is submitted and if the final report is submitted within the five years proposed by the rule, and if the person requests the response action be reviewed under the regulations in effect at the time of submittal, then the request shall be reviewed according to the regulations in effect at the time. Also, if the final report is denied by the executive director for reasons of technical inadequacy, the applicant should be given a reasonable time to correct the deficiencies and should be provided some assurance that the grandfathered rules will apply. AFCEE also stated that the rule should be clarified so as to require that the final report which is due within five years only applies to the area being addressed by the initial notification. Finally, AFCEE stated that the rule is not clear on whether the five year compliance time for submittal of a closure report applies to the specific closure activity or if it applies to an entire site closure. Weston recommended removing the last sentence or listing the specific provisions

of Chapter 350 that cannot be used because many of the provisions of Chapter 350 are already in use under Chapter 335 by the agency based on the "Implementation of the Existing Risk Reduction Rules" dated July 23, 1998. Provisions such as the exposure area, statistical evaluation, and data evaluation were not (and are not) in §335, but are included in the July 23, 1998 and the TRRP, and are being applied by TNRCC. Weston asked if the last sentence means that persons cannot use these provisions.

Concerning §350.2(m)(2), McCulley, Frick, & Gilman commented that the requirement (for grandfathering under Standard 3) that a workplan with response action objectives and cleanup objectives (e.g., a baseline risk assessment (BRA) or corrective measures study (CMS)) be submitted prior to the effective date is overly burdensome. In the case of large complex investigations, specific data needs filled by the investigation are often identified in consideration of regulatory requirements at the outset of the investigation. If the project has not reached the point that a BRA or CMS has been submitted, substantial changes to the investigation strategy and program may be necessary in order to conform to the proposed rules. McCulley, Frick, & Gilman suggested that submittal of a remedial investigation report under Standard 3 be sufficient to allow grandfathering.

Concerning §350.2(m)(2), Arcadis noted that large, complex facilities may have already divided their Solid Waste Management Units (SWMUs) into larger groupings in order to investigate and evaluate them more cost effectively. Such facilities may not choose to create a Facility Operations Area under Subchapter G of the proposed rules. In such cases, the facilities may have submitted a risk assessment for some portions of the SWMUs and not for others prior to the effective date of the TRRP. Such a situation could result in some SWMUs or groups of SWMUs being evaluated under the current Risk Rules and others under the TRRP. As a result, different portions of the same facility could be closed to different provisions for notice and other regulatory requirements. As a result, the TNRCC could have difficulty explaining these differences to the public and the regulated community. As an alternative, Arcadis suggested that the TRRP allow a facility to proceed under the existing rules if a technically complete risk assessment or CMS has been submitted for any portion of the facility prior to the effective date, and a risk assessment or CMS for the rest of the SWMUs at a facility is submitted within a time frame acceptable to the executive director. Chevron, Phillips, TCC, TXOGA, and Weston commented that the grandfathering section is very narrow and will cause delay in response, additional costs, and duplicative efforts for sites that have already submitted work plans, but now must comply with the new program. The person as well as TNRCC staff may have expended significant resources in preparing, reviewing and finalizing an investigation work plan or report. These commentors argued that it is not reasonable to arbitrarily discard the result of those efforts and start over on the day the proposed Chapter is effective. A similar but even more unreasonable example is the case where the person has already implemented the investigation required by the work plan, samples have been collected and analyzed but a baseline risk assessment or corrective measures study cannot be completed by the effective date of this Chapter. It is in no one's best interests in that event to start over under the new requirements. However, given the differences between the requirements of the Risk Reduction Standards and the proposed TRRP, starting over would be the most likely outcome. The case is even more compelling for sites that are large and complex and have submitted work plans or reports pursuant to and on a schedule consistent with the requirements of an existing permit or order. It would not be good policy to subject such sites to immediate compliance with the TRRP when the requirements of the permit or order in question were negotiated and agreed to in reliance on the current Risk Reduction rule. Chevron, Phillips, TCC, TXOGA and Weston requested allowing sites that have submitted investigation work plans or investigation reports to close under the current Risk Reduction rule. In the alternative, allow sites subject to the requirements of a permit or order that have submitted investigation work plans or investigation reports pursuant to and on a schedule consistent with those requirements to close under the current Risk Reduction rule. Weston also requested some discussion regarding how this requirement would be applied in the event a risk reduction standard Number 2 is being sought, but at some point, is converted to a RRS Number 3 due to a change in circumstance. And similar to its comment on §350.2(m)(1), Weston, recommended removing the last sentence, "Any person desiring to remain under Chapter 335 may not use any of the provision of this chapter," or listing the specific provisions that cannot be used.

Concerning §350.2(m)(3), TCC and TXOGA commented that the paragraph is unnecessary and inconsistent with the other provisions of this section and should be deleted. Unlike the preceding two subsections, the commentors asserted that it does not focus on the stage of the process or type of risk standard being pursued. The use of the term "workplan" makes all workplans prepared under permits subject to review under this rule. Therefore, the commentors recommended removing the paragraph, or at a minimum, excluding the persons who intend to pursue Standard 1 or 2 under the current rule even they are going through the permit renewal process.

The commission is providing a clarification of its expectations for this subsection and in so doing will establish the context within which to respond to numerous comments on the subject of grandfathering. The current risk reduction rule of 30 TAC Chapter 335 was promulgated in 1993. At that time the commission put users on notice that it anticipated the need for future revisions to the risk reduction rules by stating in §335.551(b): “The requirements of this subchapter will, when adequately carried out, assure adequate protection of human health and the environment from potential exposure to contaminants associated with releases from solid waste management facilities or other areas. . . . General procedures based on scientific principles are provided or referenced by these regulations so that specific numeric cleanup levels can be generated. The commission will periodically review the general procedures and revise these regulations as necessary.” Since that time, approximately two thousand closures and remediations have been initiated within the regulatory programs. Relatively straightforward projects under risk reduction Standards 1 and 2 have been completed in short timeframes (generally less than three years). Other projects under risk reduction Standard 3 have multiple studies to conduct and reports to submit for executive director review and approval. Timeframes for completion of Standard 3 projects therefore tend to be much longer than self-implemented actions by virtue of the process and also the nature of the projects.

Invariably, some response actions not completed under the existing rules will need to transition over to the new rules; commentors questioned the commission on where to draw this line. Throughout this rulemaking the commission has proposed a way to honor work completed, to the extent it is acceptable, that was started under one set of rules but would be completed under changed rules. This was shown by inclusion of a grandfathering provision similar to the current Risk Reduction rule at §335.8(a)(5), and also provisions in §350.35(e) which allow response to changes which do not rise to the level of substantial changes. The threshold for attaining grandfathered status has been lowered over time. Initially, the requirement was submission of a Response Action Plan - TRRP rule terminology that is equivalent to a corrective measures implementation work plan (i.e., all the elements of §335.553(b)(1-3)). Subsequent versions called for a corrective measure study, then just a baseline risk assessment. The March 26, 1999 proposal expressed it as submission of a work plan that establishes response action objectives and cleanup criteria while citing as examples that the baseline risk assessment or corrective measure study would be adequate to make this demonstration, although arguably something less voluminous could satisfy the performance language. The commission is imposing some limits on time or performance for response actions to remain under Chapter 335 for another reason. The commission does not intend to maintain indefinitely two sets of risk reduction regulations. This situation would be contrary to the commission’s guiding principle of eliminating whenever possible unnecessary, inefficient, or redundant regulations and processes. The commission will accept projects completed under Chapter 335 as being protective of human health and the environment, unless a substantial change in circumstances determines otherwise, and will allow partially completed projects to continue under Chapter 335 to the extent described herein. The commission is therefore promulgating a grandfathering provision that strikes a balance between maintaining progress toward risk reduction at release sites and eliminating redundant regulations.

Regarding §350.2(m)(1), the commission modified a requirement but otherwise retained the paragraph largely as proposed. Some commentors seemed to misinterpret the process intended for

risk reduction Standard 1 and 2 actions. Grandfathering for these actions is automatic so long as the person has followed the normal notification procedures of §335.8(c)(1) and (2) to initiate a risk reduction rule action prior to the implementation date (May 1, 2000) of this chapter. The information required in this notice is minimal: the facility or area to be subject to closure or remediation activities; the risk reduction standard(s) to be attained; and, the estimated time necessary to complete the activity. This information could easily be submitted in a one page letter if the person chose to self-implement, otherwise a work plan can be appended to it. The receiving program area would typically respond with a letter acknowledging receipt. The requirement to renotify the agency is only for persons who do not have such an acknowledgment letter. Noting that not all program areas might have issued or continue to issue such letters, the commission will accept alternative methods of documentation, such as entry in a TNRCC tracking system, postal records, or other means that can verify the date and content of notice being furnished prior to the TRRP rule implementation date and revises the rule accordingly. The person will have up to one year, until May 1, 2001, by which to furnish alternative documentation. The intent is to prevent false claims of notification in an attempt to secure grandfathered status. If the status is in doubt, the person should seek verification with the agency staff. The other requirement to secure grandfathered status is the completion of the response action within five years of the implementation date (May 1, 2000) of this rule. This can be demonstrated by submission of a final report that addresses the information requirements of §335.553(a). Implementation experience has shown that many Standard 1 and 2 actions have been completed in far less than five years. Commentors questioned this requirement by noting that natural attenuation remedies will generally take longer than five years and should not be forced into the TRRP rule on this arbitrary basis. The commission is requiring this cutoff because the TRRP rule addresses some implementation issues for long-term remedies such as monitored natural attenuation that the Chapter 335 rules do not, namely notification and status reports. Remedies continuing after the five year cutoff will enter the TRRP process with response action effectiveness reporting and an affected property assessment report if an equivalent report had not been submitted under §335.553. Notification requirements of §350.55 could also apply.

Commentors also expressed concern that by remaining under Chapter 335, this provision bars them from using any provision of Chapter 350. The commission has made it clear by the last sentence in Paragraph (1) that a person stays under one set of rules or the other. Persons are not to pick the provisions favorable to their situation and ignore the rest of the rules. One commentor cited a TNRCC memorandum dated July 23, 1998, that contains concepts similar to the TRRP rule but is being used by the agency to implement TRRP procedures on current Risk Reduction rule projects. The memorandum is based on many of the same sources of guidance reflecting advances or refinements in risk assessment and analytical procedures that were used to develop this rule. In the commission's assessment, it reflects what persons should be doing today to develop adequate risk assessments and response objectives to demonstrate compliance with the current Risk Reduction rule. By being presented as guidance, this memorandum is not enforceable as would be a regulation. Also, the person can propose scientifically defensible alternatives to this guidance.

Regarding §350.2(m)(2) as it relates to risk reduction Standard 3 projects, the commission has revised this paragraph to establish the grandfathering criterion as submission of the final remedial investigation report that satisfies §335.553(b)(1), and has also added a time frame of one year from the implementation date (May 1, 2000) of this rule by which time persons must submit the final remedial investigation report to qualify for this status. This transition period will enable persons with investigations nearly complete to finish them. It also affords the person an opportunity to evaluate more fully the ramifications of converting to this chapter or remaining under Chapter 335. This will also more closely parallel the approach for Standards 1 and 2. No specific request must be made for grandfathered status. The TNRCC will affirm the grandfathered status in a letter issued to the person as reviews are completed acknowledging that the final remedial investigation report satisfies the requirements of §335.553(b)(1). Given the extent of information provided in a typical

final remedial investigation report, the TNRCC review letter will be sent in as timely a manner as possible. Not receiving such a letter prior to the one year deadline does not affect a person's status. In keeping with the TNRCC's normal practice, the person will be afforded at least one opportunity to respond to deficiencies in the report before a directive to comply with this chapter would be issued. Since Standard 3 projects are not subject to self-implementation, the person should not automatically proceed to the next step without first determining its status. The commission notes that under the current Risk Reduction rule the three reports of §335.553(b) can be combined into one submittal for review and approval. This can be done, for example, for a no further action proposal under Standard 3 by combining the remedial investigation report with the baseline risk assessment and corrective measure study. If in the TNRCC's review of a combined report, the investigation is found to be satisfactory, even after a response to a notice of deficiencies, the rest of the combined report will be reviewed under Chapter 335. If the investigation report after the response to a notice of deficiencies is still found to be unacceptable, the TNRCC will direct the person to conform to this chapter for all aspects of the no further action proposal.

Some commentors recommended the criterion for grandfathering merely be the initiation of a remedial investigation, or even the submission of a work plan that contemplates compliance with Standard 3. The commission disagrees with the recommendations. Investigations in progress are often adjusted in response to unexpected conditions or new data acquisition objectives. They are also performed in phases to allow for evaluation or oversight. Since the extent of the release is to be investigated to background limits under the current Risk Reduction rule, the first objective is often to find the edge of a plume. Accomplishing this should be sufficient for PCL-based assessments under this rule. The commission notes that transition to TRRP during the investigation stage will be less disruptive to projects trying to achieve timely and efficient remediation than if it were required at later stages of the corrective action process.

Some variations to the conventional RCRA corrective action process need clarification with regard to grandfathered status. Some remedial investigations have been performed in phases. Phase 1 typically is designed to determine if a release has occurred from a SWMU. Subsequent phases then determine the extent of the release in a "step-out" fashion away from the SWMU. Often, results of these phases have been submitted to the TNRCC as separate reports. This approach, while providing a high degree of oversight, has protracted the corrective action process. Streamlining initiatives were put into place by 1996 to compress this process by eliminating intermediate work plans and reports. The commission does not intend to give grandfathered status to phased investigations if the requirements for final remedial investigations are not achieved and reported to the TNRCC by May 1, 2001. Another approach often employed at facilities performing corrective action for multiple SWMUs is the grouping of a subset of SWMUs into distinct projects that progress on different schedules. The grandfathered status will be applied on a SWMU-by-SWMU or project-by-project basis. The status of a single SWMU does not extend to the entire facility. For example, if a facility had ten SWMUs but had completed the remedial investigation on only one SWMU, only that one SWMU would be grandfathered. Similarly, if three SWMUs had been grouped together as a project and the remedial investigation was complete for that project but not others, only that project would be grandfathered. The remaining SWMUs or projects at the facility would not receive grandfathered status.

Regarding §350.2(m)(3), this provision is retained largely as proposed. One commentor thought it was unnecessary and should be deleted. Another commentor thought it should also address work plans submitted in response to orders. This provision is limited to permits; orders will be addressed below. Work plans, primarily for closure of operating hazardous waste management units, are approved as part of a permit. The operating unit might not be scheduled for closure for many years such that the permit comes up for renewal on a ten-year cycle, for example, and the work plan has

not been implemented. Unless a release is known to be associated with the unit, the person would have minimal provisions of this rule to address in the closure plan, namely, the closure performance standard of §350.2(h). Review of the work plan for compliance should not prompt a change in closure procedures unless a release has occurred in the interim and the closure plan does not address it, in which case it should. The commission therefore maintains that a review of this type is appropriate. The commission does note that this provision was carried forward from Chapter 335 where it specifically addressed closure plans. To clarify the intent of limiting the review of work plans approved in the permit only to closure plans and not all other work plans, as suggested by one commentor, the commission revised the rule to specifically state “closure plan” in place of “work plan” and struck other text not included in the version in Chapter 335 so as to maintain the original purpose of this paragraph.

Regarding §350.2(m)(4), this provision allows a person to voluntarily comply with this chapter, even if originally grandfathered, with exception for situations that would result in noncompliance with a previously approved or imposed schedule of compliance. This can be the case with enforcement orders that mandate specific actions and delivery of work plans and reports by specific time frames. The degree of prescriptiveness of enforcement orders has been variable over time, so the commission is not attempting to provide a specific requirement for grandfathering these projects. The commission instead will evaluate such issues on a case specific basis. For example, if an enforcement order issued prior to the implementation date of this chapter directed a person to respond to a release in accordance with the current Risk Reduction rule of Chapter 335, the commission will in general view this as a grandfathered action. Excessive delay on the person’s part in carrying out the ordering provisions could result in additional enforcement action and possible loss of grandfathered status. It would be appropriate for a revised order or directive issued after May 1, 2000, to require compliance with this chapter. On the other hand, persons seeking to utilize this rule, even if ordered to follow Chapter 335, can request a modification to the order and time frames so as to accomplish this change in status. The rule has been amended at §350.2(m) to correct the format for the Chapter 335 Subchapter A and S reference.

§350.3. Process.

Weston commented that this section is very helpful.

The commission agrees with the commentor, and adopts proposed §350.3 with one change. The §350.2 reference to “of this chapter” was changed to “of this title.”

§350.4. Definitions and Acronyms

Based on several comments received, the commission has amended the rule to add some definitions. The numbering of the definitions has shifted accordingly. However, in this preamble, all references to definition numbers refer to the numbers in the March 26, 1999, proposal.

Concerning §350.4(a), Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP would change the traditional language of cleanups and create false impressions and confusion. For example, the TRRP would eliminate the clear language of the term "contamination" for property or ground water and replace it with the term "chemicals of concern." For the public, "chemicals of concern" could include naturally occurring constituents in the soils or ground water, not just contaminants. Moreover, the term "chemicals of concern" is defined in such a vague fashion that it will not even be clear to technical experts. Henry, Lowerre, Johnson & Frederick stated that many of the existing terms have been interpreted by the TNRCC and, in some instances, litigated in the courts. The commission compounds this problem with the proposed adoption of a number of new acronyms that will also require interpretation such as APAR, COCS, ERA, PCLS, RBEL, etc., acronyms that are difficult to read, much less understand. The adoption

of new jargon will only make these programs more incomprehensible to the public, the regulated community and the legislative oversight committees.

The commission does not agree with the commentor's concerns that the seemingly complex terminology used in this rule will have the potential to confuse the public and create false impressions. The commission, in integrating existing rules and the American Society for Testing and Materials' Risk Based Corrective Action standard into a comprehensive corrective action process, had to develop new terms to replace terms from the implementing programs with subtle differences in meaning that precluded their universal use. The term "contamination," for example, actually has a different meaning than the commentor suggests based on its use in the current Risk Reduction rule of Chapter 335. The term "contaminant" is actually a proxy for the many other terms used by the implementing programs, such as hazardous waste constituent, pollutant, hazardous substance, etc. The definition of "contaminated medium" means that the mere presence of a contaminant in soil does not render that soil contaminated unless the concentration is enough to pose a substantial threat to human health and the environment. Similarly, the commentor failed to recognize that constituents which can occur naturally in the soil or groundwater could also be contaminants. For example, the term "hazardous substance" also includes iron and aluminum. If present in a release in high enough amounts, these common constituents can also be contaminants. This concept is not changed by the use of the term COC in this rule.

The commission disagrees regarding the commentor's statement about the vague fashion in which COC and other terms have been defined. The commission has carefully defined many terms in this section and has provided a list of acronyms, many of which are further defined in this subsection or the meaning is made clear in the text of this rule. The nomenclature used for the protective concentration levels is also explained in §350.4(d). The commission recognizes that the transition from the existing rules to this rule will require learning a new vocabulary. The commission points out that these terms were introduced early in the process of seeking public input via two conceptual documents and the 1998 proposal and disagrees with the commentor that the requirements for compliance will be more incomprehensible to the public, the regulated community and the oversight committees of the legislature as a result of the specificity provided by the rule.

Concerning §350.4(a), KOCH recommended adding a definition of Remedy Standards A and B.

The commission responds that this is not necessary since the performance requirements for Remedy Standards A and B are described in detail in §350.32 and §350.33, respectively.

IT recommended including "Self Implementation" in the definition list.

The commission does not agree that a definition for self-implementation is necessary since the process a person must follow when using a self-implementation approach under Remedy Standard A is already described in §350.32(d).

TGLO recommended that "ecological hazard index" be added to the definitions in §350.4 and defined as follows: "The sum of individual hazard quotients. COCs that are known to have the same or similar toxic mechanism (e.g., PCBs and PAHs) must be summed so that the cumulative quotients are reflected in new hazard index. All individual and summed hazard indices >1 should be considered indications of risk."

The commission agrees with the comment, with modification, as the incorporation of the term "ecological hazard index" into the rule at §350.77(c)(6) - (8) requires that the term be defined. The rule has been changed to incorporate a definition of this term.

Reliant Energy, AECT, TCC, and TXOGA, TU commented that the terms "deed notice" and restrictive covenant" are not defined and the difference between the two terms is not evident in the proposed rule. The commentors recommended the following language to describe the two terms: (1) Deed notices - Deed notices do not restrict the use of the property, but are intended to provide notice and information regarding the property to the owner of the property, prospective buyers, and other, but not restrict the use of the property; and (2) Restrictive covenants - Restrictive covenants do restrict the use of the property and are used to ensure that the use restrictions necessary for the remedy to be protective will be legally enforceable when the person owning the property is an innocent landowner.

Reliant Energy, TCC and TXGOA comment that "deed notice" and "restrictive covenants" should be defined. The commission agrees and accepts the definitions with slight modifications.

EPA Region 6 commented that it would be beneficial to define "Agricultural land."

The commission clarifies that agricultural land use is included with the two land use classifications included in the rule. Areas in which there is not a residence, such as large areas of crop land, are commercial/industrial land use. Any area in which there is a residence (e.g., a limited area of a farm) is classified as residential. The TRRP rule deals with agricultural land use in the same manner as Standard 2 of the current Risk Reduction rule.

Concerning §350.4(a)(1), "Affected property," Brown McCarroll & Oaks Hartline strongly supports the proposed revisions to the definition of "affected property." However, the commentor commented that the definition could more clearly specify how it applies to groundwater, and suggested the following definition: "The entire area (i.e., on-site and off-site; including all environmental media) which contains releases of COC at concentrations equal to or greater than the assessment level applicable for the land use (i.e., residential or commercial/industrial) and groundwater classification." Brown McCarroll & Oaks Hartline believes that the requested language adds clarification to the definition and is consistent with TNRCC's explanation of the lateral extent of affected property assessments of the preamble to the proposed rule.

The commission agrees with the commentor with regard to groundwater for the reasons stated and has amended the definition accordingly. However, the commission agrees that the definition is consistent with the lateral extent of affected property assessment, but is concerned that the definition conflicts with the provision of §350.111(a) such that it could be misinterpreted that properties affected above residential PCLs but below commercial/industrial PCLs would not necessitate an institutional control. In fact, KOCH in a comment on §350.52 raised a similar concern that commercial/industrial property would only need to be investigated to commercial/industrial levels, which is not the commission's intent. Therefore, in response to this comment, the rule has been amended such that affected property is defined in terms of residential assessment levels. Further, this change was also made in response to a Henry, Lowerre, Johnson & Frederick comment on §350.31(g).

Concerning §350.4(a)(3), "Assessment level," Groundwater Services commented that the impact of Tier 2 ecological PCLs on assessment levels and associated site assessment costs has not been carefully considered. For many compounds the proposed Tier 2 ecological benchmark screening levels are significantly lower than Tier 1 health-based PCLs and sample quantitation limits, and the actual ecological risk associated with exceeding these screening limits is unclear. Tier 2 screening limits based on "conservative exposure assumptions" may similarly pose an unduly conservative or impractical basis for defining the assessment level. To avoid undue expense, it should be clarified that the ecological PCLs used to establish assessment levels may be based on the most reasonable assumptions regarding ecological site exposure conditions and need not correspond to ecological benchmark screening levels, unless specifically proposed by the applicant.

The commission disagrees with the comments regarding Tier 2 ecological PCLs and ecological benchmarks and their relationship to assessment levels. COCs that screen out of the ecological risk assessment process based on "conservative exposure assumptions" provide a measure of comfort to the commission that these COCs are indeed not posing any significant ecological risk. Tier 2 PCLs are not developed without first adjusting the exposure with more realistic assumptions and site-specific information, as stated in §350.77(c). As was discussed in the commission's initial ERA guidance document and as will be reiterated in the forthcoming guidance, ecological benchmarks are used primarily for screening purposes and are not intended to be used as cleanup levels, although that is an option (also see responses to §350.4(a)(24) and §350.77(c)(5).

The commission agrees with the commentor regarding development of assessment levels and clarifies that the person can use ecological PCLs developed under either Tier 2 or Tier 3, if it is determined necessary to develop ecological PCLs. No rule change is necessary as the rule allows the use of either tier. The word "which" was added to the definition following the words "ecological protection concentration levels" for grammatical consistency.

Also concerning §350.4(a)(3), Chevron, TCC, and TXOGA commented that this definition allows the use of the critical PCL for Class3 groundwater as the basis for lateral investigation of groundwater, and noted that the commissioner specifically requested comment on this provision because of the concern that this approach could result in off-site properties having contaminant concentrations above the drinking water standard without notice being given. Chevron, TCC, and TXOGA strongly support the use of the Class3 groundwater PCL as the assessment level because this will result in more cost-effective investigations. The criteria for classification as Class3 groundwater are so stringent that groundwater that is so classified is highly unlikely to have significant beneficial use, and the presence of contaminants in class 3 groundwater above the drinking water standard is thus highly unlikely to represent an unacceptable risk to property owners. Moreover, because the indirect exposure pathways (such as inhalation of volatiles in air from groundwater) would still have to be addressed under the proposed TRRP, property owners would also still be protected from potential exposures in the absence of use.

The commission agrees with the commentor for the reasons stated and is retaining the provisions allowing the use of the critical PCL for class 3 groundwater as the basis for lateral investigation of groundwater.

KOCH also commented on §350.4(a)(3) noting that the assessment level for the vertical delineation of soil can be established pursuant to §350.75(i)(7). This section allows for the use of default leaching equations or an appropriate leachate test. Results from this equation or site-specific test could be coupled with a simple groundwater fate-and-transport calculation to estimate the COC levels at the POE. KOCH commented that this definition contradicts the requirement that COCs in soil be delineated to the higher of the Method Quantification Limit (MQL) or background concentrations (§350.51(d)(1)).

The commission disagrees that the definition contradicts the requirement that COCs in soil be delineated to the higher of the method quantitation limit or background concentrations. The definition for assessment level has no application to the vertical delineation of soils discussed by the commentor. No rule change is necessary.

Concerning §350.4(a)(6), "Background," Henry, Lowerre, Johnson & Frederick recommended that the discussion of background concentrations specify that the determination of background is generally limited to naturally occurring, inorganic constituents, except where anthropogenic sources can be demonstrated.

There is no rule change necessary to address the comment as the rule distinguishes naturally occurring (i.e., the concentration is not due to a release of COC from human activities) background from anthropogenic sources.

Concerning §350.4(a)(6), Chevron, TCC, and TXOGA commented that the definition of background implies that there is a single background concentration. In reality the commentors argued, there is a distribution, or range, of background concentrations. For some decisions, a single summary statistic, such as the background upper tolerance limit may be used. However, in other cases, such as a comparison of site means to background means, both the mean and the variability are important. This limited definition may lead to confusion both on the part of the regulator and the site investigator. The commentors suggested changing the definition to: “the range of concentrations of a chemical of concern within an environmental medium which may either be naturally occurring (i.e., the concentration is not due to a release of COC from human activity) or anthropogenic (i.e., the presence of a chemical of concern in the environment which is due to human activities, but is not the result of site-specific use or release of waste or products, or industrial activity). Examples of anthropogenic sources include non-site specific sources such as lead from automobile emissions, arsenic from use of defoliants, and polycyclic aromatic hydrocarbons resulting from combustion of hydrocarbons. There are some commonalties regardless of the activity; specifically, the COC are present over large areas (tens of square miles up to hundreds of square miles) and the concentrations are within the range of background concentrations, two types of comparisons are possible. One, individual site measurements can be compared to a threshold value that represents an upper bound for background concentrations. Second, the average site concentration can be compared to the average background concentrations using a means comparison approach.”

The agency agrees with the commentors that the definition of background implies that there is a single background concentration of a chemical of concern within an environmental medium and that such an implication may lead to a misunderstanding; in particular, that there is a single, "correct" or "best" statistical estimator of such a quantity. Thus, the proposed definition may have oversimplified the concept of "background" and has amended the rule to address this issue. This topic is discussed more appropriately in §350.79 (Comparison of Chemical of Concern Concentrations to Protective Concentration Levels). The definition of background does not limit suitable methodologies for determining if a response action is necessary under §350.79.

As the commentors correctly note, statistical estimates of "background" will depend on the statistical decision making mechanism used for comparing an area of concern to the area characterized by background. That is, different statistical models, will, from the same set of background data, produce different estimates of background. Consideration of the elementary methods for comparing "background" areas to other areas of concern reveal that ultimately, while the methods may involve combinations of various estimates of parameters (means, standard deviations) characterizing a population of "background" values, in the end the comparison is making a statement about the populations presumed to be the source of all samples from the two areas. Thus, it is the population that characterizes background. The estimated parameters are only vehicles for making the comparison.

That is, statistical methods comparing "background" to some other area are really tests of the hypothesis of the identity of two populations, mathematicized as probability distributions or probability density functions, or, in the case of geostatistical analysis, as a structured random field. Thus, the commission has amended the definition of background to better reflect this understanding.

Furthermore, the most fundamental view of “background” is adopted in geostatistical models (such models are allowed in the rule) of environmental chemicals. In such models “background” is conceptualized as a local quantity rather than a global quantity. That is, “background” is not viewed as a single quantity characterizing the environmental medium throughout an entire area, i.e., as a global quantity, rather “background” is considered to have a different value at every point (location) within the area being characterized, and this value is a single realization from a population existing at that *point*. In geostatistical models, then, background is considered to be this entire set of

populations (or distributions or density functions) related to each other through some measure of their spatial relationship (e.g., a variogram).

Finally, it is always necessary to remember that, given a sample in an area of concern, the ideal “background” sample for comparison to determine if that sample has an elevated concentration would be a sample taken *at the identical location* but prior to any waste management activity or release. “Background” samples taken at some distance away from that location then deviate from the ideal. From the geostatistical point of view, samples taken away from that location can still be used to estimate the “background” concentrations present at sample locations (at points) within an area of concern prior to waste management activity or releases within that area. Of course, the greater this distance is, the less accurate will be the estimated background. Thus, “background” samples, taken outside of the area of concern should be as close to the locations to be investigated as possible. This notion of “nearness” must be recognized, at least implicitly, in any appropriate definition of “background.” The revised definition of background in the rule respects the above observations.

Also concerning §350.4(a)(6), AFCEE commented that the definition provides clarification on anthropogenic sources, saying there "are some commonalties regardless of the activity; specifically the COC are present over large areas (tens of square miles up to hundreds of square miles) and the concentration levels are generally low." This characterization is not true for all anthropogenic sources; for example, arsenic in the soil can be due to past agricultural activity. Family farms are not typically tens or hundreds of square miles in size. Chlordane when appropriately applied, as a pesticide in the past could still be present in small areas (the size of a typical house) and at elevated concentrations. Anthropogenic sources are not limited to very large areas with low concentrations and therefore the clarification in the definition should be removed.

The commission disagrees with the commentor that there are some "anthropogenic" sources which do not cover large areas in low concentrations but rather small areas in "elevated" concentrations. For the purposes of this rule, the commission uses "anthropogenic" to refer to the indirect results of man's activities. The continued application of chlordane in a small area and the resulting "elevated" concentrations are the direct result of man's activities. In this example, the chlordane was applied directly to the soils for a purpose. The best example of anthropogenic background is lead in soils along and adjacent to major thoroughfares. In this example, the lead was not applied directly to the soils but occurred indirectly as the result of combustion of leaded gasoline. Similarly, the application of defoliant to plants resulted in accumulation of arsenic at low concentrations in the underlying soils. The commission notes that the application of agricultural chemicals (e.g., pesticides and herbicides) in accordance with label instructions is considered applying a product and not a disposal activity. The commission notes that the normal application of fertilizer is not considered a release.

Concerning §350.4(a)(6), Weston commented that the last sentence of the definition of background should be deleted, stating that this is an opinion that is not necessarily correct and is not needed to define "background." If this sentence remains, documentation supporting the statement needs to be referenced.

The commission disagrees that the last sentence should be deleted. This information provides important detail regarding how the commission plans to apply this definition. The commission is not referencing any particular source for its decision making in this regard. A summary statement of the mathematical basis for this condition has been provided above.

Concerning §350.4(a)(7), “Bedrock,” EPA Region 6 commented that the definition of “Bedrock” could be defined as "the geologic stratus that underlies the regolith (gravel, soil, . . .)."

The commission agrees that the proposed definition was insufficiently descriptive. The commission has amended the rule to provide more description, but did not use the recommended language.

Concerning §350.4(a)(8), "Bioaccumulative chemical," for clarification purposes and consistency with the rest of the rule, the commission has modified the term to read "bioaccumulative chemical of concern" and has changed the definition of the term to apply to all environmental media.

Concerning §350.4(a)(9), "Carcinogen," Chevron commented that the definition of carcinogen has been widened far beyond the EPA classifications in the existing rule, which has the potential to expand the list of chemicals that could be so designated and thus require assessment.

The commission has determined that the definition for the term "carcinogen" provided in §350.4(a)(9) is appropriate. As the EPA has proposed eliminating the current carcinogen classification scheme in favor of adopting a narrative approach, the commission has determined that it is no longer appropriate to base the definition of a carcinogen on the existing EPA carcinogen classification scheme. In addition, there are several different classification schemes published by different entities (e.g., EPA, NTP, IARC, ACGIH) and the specific classification for a COC may differ under the various schemes. Further, the current EPA carcinogen classification scheme is specific to potency estimates developed by the EPA, yet the hierarchy of sources from which persons should obtain toxicity values specified in §350.73(a) is not limited to the EPA. It is the opinion of the commission that if the scientific community determines that a particular study meets the weight-of-evidence requirements such that a cancer slope factor or unit risk factor can be derived and is made available in accordance with the hierarchy of sources provided in §350.73(a), then the COC should in fact be evaluated as a carcinogen.

Also concerning §350.4(a)(11), Brown McCarroll & Oaks Hartline requested that the definition of "chemicals of concern" be further clarified to indicate that the particular COC at an affected property are defined by TNRCC's substantive programs as listed at §350.2(b) - (m), which create a person's obligation to take the response action that is being performed pursuant to Chapter 350. Brown McCarroll & Oaks Hartline interprets the applicability statement of the proposed rule at §350.2 to state that the COC to be investigated in an affected property assessment pursuant to §350.51 and compared to protective concentration levels pursuant to §350.79 are dictated by the TNRCC programs that are listed at §350.2(b) - (m). The preamble goes on to list the same specific program areas listed in §350.2(b) - (m) and describes how facilities in those programs will be integrated into the TRRP. For these reasons, Brown McCarroll & Oaks Hartline requests that the first sentence of the definition of COC be revised to read as follows: "Any substance detected at an affected property that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity and that is required to be investigated and potentially remediated pursuant to one or more of the programs enumerated at §350.2(b) - (m) of this title."

The commission does not find it necessary to restate in this definition what §350.2(a) has already established.

With regard to §350.4(a)(11), Chevron commented that if this is in fact what the TNRCC intends, making a NAPL a COC seems difficult. If an RP makes a demonstration that the individual components of the NAPL are not of concern, then the mere presence of the substance might require action due to its definition as a COC. This issue shows itself in §350.33(f)(1)(C), where the language seems to shift between COC and NAPL as if these are different, unless NAPL is a COC, and then it gets complicated. Further, NAPL is not a substance that one measures in concentrations, nor are there PCLs.

The commission disagrees with the commentor's assessments regarding non-aqueous phase liquids (NAPL) being COCs. The commission views NAPL as being included in the definition of COCs because it is related to the concentration of the chemical. A NAPL is a state of matter (solid, liquid or gas) of the underlying chemical. If the concentration of the chemical exceeds its solubility limit in water or its theoretical soil saturation limit, it is predicted to occur as NAPL. The same chemical

could also exist in the vapor state in air. If NAPL is a mixture of substances, PCLs can be developed for the contributing chemicals or the proxy chemicals. However, as discussed in responses to comments submitted for §350.33(f)(1)(C) and (4)(E), and §350.78(b), if the COC as NAPL is relatively non-toxic (PCL > Solubility), then response for NAPL may not be necessary, assuming there are no other hazards.

Concerning §350.4(a)(11), Strasburger & Price, AFCEE commented that on its face, "COC" signify chemicals on a property about which the public should be concerned. Indeed, the TNRCC states that "COC is intended to relate specifically to those contaminants at concentrations which may not be protective should exposure occur." In fact the TNRCC stated that it steered away from the term "contaminant" because "the mere presence of a contaminant would not imply that unprotective situations exist." Yet the term "COC" has the same flaw. It implies an unprotective situation exists. However, upon examination of the rules, "COC" include chemicals that are merely studied to determine whether they pose adverse health effects. In addition, the term "COC" encompasses chemicals that are irrelevant to the risk analysis and are not even found on the property, e.g., laboratory contaminants. Therefore, the commentors suggest the phrase "COC" is misleading and may be misconstrued in contexts outside of this regulatory agency, e.g., litigation. As such, the commentors suggested using the term "Chemicals of interest" because it is a more accurate description and recommended replacing "COC" with "Chemicals of interest." Weston had similar comments stating that it is still extremely concerned about the definition and use throughout the document of "COC." Any chemical, including water, has the potential to adversely affect ecological or human receptors due to its "concentration, distribution, and mode of toxicity." It seems that any chemical below the default residential risk-based values (and ecological benchmark values, if appropriate), should never be considered a COC. We strongly recommend that the agency differentiate actual COC (those that pose a risk at a particular site), from Chemicals of Potential Concern (those that might pose a risk, but the potential for risk has not yet been verified), from just plain Chemicals (the list of constituents that may have been analyzed for at a certain site).

These commentors recommended a revision to the term "COC" because of potential misunderstanding or misuse by the public or litigants. "Chemical of interest" was endorsed by two commentors. The commission sees little practical difference between this recommendation and the term as proposed in the rule. The commission selected COC as a generic substitute term for many possible substances that could be addressed by this rule. It is less alarming than the term "contaminant" as used in the current Risk Reduction rule. Another recommendation is a variation of the existing COC term. The commentor proposed the use of "chemical of potential concern" as the name for a chemical that is being investigated but for which a verification of risk has not been made yet. The commission recognizes that this term is widely used in practice and guidance but does not find it necessary to incorporate it into this rule. A chemical will be of concern at an affected property until it exits the TRRP process by being found at background concentrations or below assessment PCLs, is screened out by the criteria of §350.71, or through application of removal or decontamination remedies is reduced to concentrations not requiring post response action care.

Concerning §350.4(a)(11), "COC," the commission received several comments. For clarification purposes, the commission has amended the definition of COC to remove the words "substance detected." Whether or not a chemical is detected is important in the analysis of the affected property, but not necessarily when initially determining which COCs might be relevant to an evaluation of the affected property. Such decisions are often evaluated prior to the collection of any field data. Of course, if the COC is not detected or otherwise determined not to be of concern, then the chemical would be removed from further consideration. Additionally, the words "an affected property" have been stricken from the first sentence as it adds no substance to the definition. Further, it creates a conflict with the definition of affected property because that definition references the term COC.

Concerning §350.4(a)(14), “Compensatory restoration,” Chevron commented that the agency should provide flexibility in the offsets, presumably with an evaluation of the net environmental benefits. The definition should be modified to specifically state that net environmental benefits analysis can be used which may or may not involve compensatory restoration. Chevron recommended clarifying the definition by defining compensatory restoration as the creation of ecological services to allow for in-kind and out-of-kind habitat restoration. TGLO commented that the term means the creation of ecological services by or through restoration or the setting aside of a comparable type of habitat as that which is impacted to offset residual ecological risk at an affected property. EPA Region 6 commented that TNRCC must ensure that the Natural Resource Damage Assessment Trustees are included in compensatory restoration decisions. The rule should also clearly outline their role and responsibilities in such actions.

The commission agrees with Chevron and TGLO that the term “compensatory restoration” needs to be modified to provide a more accurate description and has adopted an amended definition which reflects both comments. Regarding the EPA Region 6 comment, the commission considers that the Trustees have been extensively involved in the development of the compensatory ecological restoration aspects of the rule. The rule discusses the involvement of the Trustees to the extent allowable; however, the rule cannot dictate the role and responsibilities of other agencies. Further elaboration of their role and responsibilities will be provided in a planned memorandum of understanding and in the forthcoming ERA guidance document.

Concerning §350.4(a)(19), although no comments were received in this regard, the definition has been revised to make the term consistent with its use in §350.78 by striking the words “considering both carcinogenic and noncarcinogenic effects.” This, as well as cumulative risk and hazard, should already have been considered in the development of a PCL and is therefore extraneous here (see §350.71(g) and (h)).

Concerning §350.4(a)(20), “Decontaminate,” Campbell, George & Strong commented that a person should be allowed to propose natural attenuation/recovery as a "decontamination" remedy under Remedy Standards A or B. As presently proposed, the rule would seem to reject such a proposal (30 TAC §350.4(a)(20)). A subject of much debate over that past several months, we request that the agency clarify the definition of "decontaminate" such that it clearly includes, among others, natural attenuation/recovery as a viable decontamination option. The proposed definition of decontaminate is "to apply a permanent and irreversible treatment process to a waste or environmental medium so that the threat of release of COC at concentrations above the critical protective concentration level is eliminated." Campbell George & Strong and Chevron commented that their concern here is the use of the words "to apply." This could be interpreted to mean that the person must undertake an active treatment process, thus precluding the use of natural attenuation/recovery as a potential decontamination remedy since it typically does not involve the "application" of a treatment process by the person. Of course, this is not a "do nothing" approach since the person would be required to perform monitoring and interpret the results. Please modify this definition so that the use of natural attenuation/recovery response actions falls within the scope of a decontamination remedy.

Campbell, George and Strong requested that the definition of "decontamination" be modified so that natural attenuation would unambiguously be considered a decontamination remedy. The commission disagrees, other than discussed below, that the definition for "decontamination" needs to be modified. However, the commission agrees with the commentor that the relationship between decontamination and monitored natural attenuation should be more clearly described. Toward that end, the commission has amended §350.31(b) to emphasize that some monitored natural attenuation processes will be classified as decontamination measures while others will be considered physical control measures. This is important since the language at §350.32(b)(3) regarding Remedy Standard A states in part "Remedial alternatives, including the use of monitored natural attenuation as a decontamination remedy, must be capable of achieving the Remedy Standard A objectives within a

reasonable time frame," In other words, monitored natural attenuation can be used in response to Remedy Standard A, however, it must be a decontamination measure. The text at §350.33(b)(2) regarding Remedy Standard B states in part "Remedial alternatives, including the use of monitored natural attenuation as a decontamination or control remedy." This means that monitored natural attenuation can be used under Remedy Standard B, provided it is capable of meeting the response objectives, regardless of whether it is a decontamination or physical control measure. Further explanation of the criteria provided in §350.31(b) to distinguish between monitored natural attenuation remedies which are decontamination versus physical control remedies will be provided in future guidance. In general, though, as expressed in this subsection, natural attenuation processes where degradation is a major component such that COC concentrations are declining in degree so that critical PCLs would be achieved throughout the plume would be decontamination measures. In contrast, monitored natural attenuation where dilution and adsorption are important processes that limit the extent of COCs in excess of PCLs would be control measures. And finally, Campbell, George & Strong and Chevron recommended that the definition for "decontamination" be revised to delete the words "to apply" so as to remove the impression that an active remedy would be required. The commission agrees with this recommendation, has modified the definition accordingly, and states that certain natural attenuation processes will qualify as decontamination. However, monitored natural attenuation, like any remedial alternative is not suitable in all situations. The suitability of monitored natural attenuation is dependent on the characteristics of the hydrogeology, the COC, and the exposure conditions. Where there is on-going exposure then the most timely remedy is warranted and monitored natural attenuation is not favorably viewed in that context unless it can be demonstrated to be as timely as other appropriate remedies, but even in that situation actions would need to be taken to prevent exposure during the remedial period. A possible exception to this for ecological concerns occurs when an ecological services analysis (ESA) is conducted according to §350.33(a)(3)(B). In this case, monitored natural attenuation could potentially be used as part of the remedial alternative (e.g., when combined with compensatory ecological restoration) at the affected property to address the ecological considerations. In a few instances, the ESA may indicate that monitored natural attenuation is the only appropriate remedial alternative.

Concerning §350.4(a)(21), "De minimus," TU commented that in their comments on the 1998 proposed risk reduction rule, they noted that many electric utility facilities are located in rural areas, and that almost all power plants are located on reservoirs constructed for cooling purposes. For these reasons TU recommended that a de minimus threshold be established under which an ecological risk assessment would not be necessary. TU strongly supports the proposed definition in §350.4(21) which defines "De minimus," especially the de minimus threshold of one acre or less.

The commission appreciates TU's support of the de minimus concept.

Also concerning §350.4(a)(21), EPA Region 6 commented that affected property of one acre or less should not be considered by default de minimus. An assessment should be required to determine if the affected property comprises or has the potential to impact valuable habitats (i.e., the rule currently implies that there is no "valuable habitat less than an acre in size"). Additionally, it is unclear how the consideration of whether there is "similar un-impacted habitat nearby" would impact the affected property ecological evaluation. This can be interpreted to mean that if there was "un-impacted similar habitat nearby," then the affected property would not require protection. The EPA Region 6 considers this to be problematic since environmental protection should not be automatically judged based on relative abundance of a resource. TNRCC should also discuss the significance of bioaccumulating compounds in regard to an affected property ecological assessment. Many non-bioaccumulating compounds can adversely affect habitat and ecological receptors.

The commission disagrees with the EPA Region 6 comment regarding de minimus property for the following reasons. The multi-stakeholder ecological workgroup added the de minimus criterion to

address ecological exposure pathways which are complete but relatively insignificant. The rule does not imply that there is no valuable habitat less than one acre in size. Only if the affected property is one acre or less and meets all of the four qualifying conditions is the ecological pathway considered insignificant, and even then, a remedy to protect human health will be implemented which may be protective of ecological receptors. One of the four qualifying conditions is that there be similar, unimpacted habitat nearby. This ensures that affected property which functions as an ecological island is protected.

Regarding the EPA Region 6 comments on the significance of bioaccumulating and non-bioaccumulating compounds, the commission agrees and considers these issues addressed in the Tier 2 assessment.

Concerning “Deed notice,” the commission has added a new definition at §350.4(a)(22) because Reliant Energy, the Texas Chemical Counsel and TXGOA commented that “deed notice” should be defined. The commission considered these comments, agreed with the commentors and adopted with slight adjustment the suggested definition provided by Reliant Energy, incorporating it alphabetically into §350.4(a).

Concerning §350.4(a)(24), “Ecological protective concentration level,” Groundwater Services commented that this definition is unclear as to which species are and are not to be protected by ecological PCLs. Specifically, it is stated that PCLs are not intended for “receptors with limited mobility or range...that reside in the active areas of the facility.” Groundwater Services asked what is meant by “active areas of facility, whether all off-site receptors protected, and whether the PCLs directed toward individuals or communities.

The Commission agrees with the Groundwater Services comment that the determination of what species are to be protected by ecological PCLs is unclear in the definition of the term “ecological protective concentration level.” However, as stated in the preamble to the March 26, 1999 proposal, the more debatable issues like “what to protect” are better addressed in the forthcoming ERA guidance document. Nevertheless, the rule definition has been modified to reflect that ecological PCLs are primarily designed to be protective for more mobile or wide-ranging ecological receptors and, where appropriate, benthic invertebrate communities within waters in the state, as determined by procedures defined in §350.77(c) or (d). In the proposed definition, it was unclear whether or not benthic invertebrates, which are mostly not mobile or wide-ranging, were to be protected. Benthic invertebrates function at the bottom of the aquatic food chain, serving as a critical pathway for the transfer of energy and nutrients to higher trophic level organisms. For this reason, without the presence of benthic invertebrates, the five subcategories of aquatic life uses designated in §307.7 of the *Texas Surface Water Quality Standards* would not be possible. Therefore, since it has always been the commission’s intent that the benthic community be protected in waters in the state (i.e., not treatment or other permitted waters), the clarifying language has been added.

The commission further recognizes that receptors with limited mobility or range also need to be protected when these receptors are threatened/endangered species or when impacts to these receptors result in negative consequences to the more mobile or wide-ranging receptors and has amended the definition accordingly. The commission retains the phrase “that reside in active areas of a facility” in the definition to refer to those receptors with limited mobility or range (e.g., plants, soil invertebrates, and small rodents) where the development of PCLs is particularly not intended because the potential for these receptors to be preyed upon by more mobile or wide-ranging receptors is minimized because these areas are not conducive to predators because of the absence of habitat, the presence of humans, and the likelihood of noise. Similarly, for receptors with limited mobility or range that reside on-site but in inactive or undeveloped areas, or for those that reside off-site, PCLs are not directly intended for their protection. However, the likelihood that impacts to these receptors could

result in negative impacts to mobile or wide-ranging receptors is much greater, as these areas are usually more conducive to predators.

Regarding PCLs for individuals or communities, obviously, individuals that are threatened/endangered species will need to be protected. Benthic invertebrates, plants, and soil invertebrates are best evaluated at the community level because the abundance of these communities is usually the endpoint in the ecological risk assessment (ERA) and because the available toxicity information for these receptors is generally reported as media-based (e.g., mg COC/kg soil) as opposed to a dose. The remaining ecological receptors are best evaluated through the feeding guild concept. To this end, the rule has been modified to specifically direct the person to evaluate the feeding guilds and communities (supported by the habitats on the affected property) through their representative species when conducting an ERA. In addition, a definition for the term “community” has been added to the rule and the definitions of the terms “feeding guild” and “selected ecological receptor” have been modified. If it can be shown that the selected ecological receptor is protected, it is assumed that the entire feeding guild or community which is represented will also be protected.

Concerning §350.4(a)(25), “Ecological risk assessment,” Weston suggested modifying the definition to read: "For this program, a process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more chemical stressors."

The commission agrees with the comment that ERAs under the rule should be limited to chemical stressors as the rule only applies to chemical releases and has changed the rule to reflect this position.

Concerning §350.4(a)(26), “Ecological services,” NOAA, TPWD, and USFWS commented that the definition of ecological services should not be limited to the services provided by a habitat, but should be revised to include services provided by natural resources to other natural resources and services provided by natural resources to the public. Ecological services should not be limited to simply the services provided by a habitat. TGLO commented that the physical, chemical, or biological functions of natural resources that one natural resource provides for another. Examples include provision of food, protection from predation, and nesting habitat, among others.

The commission agrees with the commentors because the comments provide a more accurate description of the term “ecological services” and the rule has been changed accordingly.

Concerning §350.4(a)(27), “Ecological Services Analysis,” Chevron, TCC, and TXOGA recommended allowing full analysis of ecological services by including increases and decreases of services. The commentors recommended replacing "decrease" and "reduction" with change. TGLO suggested striking the phrase “of a habitat” and replacing “spatial extent of the affected property” with “the spatial extent of the contamination above risk levels.” EPA Region 6 commented that the rule should discuss the involvement and role of the Natural Resource Trustees in the development of any Ecological Services Analysis (ESA).

The commission agrees in part with the Chevron, TCC/TXOGA, and TGLO comments because the comments provide a more accurate description of the term and the rule has been changed accordingly. However, the commission maintains the statement “. . . the spatial extent of the affected property: . . .” as in this context affected property is the extent of COCs in excess of ecological PCLs. Regarding the EPA Region 6 comment, the commission considers that the rule does discuss the involvement of the Natural Resource Trustees to the extent allowable. Further elaboration of their role will be provided in a planned memorandum of understanding and in the forthcoming ERA guidance document.

Concerning §350.4(a)(29), "Exclusion criteria," Chevron commented that this definition is somewhat in conflict with the Tier 1 checklist (within which the exclusion criteria lies; see Figure 30 TAC, §350.77(b)) at Subpart II.A. In the checklist, reference is appropriately made to exclusion of "wastewater treatment facilities and stormwater conveyances/ impoundments authorized by permit." The definition of exclusion criteria in the rule should also recognize that exclusion is warranted for these areas. Phillips commented that the proposed definition pertains to the ecological exclusion criteria and discusses exclusion solely on the basis of a lack or insignificance of an exposure pathway. In the Tier 1 checklist, reference is appropriately made to exclusion of "wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit." The definition of exclusion criteria in the rule should also recognize that exclusion is warranted for these areas.

The commission disagrees with the comments of Chevron and Phillips regarding the definition of exclusion criteria. Exclusion criteria refer to conditions at the affected property that result in incomplete or insignificant ecological exposure pathways. The exclusion criteria checklist states that wastewater treatment facilities and storm water conveyances/impoundments authorized by permit are excluded from the request for the identification of the nearest surface water body, as there would be no point in identifying these entities as being potentially impacted by a release. However, if an unpermitted release of COCs were to be discharged from these entities and subsequently entered into waters in the state or its sediments, this would necessitate the need for an ecological evaluation on the potentially impacted waters/sediments. If the exclusion for wastewater treatment facilities and storm water conveyances/impoundments were to extend beyond "nearest surface water," then it might be misconstrued that an unpermitted release from these entities into another water body or its sediments need not be identified.

Concerning §350.4(a)(34), "Facility operations area," Mobil supported the concept of the Facility Operations Area, but Chevron, Mobil, TCC, TXOGA, and AFCEE commented that the definition is unnecessarily narrow by restricting FOA option to "chemical manufacturing plants or refineries" with hazardous waste permit or commission order. The commentors stated that the TRRP rules should not preclude a site from using an FOA where operations and conditions warrant such an approach regardless of facility type. Chevron further recommended striking the reference to specific types of facilities and include persons subject to enforceable terms of a voluntary cleanup agreement or conditional certificate of completion. EPA Region 6 registered several concerns with the proposed implementation of the facility operations area (FOA) concept; however, those concerns are discussed more fully in their comments on Subchapter G, §§350.131-350.135.

These comments, except for EPA, expressed support for the FOA concept but recommended that the concept be expanded to include more types of facilities than the two classes named in the definition. The commission has addressed this issue in its response to comments regarding §350.134(a)(1). For reasons provided there, the commission is not expanding the applicability of the FOA concept and will not need to revise the definition to reflect other classes of industries.

Also concerning §350.4(a)(34), KOCH commented that this definition should more closely match or reference the text in proposed Subchapter G. For example, the definition at §350.4(34) should clearly state that the facility must be an operational chemical or petroleum manufacturing plant with the North American Industrial Classification System number 325 or 324, respectively (§350.134(a)(1)).

The commission agrees with the recommendation to make the definition more closely match the text in Subchapter G and has revised the definition accordingly. The commission has also added the words "corrective action" as modifiers to "order" to make this term consistent with "corrective action order" as used in Subchapter G.

Concerning §350.4(a)(37), "Groundwater-bearing unit," Chevron commented that this definition is generally appropriate, but reliance on hydraulic conductivity as the sole criterion may include formations that cannot consistently meet the sustainable yield requirements of Class 3 groundwater. Chevron recommended adding to the end of the definition: "and/or in which the water level in a monitoring well recovers to 100% within 24 hours of being bailed dry."

The commission agrees in principle with the commentor that the ability of a well to recover after being bailed dry is an indicator of its potential to yield suitable quantities (i.e., 150 gallons per day) of water. However, there may be instances (e.g., smearing of clays, compaction of the aquifer materials, production of mudcake, etc.) where the ability of a well to recover may not be an adequate indicator of its true yield potential. Assuming that the well is properly installed (i.e., full penetrating) and developed, then the person may be allowed on a site-specific basis to use the well recovery rates to make the demonstration that the well yield is less than or greater than 150 gallons per day. The commission clarifies that the "sustainable yield requirements of class 3 groundwater" is less than 150 gallons per day and therefore, hydraulic conductivity is not the sole criterion upon which the groundwater classification is based. Hydraulic conductivity is the sole criterion to determine if a particular saturated stratigraphic interval is a groundwater-bearing unit or is evaluated as "soils" under the rule.

With regard to §350.4(a)(37), Houston Port Authority commented that "Groundwater-bearing unit should be defined based on hydraulic conductivity for clay soils."

The commission agrees generally with the commentor and notes that the hydraulic conductivity should approximate that of clay soils.

Concerning §350.4(a)(37), Arcadis, TCC, and TXOGA commented that the quoted hydraulic conductivity represents the lowest end of the range of published values that could reasonably be associated with an aquifer composed of very clayey/silty sand, or of silt. Geologic materials such as these could almost meet the qualifications for a compacted clay liner under a landfill. Therefore, this proposal would bring into regulation many geologic units that would not reasonably be considered aquifers, particularly along the Gulf Coast. Furthermore, the proposed language represents a substantial change from the existing rules, which are couched in terms of groundwater, not water-bearing unit. As such, the proposed language moves significantly away from the Groundwater Strategy of the State, which is designed to protect aquifers, not water-bearing units. Therefore, the commentors suggest that the TRRP should address aquifers with a permeability of greater than 1×10^{-5} centimeters per second. This value is much more representative of aquifers.

The commission agrees that the rule is defining geologic materials which have the inherent capability to perform as aquifers and that these materials are better represented by a hydraulic conductivity of 1×10^{-5} centimeters per second and the rule has been changed accordingly.

Concerning §350.4(a)(37), Groundwater Services commented that a definition based on hydraulic conductivity $\geq 1.0E-06$ cm/sec will result in groundwater investigations in clay soils. The value should be adjusted to $1.0E-4$ cm/sec to correspond to actual water-bearing strata.

The commission disagrees that the hydraulic conductivity should be raised to 1×10^{-4} centimeters per second. This value is too high because it will result in zones not being classified which can easily yield 150 gallons per day or greater.

Concerning §350.4(a)(37), Henry, Lowerre, Johnson & Frederick commented that a number of definitions (such as "COC" and "ground-water bearing unit") are vague and overly broad.

The commission disagrees that the definition for "groundwater-bearing unit" is vague and overly broad. The definition is changed to better reflect zones which can actually act as aquifers but the commission notes that the definition is developed to capture all geologic materials which are saturated and have the inherent ability to perform as aquifers.

McCulley, Frick, & Gilman asked the commission to verify that formations that are saturated, but have hydraulic conductivities less than 1×10^{-6} cm/sec are not considered to be groundwater-bearing units, do not have to be classified, and are not subject to any of the proposed rules related to groundwater.

The commission notes that the hydraulic conductivity has been changed in accordance with other comments, however, the comment is correct that formations with hydraulic conductivities less the 1×10^{-5} centimeters per second are not considered groundwater bearing units, do not have to be classified and are not subject to the rules related to groundwater. Further, this definition only applies to saturated formations, not the vadose zone (i.e., the unsaturated zone).

Concerning §350.4(a)(37), EPA Region 6 commented that the capacity of an aquifer to transmit water is based upon the transmissivity (i.e., hydraulic conductivity times the thickness of the aquifer), TNRCC should provide reasons for limiting the definition of ground water bearing unit based on hydraulic conductivity. Weston commented this definition is too broad and could include a one-inch thick silty clay layer, which, for all practical purposes, would not truly be a water-bearing zone. It would be more appropriate to define a water-bearing unit based on transmissivity, which is an aquifer property and provides a more accurate measure of the water-bearing capability of a geologic unit. Hydraulic conductivity (which is an aquifer material property) is a measure of the rate at which water can permeate through geologic medium and does not take into account whether or not the unit is actually thick enough to produce water.

The commission acknowledges that transmissivity is a more common measurement of an aquifer's capacity to transmit quantities of water. However, for the purposes of the rule it is more practical to make these determinations based upon the hydraulic conductivity to alleviate arguments over the saturated thickness. Also, some areas may have formations which are quite extensive in thickness but have very low hydraulic conductivities. If based upon transmissivity, these formations may have to be classified and treated as a "groundwater-bearing unit" even though they are more appropriately managed as soils from a remedial standpoint. Thin zones which have high hydraulic conductivities but potentially relatively low transmissivities will act as preferential pathways for COC migration and need to be captured as "groundwater-bearing units." There is no rule change as a result of this comment.

Concerning §350.4(a)(39), Groundwater protective concentration level exceedence zone," Henry, Lowerre, Johnson & Frederick commented that the term implies that constituent concentrations within these zones are protective of human and ecological receptors, whereas, the definitions indicate that the constituent concentrations within these zones are greater than concentrations which are protective of human or ecological receptors. Henry, Lowerre, Johnson & Frederick suggested that the term should be changed.

The commission disagrees with the commentor. The word "exceedence" within the term "PCLE zone" means that the constituent concentrations within that zone would not be protective of human health and/or ecological receptors. The zone will be protective after completion of a remedy standard. No change to the definition is necessary.

Concerning §350.4(a)(44), "Institutional control," Chevron, TCC, TXOGA, and AFCEE recommended modifying the institutional control provisions to allow for alternatives other than deed notice and abandon the use of restrictive covenants. The commentors stated that TNRCC should not rule out the use of alternative institutional controls such as local zoning restrictions or other land use ordinances, or statewide

registries, where such controls are available and can be relied upon as functional equivalents of deed notices. AFCEE further commented the Texas Legislature has already recognized that municipal zoning ordinances may serve as effective institutional controls in some circumstances. See Texas Health & Safety Code §361.753(g)(1). Yet, the TRRP effectively excludes consideration of municipal zoning ordinances as an institutional control without recognizing any executive director discretion where circumstances might warrant an approach other than the deed notice process.

The commission has extensively addressed the issue of alternatives to deed notices and restrictive covenants and has revised the rule at §350.111(c)(3) to allow the use of zoning or local government ordinances. The definition in this section has been changed accordingly to reflect that change by adding the phrase “or equivalent zoning or governmental ordinances” to the end of the sentence. The preamble discussion for §350.111(c)(3) indicates how the commission intends to evaluate the alternatives of zoning or governmental ordinances for equivalency with the information conveyed by a deed notice.

Concerning §350.4(a)(44), Chevron, TCC, and TXOGA commented that the definition is unnecessarily narrow by limiting institutional controls to deed notices and restrictive covenants. The definition prevents the use of other potential institutional controls such as local ordinances or state registries that can serve the same purpose of providing public notice and ensuring the long-term effectiveness of a remedy without exposing the State to any Takings risks. If a local government decides to pass an ordinance to make use of groundwater illegal, it seems illogical to not give that ordinance the same effect as any other control measure under Remedy Standard B. The remedy could be tied to the "change in circumstances" provision in the rule if the ordinance is repealed or otherwise modified such that groundwater subject to the ordinance is made useable again. To ensure that the TNRCC has the flexibility under the TRRP to rely upon alternative institutional controls where circumstances warrant such an approach, the definition of Institutional Control should be broadened accordingly. The standard for control, "ensuring protection," is also difficult to achieve, enforce, or define. Define institutional controls based on inclusive model used in CERCLA. Registries and, at the very least, municipal ordinances should be included in the definition. Place requirements for obtaining deed notices in text of rule as a requirement rather than through constrained definition of institutional control. Replace: "ensuring," with "have the purpose of."

Similar to the preceding comment, the commission has addressed these issues in its response to comments for the rule change of §350.111(c)(3) and the corresponding change to this definition. For reasons stated regarding §350.111, the commission sees merit in a registry but is not prepared at this time to implement one. The definition of institutional control has been broadened to allow the alternatives of VCP certificates of completion, zoning and local ordinances but not to include registries. The commission emphasizes that the VCP certificate of completion (either conditional or final) is a vehicle which currently can contain many of the same elements of a deed notice or restrictive covenant but not in the format of the model language provided in the current Risk Reduction rule of Chapter 335, Subchapter S, Appendix III. However, under this rule, a VCP certificate of completion must meet the deed notice requirements specified in §350.111 to be used as an institutional control. The certificate of completion is available only to persons who complete response actions under the direction of the VCP. Within the definition, the commission has not replaced the word “ensuring” with “have the purpose of,” as recommended by the commentators because the March 26, 1999, proposal language more closely reflects the commission’s expectations for the legal instrument placed in the property records.

As a consequence of expanding the definition of institutional control to include equivalent zoning or governmental ordinances, conforming rule changes were made to §350.31(g) and (h); §350.33(f), (f)(2), (3)(E), (4)(C)(i), and (4)(F)(i); §350.34(1) and (2); §350.35(f); §350.36(b)(4) and (c)(4); §350.37(l)(3)(C), (4), (m) and (m)(1); §350.51(l)(3) and (4); §350.53; §350.74(b)(1), (j)(2)(A) and (L); §350.111(a), (b), and (c) to accommodate the use of equivalent zoning or governmental ordinances

and clarify that landowner concurrence is not required for reliance on equivalent zoning or governmental ordinances as an institutional control. Similarly, expanding the definition to include VCP Certificates of Completion necessitated conforming rule changes to §350.31(g) and (h); §350.37(l)(4); §350.51(l)(3) and (4); §350.74(b)(1) and (j)(2)(L); §350.111(a), (b), (c), (c)(1) and (2), (d), (d)(1) and (2), and (e).

Concerning §350.4(a)(52), "Monitored natural attenuation." Chevron commented that this is inconsistent with the definition of "response action" in §350.4(a)(72) as an activity to "remove, decontaminate or control" COCs. Add monitored natural attenuation to the definition of response action.

The commission responds that it is not necessary for monitored natural attenuation to be added to the definition of response action so as to clarify that it is a response action. Section 350.32(b)(3) states that "monitored natural attenuation as a decontamination remedy" may be used to attain Remedy Standard A. And, §350.33(b)(2) states that "monitored natural attenuation as a decontamination or control remedy" may be used to meet the requirements for Remedy Standard B. It is clear from these citations that monitored natural attenuation is a response action.

Concerning §350.4(a)(54), "Natural attenuation factor," McCulley, Frick, & Gilman commented that the natural attenuation factor is defined as the concentration at the source area divided by the concentration at the point of exposure. However, under transient conditions, when a dissolved-phase plume is growing, the concentration at a source area divided by the concentration at the point of exposure may not accurately represent natural attenuation under steady-state conditions. Therefore, for the purpose of this rule, McCulley, Frick, & Gilman stated that it should be clarified that the natural attenuation factor should be estimated from data that represent a steady-state plume.

The commission agrees with the point raised by the commentor, but does not agree that a rule amendment is necessary as the definition is valid under either steady state or transient conditions. However, the commission agrees that one must have a sufficient understanding of site conditions to arrive at the appropriate conclusions. This very point is why the provisions in §350.75 regarding monitoring and modeling are included in the rule. Early monitoring with insufficient monitoring verification may mistakenly result in a steady state assumption for a transient plume.

Concerning §350.4(a)(55), "Natural resource trustees," TPWD and USFWS commented that the definition of Natural Resource Trustees should be revised to make it clearer. Staff recommend that the first sentence of the definition be modified to read "The federal natural resource trustees as designated by the President and state natural resource trustee Agencies designated by the Governor of the State pursuant to the National Contingency Plan, Oil Pollution Act and CERCLA §107(f)(2)(A) and (B)."

The commission agrees with the TPWD and USFWS because the comments provide a more accurate description of the term and the rule has been changed accordingly.

Concerning §350.4(a)(56), "Off-site property," TCC and TXOGA commented that the definition is too broad. The commentors recommended changing the definition of off-site property to read: "The legal boundaries of property adjacent to on-site property which contains releases of COC from the on-site property at such concentrations such that it qualifies as affected property."

The commission disagrees with the commentors and is not amending the rule. The rule is simply making a distinction based on property boundaries to facilitate discussion in the rule. Further, the proposed amendment is too narrow as off-site properties other than only the adjacent properties may be affected or threatened by a release. The definition as proposed is appropriate as its affect can expand or contract based on the site-specific situations. Further, such a modification could undermine the provisions of §350.55 regarding notices to off-site parties.

Concerning §350.4(a)(57), “On-site property,” TCC and TXOGA suggested changing the definition to read: "The legal boundaries of the property or properties containing the source of the unauthorized release being addressed pursuant to this chapter."

The commission disagrees. The term “on-site” is used for more than just the property where the release originated, but also the property for which the person responding to this rule is responsible for. The person taking the action is not always addressing the source property (e.g., VCP sites). Therefore, the rule has not been amended.

Concerning §350.4(a)(59), “Person,” Dow commented that the definition includes both government and non-government entities. Dow stated that this creates potential problems and/or increased expense for the state in several sections of TRRP, including where the state government will be taking state funded action to remediate property not owned by the state. The best remedy is to eliminate the government entities from the definition and refer to these entities where necessary in the rule. In order to accomplish this recommended action, Dow suggests that the definition of person should be modified as follows: “Person - an individual, corporation, organization, business trust, partnership, association, or other legal entity.”

The definition of "person" included governmental entities, which may create problems for the state, particularly where state government will be conducting remedial action on property the state does not own. The commission agrees with the commentor and has revised the rule to remove from the definition of “person” the reference to governmental entities that are not a responsible party performing a remedial action.

Also with regard to §350.4(a)(59), TCC and TXOGA recommended adding the following to the end of the definition of "Person": "pursing a response action to address an unauthorized release of COC under this chapter."

The commission does not choose to add the suggested language to the definition of “person” as it is evident throughout the rule that "person" is indeed the one engaged in the response action.

Concerning §350.4(a)(61), “Physical Control,” AFCEE commented that the definition includes hydraulic containment wells and interceptor trenches as physical control. Whereas these technologies do have a component of control, they also can be used for removal (pump and treat). AFCEE recommended clarifying the definition so that the use of these technologies is not limited.

The commission has addressed the commentor’s concern in the response to comments for §350.33(a) and (b) relating to the requirement to use removal and/or decontamination for Class1 groundwater. In response to a comment from Henry, Lowerre, Johnson & Frederick concerning long-term effectiveness and concerns over the use of fences, the words “. . . ,but typically not fences” were added to the end of the definition. Henry, Lowerre, Johnson & Frederick’s comment is presented and addressed in the response to general comments section of the preamble.

Concerning §350.4(a)(66), “Protective concentration level exceedance zone,” EPA Region 6 stated that although in a risk-based approach there may be areas where contaminants are being contained the definition must clearly state that the contaminant concentrations within this zone will be protective at the point of exposure. Chevron, TCC, and TXOGA commented that the first sentence of the definition includes hazardous waste in the definition of the PCL exceedance zone, and stated that this is unnecessary and inconsistent. Chevron recommended removing "as well as, hazardous waste" from the first sentence. Henry, Lowerre, Johnson & Frederick commented that the definition of "Protective concentration level" redefines contamination so as to no longer include concentrations of contamination below health-based levels. This is inconsistent with the historical definition and also the definition in the Solid Waste Disposal Act. The public may perceive this as a "smoke and mirrors" move. Henry, Lowerre, Johnson & Frederick

also stated that the term implies that constituent concentrations within these zones are protective of human and ecological receptors, whereas, the definitions indicate that the constituent concentrations within these zones are greater than concentrations which are protective of human or ecological receptors. Therefore, Henry, Lowerre, Johnson & Frederick recommended changing the term.

Based on the following discussion, the commission is not modifying these definitions in response to these comments. The change suggested by Region 6 is inappropriate, since the definition should define what a PCLE zone is and leave it to the performance objectives for Remedy Standards A and B to specify particular requirements such as being protective at the point of exposure. Also, the words "as well as, hazardous waste" must remain in the definition for PCLE zone, since material which really is a hazardous waste, but which contains COCs at concentrations below the critical PCLs, would still be subject to regulation and need to be included within a PCLE zone. And finally, the commission disagrees with Henry, Lowerre, Johnson & Frederick's comment. The word "exceedence" within the term "PCLE zone" means that the constituent concentrations within that zone would not be protective of human health and/or ecological receptors.

Concerning §350.4(a)(67), "Reasonably anticipated to be completed exposure pathway," Chevron commented that this definition is inconsistent with the criteria in §350.71(c) that dictate how to determine whether a pathway is reasonably anticipated to be complete. This definition is consistent with EPA guidance and common practice. The text in §350.71 (c) should be amended to be consistent with this language.

The commission maintains the definition as proposed. This definition is consistent with §350.71(c) in general and in particular with respect to §350.71(c)(8).

Concerning §350.4(a)(68), "Release," Chevron suggested a change: (F) should be added to this definition to identify the use and/or application of registered pesticides in a manner consistent with the pesticide label as an additional exception to the definition of "Release." Chevron, Dow, TCC and TXOGA argued that the definition of "Release" appears to have been expanded to include authorized releases (such as NPDES-permitted outfalls or injection wells), and the commission should clarify that these types of discharges are not included in the definition. Chevron, TCC and TXOGA further noted that "Release" should be defined by the triggering program, not by the TRRP. Chevron recommended referencing back to the program consistent with §350.2, Applicability. In addition, (F) should be added to this definition to identify the use and/or application of registered pesticides in a manner consistent with the pesticide label as an additional exception to the definition of "Release." Groundwater Services commented that this definition should be deleted since "Release" is defined under other TNRCC program areas.

The commission disagrees with the commentors. The definition of "release" used in these rules is the same as that found in the general provisions of the Solid Waste Disposal Act, Texas Health and Safety Code, §361.003(28). The commission has not expanded this definition.

Concerning §350.4(a)(68)(A),(B),(E), EPA Region 6 commented that the protection of human health protection under a potential industrial worker scenario (as in a residential or ecological resource/receptor potential scenario) should be explicit and not exempted when there is possibility of a possible claim being filed against the employer. Additionally, it is important to note that although it may be reasonable to consider widespread anthropogenic, non-site related releases in a different light, it is very difficult to substantiate these cases for emissions from engines and normal application of fertilizer. In the latter, record keeping of routine application may be necessary to verify reasonableness of consideration.

The commission disagrees with the commentor. The definition of "release" used in these rules is the same as that found in the general provisions of the Solid Waste Disposal Act, Texas Health and

Safety Code, §361.003(28). Further, this definition is substantially the same as the definition of "release" found in CERCLA §101(22) (42 USC, §9601(22)).

Concerning §350.4(a)(71), “Residential land use,” McCulley, Frick, & Gilman and SRA commented that they believe that the term residential land use (and all its inherent risk assessment meanings) is not appropriate for parks and other non-residential areas listed under this definition. These areas that are visited by receptors periodically and for short durations clearly have different exposure conditions than residential areas. Estimates of risk to receptors in these non-residential areas will be greatly overestimated by subjecting them to a residential evaluation. Under the current Risk Reduction rule, parks and other non-residential areas can be assessed using a recreational-type or other appropriate scenario. Because of the extremely variable usage patterns and exposure potential associated with parks, we suggest that these areas be evaluated on a site-specific basis and parks and other non-residential areas be eliminated from the residential land use definition.

The commission disagrees that parks and other "non-residential areas listed under this definition" should be treated on a site-specific basis. Due to the unknown variability and potentially sensitive receptors (e.g., children) which may frequent these areas, the commission is retaining the residential land use classification. The commission notes that many of these local, state and federal parks contain some of the State's most valuable natural resources and that it is not in the public's best interest to restore these areas such that they may only have limited use due to potential exposure to COCs.

Concerning §350.4(a)(71), Harris County Pollution Control Division asked that the commission clarify the application of the residential/commercial land use definition as it pertains to county rights-of-way, easements and stormwater conveyances.

The commission clarifies that land use is determined by comparing current land use to the definitions for commercial/industrial and residential land use. On a site-specific basis, the commission anticipates that easements could be either land use classification. County rights-of-way may also fall within either classification but may tend to be commercial/industrial. Storm water conveyances will also tend to be commercial/industrial land use. The commission notes that the landowner must be in agreement with commercial/industrial land use as they must give their consent to the filing of any required institutional controls in the real property records.

Concerning §350.4(a)(73), “Risk-based exposure limit,” TCC and TXOGA commented that the first part of the definition, which refers to the concentration of the chemical in the exposure medium, is the definition of PCL not of RBEL, and recommended modifying the definition as follows: “The RBEL is the exposure that is protective of human health or the environment (i.e. for human health the exposure resulting in 10^{-5} or less cancer risk or HQ less than or equal to one).”

The commission disagrees with the comment that the initial part of the RBEL definition, which refers to the concentration of the chemical in the exposure medium, is the definition of the PCL and not the RBEL. The term “RBEL” refers to a COC concentration in a specific exposure medium (e.g., vegetables, air) and is not necessarily limited to potential source media such as groundwater or soil, which are the media to which the PCL concentrations apply.

Concerning §350.4(a)(74), the rule has been amended in response to comments on §350.54 to recognize that it is analogous to sample-specific detection limit.

With regard to §350.4(a)(78), “Soil protective concentration level exceedence zone,” EPA Region 6 referred to its comments on the definition of “Protective concentration level exceedence zone.” Similar to its comments on “Protective concentration level exceedence zone,” Henry, Lowerre, Johnson & Frederick stated that the term implies that constituent concentrations within these zones are protective of human and

ecological receptors, whereas, the definitions indicate that the constituent concentrations within these zones are greater than concentrations which are protective of human or ecological receptors. Therefore, Henry, Lowerre, Johnson & Frederick recommended changing the term.

The commission notes that these comments are very similar to those received on §350.4(a)(66) regarding protective concentration level exceedance zone. Please refer to the commission's response to comments on §350.4(a)(66).

Concerning “Restrictive covenant,” the commission has added a new definition at §350.4(a)(77) because Reliant Energy, the Texas Chemical Counsel and TXGOA commented that “restrictive covenants” should be defined. The commission considered these comments, agreed with the commentors and adopted with slight adjustment the suggested definition provided by Reliant Energy, incorporating it alphabetically into §350.4(a).

Concerning §350.4(a)(79), “Source area,” Henry, Lowerre, Johnson & Frederick found the use of the term “source area” to be confusing because it appears to include the lateral and vertical limits of affected soils and groundwater. Source area normally only includes the area in the vicinity of the release. Chevron commented that the presence of non-aqueous phase liquids or a location of highest concentration of COC should not be considered a “source area” unless releases from them are occurring and they are in fact the source of the release in question. The definition should be limited to the location releasing the COC. Depending on the site, it is possible (and probable at many sites) that the original location releasing the COC may not be present due to previous removal actions, resulting in no source area. Weston suggested replacing “the location of highest concentration” with “the location of soils containing COC at concentrations that may result in a continuing source of the chemicals to groundwater.” For historical spill locations, often only residual amounts of chemicals remain in the groundwater. The highest concentration could be only several times the MCL in the groundwater that should not be considered a “source area.”

The commission agrees that the proposed definition for source area is not sufficient for the reasons and uncertainty expressed by the commentors and has amended the definition to add clarity of what a source area is and is not. The commission agrees that NAPLs or high concentrations of COCs that are not leaching, dissolving or emitting in any manner are not source areas. However, the commission points out that NAPLs or high concentrations of COCs that leach, dissolve or emit COCs at any concentration are technically a source area. However, only NAPLs or high concentrations of COCs that leach, dissolve, or emit COCs at unprotective concentrations are typically of regulatory concern as a source area under this rulemaking.

The commission acknowledges and agrees with Chevron’s and Weston's points that source areas may have been removed and that the highest concentrations of COCs at an affected property are not necessarily by default a source area. However, if such is the case, then unprotective leachate and emissions should no longer be generating, and any remaining dissolved-phase plume should be deteriorating. The rule is written in the context of source areas; when those portions of the rule are encountered, the person should presume that the source area is the location of the original release for the purposes of this rulemaking. For example, assume in the past a source area of chrysene has been removed and the concentration of chrysene in soil no longer generates unprotective concentrations of leachate. However, concentrations of chrysene remain in the surface soils in excess of the Tier 1 $^{Tot}Soil_{Comb}$ PCL. In §350.75(b)(1), Tier 1 is expressed in terms of assuming the exposure occurs at, above or below the source area. Therefore, the person should just assume that the “source area” in this example is the location of the original point of release, which results in the interpretation in this context that the source area for chrysene is the surface soil PCLE zone.

Concerning §350.4(a)(81), “Stressor,” Mobil commented that the definition of "Stressor" ends with the limitation that only the chemical entities apply in the regulation. Mobil suggested that this definition should be deleted as it adds nothing to the regulation that is not already covered under the term "Chemical of concern."

The commission disagrees with the comment regarding eliminating the term "stressor" because this term is used in the definition of "ecological risk assessment"; however, the definition of "ecological risk assessment" has been modified to indicate that chemical stressors equal COCs (also see responses to §350.4(a)(25) and 350.77(a)).

Concerning §350.4(a)(83), “Surface cover,” in this definition the word “fill” has been removed to be consistent with the Tier 1: Exclusion Criteria Checklist.

Concerning §350.4(a)(82),(84), EPA Region 6 commented that the definition of surface soil extending from ground surface to 15 feet in depth for residential land use and from ground surface to five feet in depth for commercial/industrial land use is inappropriate to apply as a universal definition. These soil depths are inconsistent with EPA policy and guidance concerning most surface soil exposure scenarios.

The definition of surface soil should weigh the likelihood of the area being developed, the distribution of contamination, and allow for reasonably expected soil disturbances as the result of landscaping, gardening and local construction practices. The default surface soil zone for ecological exposure pathways of 0.5 feet may not encompass the potential exposure areas for some animals such as larger than small size burrowing animals. A larger interval should be considered. Fundamentally, the soil depths should be consistent with the expected exposures.

Additionally, in defining sampling intervals for the defined soil depths, EPA Region 6 suggests that maximum discrete sampling intervals of one foot be required for the top sampling interval and consider increasing the interval size with depth as appropriate for adequate vertical extent and exposure characterization. For example, sampling for lead exposures should utilize a sampling interval of two centimeters. If, however, composite sampling versus interval sampling is used to characterize the chemical concentrations, the depth may have a dilution effect and would not be appropriate.

Regarding EPA’s comments concerning the human health applications of the definition of “surface soil,” the commission has responded in detail to the issues raised by these comments in its response to comments regarding §350.37(c). The commission disagrees that a sampling interval larger than 0.5 feet be used as the default surface soil zone for ecological exposure pathways. The commission acknowledges that at times larger surface-dwelling animals might be exposed to greater intervals through "rooting" or other activities. However, the commission considers that a greater interval will dilute the exposure to the majority of surface-dwellers, particularly those that occupy the lower levels of the food chain (e.g., invertebrates, rodents) and those who are exposed to incidental soil ingestion while consuming prey (e.g., raptors). The commission has responded further on the issues raised by the commentors in its response to comments regarding §350.37(c). The rule is changed to make the word “five” the numeral “5” for consistency in the definition.

Concerning §350.4(a)(84), “Surface soil,” Chevron commented that the definition does not take into account regional construction practices which may limit the depth of excavation. Therefore, Chevron suggested adding to the last part of the first sentence: "or to the top of the uppermost groundwater-bearing unit, or consistent with regional construction practices, whichever is least in depth. Environmental Resources Management commented that this is a major change from existing rule in that it increases the soil depth for evaluation of direct contact from 0-2 feet to 0-5 feet, and thus will require unnecessary remediation at depths below which commercial/industrial worker exposures are likely to occur. Weston recommended evaluating an industrial worker using the 0-2 foot zone as in the existing rules, and to use

OSHA-type worker standards to address construction worker exposures in the 2-5 feet interval. McCulley, Frick, & Gilman commented that the definition for surface soil at residential properties is the soil zone extending from ground surface to 15 feet in depth. This depth interval is also described for residential properties under the Affected Property Assessment (APA) in §350.51. The rationale for selecting this depth interval, however, is not provided. During the public hearing held in Austin, Texas on July 6, 1998, TNRCC staff indicated that this depth interval was selected to protect against the excavation of soils from zero to 15 feet while installing below ground swimming pools. EPA guidance (EPA, 1992 and 1995) generally defines surface soils as the soil zone extending from ground surface to six inches in depth but these documents recognize that it may be necessary to evaluate the soil depth assumptions based on site-specific conditions. EPA originated the practice of considering a soil column of 0 to 15 feet for residential properties in the northeastern U.S. to protect against placing subsurface soils excavated during the construction of basements at the surface. McCulley, Frick, & Gilman stated that this rationale is not appropriate for Texas since most residential dwellings in Texas do not have basements. It is our opinion that regulating all closure activities in residential and potentially residential areas based on the likelihood of a resident installing a belowground swimming pool is overly conservative since the fraction of homes in Texas with belowground swimming pools is small. Furthermore, McCulley, Frick, & Gilman noted that it communicated with several professionals in the swimming pool industry who indicated that residential swimming pools are rarely deeper than five feet and almost never deeper than eight feet.; therefore, the general soil depth required during excavation seldom exceeds nine feet. Thus, McCulley, Frick, & Gilman recommended that the surface soil definition and later requirements related to surface soil depth for residential properties be revised to indicate that surface soil is considered to be the 0 to 6 inch soil interval. Deeper surface soil depths, such as zero to three feet, could be considered based on site-specific conditions (e.g., building practices and gardening).

The commission has responded in detail to the issues raised by the commentors in its response to comments regarding §350.37(c).

Concerning §350.4(a)(84), Brown & Caldwell recommended revising the definition to read, "The soil zone extending from ground surface to 15 feet in depth for residential use and from ground surface to five feet in depth for commercial/industrial use; to the top of the uppermost groundwater-bearing unit; or to the top of bedrock, whichever is least in depth."

The commission agrees to make the suggested change and has amended the surface soil definition accordingly. The definition for "bedrock" as proposed is too subjective for this new use since it contains the term "solid rock." Therefore, the commission has added clarifying language to the solid rock reference in the bedrock definition. Where bedrock is the vertical limit to surface soil, subsurface soil POEs would then apply to the bedrock.

Concerning §350.4(b) and (d), KOCH commented that a number of the acronyms used in the proposed TRRP rules are not defined in these sections. For example, K_{sw} is not defined or information on how to calculate this parameter is not provided in the proposed rules (see equations in figure §350.75(a)(1)). The term $^{Air}GW\text{-}Soil_{Inh-v}$ is used in Table 1 dual (Tier 1 Residential Soil Protective Concentration Levels (PCLs)) and Table 2 (Tier 1 Commercial/Industrial Soil PCLs). However, there is no definition of this term or how it is calculated.

The commission included definitions of acronyms that are found in the text of the rule. Acronyms found only in the tables were not included in the acronyms definitions. This was done in an effort to shorten the rule in response to comments received on the May 15, 1998, proposal of the rule.

The definition of K_{sw} was inadvertently left out of the March 26, 1999 proposal, but is included in this rule making. The commission has removed the PCL $^{Air}GW\text{-}Soil_{Inh-v}$ from the Tier 1 PCL table as this pathway should not commonly be a driving exposure pathway.

Concerning §350.4(c)(6), Weston questioned why an exposure route is not included in the example.

The commission responds that there are various exposure routes for surface water. Therefore, in the vein of simplicity, the commission did not include exposure routes for this PCL.

Concerning §350.4(d)(6), TCC, TXOGA commented that there is a typographical error in the acronym for the PCL for inhalation of volatiles and particulates from surface soil. It should be ^{Air}Soil_{Inh-VP} (i.e., Ing should be Inh).

The commission thanks the commentor for pointing out this error and has amended the rule accordingly.

§350.5. Severability

The commission did not receive any comments on proposed §350.5, and the section is adopted as proposed.

§350.31. General Requirements for Remedy Standards.

Concerning §350.31, Henry, Lowerre, Johnson & Frederick is concerned that the proposed TRRP rule relies heavily on exposure prevention as a means of addressing contamination problems, as opposed to exposure prevention coupled with long-term protection of groundwater resources. The predicted consequence of the proposed rules would be that small businesses desiring to sell their property would implement Remedy Standard A, while large industrial facilities would pursue the more liberal Remedy Standard B. The net impact of this would be to essentially "write off" the groundwater beneath these facilities.

The commission acknowledges that the rule allows the person conducting the action to choose either Remedy Standard A or B. This is similar to the current Risk Reduction rule (30 TAC 335), in that persons may choose Risk Standard 1, 2 or 3. Risk Standard 3 of the current Risk Reduction rule allows the use of alternate concentration limits with the support of adequate institutional controls to apply an exposure prevention approach. The commission sees little difference in these options as it pertains to persons choosing not to remediate to drinking water levels and thus does not believe there will be any significant change with the new TRRP rule.

Concerning §350.31, Henry, Lowerre, Johnson & Frederick stated that not requiring deed recordation for concentrations of COC below health-based levels may deny future landowners knowledge of actual conditions. It may also prevent them from responding to potential changes in future risk-based concentration reductions. In addition, it may also not allow them to make informed decisions about their desire to acquire the property.

The agency's response to this general question is provided in the discussion under §350.31(a),(b).

§350.31(a),(b).

Concerning §350.31(a),(b), the PIC commented that it would prefer that ultimate remedies not allow for the existence or migration of contaminants above background levels onto leased or off-site properties without written landowner concurrence. The PIC stated that it lacks the technical expertise sufficient to allow it to endorse or oppose many of the risk-based exposure concepts in the rule as they would apply in addressing existing contamination on a responsible party's property. However, the PIC and Henry, Lowerre, Johnson & Frederick do have concerns about remedies which would allow contamination above background levels to remain or migrate onto another person's property without triggering notification or remediation obligations on the part of the responsible party. The PIC and Henry, Lowerre, Johnson & Frederick stated that today's protective standards are subject to change over time as the body of scientific data grows.

Today's science of determining acceptable exposure levels may be proven unsound at some later date in the future. The result could be that contaminants are allowed to spread at a level which is subsequently proven not to be protective of human health and the environment. Furthermore, because there is no requirement to provide notice of contaminant levels which are above background but below PCLs, no notice is given. As a result, there will be a lack of knowledge of the existence of the particular concentrations on affected property in the future when scientific developments may demonstrate that such concentrations are not protective of human health and the environment.

The commission does not concur with these characterizations of the protective nature of this risk-based response action rule. The commission initiated its development of a risk-based response action program when it promulgated the current Risk Reduction rule in 1993. Under the current Risk Reduction rule, chemicals present in environmental media above background levels are considered "contaminants" and Risk Reduction Standard 1 is based on the reduction of chemical levels to background or below. The TRRP rule being promulgated today completes the agency's move away from a background-based to a risk-based process for determining cleanup levels (i.e., protective concentration levels (PCLs)). The commission finds by adopting the TRRP rule that there are protective, risk-based concentrations of COCs which can remain within an environmental medium considering all relevant human health and environmental exposure pathways that are so low as to be below levels of regulatory concern. It is not defensible from a scientific perspective to refer to such an environmental medium as "contaminated". This TRRP rule has also removed the requirement to place an institutional control in the property deed record in those instances where a COC is present above background but below the residential-based PCL. Stake holders have frequently commented that institutional controls have a negative effect on the value and marketability of land. The agency as a result has limited their use to those circumstances where they are clearly warranted to provide adequate notice of appropriate future land use. Pursuant to §350.35 (relating to Substantial Change in Circumstances), in the unlikely event that a change in toxicity data for a COC is of such magnitude to present an unacceptable threat to human health or the environment which would be considered a substantial change in circumstance, the person would be required to take any necessary additional response actions to resolve the problem. Under TRRP, background normally only becomes an issue when this concentration is greater than the risk-based PCL, in which case the background value becomes the PCL.

Also, concerning §350.31(a),(b), Henry, Lowerre, Johnson & Frederick commented that the TNRCC apparently plans to rely upon voluntary compliance for the TRRP. The provisions of the TRRP are written in vague and conflicting language, making enforcement impractical, if not impossible. The "self implementing" provisions will not be subject to effective enforcement, since there is no adequate notice or reporting of the actions being taken. Henry, Lowerre, Johnson & Frederick also commented that TRRP is fundamentally flawed in that a polluter is not required to make any type of showing that cleaning up pollution it caused to background levels would be economically infeasible. This is a fundamental difference in philosophy between an environmental protection agency and an economic development agency. Henry, Lowerre, Johnson & Frederick further commented that TNRCC is not proposing to require a polluter to show in any way that cleaning up contamination to background levels would be economically or technically infeasible or so unduly burdensome as to prevent clean-up. Moreover, this commentator states that the commission should adopt provisions for cleanup of public rights-of-way and easements to ensure that they are protective for residential uses and for contact at deeper than 15 feet below ground level where contact occurs during utility construction. Moreover, Henry, Lowerre, Johnson & Frederick argued that the proposed TRRP allows a stabilization process to be permitted, but does not require an adequate demonstration of the permanence or irreversibility of the process.

Henry, Lowerre, Johnson & Frederick provided a number of comments on "Remedy Standard C." First, the commentator noted that Remedy Standard C has a significant financial impact on local governments to

the extent that a "no use" restriction will further reduce the taxable values of the property. The standard indicates that anyone who has released hazardous constituents at the site can essentially decide that these releases can be ignored and access to the site land be restricted. Henry, Lowerre, Johnson & Frederick suggested that this remedy should be limited to extreme cases, because of the significant potential it presents for the creation, rather than the elimination, of brownfields. Only allow if the property could be cleaned up in the future for productive use without undue expense and the use of the remedy will not have a detrimental affect on land values compared to land values if the site were cleaned up unless it is shown that the contamination would not be remedied within a reasonable time without use of the Remedy Standard C option. The commentor also stated that the definition of "No Active Land Use" associated with Remedy Standard C is not clear and needs further development. It is also not clear what controls are expected to be associated with this land use, and for what duration they would apply, and it is not readily apparent what type of Standard C remedy selections would not require both mandatory site restrictions and institutional controls. For unzoned areas, Henry, Lowerre, Johnson & Frederick commented that the TNRCC should make the decision for use of Class C remedy after input from surrounding property owners and the municipality where the site is located. Finally, Henry, Lowerre, Johnson & Frederick commented that for Standard C, engineering and institutional control measures are allowed. It appears that within this standard, there is no protection afforded to the trespasser receptor.

Henry, Lowerre, Johnson & Frederick comments that Standards A and B are unenforceable because they are written in vague and conflicting language. This commentor also concludes that TRRP is fundamentally flawed in that a polluter is not required to make any showing that cleaning up pollution it caused to background levels would be economically infeasible. Henry, Lowerre, Johnson & Frederick also expresses the view that this is a fundamental difference in philosophy between an environmental protection agency and an economic development agency. Moreover, this commentor states that the commission should adopt provisions for cleanup of public rights-of-way and easements to ensure that they are protective for residential uses and for contact at deeper than 15 feet below ground level where contact occurs during utility construction. The commentor continues with the concern that TRRP allows stabilization processes to be used but does not require an adequate demonstration of the permanence or irreversibility of the processes. And finally, Henry, Lowerre, Johnson & Frederick provides a number of comments regarding "Remedy Standard C" and allowing "polluters to basically fence and walk away from contaminated sites."

The commission does not agree with the comments provided by Henry, Lowerre, Johnson & Frederick. The remedy standards are purposefully written in performance-based language. All a person must do when they perform a response action is to achieve and maintain the performance required for either Remedy Standard A or B. The commission rejects the assertion that the remedy standards are written in vague language. The commission asserts that this performance-based approach will be much more productive and positive than attempting to define by rule exactly how every problem will be resolved. Next, for the reasons presented previously, the commission states that it is not a wise use of society's resources to require persons to clean up affected properties to background levels. The same response action provisions which apply throughout TRRP, either on-site or off-site, would also apply to public rights-of-way and easements. The written permission of the landowner would be required for an institutional control noting commercial/industrial land use or use of a physical control to prevent exposure. With regard to the depth of surface soil, the commission refers the reader to the discussion for §350.37(c) which more fully explains the agency's rationale for defining surface soils as the upper 15 feet of soil for residential properties. Also, the agency when defining "decontamination" at §350.31(b) did mention "stabilization" along with solidification and fixation processes and concluded that they will normally be considered physical control measures. The commission disagrees with the implication contained in the commentor's statement that all treatment methods should be permanent and irreversible. There is no TRRP rule requirement that treatment measures be permanent or irreversible. However, there is a requirement that a response

action using one or more of these physical controls must continue to meet the performance requirements of the applicable remedy standard over time. And finally, the commission notes that the statements regarding Remedy Standard C are no longer relevant. Remedy Standard C was discussed in a conceptual document published by the commission for consideration in 1996. Remedy Standard C and the discussion about "allowing polluters to basically fence off and walk away from sites" are not part of the TRRP rule being adopted today.

Concerning §350.31(a),(b), Gum Springs Water Supply Corporation commented that they are opposed to the use of the gasoline additive MTBE. We are concerned about the possible contamination to our groundwater supplies. The potential harm that gasoline additive such as MTBE, presents to our ground water supplies outweighs any potential benefit to our quality of air. I strongly urge you to place a ban on the marketing of MTBE in Texas. We need our air to be clean, but not at the expense of our drinking water supplies.

Gum Springs Water Supply Corporation urged the commission to place a ban on the marketing of methyl tertiary-butyl ether (MTBE) in Texas in light of their concern about the possible contamination of the state's groundwater supply. Any regulatory action regarding the marketing of MTBE in Texas would be clearly beyond the scope of the response action program described in the proposed TRRP rule published in the *Texas Register* on March 26, 1999. As such, this is not a decision that the commission can include when adopting the TRRP rule. However, the reader is referred to §350.74(f)(3) which specifically addresses MTBE.

§350.31(c)

Concerning §350.31(c), Chevron, Groundwater Services, Port of Houston Authority, AECT, Reliant Energy, TU, and Weston commented that the rule states that "...the person shall demonstrate the remaining concentrations of volatile COCs in the soil or groundwater will not result in vapor concentrations in excess of 25% of the LEL for the COC or COC mixture within the outdoor air, surface or below ground structures, or within the soil zone extending from ground surface to 15 feet in depth, or to the typical depth of the construction zone when it extends to depths greater than 15 feet." It is unclear how the vapor concentration will be determined. Air monitoring or calculation of the vapor concentration at most sites is impractical due to the fact that the COC vapor concentration will vary significantly over small distances. The commentors stated that a "demonstration" for every site that contains volatile organic compounds is unnecessary and will significantly increase cost. The commentors recommended that the TNRCC develop separate criteria for sites that require surface or subsurface air monitoring. The commentors also commented that the requirement to reduce soil vapor concentrations to less than 25% lower explosive limit (LEL) could be problematic and difficult to measure compliance. Also the commentors asked that by using the term "demonstrate", does TNRCC expect monitoring or calculations. Neither is practical. The COC mixture will vary significantly over small distances and the number of factors involved would make the calculation of 25% of the LEL difficult to agree upon. If monitoring were expected - this would require an unsaturated zone monitoring program to demonstrate compliance at every cleanup site that contains volatile organic compounds or could generate methane by biodegradation. Moreover, PST has measured for this limit on hundreds of sites and never found a record of "exploding" soils. The need for this standard is unclear and difficult to measure for compliance. This should only be a concern at a small subset of sites and to have to demonstrate this at every cleanup site is excessive. The commentors suggested deleting the requirement and have TNRCC staff provide criteria for what types of sites should perform subsurface zone vapor monitoring. Groundwater Services commented that the requirement to reduce vapor concentrations in soil to less than 25% lower explosive limit (LEL) is highly problematic both in terms of conducting soil vapor measurements and implementing corrective measures. Soil vapor levels are not a reliable predictor of vapor accumulation problems in subgrade structures and will result in unnecessary cleanup actions. Also, there is no historical record of exploding soils; so need for this standard is unclear. Groundwater Services recommended deleting the soil vapor standard and replacing it with requirement that vapor

concentrations be measured within subgrade structures subject to vapor accumulation in the proximity of the affected soil zone. Finally, the commentors suggest providing additional details regarding "below-ground structure." It should be clear that this would not apply to groundwater monitoring wells or structures installed for groundwater remediation purposes.

The commission amends the rule to focus evaluations primarily on structures in proximity of volatile NAPLs or other sufficiently high concentrations of COCs in environmental media where those structures may reasonably be subject to vapor accumulations; however, reasonable potential areas of future construction such as within utility corridors should also be considered. The PST program has worked with numerous occurrences of explosive situations stemming from releases. Generally the explosive situations result from vapors originating from NAPLs which have entered subsurface structures. However, contrary to the comments received, there is a specific example near an LPST site in McAllen, Texas of a flash fire from a boring installed for the footing for a traffic light. The boring had encountered NAPL and the vapors which had accumulated in the boring flashed when workmen began using a cutting torch over the boring to cut rebar for the concrete footing. A conforming change is also made to §350.78(d) since a specific criteria (25% of the lower explosive limit) is removed, the reference in §350.78(d) to §350.31(c) criteria is no longer appropriate.

With regard to the comment regarding monitoring wells and remedial systems, the intended focus of the rule is not such features, albeit the commission warns that proper precautions always be taken to protect human health and safety should those conditions exist. However, the commission does note that if explosive conditions do exist in monitoring wells or within remedial systems, then this suggests that the site is not adequately protective if the source of those conditions is within the typical subsurface construction zone for the proximal area. When explosive conditions are encountered or suspected in surface or subsurface structures, the commission expects the person to take immediate action to contact the proper authorities and take all actions reasonably necessary to protect human health and safety.

§350.31(d)

Concerning §350.31(d), Henry, Lowerre, Johnson & Frederick commented that the rule provides that notice of final sampling is to be made to the TNRCC, but not to landowners or adjacent landowners. This should be changed to provide complete notification to the potentially affected persons.

The commission is adopting subsection (d) as proposed. Henry, Lowerre, Johnson & Frederick commented that notification of the final sampling to demonstrate completion of a response action should be made not only to the agency but also to all potentially affected persons. The commission does not concur with this proposed modification of the notification procedures. The commission points out the notification requirements established in §350.55. The section requires that a notice of availability be provided to, at a minimum, the landowners, no later than at the time of submission of a plan and/or report for executive director review which contains this information. Other parties are notified to the extent they may encounter the released COCs. The commission takes the position that the rule provides for sufficient public participation. The commission is not amending this subsection and notification for qualifying parties and timing for that notification will be as specified in §350.55.

§350.31(e)

Concerning §350.31(e), Chevron commented that ".sufficient progress has been made." -- TNRCC needs to give specific, scientifically determined criteria for this standard. Henry, Lowerre, Johnson & Frederick is not clear how remediation projects with long-term treatment will be addressed. Construction completion reports and operation and maintenance phase reporting is normally required, and regular assessment of the effectiveness of the treatment system and progress towards remediation goals. Henry, Lowerre, Johnson &

Frederick also commented that this type of reporting does not seem to be required in these sections, and should be. And finally, Henry, Lowerre, Johnson & Frederick indicates that a table shows natural attenuation for periods up to 30 years but does not show any requirement for inspections, monitoring, maintenance, or financial assurance.

The commission is adopting subsection (e) today pertaining to remedy standard reports without modification. Chevron commented that the agency should provide specific, scientifically determined criteria in the rule for judging whether sufficient progress is being made toward the completion of a response action. Given the wide differences in the number and types of COCs, the hydrogeology, and the horizontal and vertical extent of soil and/or groundwater PCLE zones at various affected properties, the commission has decided not to formally adopt in this rule criteria for determining whether adequate progress toward completion of a response action has occurred. This will be a site-specific judgment. Henry, Lowerre, Johnson & Frederick also resubmitted several comments which were originally submitted in 1996 with regard to a conceptual document published by the commission. To start, the commentor states that he is not clear how remediation projects with long-term treatment will be addressed. The commentor also requests an explanation how implementation of long-term treatment of natural attenuation will be monitored or evaluated. The commentor also states that construction completion reports and operation and maintenance phase reporting is normally required but doesn't seem to be discussed. And finally, Henry, Lowerre, Johnson & Frederick indicates that a table shows natural attenuation for periods up to 30 years but does not show any requirement for inspections, monitoring, maintenance, or financial assurance. The commentor is incorrect in its assertions. The TRRP rule covers these topics in detail. For example, as detailed in this subsection, a person must submit a response action effectiveness report to the executive director every three years following submittal of the self-implementation notice for Remedy Standard A or the date of approval of the response action plan for Remedy Standard B by the executive director to document that sufficient progress is being made to achieve the remedy. Also, the reports under TRRP are discussed in detail in Subchapter E. These include the affected property assessment report in §350.91, the self-implementation notice in §350.92, the response action effectiveness report in §350.93, the response action plan in §350.94, the response action completion report in §350.95, and the post-response action care report in §350.96.

§350.31(f)

The commission did not receive any comments on proposed §350.31(f) and the section is adopted as proposed.

§350.31(g)

Concerning §350.31(g), Ranger commented that offsite deed recordation should never be a requirement on sites where contamination is not a permanent condition. Therefore, all aspects of deed recordation should be removed.

With regard to organic COCs, no concentration may be permanent. However, the rate of decay and attenuation could be so slow that it could be many generations before COCs may degrade to below residential PCLs. Given this possibility, it is in the best interest of the general public to ensure these matters are effectively recorded such that persons in the future can be made aware of the COC conditions at a property. The commission agrees that it may be unwarranted to impose a permanent record on what may be a very temporary situation and has amended §350.34 to provide for the issuance of conditional no further action letters such that a case could be for all intents and purposes considered closed except that an institutional control is required under the current COC conditions to achieve a final no further action. The person could be issued a conditional no further action letter,

then rely on natural processes to further reduce COC concentrations over time to below residential PCLs.

Concerning §350.31(g), Brown Carls & Mitchell commented that when the person chooses to implement Remedy Standard A for commercial/industrial property, and the residential and commercial/industrial PCLs are the same, there should be no requirements to file an institutional control. The chemical of concern in the dry cleaning industry is tetrachloroethylene. The groundwater PCL for tetrachloroethylene is the same for residential and commercial/industrial sites unless air is an exposure pathway. Thus, there is no difference in the level of protectiveness achieved, and there should be no requirement to file an institutional control for commercial/industrial sites that achieve Remedy Standard A.

The commission clarifies that if PCLs are the same for residential and commercial/industrial land use (e.g., the maximum contaminant level for groundwater) and the affected property is addressed to attain Remedy Standard A, then the person is not required to use an institutional control as the property meets residential standards under Remedy Standard A.

Concerning §350.31(g), Henry, Lowerre, Johnson & Frederick commented that there is no method to notify the new owners of the activities that have taken place at this residential site. Future landowners and tenants should be allowed to make informed decisions regarding remaining contamination even if it is below health-based levels.

The commentor is correct that under this rule attainment of Remedy Standard A for residential land use does not require an institutional control to be placed in the property deed records. As stated previously, the TRRP rule being promulgated today completes the agency's move away from a background-based to a risk-based process for determining cleanup levels (i.e., PCLs). The commission finds by adopting the TRRP rule that there are protective, risk-based concentrations which can remain within an environmental medium considering all relevant human health and environmental exposure pathways that are so low to be below levels of regulatory concern. Properties which have response actions that obtain Remedy Standard A for residential land use can be safely used for any purpose and there is no need to place an institutional control in the real property records. The purpose of an institutional control is singularly to inform persons that there is some limitation on the current and future use of the property. If there is no such limitation, then there is no need for an institutional control.

Concerning §350.31(g), Henry, Lowerre, Johnson & Frederick commented that one of the truly outrageous aspects of the TRRP is allowing a polluter to clean up to some "risk-based" level and then allowing the site to be used for residential use with no notice to subsequent landowners.

The commission disagrees with the commentor and notes that properties which have response actions that attain Remedy Standard A for residential land use can be safely used for any purpose and there is no need to place an institutional control in the real property records. The purpose of an institutional control is singularly to inform persons that there is some limitation on the current and future use of the property. If there is no such limitation, then there is no need for an institutional control. However, the commission has noted a potential point of contention within the proposed rule resulting from the application of §350.111(a) in conjunction with the definition of "affected property" that has made it unclear whether commercial/industrial properties affected at concentrations greater than residential PCLs, but less than commercial/industrial PCLs, need to have an institutional control. Clearly, §350.31(g) requires this. Therefore, the commission has amended §350.4(a)(1) to redefine "affected property" in terms of residential assessment levels.

Concerning §350.31(g), Henry, Lowerre, Johnson & Frederick commented that it seems unreasonable to allow industries to continue to affect already disproportionately impacted communities by allowing a

proliferation of deed restricted, contaminated properties in these neighborhoods. This seems to be a recipe for increasing the number of Brownfields in these communities.

The commission notes that Texas law does not allow industries to deed restrict the property of others. Deed restrictions or restrictive covenants, as they are referred to in the rule, and deed notices will generally only be accepted under this rule with the consent of the landowner. Further, the rule is designed to prevent the creation of new Brownfields and address existing Brownfields. The stated purpose of the rule is "The program also sets reasonable response objectives that will protect human health and the environment and preserve the active and productive use of land."

Also with regard to §350.31(g), Henry, Lowerre, Johnson & Frederick commented that the assumption that the current levels of safety for drinking water and exposures in soils will not be changed is not based on fact or experience. There is no basis to assume that our current knowledge of the risks of exposure to thousands of chemicals is perfect. Standards of exposure are constantly changed up and down as we learn more. What is considered safe today may not be safe tomorrow. The recent recommendation of the National Academy of Sciences to lower the numerical standard for drinking water is just one example. Henry, Lowerre, Johnson & Frederick suggested that deed recordation of contamination below residential standards is the best way to assure that future landowners will know if they are at risk because of chemicals left in place. The current rules require such deed recordation. The proposed TRRP would not. Furthermore, prospective landowners have the right to know if any contamination remains on the property that they're assessing. They may have different standards of concern than TNRCC. In a similar comment, Henry, Lowerre, Johnson & Frederick commented that removal of the deed recordation requirement simply shifts the responsibility for disclosing the contamination that is left by the responsible party (whether or not it is over the standards for what is safe) to landowner or real estate agents. Someone must disclose that there is contamination under a property. That burden should remain with the person responsible for the contamination, the person who has the most information on the contamination.

The commission disagrees that deed recordation of the presence of COCs below residential concentrations is appropriate and refers the commentor to the responses above dealing with this same issue. In regards to the use of institutional controls to note the fact that a long-term response action is being taken, the commission clarifies that if it is known at the time of submittal of the SIN, RAP, or RAER to take in excess of 15 years from the date of submittal of the SIN or the date of executive director approval of the RAP to achieve the requirements, then the person is required to file the notice within 90 days of such determination. If remedies can be completed within 15 years or a longer time-frame that is determined to be reasonable based upon site-specific circumstances then there is no need to place what some have described as a "permanent record" of the presence on COCs which may no longer be present. Further, the commission notes that the rule is an improvement over the current Risk Reduction rule (30 TAC, Chapter 335) in dealing with self implementing actions. The current rules do not contain any requirements for interim deed recordation or the ability to clearly respond to unreasonable time frames for self implementation under Remedy Standard 1 or 2. The TRRP rule does provide a reasonable mechanism to respond in situations where persons are not pursuing completion under Remedy Standard A in a reasonable time frame based upon site-specific circumstances.

Lowerre comments that the commission should require deed recordation when COCs are above background to alert future landowners about those COCs and to give them adequate warning if risk based concentrations of the COCs are lowered in the future. The commission disagrees, although acknowledging some risk inherent in the rule. The commission believes that a risk based rule does not eliminate all risk, but rather unacceptable risk. This belief is inherent in the setting of risk levels such as 10^{-4} , 10^{-5} , or the 10^{-6} that Lowerre supports. There is some residual risk in all the cleanup numbers. Similarly, the decision to not require deed recordation when, with current knowledge, all uses of the property are appropriate, is a decision about acceptable risk. The commission finds the

risk to be minimal and overridden by competing interests of not stigmatizing property, possibly resulting in Brownfields which have their own risk. Further, the commission questions any sort of burden in providing notice. Generally it is the completion of a standard disclosure form attesting to any knowledge of contamination. Via this rule, the person would know the source of the contamination and could direct the prospective buyer to the commission for further information, which is exactly what an institutional control should accomplish. Further, given that if the level of COCs were to be removed either naturally or with action to below detection limits, then the person could determine that COCs are not present, not having to disclose possibly, and then there is not a permanent record of a bygone problem. The commission fully believes that the appropriate position has been taken.

Finally concerning §350.31(g), Fina commented that the institutional controls requirement for both Remedy Standard A and Remedy Standard B present a framework for Class 1 and Class 2 off-site groundwater of deed recordation or cleanup to MCLs. This framework is unworkable, having severe negative consequences. Under this framework, a landowner can demand exorbitant monetary amounts for the deed recordation. These proposed rules thrust the TNRCC into the middle of land disputes. The TNRCC should remove the deed recordation requirements. An alternative approach is to expand the definition of institutional control. Zoning should be included in the definition. There is no technical or legal reason why zoning cannot be the basis for Institutional Control.

The commission clarifies that the rule does not require the use of institutional controls as the commentor stated. The person may restore the groundwater to concentrations which are safe for human ingestion and avoid any institutional control. Also, the commission is clearly not in the land use regulation business but recognizes that landowners are in the land use business, and therefore, the landowner must be involved in decisions related to the current and future use of their property. The rule provides the appropriate mechanism to make sure that landowners are involved in these decisions which affect the current and future use of their property and thus the potential for exposure to COCs. Additionally, the commission notes that the definition of institutional controls has been expanded to include equivalent zoning and governmental ordinances. The reader is referred to the responses to comments for §350.4(a)(44) and §350.111.

The rule has been amended to conform to the expanded definition of institutional controls

§350.31(h)

Concerning §350.31(h), Environmental Fuel Systems and ICE commented that the PST industry appreciates TNRCC allowing up to 15 years for such remedial methods as monitored natural attenuation, without a deed notice requirement in that term. This may be a good tool. This alleviates some concerns the PST industry had related to the '98 draft rules. Henry, Lowerre, Johnson & Frederick commented that the proposed extension of the grace period to 15 years - for no deed recording during an extended response action - is also much too long. Every responsible person will claim the response can be done in 15 years to avoid deed recordation. There is no incentive to estimate accurately and no penalty if the response period is double or triple that 15 years. AFCEE requested that the commission clarify in the preamble to the final rule that the executive director will give consideration to allowing more than 15-years without institutional controls where site conditions and the nature of the constituent in question would warrant such an extended period of time.

Concerning §350.31(h), Chevron and Campbell, George & Strong commented that the timing of institutional control requirements throughout the TRRP should be modified to require such controls to be filed prior to completion of the response action only if the property is to be conveyed or a "substantial change in circumstances" arises. (30 TAC, §§350.31(h), 350.33(f)(2) - (4), and 350.51(1)(3) - (4)). The proposed TRRP contains several provisions that could require institutional controls to be executed before

completion of the response action and, thus, prematurely burden the corrective action process with additional legal requirements. While the commentors support the agency's proposed site-specific approaches provided by these sections of the proposed TRRP, the institutional control requirements for these sections should be adjusted to more efficiently accomplish the agency's goals without undue disruption of the corrective action process. Neither long-term effectiveness of the response action nor takings concerns justify institutional controls prior to the completion of a response action, unless the affected property in question is to be conveyed or a change in land use is anticipated. The risks associated with changed land use and other "substantial change(s) of circumstances" are adequately addressed by the notification and institutional control requirements in proposed §350.35. As for the risks associated with the conveyance of affected property, the commentors argue existing real estate disclosure laws and due diligence requirements are likely to be just as effective as deed notices to ensure the long-term effectiveness of a response action. Any doubts that the agency has regarding the effectiveness of existing law could be adequately addressed by a requirement that an institutional control be filed prior to the conveyance of the affected property without unduly burdening the corrective action process with an earlier requirement. AFCEE had similar comments to Campbell, George & Strong and Chevron. AFCEE stated that potentially aggravating the problems associated with the institutional control provisions is the fact that some of the proposed sections of the TRRP require the filing of an institutional control long before the response action is completed. Specifically, proposed §350.31(h) provides that the executive director may require the filing of an institutional control prior to completion of the response action if it is predicted that a response action will not be completed within 15 years. Proposed §350.33(f)(2) - (4) require the filing of an institutional control "within 120 days of approval of the RAP" for sites relying upon "waste control units," "technical impracticability," or "plume management zones." Proposed §350.51(l)(3) - (4) require the filing of an institutional control if the size of exposure assumptions are changed but do not specify when the control must be filed. AFCEE suggested modifying the institutional control requirements in proposed §§350.31(h), 350.33(f)(2) - (4), and 350.51(l)(3) - (4) so that institutional controls are not mandated prior to completion of a response action unless the affected property is conveyed or as otherwise required by §350.35 due to a "substantial change in circumstances."

The commission disagrees with the commentor that institutional controls should not be required prior to the completion of a response action. In §350.31(h), persons are required to place a deed notice in the real property records to alert future landowners to the fact that long-term response actions are being conducted. It is necessary to alert future landowners to these conditions, because it may not be apparent that COCs are present at unsafe levels and may remain so until the response action is completed, which may be an extended period. The commission does note that the rule provides criteria in §350.31(h)(2) which release persons from the requirements of §350.31(h). Chevron also suggested removing the requirement that proof of filing of the institutional control be submitted within 120 days of approval of the RAP. Campbell, George & Strong as well as Chevron and AFCEE all commented in a similar vein that the requirement should be revised which specifies that an institutional control be filed within 120 days of the approval of a RAP whenever a modified groundwater response approach is approved for a waste control unit, technical impracticability demonstration, or plume management zone. Their general suggestion was that instead the agency should require the institutional control to be submitted within 90 days of the response action completion report. This recommendation is similar to the suggestion that the agency has responded to in §350.33(g) - (n) and that was submitted by the TCC and the Texas Oil and Gas Association. The commission does not agree with these requests to postpone filing the institutional control. The commission finds that it is especially important that a response action which involves one or more of the modified groundwater response approaches have a reliable mechanism to prevent human exposure to contaminated groundwater. In order to use the degree of flexibility provided in this subsection for groundwater "exposure prevention" response action, the person must establish the institutional control directly after approval of the RAP so that there can be a high level of assurance that people are not contacting contaminated groundwater. If at the end of the response action an institutional control would be needed, then there is no reason to defer the application of the

institutional control. The commission has given some latitude with regard to institutional controls required in response to §350.51(l)(3) and (4), and §350.74(b)(1) by not specifying when those controls must be filed as those controls are more for administrative purposes and are highly subject to change based on business practices. Additionally, the requirements of this subsection are specifically included to place some timeliness into the response action.

Concerning §350.31(h), Chevron commented that this subsection is unclear as to whether it applies to on-site or off-site property. Moreover, the requirement for filing an institutional control should only apply if the property is to be sold, or if the land use changes. Clarify the applicability regarding on-site or off-site response actions. In addition, see the discussion in Attachment 4 of Chevron's comments regarding the institutional control issues raised by the rule.

The commission clarifies that the rule refers to "affected property" in §350.31(h) and does not make a distinction between on-site or off-site properties. Therefore, the requirements in §350.31(h) apply to all of the affected property, whether it is on-site or off-site. The commission disagrees that this deed notice (as required in §350.31(h)) should only occur if the property is sold or the land use changes. This requirement to place an institutional control in the real property records is limited to the circumstances where response actions are going to take a long time to complete and it is appropriate to note such facts in the real property records and not rely upon the speculation that the person will take such actions potentially several decades later.

Concerning §350.31(h), EPA Region 6 commented that the inclusion of the word "may" in reference to providing proof of the filing of an institutional control seems to lessen the stringency of the requirement. Wording in the draft sent via the TNRCC's August 21, 1998, memo is preferred.

The commission clarifies that the provision is appropriately worded and that the actions under §350.31(h) are not always mandatory as the person may be able to make demonstrations under §350.31(h)(2) that the filing of the institutional control is not required.

Concerning §350.31(h), Brown Carls & Mitchell commented that this section should be clarified to state that the institutional control that may be required by the TNRCC is a deed notice, not a deed restriction, for implication of long term remedies such as natural attenuation.

The rule already does this. Section 350.31(h) refers to §350.111(b)(1) which states that "for on-site and off-site properties where an institutional control is required pursuant to §350.31(h) of this title (relating to General Requirements for Remedy Standards), the person shall file a deed notice . . ."

The rule has been amended to conform to the expanded definition of institutional controls.

§350.31(i)

Concerning §350.31(i), Weston suggested adding "with regards to the current environmental conditions of the property" to the end of the paragraph to limit this requirement. Without such a limitation, Weston asserted this would suggest that the owner should be aware of future events that might limit the use of the property (i.e. condemnation for road construction).

The commission agrees with the commentor that owners are only required to inform others of the information of which they are aware and is changing the rule to reflect this qualification on information which must be communicated.

§350.31(j)

Concerning §350.31(j), Chevron, TCC, and TXOGA commented that the preamble expresses an intent for cleanup to TRRP standards to be deemed adequate or to replace cleanup under several programs. This subsection suggests that TRRP standards are cumulative with other programs, and that "additional" actions expressed in other rules must also be met. The commentors stated that the rule language should express the intent of the agency to consider cleanup under the TRRP to be adequate under other covered State programs. They recommended removing subsection (j), or modifying the language to read as follows: "While the regulations of this chapter provide the sole basis for determining how a release covered by the various program areas should be addressed, the person still must meet any more stringent or additional administrative or procedural requirements found in the particular rules for the covered program areas or applicable federal requirements."

The commission is adopting subsection (j) as proposed because it accurately describes the relationship between TRRP and other state and federal rules. The commission cannot agree to the requested modification. The commission has, to the extent possible, made TRRP the single risk-based program to guide response actions at affected properties subject to its jurisdiction. However, the commission cannot establish or redefine the person's responsibilities under other state or federal regulations through TRRP. TRRP must be viewed as setting the "floor" or minimum level of regulatory requirements for response actions. In particular, the commission cannot exempt a person from federal hazardous waste investigation or remediation responsibilities. In summary, if there are any additional or more stringent administrative, procedural, or substantive response action requirements found in the particular rules for the covered program areas or applicable federal regulations, then the person must comply with those requirements.

§350.32. Remedy Standard A.

§350.32(a)

Concerning §350.32(a), EPA Region 6 stated that it had several concerns with the implementation of Remedy Standard A. First, the current version of the TRRP expands the standard to include consideration of industrial/commercial land use for clean closures. Secondly, there is no requirement for financial assurance under this remedy standard even when there is a potential for waste to remain in place. Remedy Standard A is intended to be self-implementing, and as written, would not be consistent with RCRA public participation requirements. EPA Region 6 considers TNRCC's use of monitored natural attenuation as an example remedy for self implementation as problematic.

EPA Region 6 expressed several concerns with the implementation of Remedy Standard A, but the commission does not believe that these concerns represent a problem. EPA Region 6 is incorrect about TRRP expanding the land uses for clean closure to include commercial/industrial. Since 1993 when the agency adopted the current Risk Reduction rule, closures have been based upon Risk Reduction Standard 1 at background levels; Risk Reduction Standard 2 (standard risk-based) for either residential or non-residential (commercial/industrial) land uses; or Risk Reduction Standard 3 (site-specific risk-based) for either residential or commercial/industrial land uses. Thus, restoring affected properties to levels suitable for commercial/industrial future uses is nothing new for the citizens of Texas. By EPA's own definition, most recently clarified in memorandum dated March 16, 1998, clean closure means no further regulatory control under RCRA Subtitle C is necessary to protect human health and the environment. In practical terms, this means no permits or post closure care provisions are needed. Clean closure for commercial/industrial assumptions is acceptable when there is good assurance that the land use will remain commercial/industrial. The commission has provisions for deed notice in both the current Risk Reduction rule and the TRRP rule to satisfy this condition and as such these regulations are fully useable for RCRA clean closure purposes. Under both Remedy Standards A and B of TRRP, affected properties restored to levels suitable for commercial/industrial land use do require an institutional control to be placed in the property deed

records. Also, financial assurance under this rule covers post-response action care, that is, it provides funds adequate to maintain or monitor any physical controls after the response action has been completed. Since response actions under Remedy Standard A are limited to removal and/or decontamination measures this means physical controls are not allowed and, thus, there is no need for financial assurance. Also, if waste were to remain in place then the affected property would not have attained Remedy Standard A and financial assurance would be required under Remedy Standard B. Also, since 1993 response actions conducted under Remedy Standard 1 and 2 of the current Risk Reduction rule have been self-implemented. The commission knows through the experience of reviewing plans documenting the early and successful completion of many response actions from 1993 to the present that self-implementation of pollution cleanup remedies represents good public policy and results in increased protection for human health and the environment. Under TRRP, the person is required to comply with any additional or more stringent requirements expressed in any other applicable regulations. For example, this agency is not exempting a facility from complying with the RCRA public participation requirements if those requirements are applicable to the facility. However, neither is this agency applying the RCRA public participation requirements to those affected properties in Texas to which they are not applicable. TRRP must be viewed as setting the minimum risk-based response action requirements for Texas. Persons, however, must evaluate whether there are additional or more stringent requirements which would require further actions. And finally, the commission disagrees with EPA Region 6's statement that the use of monitored natural attenuation at affected properties undergoing a self-implemented response action is a problem. Under Remedy Standard A, monitored natural attenuation must qualify as a decontamination action, as opposed to a physical control, and must meet the overall response objectives for the remedy standard. The commission rejects EPA Region 6's implication that the agency has inadequate control over persons conducting a self-implemented remedy. To begin, the person must submit a self-implementation notice (SIN) to the executive director and the appropriate regional office at least ten days before conducting a response action. The person must also submit a response action effectiveness report (RAER) to the executive director every three years following submission of the SIN to document that adequate progress is being made. After either the SIN or RAER, the executive director may request a more frequent monitoring period, may require a demonstration of the appropriateness of the remedy, or may require the person to perform an alternative response action.

Unnecessary regulatory oversight and red tape should be avoided in the corrective action process as little is gained but inefficiency. In fact, these EPA Region 6 comments are counter to recent discussions with Region 6 representatives about dropping the historical "process over results" philosophy, the same philosophy discussed in a negative light on page 1-1 of the December 1998, Draft Risk Management Strategy released by EPA Region 6.

For the purpose of consistency with other portions of the rule and ease of understanding, the commission is replacing the word "soil" with "surface soil and subsurface soil" at three places within §350.32. First, at §350.32(a)(3), the revised text reads "remove and/or decontaminate the surface soil, subsurface soil, and groundwater PCLE zones." This is consistent with the list of PCLE zones in the performance standard for Remedy Standard B expressed at §350.33(a)(1). This is also consistent with the distinction between surface soils and subsurface soils described in the definitions of §350.4(a). And finally, §350.75 defines different PCLs as pertaining to surface soils and subsurface soils. As a result, in all likelihood the critical PCLs for surface and subsurface soils at an affected property will be different. Second and for the same reasons, §350.32(b)(2) is revised to read "The person shall remediate the affected property such that the concentration of COCs in surface soil, subsurface soil, groundwater, and other environmental media do not exceed the applicable critical PCLs." It is reasonable to distinguish between surface soil and subsurface soil because the critical PCLs will be different. Third, and for all the previous reasons, the commission is changing the definition of soil PCLE zone to state "A protective concentration level exceedence zone within the

surface soil or subsurface soil . . ." These revisions are being made for the purpose of clarity and do not change the commission's original intention.

Concerning §350.32(a), Henry, Lowerre, Johnson & Frederick commented that the objective, "prevent COC at concentrations above the PCLs from migrating beyond the existing boundary of the groundwater PCLE zone," seems to imply no migration is allowed. However, other locations in the proposed rule clearly allow migration to an alternate point of compliance. Henry, Lowerre, Johnson & Frederick believes these statements need to be reconciled. Also, Henry, Lowerre, Johnson & Frederick requested that the commission discuss when TNRCC envisions hydraulic containment to prevent migration is required. Henry, Lowerre, Johnson, & Frederick also made the following comments: please describe when plume containment versus plume migration will be required and, given the drought conditions, all potentially usable Class 2 groundwater should be restored.

Henry, Lowerre, Johnson, & Frederick inquires about and requests a reconciliation for, what they see as an inconsistency between the statement that persons must "prevent COCs at concentrations above the critical groundwater PCLs from migrating beyond the existing boundary of the groundwater PCLE zone" and other locations in the rule which clearly allow groundwater migration to an alternate point of compliance. The TRRP rule contains two remedy standards, Remedy Standard A and Remedy Standard B. The quotation in the first sentence is found in §350.32(f) and applies to Remedy Standard A. Remedy Standard A requires "pollution cleanup", "walk away" remedies and, as a result, does not allow the groundwater PCLE zone to expand. Remedy Standard B starts out with the objective of restoring the groundwater throughout the groundwater PCLE zone to the critical PCLs as explained at §350.33(f)(1). However, Remedy Standard B at §350.33(f)(4) also extends the option, if an affected property qualifies, to establish a plume management zone for Class 2 or 3 groundwater where the point of exposure to groundwater is changed from throughout the groundwater PCLE zone to the hydraulically downgradient limit of the plume management zone. The maximum extent of the plume management zone for Class 2 and 3 groundwater is described in §350.37(l) and (m), respectively. Thus, there are different performance objectives for responding to groundwater PCLE zones under the two remedy standards. More details about responding to groundwater PCLE zones under Remedy Standard B are provided in the response to comments for §350.33(f). In regard to when hydraulic containment would be required to prevent groundwater PCLE zone migration, the remedy standards in TRRP are performance-based. The rule says what needs to be accomplished in terms of managing PCLE zones or protecting or restoring natural resources. The rule does not, however, specify exactly how those requirements must be met. Therefore, TRRP does not specify when hydraulic containment must be used. Henry, Lowerre, Johnson, & Frederick also made the following comments: please describe when plume containment versus plume migration will be required and, given the drought conditions, all potentially usable Class 2 groundwater should be restored. With regard to the first question the rule itself would set the performance objectives for a groundwater response action. For example, under §350.33(f)(1) the objective for all groundwater classes is to restore the water-bearing zone to the applicable critical PCL. The primary action here would not be either containment or migration, but rather removal with surface treatment, for example. For a technical impracticability demonstration, outside of a plume management zone, the person has to prevent expansion of the groundwater PCLE zone and could use a physical control. And finally, with regard to the second question, please refer to the section for §350.33(a),(b) in which Class 1 and Class 2 groundwater as well as pollution cleanup versus exposure prevention response actions were discussed in detail.

§350.32(b)

Concerning §350.32(b)(3), Henry, Lowerre, Johnson & Frederick commented regarding the use of natural attenuation, EPA recognizes the process as effective for non-chlorinated hydrocarbons such as fuels. However, its effectiveness for other contaminants is not as well demonstrated. Henry, Lowerre, Johnson &

Frederick suggests TNRCC consider specifying what conditions are appropriate for monitored natural attenuation. Use of this approach should be closely monitored to assure degradation is occurring.

The commission has taken a different approach from the one suggested. Instead of trying to specify the many details for the numerous groundwater response methods, the commission is today defining the performance that whatever methodology is used must attain. Thus, the commission disagrees with the commentor because it is more appropriately the agency's role to define the required performance and then to let the person submit a plan that he or she believes will achieve the response objectives. The agency is prepared to reject soil and/or groundwater response plans when it is clear from the beginning that they either will not work or will work so slowly that the response time cannot be considered "reasonable." With regard to Henry, Lowerre, Johnson & Frederick's last suggestion, the TRRP rule requires sufficient monitoring to determine the extent of the groundwater PCLE zone over time. The rule is to be applied by individual program areas. The most appropriate place to establish remedial time frames is on a site-specific basis by the individual program area. Appropriate natural attenuation remedies are not "do nothing" remedies. In fact, in many instances natural attenuation may be just as effective a remedial strategy as a more active remedy. The commission does have controls in place such as the 15 year institutional control provision contained in §350.31(h) designed to compel timeliness to the remedial process, as well as progress reporting (i.e., response action effectiveness reports) as a means to ensure sufficient remedial progress is being achieved. If persons can demonstrate monitored natural attenuation achieves remedial objectives within reasonable time frames, then monitored natural attenuation is an acceptable alternative.

Concerning §350.32(b)(3), Henry, Lowerre, Johnson & Frederick submitted many comments. Henry, Lowerre, Johnson & Frederick suggested that the rules move Texas toward relying on ground water and soils to use their natural ability to assimilate contamination and convert toxic chemicals into safe chemicals. That is a dangerous step. It assumes that the system under stress to cleanse itself is not exposed to another type or round of contamination which can overload the system. Natural attenuation is not proven for many chemicals and can take 50 to 100 years to work, if, in fact, it works at all. If natural attenuation is allowed it must only be use when it is proven to work, not when it can work in theory. Henry, Lowerre, Johnson & Frederick also commented that the proposed program endangers future groundwater supplies in a multitude of ways - from the definition of a currently or potentially usable source to the reliance on "natural attenuation" of contaminants in soil. Moreover, the program fails to provide for any remedy if it turns out the predictions of the risk assessment and modeling were wrong, and contaminants do migrate off-site above safe levels. They also commented that the proposed TRRP provides the responsible party with many ways to delay cleanup. For example, the rules do not provide clear standards for what is an acceptable deadline for completion of a cleanup using "natural attenuations." The rules will allow for natural attenuation for a reasonable time, possibly even 100 years. The limit of a "reasonable" time for attenuation needs to be defined in terms of years, or at least limited." The rules also allow a responsible party that has negotiated with TNRCC for years over a cleanup, but with no schedule or plan approved, to shift to the new TRRP and begin the process over. Again, delays in remediation will occur and the TRRP will allow the unnecessary waste of TNRCC staff time and effort. Henry, Lowerre, Johnson & Frederick requested clarification that monitoring and reporting will be required when long-term treatment remedies are utilized to achieve Standard A. The agency should discuss appropriate monitoring and maintenance requirements for monitored natural attenuation and other long-term treatment remedies Brown Carls & Mitchell commented that given enough time, virtually all COCs will attenuate under natural conditions, and natural attenuation is an accepted remedial alternative under 350.32(b)(3) if Remedy A standards are achieved in a "reasonable time frame." Brown Carls & Mitchell and Weston asked whether the executive director will: (1) specify a reasonable time frame, (2) provide guidance for determining a reasonable time frame, or (3) allow the person to determine if an estimated time frame is reasonable and present his justification for it. Brown Carls & Mitchell also recommended amending §350.32(b) to make it clear that natural attenuation is permissible under remedy Standard A. Because natural attenuation is discussed in the context of Remedy Standard B, but not in the context of Remedy

Standard A, one could be led to conclude that a person cannot use natural attenuation to achieve Remedy Standard A. The Preamble states that natural attenuation may be used Remedy Standard A, but the rule itself is silent. Brown Carls & Mitchell recommends that the rule be amended to expressly state that a person can use natural attenuation to achieve Remedy Standard A.

Contrary to the implication provided by the number of comments, the commission is not recommending monitored natural attenuation over any other type of removal and/or decontamination response action to achieve the performance objectives for Remedy Standard A. Monitored natural attenuation was mentioned to make it clear that this type of response action may be used to attain Remedy Standard A provided it qualifies as a decontamination process as defined at §350.31(b). All response actions, including monitored natural attenuation, must be capable of achieving the Remedy Standard A performance objectives within a reasonable timeframe. The agency does not plan to specify in an across-the-board fashion what is a reasonable time period for the completion of response actions at all affected properties in Texas. Instead, this will be a case-by-case determination using the factors expressed in the rule as "the particular circumstances at an affected property; and must be appropriate considering the hydrogeologic characteristics of the affected property, COC characteristics, and the potential for unprotective exposure conditions to continue to result during the remedial period". Evaluation by the commission of the reasonableness of use of monitored natural attenuation will be based upon data in the SIN and the RAERs, which are submitted every three years to document whether sufficient progress is being made to achieve the remedy. As with all types of response actions, the executive director may require more frequent reporting. The executive director may also require a demonstration of the appropriateness of the remedy. If the executive director determines either that insufficient progress is being made toward attainment of the remedy standard or that the response action is inappropriate, then the executive director shall require the person to perform an alternative response action. Also, the provision expressed at §350.31(h) allows the executive director to require an institutional control to be recorded if a response action is either predicted to take or does take in excess of 15 years to be completed. This process is designed to encourage early completion of response actions. Also see the commission's responses to the monitored attenuation portion of the comments concerning §350.4(a)(20) and §350.33(a)(3)(B).

The initial statement by Henry, Lowerre, Johnson & Frederick that reliance on the natural ability of groundwater and soils to assimilate and convert toxic chemicals is a "dangerous step" is not true. In appropriate circumstances at numerous sites, natural attenuation in soil and groundwater has proven to be an effective remedy. Natural attenuation is not a "do nothing" remedy. In many instances, monitored natural attenuation may be just as effective of a remedial strategy, if not more, than an active remedy. Regarding the next statement, it is true that natural attenuation has not been as effective with certain types of chemical compounds as others. The types of COCs at an affected property will be an important component of the agency's evaluation whether monitored natural attenuation is an appropriate response action to achieve the remedy standard within a reasonable time period. The commission rejects the assertion that use of monitored natural attenuation will result in the endangerment of future groundwater supplies. Persons are required by §350.32(a)(3) to remove and/or decontaminate the soil PCLE zone to protect the underlying groundwater and persons are required by §350.32(f) to prevent the expansion of the groundwater PCLE zone. The next statement asserting a lack of protection if risk assessments and modeling are wrong and COCs above PCLs come to be located on off-site properties is also incorrect. Section 350.35 describes the additional activities that a person must take if a substantial change in circumstances occurs at an affected property. Also, the commission disagrees that it should by rule discuss the appropriate monitoring and maintenance requirements for monitored natural attenuation and long-term treatment remedies. The variation between affected properties is so great that those activities which would be excessive for one site would not be adequate for another. Monitoring and maintenance activities will be proposed by the person and approved by the agency on a site-specific basis.

Finally, the commission stresses that the TRRP response action process is not designed to penalize persons responsible for responding to affected properties. Rather, it is to provide protection of human health and the environment. If a person can demonstrate that monitored natural attenuation will achieve response objectives within a reasonable timeframe, then monitored natural attenuation is an acceptable remedy. Additional discussion regarding the uses and limitations of monitored natural attenuation is provided in the section of this preamble regarding Remedy Standard B.

§350.32(c)

Concerning §350.32(c), Brown Carls & Mitchell commented that this subsection states that, under Remedy Standard A, PCLs are to be determined using exposure pathways where the receptor comes into contact directly within, above, or below a source medium. Brown Carls & Mitchell asked if any exceptions to this requirement will be allowed where the installation of new groundwater supply wells is highly unlikely due to the availability of public water supplies or is prohibited by local or state ordinances. Brown Carls & Mitchell and KOCH commented that this subsection states that lateral transport consideration that place a POE outside the source area are used only to ensure that residents are protected when an on-site or off-site receptor is assumed to be commercial/industrial worker. The commentors stated that the text is confusing and additional clarification should be provided. It is not immediately obvious that this statement applies when commercial/industrial land use is assumed for the source area, but at least one land use outside the source area is residential. Some additional explanation of this statement in the Proposed Rules, the Preamble, and the flowchart in Figure 8 is needed.

Brown Carls & Mitchell questioned whether the commission would make any exceptions to the requirement that PCLs for Remedy Standard A be determined using exposure pathways where the receptor comes into contact with the COCs directly within, above, or below a source medium. In particular, they inquire whether an exception would be allowed when "the installation of new groundwater supply wells is highly unlikely due to the availability of public water supplies or is prohibited by local or State ordinances". No, the commission is making no exception to the manner in which PCLs are determined under Remedy Standard A. Remedy Standard A is based on the requirement that all environmental media be protective for direct receptor exposure and that such media also be protective based on cross-media transfer of COCs to other environmental media. Also, while an institutional control is required under Remedy Standard A to note commercial/industrial land use, institutional controls are not allowed under this standard to record the need to prevent exposure to or use of an environmental medium, such as groundwater.

Both Brown Carls & Mitchell and KOCH stated that the remainder of this subsection which explains when lateral transport considerations can be used to determine PCLs is confusing and requires further explanation. The commission agrees with this conclusion and has modified the second sentence to more clearly state when lateral transport considerations may be required. With one exception, lateral transport considerations which move the point of exposure away from the source area shall not be used to determine PCLs under Remedy Standard A. The exception is when the PCLs have been determined based upon on-site commercial/industrial workers and it is determined to be necessary to check using lateral transport considerations whether such PCLs need to be lowered in order to be protective of off-site residents.

§350.32(d)

Concerning §350.32(d) and the self-implementing aspect of the proposed rule and its lack of a requirement for pre-approval of Remedy Standard A remediations, Henry, Lowerre, Johnson & Frederick asked how will on-site treatment and compliance, with the accompanying need for RCRA or air permits, be ensured.

The reader is referred to responses to comments for §350.31(g) in regards to institutional controls and residential Remedy Standard A response actions. The commission clarifies that properties with RCRA permits have to meet the requirements of their permits and/or any more stringent state or federal regulations, which may limit or even preclude the ability to conduct self-implemented response actions on these properties. Any properties which require air permits must still obtain those permits, as the rule does not alter these requirements. Section 350.92(a)(6) requires the person to include in a self-implementation notice (SIN) an "acknowledgment that any permits needed to implement the remedy will be obtained prior to implementation." The SIN also requires the person to submit a list of COCs which require a response action and a description of the response action chosen to achieve Remedy Standard A. A response action effectiveness report will be submitted every three years describing the progress of the response action. This information will help the commission staff make an independent judgment, if need be, whether the response action at an affected property requires a permit or other authorization.

Concerning §350.32(d), Henry, Lowerre, Johnson & Frederick commented that the discussion of self-implementation might consider addressing specific regulatory requirements which could prevent such actions, such as RCRA permit modifications and public participation. Also, Henry Lowerre, Johnson & Frederick stated that it is opposed to self-implementation. The commentor further stated in ignorance of how polluters might manipulate testing, exposure assessments and modeling in their own interest, the agency proposes that it have only a discretionary duty to review site assessments and remedy, and that the only mandatory review is at the end of the day when the "cleanup" has been implemented.

Subsection (d) of §350.32 pertains to a person's option to self-implement a Remedy Standard A response action. Henry, Lowerre, Johnson, & Frederick submitted numerous comments which expressed objections to or problems with this concept. First, Henry, Lowerre, Johnson & Frederick suggested that the commission consider addressing specific regulatory requirements which would prevent such a self-implementing process, for example, RCRA permit modification and public participation. As previously stated in this preamble, TRRP must be viewed as setting the minimum risk-based response action requirements in Texas. However, persons must evaluate whether there are more stringent or additional administrative, procedural, or substantive response action regulatory provisions which would require additional actions. In particular, §350.31(j) states that "The person shall also perform any more stringent or additional response actions which are required by statute or regulations governing the program areas covered by this chapter as specified in §350.2 of this title (relating to Applicability)". The commission is not exempting persons from fulfilling their responsibilities under other regulatory programs, including RCRA permit modifications and associated public participation requirements. The commission is, through this rule, requiring persons to meet their responsibilities under other regulatory programs. However, it is not feasible for the commission to attempt to summarize all other applicable federal, state, county, and municipal regulations within TRRP.

Second, Henry, Lowerre, Johnson & Frederick concluded based on the following rationale that the commission has placed an over-reliance on self-implementation: "In brazen ignorance of how polluters might manipulate testing, exposure assessment and modeling in their own interest, the agency proposes that it have only a discretionary duty to review site assessments and the remedy, and that the only mandatory review is at the end of the day when the "cleanup" has been implemented." This statement does not reflect a firm understanding of the self-implementation process being adopted and the commission does not agree with any of its assertions. The implication a reader receives from the statement is that self-implementation is a new and significantly different administrative procedure. This is not correct. Self-implementation was initially adopted by the agency in 1993 as part of the current Risk Reduction rule (30 TAC, Chapter 335) and applies to Remedy Standards 1 and 2. The commission's action regarding self-implementation is more appropriately characterized as a continuation of present policy with the addition of several additional precautionary measures to

further assure that appropriate actions are occurring at affected properties for which a self-implementation notice (SIN) has been submitted. Contrary to the negative connotation in the statement, and as previously stated, the commission knows through the experience of reviewing plans documenting the early and successful completion of many response actions from 1993 to the present that self-implementation of pollution cleanup remedies is good public policy and results in increased protection for human health and the environment. The information required to be included in a SIN is described in §350.92 and is more comprehensive regarding the affected property and planned response action than the notice received under the current Risk Reduction rule. Additionally, as described at §350.31(e), the person must submit a response action effectiveness report (RAER) to the executive director every 3 years following submission of the SIN in order to document whether sufficient progress is being made to achieve the performance objectives for the remedy standard. The executive director may require a more frequent reporting period. The executive director may also require a demonstration of the appropriateness of the remedy. If the executive director determines that either insufficient progress is being made or that the self-implemented response action is inappropriate, then the agency may require the person to evaluate and perform an alternative response action. So the agency is not "closing its eyes" to how persons may present data to their own advantage, is not adopting a discretionary duty to review site assessments, and is not proposing to wait until the response action is complete before reviewing project information.

§350.32(e)

Concerning §350.32(e), Brown Carls & Mitchell commented that under Remedy Standard A, critical PCLs must be achieved throughout the PCLE zone(s). It seems confusing and unnecessary to state that demonstration of technical impracticability is not an option under Remedy Standard A.

The commission does not agree. Even though the implication is provided by other rule text, the commission desires to make it very clear to all persons that a technical impracticability demonstration cannot be used to meet the Remedy Standard A performance objectives. A person initially intending to meet Remedy Standard A can make a technical impracticability demonstration if they find it technically impracticable to achieve Remedy Standard A requirements, but the remedy is completed under Remedy Standard B at that point.

§350.32(f)

Concerning §350.32(f), KOCH commented that the concentration of COCs in groundwater samples often exhibits natural variability. This variability should be explicitly considered when evaluating compliance with a groundwater PCL Exceedance (PCLE) zone. A response action should not be triggered if there is a temporary expansion of the existing boundary of the groundwater PCLE zone.

The commission's response to this comment depends upon the commentor's meaning for the phrase "natural variability" of the concentration of COCs in groundwater. If by natural variability the commentor means that the COCs are "naturally occurring" and that the concentrations in groundwater have not been increased by leachate from the affected property, then the COCs would be considered "background levels" and would not be part of a groundwater PCLE zone. If on the other hand, the commentor means by "natural variability" that variations in hydrogeologic properties result in differences in transport of COCs by location and that the COCs in groundwater were derived from activities at the affected property, then compliance with the requirements of subsection (f) would be required. The commission has no objection to a person resampling a monitor well to determine whether previous groundwater sampling results were accurate. The requirement remains, however, under Remedy Standard A that persons prevent COCs above critical PCLs from migrating beyond the existing boundary of the groundwater PCLE zone. If there is natural

variability in the hydrogeologic setting and groundwater transport, then these factors should be taken into account in meeting this performance objective.

§350.32(g)

Concerning §350.32(g), Brown & Caldwell commented that this subsection allows the executive director to require the person to monitor environmental media to verify the models used to determine PCLs established under Tiers 2 or 3. This section should be clarified to eliminate this requirement if Tier 2 models that follow TNRCC guidance are used.

Brown & Caldwell suggested that the commission modify subsection (g) to remove the option that the executive director could require a person to monitor environmental media to verify models used to determine PCLs when those PCLs were determined using Tier 2 models following agency guidance. The commission understands but does not concur with this comment. However, the commission is amending this subsection to verify that PCLs based on models are protective. The agency has selected fate and transport models for use under Tier 2 which are reliable given the current state of knowledge. The agency is comfortable with PCLs calculated using Tier 1 methods due to the conservative nature of the estimated parameter values. Under Tier 2, however, the person proposes site-specific parameter values for use in the fate-and-transport equations which can have a large effect on the PCL calculations. The site-specific nature of these parameter values in a Tier 2 analysis requires that the commission retain the flexibility to require the person to perform monitoring to verify the PCL calculations against conditions at the affected property to ensure that decisions based in part on models are appropriate.

§350.33. Remedy Standard B.

§350.33(a)

The commission received many comments concerning proposed §350.33(a)(3)(B). ARCADIS Geraghty & Miller noted that §350.33(a)(3)(B) states, “When determined appropriate by the executive director and approved by the Natural Resource Trustees, the person may use the results of a Tier 2 or 3 ecological risk assessment ... to conduct an ecological services analysis of the affected property.” Later in paragraph (B), ARCADIS Geraghty & Miller noted the proposed rule states, “If the person decides to pursue use of compensatory restoration, the person must conduct the compensatory restoration and other activities associated with the ecological services analysis with the approval of and in cooperation with the Natural Resource Trustees.” ARCADIS Geraghty & Miller commented that these statements appear contradictory. The former seems to indicate that the decision on whether to conduct an Ecological Services Analysis rests with the TNRCC and the Trustees, while the latter indicates that the decision rests with the person. In addition, ARDADIS Geraghty & Miller asserted that these statements seem to contradict §350.77(a), which states, “the person shall have the option of conducting an ecological services analysis.” ARCADIS Geraghty & Miller agreed with the latter statement, that the decision to enter into this program should rest with the person, just as the decision to pursue compensatory restoration. While the ESA appears to be an innovative means to resolve ecological issues, ARCADIS Geraghty & Miller stated that soliciting the involvement of the Natural Resource Trustees at such an early stage in the process may be a disincentive to many persons who might otherwise participate. Also, soliciting the involvement of the Trustees will necessarily reduce the pace of the ESA. ARCADIS Geraghty & Miller suggested that these decisions should be based upon the data and regulatory program particular to the affected property, and upon an agreement between the person and the TNRCC, and should not involve the Trustees. A separate Federal program exists to address any concerns that the Trustees might have at a later date.

Campbell, George & Strong asked what is the statutory basis for granting authority to the Natural Resource Trustees (the "Trustees") to approve or reject requests to conduct an ecological services analysis

(30 TAC, §350.33(a)(3)(B) and §350.77(f)(2)). The requirement to initially request and obtain approval from the Trustees to conduct an ecological services analysis, after it is determined appropriate by the executive director, is on shaky legal ground and should be removed. Campbell, George & Strong viewed the rule as providing the Trustees with two approvals - (1) approval of the person's request to pursue a remedy using the ESA approach and (2) approval of the person's use of restoration. Their comment dealt with the first approval. Campbell, George & Strong wondered what federal or state statutory basis the agency is relying upon in order to delegate approval authority to other federal and state agencies (i.e., the Trustees). Campbell, George & Strong commented that none that it knew of would allow the delegation of outright approval authority, and asked if the agency knows of specific Water Code and/or Health & Safety Code provisions that allow this to occur. If not, Campbell, George & Strong requested that the agency eliminate the requirement for a person to obtain the Trustee's approval to conduct an Ecological Services Analysis, stating that the executive director still has the ability to approve or reject a person's request to use this option. Campbell, George & Strong emphasized that the approval it was referring to is not to be confused with the Trustees' approval authority for conducting a restoration project. Giving initial approval authority appears to be based on a combination of the following reasons: (1) concern that the executive director and his/her staff will not make decisions that are in the best interests of the environment (despite the fact that the agency is also one of the Trustees), (2) uncertainty as to the future development of an interagency memorandum of agreement (MOA) that will describe the roles and responsibilities of each Trustee and the agency, and/or (3) the agency is not equipped to review and approve Ecological Services Analyses. As to the first and second reasons, Campbell, George & Strong stated that it strongly believes that dealing with these types of concerns in the rule is inappropriate and should be worked out by the agencies outside this rule. As to the last reason, Campbell, George & Strong recognized the agency's concerns but pointed out that the Trustees would still be involved in the process but they should simply not have rule-directed approval authority regarding a request to use this remedial option.

NOAA, TGLO, TPWD, and USFWS commented due to the inherent overlap between "compensatory restoration" as described in the rule and the Trustees' existing authorities, Trustee control of the "point of entry" to the ESA process is necessary for a workable rule. The commentors supported the provision in §350.33(a)(3)(B) that gives the Natural Resource Trustees the approval authority, in conjunction with the executive director, of a person's proposal to conduct an Ecological Services Analysis of an affected property that exceeds ecological PCLs is absolutely necessary to make the ESA concept work. Only when ESA is applied appropriately can the concept of rapid compensation for minor continuing ecological injuries work. However, the commentors registered concern that, as drafted, the rule language leaves questions. In §350.33(a)(3)(B), they requested that compensatory restoration should be made a requirement of the Ecological Services Analysis by striking the phrase "where appropriate" in the third (3rd) sentence of paragraph 350.33(a)(3)(B), striking "If the person decides to pursue use of compensatory restoration," leaving the remainder of the sentence, "the person must conduct the compensatory restoration and other activities associated with the ecological services analysis with the approval of and in cooperation with the Natural Resource Trustees." Without this change, the commentors argued this language may be misinterpreted to imply that if the person does not pursue compensatory restoration as a result of the ecological services analysis, then the person does not have to seek approval of the Natural Resource Trustees. In some cases, the conclusion of the ESA may be that no compensatory restoration is warranted; however, approval authority should still be sought from the trustees.

In addition, Campbell, George & Strong commented that the Trustees' involvement in the completion of a restoration project under the Ecological Services Analyses remedy is a de facto settlement of natural resource damages (NRDs) for future ecological injuries and should be acknowledged in the rule and/or preamble (30 TAC §350.33(a)(3)(B) and §350.77(f)(2)). As to the requirement to seek approval from and cooperate with the Trustees for conducting restoration, Campbell, George & Strong chose not to debate the Trustees' reasons for having that authority, rather, they pointed out that the Trustees' reasons for having approval authority should be clearly identified in the rule and/or preamble. The Trustees have asserted that injury is a subset of risk, and since habitat restoration is to be used to offset ecological risks, a person could

argue that the Trustees are precluded from seeking recovery for natural resource injuries due to the statutory prohibition against double recovery. The Trustees, therefore, conclude that any restoration that is conducted as an offset to ecological risks without their approval and involvement infringes on their statutory authority. Accordingly, the agency (as well as the Trustees) should recognize that the Trustees' involvement at sites where restoration is provided as part of the ecological services analysis is, in effect, a settlement of the person's NRD liability for future ecological injuries at that site. Of course, this would not include any potential NRD liability the person might have for historical lost uses and/or lost human uses.

Concerning §350.33(a)(3)(B) and §350.77, NOAA, TPWD, and USFWS commented that the rule is unclear regarding the use of monitored natural attenuation and the use of institutional controls as a remedial strategy as it relates to ecological PCLs. Monitored natural attenuation and institutional controls can be protective to human health; however, these types of remedies do not apply to the protection of ecological receptors that could freely move in and out of a contaminated area. The commentors recommended that the rule should state that if COCs are left in place above ecological PCLs, then an Ecological Services Analysis or its equivalent must be conducted.

NOAA, TPWD, and USFWS commented that an Ecological Services Analysis or its equivalent must include: 1) an evaluation of the effects of reasonable and feasible remediation alternatives with respect to present and predicted losses of ecological service, and 2) clear justification of leaving COC's in place above ecologically derived PCL's. If the Trustees are not party to the development of an ESA or its equivalent, the Person assumes the risk that a future NRDA action may be pursued against the party and that the costs of additional remedial action may be included in the calculation of natural resource damages. The potential liability associated with leaving contamination in place above ecologically derived PCL's without the involvement of the Trustees should be clearly presented to the regulated community via language in the rule or its Preamble.

TGLO, TPWD, and USFWS commented that the regulated community should be made aware that Trustee costs associated with review of Ecological Services Analyses and compensatory restoration proposals are considered reasonable costs of assessment related to the evaluation of potential for injuries to biological resources and are clearly reimbursable under CERCLA. The regulated community should also be aware that conducting an Ecological Services Analysis and/or compensatory restoration in cooperation with the Trustees will not release the Person from natural resource damages liabilities for past lost use of ecological services or public use services (as defined in TAC Title 30, Chapter 20 pursuant to the Oil Spill Prevention and Response Act). Statements which clarify these issues should be included within the Preamble. TGLO stated that it should be noted that this rule may impose a greater workload upon the trustee agencies and therefore require more staff time for review. Although we agree that this is a more efficient way of seeking restoration of injured natural resources, the state agencies must be able to handle the workload so that the process can be streamlined and not "bogged down" by understaffing. The TGLO would need to increase its staff by two qualified full-time employees (FTEs), which would be approximately \$100,000 in salaries and benefits. Please note this as part of the financial impact analysis for this rule. TGLO requested that the commission clarify within the preamble that any compensation contemplated by this rule and this process to biological resources is associated only with primary lost services restoration and future lost services as compared to a baseline. TGLO, TPWD, and USFWS also commented that it should be stated in either the preamble or the rule that performance of an Ecological Services Analysis and the use of compensatory restoration will not release the Person from NRDA liability associated with past lost use of natural resources or their services.

EPA Region 6 commented that the ESA is not clearly defined in the proposed rule, nor has any prescriptive guidance been provided by TNRCC as to its application. Unless the TNRCC provides for specific evaluation criteria to be used in this evaluation, the ESA should be removed from the proposed rule.

The commission agrees with the ARCADIS Geraghty & Miller comment that the rule appears contradictory regarding the ecological services analysis (ESA). The rule has been changed here and at §350.77 to clarify that although conducting an ESA is an option, with exception as noted (i.e., concentrations of COCs exceed ecological PCLs and are proposed to be left in place with the potential for continuing exposure), it is an option for which the affected property must be qualified by the executive director after consultation with the Natural Resource Trustees in order for that ESA to be considered as a basis for remedial decisions regarding ecological risks. The commission disagrees with the comment regarding Trustee involvement. As discussed in the preamble to the proposed rule, the Trustees have jurisdictional authority in developing and evaluating ESA projects and their involvement and approval is essential. It is only the presumed Trustee involvement which gives the commission a comfort level in including the ESA option in the rule. The Trustees are developing a Memorandum of Understanding (MOU) that will describe in detail how the process of coordination within the ESA process will work, including time frames that will keep the process on track for a timely resolution. This MOU will be subject to public comment before it is finalized.

Regarding the Campbell, George & Strong; NOAA; TGLO; TPWD; and USFWS comments pertaining to the requirement for the person to obtain Trustee approval when requesting an ESA, the commission agrees in part with the commentors and responds as follows: The rule was initially worded to address the concern that the person not expend time and money on a project which will not be approved because it did not qualify for an ESA. In this regard, it made sense to have those who are ultimately responsible for approving the ESA (i.e., the Trustees) also be those who decide whether the circumstances at an affected property merit an ESA. However, the commission is the authority for remediations in the state and is not delegating this authority to any other agency. Therefore, the rule has been changed to no longer require Trustee approval of the request to pursue an ESA. However, the commission also recognizes that a decision to pursue a remedial alternative which could potentially threaten resources which the Trustees are authorized to protect should be based on input from the Trustees. Therefore, the rule has also been changed to reflect that the executive director must consult with the Natural Resource Trustees before approving the request to pursue an ESA. The rule retains the language that all ESA-related activities must be conducted with the approval of and in cooperation with the Natural Resource Trustees.

The commission disagrees with the Campbell, George & Strong comment pertaining to the Trustees involvement in the ESA being considered a de facto settlement of natural resource damages (NRD) for future ecological injuries. The rule and preamble outline a process which facilitates the involvement of the Trustees in the ESA process. Through Trustee involvement, it is the intent of the commission to provide finality to the level of restoration required to compensate for future ecological injuries associated with a given risk management decision. However, the commission disagrees that restoration performed under an ESA constitutes a de facto settlement of NRD liability. The commission recognizes that the Trustees' reasonable costs of assessment are a statutory component of NRD liability. As such, the resolution of NRD liability for continuing ecological injury, de facto or otherwise, would require reimbursement of the Trustees' costs of participation in the ESA process.

The commission also agrees with the NOAA, TGLO, TPWD, and DOI comments regarding the ESA process and compensatory ecological restoration for the reasons stated and has amended the rule to clarify that compensatory ecological restoration and all other ESA activities must be conducted with the cooperation and approval of the Trustees. The commission also agrees with the NOAA, TPWD, and USFWS comments regarding the need for clarification pertaining to the use of monitored natural attenuation with respect to ecological receptors. The commission does not intend for monitored natural attenuation to be used in scenarios where there could be on-going unprotective exposures to ecological (or human) receptors. A possible exception to this for ecological concerns occurs when an ESA is conducted according to §350.33(a)(3)(B). In this case, monitored natural attenuation could potentially be used as part of the remedial alternative (e.g., when combined with compensatory

ecological restoration) at the affected property to address the ecological considerations. In a few instances, the ESA may indicate that monitored natural attenuation is the only appropriate remedial alternative. Regarding the Trustees' comments on recoverable costs and liability, the commission acknowledges that the Trustees have cost recovery authority, and that participation in the ESA does not necessarily address all natural resource damage liability issues.

The commission disagrees with the EPA Region 6 comments regarding the ESA. The purposes of the rule are to introduce the concept of an ecological services analysis and to facilitate the involvement of the Trustees, not to provide specific evaluation criteria for the ESA process. However, language addressing minimum requirements for the ESA has been added to the rule.

Additional details of this process may be outlined in the forthcoming ERA guidance document and/or the planned MOU.

With the exception of a revision to the wording of subsection (b) which is necessary to clarify its meaning and to make it consistent with the remainder of the section, and the changes discussed above, the commission is adopting subsections (a) and (b) without revision.

Concerning §350.33(a),(b), AFCEE commented that the proposed provisions limit response actions for class 1 groundwater to technologies, which remove and/or decontaminate. This restriction against the use of physical controls for class 1 response actions is unduly restrictive and expensive. Furthermore the definition of physical control includes hydraulic containment wells and interceptor trenches both of which also remove COCs. The application of these two provisions excludes the use of pump and treat for class 1 groundwater. To the extent that this proposal does not distinguish between containment versus removal/decontamination as the object of such physical controls, the AF request the rule make clear that pump and treat, and other physical control technologies that also remove and decontaminate (interceptor trenches) are allowable response actions for class 1 groundwater.

The commission repeats that the response actions for class 1 groundwater are limited to removal and/or decontamination because the objective is to reduce the COC concentrations within the class 1 groundwater PCLE zone to the critical groundwater PCLs. Physical controls are not allowed to address class 1 groundwater because the objective is to reduce the COC concentrations so that the PCLE zone is gone rather than just contain it over time. The commission maintains that the primary use of hydraulic containment wells and interceptor trenches is, at most sites, to passively prevent the continued migration of a groundwater PCLE zone. The primary use is generally not to actively withdraw groundwater, such as with a pump-and-treat system, with the purpose of restoring the water-bearing zone to the critical groundwater PCLs. In general, therefore, hydraulic containment wells and interceptor trenches are appropriately classified as physical control measures. Granted, groundwater is removed from the PCLE zone using both of these technologies. The listing of hydraulic containment wells and interceptor trenches as examples of physical controls does not mean that these methods could not be considered on a site-specific basis to be removal measures. Such a designation would require that the person document to the satisfaction of the executive director that the performance objectives for class 1 groundwater can be attained within a reasonable time frame. Under these circumstances, no modification to the physical control definition is necessary or warranted.

Concerning §350.33(a),(b), Brown Carls & Mitchell commented that under Remedy Standard B, for class 1 groundwater PCLE zones, a person must use removal and/or decontamination to critical groundwater PCLs without controls. This makes Remedy Standard B for class 1 groundwater identical to Remedy Standard A. This overlap is confusing and should be clarified. Also, it would be helpful to clearly state that demonstration of technical impracticability is only available for class 1 groundwater under Remedy

Standard B. Because class 1 groundwater will evidently be treated differently by the commission, we would suggest that all references to class 1 groundwater be consolidated into one section.

Brown Carls & Mitchell stated that the rule is confusing because the requirements for class 1 groundwater are the same under Remedy Standard A as for Remedy Standard B. The commission disagrees since it is an entire affected property rather than an environmental medium which qualifies for a remedy standard. Yes, class 1 groundwater must be restored to the critical PCLs under both Remedy Standards A and B. However, the surface and subsurface soil PCLE zones must be removed and/or decontaminated under Remedy Standard A and can be removed, decontaminated, and/or controlled under Remedy Standard B. In addition, this commentor suggested that all references to class 1 groundwater be consolidated in a single location. The commission disagrees. The exception to the use of control measures for class 1 groundwater placed in §350.33(b) and the statement of the general groundwater response objectives in §350.33(f)(1) is a logical organization and does not require revision.

Concerning §350.33(a),(b), Exxon supported the recognition of the range of potential remedial options including natural attenuation and the use of engineering and institutional controls.

Concerning §350.33(a),(b), Chevron, Phillips, and AFCEE supported the recognition by TNRCC of the usefulness of monitored natural attenuation as a remedy. Henry, Lowerre, Johnson & Frederick commented that the rules move Texas toward relying on ground water and soils to use their natural ability to assimilate contamination and convert toxic chemicals into safe chemicals. That is a dangerous step. It assumes that the system under stress to cleanse itself is not exposed to another type or round of contamination which can overload the system. Natural attenuation is not proven for many chemicals and can take 50 to 100 years to work, if, in fact, it works at all. If natural attenuation is allowed it must only be use when it is proven to work, not when it can work in theory. Phillips stated that the TNRCC should clarify that a monitored natural attenuation approach could allow NAPL to remain in place, even though the monitoring period could be quite long. AFCEE commented that it was concerned that agency staff might misinterpret the following preamble language: "The 15 year time period is considered an adequate time frame, based on the agency's experience with the PST program, to complete a remedial action that relies on monitored natural attenuation." Contaminants typically encountered in the PST program, petroleum hydrocarbons, do not degrade using the same mechanisms as other contaminants typically encountered in the Industrial and Hazardous Waste program, chlorinated hydrocarbons. AFCEE stated that while 15-years may be a reasonable time frame for petroleum hydrocarbons, chlorinated hydrocarbons undergoing reductive dechlorination may take much longer. This is an important scientific distinction that should be acknowledged in the preamble. Additionally, AFCEE asserted that the EPA does not prescribe what is to be considered a reasonable time frame for conducting MNA response actions. The EPA policy on MNA (OSWER Directive 9200.4-17 "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites") recognizes that "decisions regarding the "reasonableness" of remediation time frame for any given remedy alternative should then be evaluated on a site-specific bases." The AF requests language be added to the preamble to clarify that 15-years will not be mandated as the measure of determining reasonable timeframes for MNA application. TransSystems commented that the proposed TRRP should allow Tier 2 cleanup levels with natural attenuation. If natural attenuation effects are technically demonstrated as site characterization phenomena and as an appropriate site remedy, then periodic groundwater monitoring of these characteristics should be part of the institutional controls and/or long term care under Standard B for either Tier 3 or 3 cleanups. Of critical importance to consider when implementing natural attenuation as a site remedial technology option, is the level of uncertainty for long duration groundwater cleanups is largely offset by the long term care requirements under the Standard B provisions. Finally, Chevron commented that the language, "anticipated time frame to achieve the critical groundwater PCLs is reasonable," leaves the determination of this performance standard undefined.

The commission also received a number of comments regarding monitored natural attenuation which is discussed as a possible remedial alternative at §350.33(b)(2). Exxon supported the rule's recognition of the range of potential options including natural attenuation and the use of engineering and institutional controls. Chevron noted their support of the agency's recognition of monitored natural attenuation as a remedy. The comments by Exxon and Chevron are statements of support for the use of monitored natural attenuation and require no response. The comment provided by Henry, Lowerre, Johnson & Frederick has previously been responded to in the section of this preamble regarding §350.32(b)(3) which pertains to the use of monitored natural attenuation under Remedy Standard A. The responses provided for Remedy Standard A are also relevant to use of monitored natural attenuation under Remedy Standard B. Monitored natural attenuation used under Remedy Standard A must qualify as a decontamination process while monitored natural attenuation used under Remedy Standard B can be either a decontamination or control measure. The comment by Phillips requested the agency to conclude that monitored natural attenuation would allow NAPLs to remain in place, perhaps for a quite long monitoring period. The commission does not concur with the commentator's request. Outside of a plume management zone, NAPLs can be addressed by §350.33(f)(3) to the extent that it is technically impracticable to remove the NAPLs. Within a plume management zone, NAPLs are addressed by §350.33(f)(4)(E). With regard to Phillip's statement that the monitoring period for a natural attenuation remedy could be "quite long", the agency notes that all response actions, including natural attenuation, must be capable of achieving the Remedy Standard B response objectives within a "reasonable time frame". The agency does not plan to specify in an across-the-board fashion what is a reasonable time period for completion of response actions at all affected properties in Texas. This will be a case-by-case determination as previously discussed in §350.32(b)(3) regarding use of natural attenuation under Remedy Standard A. AFCEE was concerned that the 15 year time period found in §350.31(h) would be interpreted as determining what is a reasonable time frame for a monitored natural attenuation remedy. The determination of a reasonable time frame to attain response objectives for a remedy standard is to be based on a site-specific evaluation of an affected property and not a default 15 year period. Persons can view the 15 year period as a period to make a determination that monitored natural attenuation will be an effective, timely remedy, not that it must be completed within the 15 year window. With regard to TranSystem's comment, PCLs to be used with monitored natural attenuation can be determined using Tier 1, 2, or 3. The periodic groundwater monitoring schedule will be proposed by the person as a part of the response action plan. After the response action plan is approved by the agency, the included schedule and the details of the monitoring plan will be implemented by the person during the response action. And finally, this preamble previously discusses what the commission means by a reasonable time to complete a response action.

Concerning §350.33(a),(b), AFCEE commented that it understands that the agency's motivation for going to a more standardized approach ("one-size-fits-all") is in part due to staffing concerns. Allowing more innovative solutions and flexibility requires an increased resource commitment on the agency's part. However, for facilities that directly participate in the funding of agency oversight flexibility should not be limited. The Department of Defense through a memorandum of agreement with the states participates in the funding for state regulatory oversight. The rule should not limit options due to agency resource constraints if the regulated facility contributes to the funding of their oversight.

AFCEE commented that they understood that the agency's motivation for going to a more standardized approach (i.e., "one-size-fits-all") is in part due to staffing concerns. They further stated that for facilities that directly participate in the funding of the agency, oversight flexibility should not be limited. First, the commission does not concur that it is adopting a "one-size-fits-all" rule. The rule does provide soil and groundwater performance objectives for attaining the remedy standards and for adequately protecting human health and the environment; however, it does not specify the particular removal, decontamination, and/or control approaches that a person will use to achieve these performance objectives. Also, we do not concur that we have specified "standardized

approaches" that limit "innovative solutions" and flexibility. Moreover, oversight is not limited. The list of reports defined for use under Remedy Standard B (i.e., affected property assessment report, response action effectiveness report, response action plan, response action completion report, and post-response action care reports) and the manner in which these reports are to be used, as described in §350.31 and §350.33, merely describe the minimum and typical reporting to be performed to maintain conformance with Remedy Standard B. If some other regulation requires additional or more stringent reporting, for example RCRA, the agency will, of course, perform whatever additional review is necessary. Finally, the agency points out that at the current level of funding, although appreciated, the staff positions funded by the Department of Defense are essentially at maximum workload already. Additionally, the commission is constrained by staffing caps set by the legislature and other administrative issues that revolve around governmental entities that limit the number of staff, even if funds are available.

Concerning §350.33(a),(b), Henry, Lowerre, Johnson & Frederick commented that the current environmental programs of EPA and Texas emphasize pollution abatement, because of the uncertainties involved in evaluating risks of exposure to public health and the environment. Moreover, pollution abatement steps, such as groundwater extraction and treatment, are often effective and economically practical. The proposed TRRP appears to be based on the unjustified and unexplained assumption that such activities are always not practical or economically feasible. As a result, the proposed TRRP would shift the programs to an emphasis on reducing exposures. Thus, some contaminants will be left in place, even if the added costs of removal of those contaminants with others are negligible. TNRCC has provided no justification for such changes, except the potential for the regulated industries and TNRCC to save money. Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP conflicts with historic policies for active remediation. In their place, the TRRP encourages the use of engineered controls, even untried and untested controls. The failure rate of such controls in the past has been significant. Despite the certainty of some failures, the proposed TRRP does not provide the financial assurance mechanism, monitoring, reporting and other back-up systems to evaluate and respond to such failures. Finally, engineered controls do not eliminate the contamination. The use of engineered controls needs to be limited to cases where there is proof that remediation is not economically feasible or reasonable. Finally Henry, Lowerre, Johnson & Frederick commented that Remedy Standard B may be interpreted to create an inadvertent incentive for industrial facilities to leave waste in place and not initiate groundwater cleanups.

The commission does not agree with any of the statements provided by Henry, Lowerre, Johnson & Frederick. One of the commission's primary objectives in developing TRRP was to establish a uniform set of performance-based soil and groundwater response objective to guide response actions at affected properties regulated via the agency's Office of Permitting and other applicable program areas. These fundamental objectives are policy determinations and are being adopted by the commission in TRRP to apply in a uniform fashion rather than to have these high-level decisions be subject to unwarranted variability from site to site. The exact manner in which these performance objectives will be attained at individual affected properties will be determined on a site-specific basis. Through a four year process which involved two conceptual documents and significant interaction with stakeholders, the commission has used its best professional, scientific, and societal judgment in developing and promulgating this rule. The primary performance standard for Remedy Standard B is stated in §350.33(a)(1), and with later qualifying text, requires a person to "remove, decontaminate and/or control the surface soil, subsurface soil, and groundwater human health PCLE zones". One of the primary activities in issuing this rule has been to determine those circumstances when a pollution cleanup (i.e., remove and/or decontaminate) response must be used and when an exposure prevention (i.e., remove, decontaminate, and/or control) remedy may be used. The commission does not agree with the assertion that a pollution cleanup response action should be used for all soil and groundwater PCLE zones regardless of the circumstances.

The commission concludes that this rule strikes an appropriate balance between requiring pollution cleanup response actions and allowing physical controls, institutional controls and financial assurance to prevent the exposure of humans and ecological receptors to unprotective levels of COCs. For example, TRRP under Remedy Standard B will allow a cap to be used provided it will reliably contain the COCs within a soil PCLE zone over time. Also, provided an affected property qualifies, TRRP will allow COCs to remain within a plume management zone within class 2 or 3 groundwater. The commission concludes that TRRP will provide greater levels of protection for human and ecological receptors because it is more cost-effective and the built-in flexibility will result in persons more rapidly pursuing completion of response actions. In addition, financial assurance for post-response action care will provide greater protection by increasing the assurance that post-closure monitoring will be completed. Contrary to Henry, Lowerre, Johnson & Frederick's statement, TRRP does specify the process a person will use for providing financial assurance and for monitoring and reporting during the performance of a response action and during the post-response action care period. With regard to the assertion that TRRP may create an incentive for industrial facilities not to initiate groundwater cleanups, the commission notes that it initially considered requiring cleanup of all affected groundwater to the PCLs, but moved from that position because it would have been more stringent than the existing regulation at that time. Also, it would not recognize technical and financial limitations. It would not recognize that all groundwater impacts do not represent the same threat to human health and the environment, and therefore, do not warrant the same level of restoration. Finally, it does not recognize the effectiveness of exposure prevention response objectives. The commission determined that allowing the use of exposure prevention response actions in certain situations is consistent with previous regulations and practices and protective of human health and the environment. Also, it should foster the implementation of more response actions since such responses are more feasible to implement. Therefore, the commission has decided not to require a pollution cleanup approach for all groundwater PCLE zones and to allow an exposure prevention approach for qualifying groundwater PCLE zones. Under Remedy Standard B, persons can take a removal, decontamination, and/or control approach for soil PCLE zones provided the response objectives will be attained and then maintained over time.

Also with regard to §350.33(a),(b), Chevron, TCC, and TXOGA commented that although it is clear that the agency is trying to protect against further degradation of groundwater after the RAP is submitted, if the concentration of COCs does not increase at the attenuation monitoring points, then it can be assumed that even though COCs may be leaching from the soil, there is no net increase in risk within the plume management zone, or more specifically at the alternate POE. Therefore this subsection is unnecessary provided that the requirements of §350.33(a)(1) are met. The commentors suggested that the agency should also consider the use of critical attenuation monitoring points, which would be those points along the plume that are considered true early warning points for potential exceedances at the POE. Exceedance at any attenuation monitoring point is far too conservative considering that larger facilities may be monitoring tens of acres within a single management area, or facility operating area. Mobil commented that to attain Remedy Standard B, the person conducting the remediation must ensure that the concentration of COCs in class 2 groundwater must not increase due to leachate from soils or subsurface soils from that concentration identified at the time of the RAP submission. Mobil stated this requirement seems to negate the option of using Facility Operations Areas. Also, to limit the use of natural attenuation and biodegradation. At properties that may span many acres, and that may have monitoring wells down-gradient from the source area and between any potential point of exposure, this proposal seems to negate the concept of risk-based corrective action. Chevron and Mobil recommended removing this requirement. As an alternative, Chevron recommended replacing it with critical attenuation monitoring points.

The TCC in conjunction with the Texas Oil and Gas Association, Chevron, and Mobil all submitted similarly worded comments regarding §350.33(a)(2). This provision requires a person to ensure that any leachate from the surface and subsurface soil PCLE zones, in the circumstance when a plume management zone and alternate POE have been established, does not increase the concentration of

COCs in class 2 groundwater above the measured concentration at the time the response action plan was submitted. This provision means that the person must manage any soil PCLE zones such that the COC concentrations do not increase over time throughout an underlying class 2 plume management zone. The commentors stated that this provision should be removed. Their rationale is that if the concentration of COCs do not increase at attenuation monitoring points or at the POE at the downgradient extent of the plume management zone then there is no increased risk even if COCs are leaching from the soils. The commission does not agree with the commentors' assessment.

This paragraph discusses the commission's logic for adopting this requirement for soils overlying class 2 groundwater. This analysis also provides further insight into the "pollution cleanup" versus "exposure prevention" balance that the commission is establishing in this rule. The commission considered three soil source area response objectives which could be adopted in the situation where under Remedy Standard B such soil source areas overlie presently contaminated class 2 or 3 groundwater-bearing units which qualify as plume management zones. First, the soil source area could always be removed, decontaminated, and/or controlled, regardless of the current condition of the underlying groundwater, such that it does not serve as a continuing source of COC migration above the critical groundwater PCLs (approach recommended by Henry, Lowerre, Johnson & Frederick). Second, the soil source area could be removed, decontaminated, and/or controlled so that the concentration of COCs within class 2 groundwater below the soil source area do not increase with time. This is essentially requiring the soil source area to be managed so that the groundwater contamination does not get worse with time (approach being adopted today by the commission). And third, the soil source area could be removed, decontaminated, and/or controlled such that concentrations of COCs could be allowed to increase just so long as the critical groundwater PCLs are not exceeded at the downgradient extent of the plume management zone (approach recommended by TCC et al). The commission is adopting today under §350.33(f)(4) an exposure prevention approach for currently affected class 2 and 3 groundwater by establishing a plume management zone approach. The commission is adopting this approach because it is both economically reasonable and protective of human health and the environment. The commission is also discussing here flexibility with regard to the degree of control required for soil source areas overlying currently contaminated class 2 and 3 groundwaters. The commission is not, however, providing flexibility for soil source areas overlying class 1 groundwater or uncontaminated class 2 or 3 groundwater. When a plume management zone is authorized pursuant to §350.33(f)(4) in currently affected class 2 or 3 groundwater, groundwater POEs are not set directly beneath the soil source area. They are alternatively set some distance downgradient at the boundary of the plume management zone. In this situation, the groundwater PCLs must be met at the boundary of the plume management zone and not in groundwater located directly beneath the soil source area. COC concentrations which exceed the PCLs remain in groundwater in the intervening area between the soil source area and the downgradient boundary of the plume management zone. As a result, it would be very difficult to determine in the field whether leachate entering groundwater from overlying soils had COC concentrations above the critical groundwater PCLs. Thus, with class 3 groundwater, the commission is requiring that soil source areas be removed, decontaminated, and/or controlled such that the critical groundwater PCL is not exceeded at the boundary of the plume management zone. The commission is adopting a more conservative pollution prevention approach in the circumstance where a soil source area overlies class 2 groundwater. The pollution prevention response objective requires that the soil source area be removed, decontaminated, and/or controlled to the extent necessary such that the concentrations of COCs in the underlying groundwater do not increase above levels present at the time the response action plan is submitted to the executive director. The commission is adopting this requirement because it is reasonable, prudent, and in the best interest of the current and future citizens of this state. Class 2 groundwater is a potential future drinking water supply and, even though agreeing to a plume management zone for currently affected class 2 groundwater, the commission is not "writing off" its use for all time.

Mobil postulated that the class 2 groundwater soil response objective effectively prohibits a facility operations area (FOA) as allowed in Subchapter G. The commission disagrees. The person has additional flexibility under FOA which amends these provisions during the life of the FOA.

The previous commentors also requested that the commission designate critical attenuation monitoring points within the plume management zone because it is far too conservative at larger facilities for every attenuation monitoring point to be used as an early warning location of a PCL exceedence at the POE. No change to the rule is necessary in response to these comments. Section 350.33(f)(4)(D)(i) specifies that the number and location of attenuation monitoring points shall be adequate to reliably verify over time the current and future conformance with the plume management zone response objectives. The provision continues that the number and location of attenuation monitoring points shall depend on a site-specific evaluation of a number of factors. The person, based on this site-specific analysis, will propose the number and location of attenuation monitoring points in the response action plan. When reviewing the response action plan, the agency will either accept or comment on/modify the number and/or placement of attenuation monitoring points. Once the response action plan is approved by the executive director, the person will be required to manage the plume management zone, including the attenuation monitoring points, in accordance with the details of the approved plan.

Concerning §350.33(a),(b), EPA Region 6 commented that this section appears to provide for the consideration of the protection of ecological resources as a secondary concern. Writing in terms of "minimal" human health threats and "significant" or "highly disproportionate" effects on ecological receptors are not clearly defined which would lead to subjective judgements and inconsistent application. Ultimately, TNRCC should clearly state the performance criteria for this type of comparison evaluation between human health and environmental impacts, otherwise, EPA Region 6 recommended that TNRCC consider both types of protection and base the ultimate risk-based decision on the most stringent unless there are tangible mitigating circumstances to do otherwise.

EPA Region 6 commented that the wording of §350.33(a)(3) appears to place the consideration of protection of ecological receptors as a secondary concern. They also commented that the terms "minimal" human health threats and "significant and highly disproportionate" effect on ecological receptors are not clearly defined and will lead to subjective judgments. Actually, this provision provides increased protection for ecological receptors. The sentence in question reads: "When human health PCLs are exceeded within environmental media at an affected property, a person must perform a response action pursuant to paragraph (1) of this subsection to address the risks to human health unless the person adequately demonstrates that the threats to human health are minimal and that a human health-based response action would have a significant and highly disproportionate effect on ecological receptors". The intent of this language is to remove the requirement to perform a response action if the risk reduction to humans as a result of the action would be low but the adverse effects on ecological receptors would be very high. TRRP is a performance-based rule and the agency considers that this language is sufficient to evaluate whether a person makes an adequate demonstration.

Further, terms like "minimal" and "significant" and "highly disproportionate" are performance-based and are a common and normal convention in rulemakings. One only needs to review the EPA's own rules and guidance to verify this conclusion. These terms provide intent and the flexibility to ensure that appropriate actions are taken; therefore, the commission is not amending the rule in response to these comments.

Concerning §350.33(a),(b), Henry, Lowerre, Johnson & Frederick commented that any physical controls need to be designed so that local governments can abate nuisance conditions and enforce ordinances controlling weed conditions on the property if the property owner does not abate such conditions.

Henry, Lowerre, Johnson & Frederick stated that any physical controls need to be designed so that local governments can abate nuisance conditions and enforce ordinances if property owners do not abate such conditions. Such conditions include weeds on the property, the breeding of mosquitos, and the harborage of rats or vermin. The commission notes that its primary mission in preparing a response action rule for affected properties involves protecting human health and the environment from hazards posed by COCs. However, physical control measures designed, constructed, and maintained to fulfill the performance objectives for a TRRP remedy standard should, in all likelihood, not pose the listed nuisance problems. If they do, the commission has no objection to local governments enforcing their ordinances against nuisance conditions.

Concerning §350.33(a),(b), EPA Region 6 commented Remedy Standard B requires that class 1 ground waters must be cleaned up to the PCL standards, but class 2 ground waters may remain contaminated if only controls are used. Class 2 ground waters are a usable water supply, and with Texas' population growth and ever increasing demands for water supplies, it is not in the public or environmental interest to allow contamination of useable ground water that could be needed to meet these growing water demands. Class 2 ground waters may become class 1 ground waters in the future. Remedy Standard B should provide for removal and/or decontamination to the PCL for each COC for both class 1 and class 2 ground waters. EPA Region 6 also commented that controls should not include institutional controls, but rather physical controls when dealing with class 2 ground water aquifers.

The commission does not agree with EPA Region 6's conclusion or that their comment accurately characterizes the requirements of this rule regarding class 2 groundwater. By definition, a class 2 groundwater-bearing unit is initially considered suitable for use as a human drinking water supply. This means that, unless modified, the POE to class 2 groundwater shall be throughout the on and off-site extent of the groundwater PCLE zone. Additionally, the rule we are issuing today takes a pollution prevention approach for any class 1, 2, or 3 groundwater-bearing unit which does not contain COCs above the critical PCLs. The requirement here is that a clean groundwater-bearing unit shall not be allowed to become contaminated over time. With regard to affected groundwater, which would apply to class 2 groundwater, the general groundwater response objectives are listed in §350.33(f)(1) and must be attained unless a person demonstrates that an affected property qualifies for one or more of the identified areas of flexibility: §350.33(f)(2) - (waste control unit); §350.33(f)(3) - (technical impracticability); and §350.33(f)(4) - (plume management zone). Until and unless the executive director concurs with the designation of a plume management zone, or one of the other two areas of flexibility, the person is required to remediate a class 2 groundwater PCLE zone to the critical groundwater PCLs. Detailed factors to guide the evaluation of acceptability of a plume management zone are listed at §350.33(f)(4)(A) and are expressed in terms of potential adverse effects on groundwater and surface water quality. If a plume management zone is approved, then an exposure prevention approach would be used in which the critical PCL would only need to be attained at the groundwater POE at the downgradient limit of the plume management zone.

In adopting this policy for currently affected class 2 groundwater, the commission has noted the statement by the legislature in the Groundwater Protection Act (Texas Water Code, Chapter 26.401) that "aquifers vary both in their potential for beneficial use and in their susceptibility for contamination". When a plume management zone is agreed to for class 2 groundwater, the commission is not "writing off" the groundwater within this zone forever. By including plume management zones in this rule, the commission is making the scientific and policy determination that there are some groundwater contamination situations which are more appropriately managed by an "exposure prevention" rather than a "pollution cleanup" approach. The agency expects, since the source areas will have been controlled, that over time natural attenuation will decrease the concentration of many COCs as they flow within the plume management zone. Thus, the commission expects the class 2 groundwater within the plume management zone at many sites to be restored to the critical PCLs over time.

EPA Region 6 stated in response to Remedy Standard B that the word "controls" when referring to class 2 groundwater aquifers should only refer to "physical" and not "institutional" controls. The commission disagrees. In addition to the institutional controls required in response to §350.31(g) and (h), the commission has prepared Remedy Standard B so that an institutional control would be used if a waste control unit, technical impracticability, or plume management zone modified groundwater response objective is used. These institutional controls would be used to notify persons about the presence of COCs in groundwater which could be a hazard. These institutional controls are prudent and warranted to protect human health. Further, if the person can demonstrate that the COCs in groundwater are at steady-state or declining conditions, then there is no basis for requirement of a physical control. Physical controls are warranted when they are necessary to control the extent of COCs or to prevent access to the COCs.

EPA Region 6's comments regarding controls and §350.33(b) alerted the commission to two necessary changes to the text of this subsection. First, for the purpose of clarity and consistency, the commission is adding the text "As defined further by the surface and subsurface soil response objectives in subsection (e) and the groundwater response objectives in subsection (f)," to the beginning of this subsection. This change is necessary because all combinations of removal, decontamination, and/or control remedies are not available in all situations and their availability is further specified in subsections (e) and (f). This clarification is consistent with the commission's intent as expressed in the remainder of this section. As an example, with regard to a class 2 groundwater PCLE zone, and as previously discussed, a person is initially required to meet the groundwater cleanup response objective of §350.33(f)(1) and could not use a plume management zone of §350.33(f)(4) as a control measure unless approved by the executive director. Second, §350.33(b) presently lists the remedy types as ". . . removal and/or decontamination with controls or controls only. . ." This is clearly not consistent with the commission's intent since both of these remedy types involve control measures. Thus, for the sake of consistency and accuracy, the list of types of response actions has been revised to read ". . . removal and/or decontamination, removal and/or decontamination with controls, or controls only. . ." This text is consistent with the remedy types listed for soil PCLE zones in §350.33(e).

AFCEE expressed concern that the 15 year time period specified in §350.31(h) would be used to judge whether a monitored natural attenuation response action was achieving the required performance objectives within a reasonable time frame.

No. The determination of a reasonable time frame to attain response objectives for a remedy standard is to be based on a site-specific evaluation of an affected property, not a default 15 year period. Persons can view the 15 year period as a period to make a determination that monitored natural attenuation will be an effective, timely remedy, not that it must be completed within the 15 year window.

Concerning §350.33(a),(b), Henry, Lowerre, Johnson & Frederick commented that it is not readily apparent what the concept of using controls to achieve residential land use means. They inquired as to what types of controls and restrictions does the agency envision.

As one example, a plume management zone could extend beneath a residential property where the surface and subsurface soil does not contain COCs above the critical PCLs. The plume management zone would need to be analyzed to make sure that volatile emissions do not present a hazard to residents at the land surface. Also, the presence of the plume management zone below the residential property would be noticed with an institutional control in the land records. As a second example, under TRRP the standard POE to residential surface soil is from the land surface to 15 feet in depth, to groundwater, or to bedrock, whichever is shallower. A person could propose residential land use with a shallower POE to surface soils for the property. Approval of such a proposal would be made

on a site-specific basis. At a minimum, the person would be required to demonstrate that volatile emissions do not present a hazard, that a realistic and enforceable restriction against excavation below the protective depth is publicized, that the excavation restriction is recorded in an institutional control, and in general that the proposed use of the property will be protective of human health and the environment.

Concerning §350.33(a),(b), Henry, Lowerre, Johnson & Frederick commented that notice and an opportunity for comment need to be provided to adjacent landowners and local governmental authorities prior to the implementation of any remedy involving institutional or engineering controls.

Adjacent landowners and municipalities may be notified pursuant to §350.55 of the availability of sample results if a person collects samples from property which he does not own (i.e., off-site properties and leased lands). Moreover, a municipality would be notified in response to §350.74(j)(2)(E) if a person requests to vary one of the default commercial/industrial exposure factors for the affected property when determining risk-based exposure limits. The commission has worked hard, to the extent consistent with existing statutes, to incorporate into TRRP the notice and informed consent of the public and municipalities. However, in the situation in which the person performing the response action is the landowner and any surface soil, subsurface soil, and/or groundwater PCLE zone(s) are restricted to the subject source property, TRRP does not require the notification of the adjacent landowners or of the municipality. Any more stringent or additional notification and public participation requirement which is applicable to the property in response to another regulation, such as RCRA, would, of course, have to be complied with.

Concerning §350.33(b)(2), Henry, Lowerre, Johnson & Frederick commented that regarding the use of natural attenuation, EPA recognizes the process as effective for non-chlorinated hydrocarbons such as fuels. However, its effectiveness for other contaminants is not as well demonstrated. Henry, Lowerre, Johnson & Frederick suggests TNRCC consider specifying what conditions are appropriate for monitored natural attenuation. Use of this approach should be closely monitored to assure degradation is occurring. Henry, Lowerre, Johnson & Frederick also commented that the proposed program endangers future groundwater supplies in a multitude of ways - from the definition of a currently or potentially usable source to the reliance on "natural attenuation" of contaminants in soil. Moreover, the program fails to provide for any remedy if it turns out the predictions of the risk assessment and modeling were wrong, and contaminants do migrate off-site above safe levels. Finally, Henry, Lowerre, Johnson & Frederick commented that the rules move Texas toward relying on ground water and soils to use their natural ability to assimilate contamination and convert toxic chemicals into safe chemicals. That is a dangerous step. It assumes that the system under stress to cleanse itself is not exposed to another type or round of contamination which can overload the system. Natural attenuation is not proven for many chemicals and can take 50 to 100 years to work, if, in fact, it works at all. If natural attenuation is allowed it must only be use when it is proven to work, not when it can work in theory.

The commission refers persons to the responses provided for comments in regard to §350.32(b)(3).

§350.33(c)

The commission did not receive any comments on proposed §350.33(c).

§350.33(d)

Concerning §350.33(d), Henry, Lowerre, Johnson & Frederick asked what process will TNRCC utilize to evaluate when interim stabilization measure are required. Henry, Lowerre, Johnson & Frederick suggested that TNRCC promulgate standards for implementing stabilization activities because experience shows that recalcitrant persons ignore guidance with the argument that it is not enforceable.

This comment pertains to the requirement that the person must receive the executive director's written approval of a response action plan before commencing response actions to attain the standard, but this does not preclude the person from taking interim actions. The obvious situation where an interim action or stabilization measure could reasonably be pursued is where human and/or ecological receptors are actually being exposed to COCs at concentrations in excess of the PCLs so that waiting for the normal approval process of a response action plan before action would not be acceptable. Henry, Lowerre, Johnson & Frederick further suggested that the agency promulgate standards for implementing stabilization activities. At this point, the agency plans to manage the review of the need for and conduct of interim actions based on case-by-case evaluations.

Also concerning §350.33(d), Henry, Lowerre, Johnson & Frederick commented that TNRCC apparently plans to rely upon voluntary compliance for the TRRP. The provisions of the TRRP are written in vague and conflicting language, making enforcement impractical, if not impossible. The "self implementing" provisions will not be subject to effective enforcement, since there is no adequate notice or reporting of the actions being taken.

The commission disagrees with these statements. In the first place, TRRP as an over-arching technical rule will be implemented through the various program areas identified in §350.2 (relating to Applicability). Therefore, compliance with and enforcement of TRRP will be managed by the program areas. The commission disagrees with the assertion that the remedy standards are written in vague, conflicting language making enforcement impossible. The remedy standards are crafted using performance-based language which details the response objectives which are to be achieved. The remedy standards purposefully describe the required performance rather than attempting to define by rule exactly how every problem will be resolved. An enforcement action referencing TRRP would involve a demonstration by the commission that a person had failed to achieve the performance objectives for the remedy standard in question. Since these performance objectives are neither vague nor conflicting, enforcement using TRRP will be feasible. And finally, the discussion in the last sentence regarding "no adequate notice or reporting of actions being taken" is not correct in light of the sequence of reports summarized in Subchapter E (relating to Reports). In regard to the statement that the commission plans to rely upon voluntary compliance, the commission amends the rule to clarify that the person must receive the executive director's written approval of the affected property assessment report in addition to the response action plan.

§350.33(e)

Concerning §350.33(e), Brown Carls & Mitchell commented that according to the proposed rule and preamble, a person may use the following options to meet Remedy Standard B objectives: (1) removal and/or decontamination; (2) removal and/or decontamination with physical or institutional controls; or (3) use of physical or institutional controls only. If a person chooses removal and/or decontamination, then elects to achieve the general Remedy Standard B groundwater response objectives, this approach becomes identical to remedy Standard A. Brown Carls & Mitchell stated that this overlap is confusing and should be eliminated.

The commission agrees with Brown Carls & Mitchell's analysis that if a person removes and/or decontaminates the soil PCLE zone and uses the general groundwater response objectives that this ends up with the same result under Remedy Standard B as for Remedy Standard A. The commission, however, does not agree either that this is confusing or should be eliminated. Remember that it is an entire affected property and not a particular environmental medium which qualifies for a remedy standard. The way Remedy Standard B is written it provides maximum flexibility. For example, a person could remove and/or decontaminate the soil PCLE zone and then qualify to use a groundwater plume management zone as a control measure. Or the person could restore the groundwater using the general groundwater response objectives and control the soil PCLE zone.

§350.33(f)

Concerning §350.33(f), ARCADIS Geraghty & Miller, Chevron, and Fina commented that there is no scientific or policy justification for excluding the use of technical impracticability and a plume management zone together. The commentors believe that these two concepts can and do work together at actual sites today for certain COCs under certain hydrogeologic conditions, e.g., the concentrations of a NAPL cannot be reduced to the applicable PCLs within a reasonable time frame (TI), but the concentrations of the dissolved phase plume associated with the NAPL will also not exceed the PCLs within a plume management zone because of hydrogeologic constraints or natural attenuation factors. Fina stated that for instance, an offsite DNAPL contamination with a dissolved plume could result in a request for technical impracticability to manage the DNAPLs while a different plume management use would be appropriate for the dissolved constituents. Therefore, we suggest that the mutual exclusion of these two approaches is not technically supported and should be removed from the final rule. Brown & Caldwell suggested modifying the provision to allow for the use of a plume management zone with a technical impracticability demonstration if the technical impracticability zone is isolated from the plume management zone through physical control, such as a slurry wall or groundwater interceptor trench.

The agency received several comments which suggested that there was no technically defensible reason for not allowing a person to use both a technical impracticability demonstration and a plume management zone to address the problems posed by a single groundwater PCLE zone. The commission is accepting the general thrust of these comments for the reasons given. However, when combined with a technical impracticability demonstration the plume management zone is a “no growth” plume management zone. The boundary of the groundwater PCLE zone is not allowed to expand. The agency has modified the second sentence quoted above based upon the comments received and so that it now more clearly states the agency’s original intention. The commission is adopting this subsection as proposed except with regard to the second previously quoted sentence which is replaced with: “A person who satisfactorily demonstrates technical impracticability as described in paragraph (3) of this subsection may use such technical impracticability to establish a plume management zone as described in paragraph (4) of this subsection for instances when a plume management zone would not otherwise be authorized by the executive director, except that the person shall not allow the groundwater plume management zone to expand beyond the existing boundary of the groundwater PCLE zone.”

Also concerning §350.33(f), Henry, Lowerre, Johnson & Frederick commented that it appears that under Remedy Standard B - residential, designation could be applied to a situation where a facility has contaminated the groundwater underlying adjacent, off-site residential property, when it is served by a municipal water supply system, the city has an ordinance prohibiting installation of private water wells, and it is a class 2 aquifer. The result could be that the facility would not be required to perform remediation of the off-site contamination. Henry, Lowerre, Johnson & Frederick commented that this seems to conflict with statements that off-site properties must be remediated to unrestricted land uses.

The commission acknowledges that such a situation could occur. TRRP requires the groundwater to be restored to the critical PCLs unless a portion or all of a groundwater-bearing zone qualifies for one or more of the modified groundwater response objectives listed in paragraphs (2), (3), and/or (4). In the above scenario, the plume management zone appears most relevant. However, there are controls here. The plume management zone must first be approved by the executive director. If the establishment of the plume management zone could not be demonstrated to be appropriate, then it would not be approved. Additionally, the commission points out that an ordinance could be used as an institutional control with the amendments included in today’s rule, but that ordinance will be required to be demonstrated to be sufficiently protective before the commission would approve its use.

Concerning §350.33(f), Henry, Lowerre, Johnson & Frederick commented that the agency should describe when plume containment versus plume management will be required and that the rule should require that class 2 groundwater be remediated pursuant to Remedy Standard A. Particularly in light of frequent drought conditions in Texas, Henry, Lowerre, Johnson & Frederick believes that the state's goal should be to restore all potentially usable groundwater, rather than to allow an exposure prevention approach.

The first question about when a containment versus groundwater management response action would be allowed has been previously addressed under §350.33(a). With regard to the second question, please refer to the section for §350.33(a),(b) in which class 1 and class 2 groundwater as well as pollution cleanup versus exposure prevention response actions were discussed in detail.

Concerning §350.33(f)(1), Chevron and AFCEE commented that this suggests that no growth in a plume is allowed even if it is entirely onsite. This limit applies to all three classes of groundwater. It does not consider the possibility that natural attenuation and onsite plume growth could occur simultaneously without necessarily increasing offsite exposure risks (or onsite exposure risks, which can be more easily managed). Potentially could divert funds away from more effective "risk reduction" activities. We recognize that the Preamble explicitly states that plume growth is not acceptable, however, there may be circumstances where it would be a reasonable decision to allow temporary/transient plume growth. Chevron commented that the boundary of the groundwater PCLE zone is defined by the critical groundwater PCL; therefore this requirement has the effect of forbidding any increase in the size of the PCLE zone. While they acknowledged that they understand the intent of this requirement, in practice it may not be possible even using an active restoration approach to immediately and permanently stop the migration of COCs in groundwater, particularly when the effects of prolonged rainfall events are taken into consideration. Chevron suggested a link of adverse impacts to beneficial uses, and recommended defining exceptions in cases of other plumes/sources with similar chemical compositions. Chevron provided the following alternate language: "While achieving . groundwater PCLs from migrating such that reasonably likely beneficial uses are adversely impacted." Finally, Chevron recommended allowing migration to occur to some prescribed distance that is still smaller than that allowed for a plume management zone, e.g. to no more than 20% of the existing plume length as defined in §350.37(1)(4). KOCH commented that for class 1 and 2 groundwater, these critical PCLs could be MCLs for drinking water. While response actions to restore all groundwater to drinking water quality is a lofty goal, it can be very costly and time consuming without improving human health or the environment. In areas served by a public water supply system, that obtains its water from a source other than impacted groundwater, the critical PCLs should not be MCLs. If people are not being exposed to COCs in groundwater and will not be exposed in the foreseeable future, or in areas where the groundwater has no reasonably anticipated future beneficial use (§350.37(1)(3)(A)), then implementing a response action to achieve drinking water standards is inappropriate. KOCH suggested that it should be clearly stated in this paragraph that a person has the option of changing the POE from throughout the groundwater PCLE zone to an alternate location (§350.33(f)(4)(B)). It is misleading to state in this section that all groundwater must be restored to drinking water standards.

KOCH, AFCEE, and Chevron expressed similar comments which objected to the requirement that COCs at concentrations above the critical groundwater PCLs not migrate beyond the existing boundary of the groundwater PCLE zone. One of the commentors suggested that the commission revise the requirement such that COCs could migrate beyond the boundary of the groundwater PCLE zone just so long as groundwater with reasonably likely beneficial uses is not adversely impacted. The commission disagrees. The commission, with this rule, is establishing a plume management zone approach for class 2 and 3 groundwater. However, a person may not implement a plume management zone, until and unless, the executive director concurs that the COCs will not pose a substantial present or potential hazard to human health or the environment. Absent that approval or approval to use one of the other modified groundwater response approaches, the requirement is to restore the groundwater PCLE zone to the critical PCLs. As a result, further expansion of the groundwater PCLE zone is not allowed.

Concerning §350.33(f)(1), Michelle A. McFaddin commented that the owner/operators of these facilities should be required to work with local governments as well as these affected landowners to develop appropriate cleanup alternatives that will restore the groundwater if feasible or, at a minimum, provide just compensation for the loss of this critical natural resources in a forum that involves all of the affected parties.

The reader is referred to the commission's previous response at §350.33(f) regarding a similar question posed by Henry, Lowerre, Johnson & Frederick. Section 350.111(c) discusses the circumstances and actions required to seek landowner consent for filing an institutional control when it is technically impracticable to restore an affected property to residential-Remedy Standard A concentration levels.

Concerning §350.33(f)(1), Chevron commented that reducing the concentrations of COCs in all classes of groundwater, while a commendable objective, should allow varying time frames for this to be accomplished at a minimum, depending on groundwater class. Removing NAPLs to the extent practicable, except where the COC is low toxicity, is a confusing statement, especially if NAPL is a COC, as in the Definitions. Chevron recommended that "Preventing COCs from migrating to air." should include demonstration that such a circumstance will not occur, rather than just requiring an active air flow interception system as a groundwater response objective.

As expressed previously, the commission is not laying down any rigid time frames to define what is a reasonable response action time at a particular affected property. What is reasonable will be a judgment based on all the information available about a particular property. The commission does not agree that groundwater classification by itself would be adequate to make that judgment. Further, the commission's statement about "preventing COCs from migrating to air" means the person should make sure that the groundwater PCLE zone is not evolving volatile organics up through the aquifer and the overlying soils so that they enter the breathing zone. There is no requirement to construct an "active air flow interceptor system" unless, of course, that would be a rational response to an existing problem.

Concerning §350.33(f)(1)(C), Brown & Caldwell, Chevron, McCulley Frick & Gilman, AFCEE, and EPA Region 6 commented on this provision. Brown & Caldwell recommend that, in addition to the provisions currently proposed, a person should be allowed to leave NAPL in place if it can be demonstrated to be beneficial to groundwater quality. For example, if a diesel NAPL is present in the same water-bearing zone as a dissolved-phase chlorinated solvent plume, the NAPL will increase the rate at which the chlorinated solvents biodegrade. Under these circumstances, removal of the NAPL would actually be detrimental to groundwater quality. Chevron requested that removal of NAPL only be required when it will lead to a significant reduction in the time required to meet critical PCLs in the plume. Chevron also stated that TNRCC needs to define "practicable." AFCEE commented that EPA recognizes in their "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration", dense NAPLs (DNAPLs) "are particularly difficult to locate and remove from the subsurface." Based on its belief that under the proposed provisions most groundwater PCLE zones contaminated with DNAPLs that are not under a plume management zone would be forced to make a technical impracticability determination, AFCEE suggested allowing NAPLs to remain in place. McCulley Frick & Gilman suggested that the proposed rule not focus directly on NAPL removal, but incorporate NAPLs into the overall concept of technical impracticability of groundwater restoration. At a minimum, McCulley Frick & Gilman suggested that the arbitrary and potentially non-risk related requirement for NAPL removal to the maximum extent practicable be deleted from the rule. EPA Region 6 commented that this section should reflect the removal of NAPLs which meet the definition of principal threats where practicable. See related general comment above.

The commission has deleted this subparagraph from the rule as it was extraneous, and has redesignated subparagraphs (D) - (F) as (C) - (E), respectively. The general provisions in subparagraph (A) of this section already set the general response objective to reduce COC concentrations throughout the groundwater to the critical PCLs. Additionally, the collective requirements of subparagraphs (A) - (B) and (D) - (F) are in effect the same conditions that would be achieved for groundwater to satisfy Remedy Standard A. NAPLs are not specifically identified under Remedy Standard A as they are indirectly addressed in subsection §350.32(a)(3) as a consequence of removing or decontaminating all COCs throughout the groundwater to their critical PCL. NAPLs may be comprised of one or more COCs, and the requirement to reduce COCs to critical PCLs throughout the groundwater includes any associated NAPLs. If the COC is non-toxic such that the critical PCL exceeds the solubility limit, then the NAPL would generally not require a response action unless there was some other aesthetics problem or hazard associated with it. Additionally, if it is not feasible to remove the NAPL to the critical PCL, then the technical impracticability provisions of paragraph (3) of this subsection could be applied for all classes of groundwater. Readers are referred to the amendments to §350.33(f) and (f)(3) and to responses to comments on those sections for further discussions regarding technical impracticability. NAPLs, however, remain specifically addressed in §350.33(f)(4)(E) relative to plume management zones. Under the context of a plume management zone, an evaluation of the benefit of the removal of the NAPLs could be made to address such issues as those offered by Brown & Caldwell and Chevron. Further, under Remedy Standards A and B, persons could consider the appropriate phase of NAPL removal in the context of the overall remedial strategy, and defer to later NAPL recovery when doing so aids the remedial progress without putting human health and safety or the environment at unacceptable risk.

Concerning §350.33(f)(2), Chevron commented that the requirement to file an institutional control should only apply if the property is to be sold, or the land use changes.

The commission maintains and defends the use of such an institutional control to provide notice of the existence and location of the groundwater PCLE zone beneath the waste control unit and to prevent usage of and exposure to this groundwater until such time as the COCs may reduce to the critical groundwater PCLs. The commission disagrees that the filing of an institutional control should wait until the property is sold or the land use changes. Section 350.37(e)(1) excludes the groundwater PCLE zone beneath the waste control unit as a point of exposure to groundwater. The institutional control is a fundamental aspect of the regulatory design to protect human health and the environment.

Concerning §350.33(f)(2), EPA Region 6 commented that the exclusion of ground water from restoration under units is not consistent with RCRA requirements for regulated units, and the distinction should be noted. Care should be exercised since these units are frequently sources of principal threat wastes which should be removed. Increasing concentrations of COCs do not trigger any action. These concerns with the treatment of regulated units under TRRP extend to all aspects of the rule (e.g., 350.37(e)(1)), and afford TNRCC with opportunities to explicitly refer regulated entities back to specific programs which are in conflict with various sections of the rule.

Exclusion of groundwater beneath waste control units from the requirement to be restored to health-based levels is not new in Texas. That provision was incorporated into Remedy Standard 3 of the current Risk Reduction rule with its adoption in 1993. The rationale behind this exclusion is that a waste control unit as defined has both a liner, either clay or synthetic, and an engineered cap. The exclusion from groundwater restoration activities prevents damage to these structures. With regard to EPA Region 6's other concerns, TRRP must be viewed as setting minimum requirements. If there are more stringent or additional, administrative or substantive requirements that are applicable to an affected property then the person must comply with those additional requirements. There are clearly more stringent requirements which apply via RCRA to regulated units. The commission constructed

TRRP to summarize its risk-based, performance-oriented program. The agency does not believe it advisable to try to reference every potentially applicable federal, other state agency, county, or city regulation in this rule, but anticipates the future development of guidance in this regard.

Concerning §350.33(f)(2) - (4), AFCEE commented that potentially aggravating the problems associated with the institutional control provisions is the fact that some of the proposed sections of the TRRP require the filing of an institutional control long before the response action is completed. Proposed §350.33(f)(2) - (4) require the filing of an institutional control "within 120 days of approval of the RAP" for sites relying upon "waste control units," "technical impracticability," or "plume management zones." Concerning §350.33(f)(2) - (4), AFCEE suggested modifying the institutional control requirements in proposed §350.33(f)(2) - (4) so that institutional controls are not mandated prior to completion of a response action unless the affected property is conveyed or as otherwise required by §350.35 due to a "substantial change in circumstances."

The commission refers the reader to the response that it provided to this issue under §350.31(h). The rule has been amended to conform with the expanded definition of institutional control.

Concerning §350.33(f)(3), Phillips commented that it supported the recognition by TNRCC of the usefulness of monitored natural attenuation as a remedy, but commented that the TNRCC should clarify that a monitored natural attenuation approach could allow NAPL to remain in place, even though the monitoring period could be quite long.

As with any remedy, source area abatement is generally paramount to shortening remedial time frames. The remedial life span of the matter will be longer with NAPLs which are allowed to remain in place and serve as a continuing source of dissolved-phase COCs. Again, the commission notes that all response actions, including monitored natural attenuation, must be capable of achieving the Remedy Standard B response objectives "within a reasonable time frame." The commission advocates that remediations be completed in a timely manner and included the institutional control provisions of §350.31(h) to reinforce this point. Nevertheless, the commission also recognizes the fact that corrective action resources are finite and limited, and remedial time frames can be adjusted in a protective manner to provide an effective balance of progress and cost. The reasonableness of the timeframe depends on the actual circumstances at a particular affected property. A "quite long" time frame using monitored natural attenuation would not necessarily be "reasonable" if there were readily available, workable response approaches to serve in the place of natural attenuation. On the other hand, for an affected property where there are no other technically achievable groundwater response methods, then monitored natural attenuation could be used pursuant to a technical impracticability demonstration and following the requirements for that modified groundwater response approach. The acceptability of the remedial time frame will be made in the context of overall site risks on a site-specific basis. There is no elimination of the use of monitored natural attenuation solely for the presence of NAPLs.

Concerning §350.33(f)(3), Henry, Lowerre, Johnson & Frederick commented that the term "Technical Impracticability" (TI) is a difficult concept in this day of rapidly changing technologies. A very high burden of proof should be provided in the rule for this. Provisions for revisiting a TI decision at regular intervals, as EPA does for their TI decisions at Superfund sites, are needed.

The commission notes that the burden established by the rule to qualify is high. The rule states: "The person must demonstrate . . . that it is not feasible from a physical perspective using currently available remediation technologies due either to hydrogeologic or chemical-specific factors to reduce the concentration of COCs throughout all or a portion of the groundwater PCLE zone to the applicable critical groundwater PCLs within a reasonable time frame." The commission also notes EPA's statement when adopting the technical impracticability guidance that when evaluating

technical impracticability "prior to remedy implementation, site characterization efforts must be especially thorough and must clearly and convincingly demonstrate that the attainment of cleanup levels is not practicable". Henry, Lowerre, Johnson & Frederick also commented that the agency should revisit technical impracticability decisions on a regular basis. The agency makes reference to the response action effectiveness reports (RAERs) which are to be submitted on a frequency of at least every three years to verify whether adequate progress is being made to achieve response action completion. These reports, which the executive director can require more frequently if need be, will keep the agency aware of the current status of affected properties.

Concerning §350.33(f)(3), TransSystems commented that Remedy Standard B requirements should allow Tier 2 cleanup levels with natural attenuation. If natural attenuation effects are technically demonstrated as site characterization phenomena and as an appropriate site remedy, then periodic groundwater monitoring of these characteristics should be part of the institutional controls and/or long term care under Standard B for either Tier 2 or 3 cleanups. Of critical importance to consider when implementing natural attenuation as a site remedial technology option, is the level of uncertainty for long duration groundwater cleanups is largely offset by the long term care requirements under the Standard B provisions.

TransSystems stated that if natural attenuation effects are technically demonstrated as an appropriate remedy during site characterization, then periodic monitoring should be part of the long-term care under Remedy Standard B. The way this would happen is that the person would submit a response action plan along with an affected property assessment report for Remedy Standard B. The response action plan would describe the response action they are proposing along with details like the location and frequency of groundwater monitoring. After approval of the response action plan, the person must submit a response action effectiveness report at least every three years.

Concerning §350.33(f)(3)(A), Chevron commented that it is confusing what "physical perspective" implies. It could imply that a person needs to have attempted remediation prior to seeking a TI Waiver. Although this is recommended within EPA's guidance, it also states that ".in some cases, TI decisions may be made prior to remedy implementation" where it is clear that remediation to drinking water standards is impracticable. Alternatively, it could imply that cost cannot be a consideration in seeking a TI waiver. Cost is one of the factors that can be evaluated according to the EPA Guidance. Chevron recommended deleting the phrase " from a physical perspective."

The commission disagrees that the meaning of "physical" is unclear. The rule states ". . . that is not feasible from a physical perspective using currently available remediation technologies due either to hydrogeologic or chemical-specific factors . . ." Thus, to use this modified groundwater response approach, the person must convincingly demonstrate that because of physical factors (e.g., hydrogeologic or chemical-specific factors) there are no currently available remediation technologies that are capable of reducing the concentration of COCs throughout the groundwater PCLE zone to the applicable critical groundwater PCLs within a reasonable time frame. Also, there is no requirement that a person have installed and tried a response action before a technical impracticability demonstration is agreed to. The need for site assessment information, however, will be higher if a response action has not been attempted. A groundwater response action may be determined to be technically impracticable if the cost of attaining the PCLs would be inordinately high. The role of cost, however, is subordinate to that of ensuring protectiveness. The point at which the cost of PCL compliance becomes inordinate must be determined based on the particular circumstances of the affected property. As with long restoration timeframes, relatively high restoration costs may be appropriate in certain cases, depending on the nature of the contamination problem and considerations such as the current and likely future use of the groundwater.

Concerning §350.33(f)(3)(A),(C),(E), Brown Carls & Mitchell commented that if it is shown, through a demonstration of technical impracticability, that removal and/or decontamination of a class 1 groundwater to critical groundwater PCLs without controls cannot be achieved, §350.33(f)(3)(C) states that physical controls must be used to prevent COCs from migrating beyond the PCLE zone, and §350.33(f)(3)(E) states that an institutional control must be placed on the affected property. These two requirements are inconsistent with §350.33(b) and other references to the application of controls to class 1 groundwater. As stated above, the special provisions pertaining to class 1 groundwater should be segregated into a separate action in order to prevent this confusion.

Brown Carls & Mitchell commented that the technical impracticability requirements of §350.33(f)(3) are inconsistent with the requirements of §350.33(b) as they pertain to class 1 groundwater. The commission disagrees. The flexibility described in §350.33(f)(3) regarding technical impracticability is being extended to all three classes of groundwater. This means that if a person is dealing with a groundwater PCLE zone in class 1 groundwater which would normally have to be removed or decontaminated to the critical groundwater PCLs but this is not technically feasible then, with approval, the person can proceed with the different set of performance objectives defined in §350.33(f)(3). Brown also commented that all of the requirements for class 1 groundwater should be in one place. The commission disagrees. The requirements for class 1 groundwater are clearly stated. The groundwater discussion is more logically and compactly organized by discussing the requirements for all three groundwater classes at the same time rather than sequentially. Brown Carls & Mitchell also pointed out as being inconsistent with class 1 groundwater response requirements the provisions of proposed §350.33(f)(3)(C) which would have required use of a physical control(s) to prevent migration of COCs from that portion of the groundwater PCLE zone which satisfies the technical impracticability demonstration. Note the discussion in a following paragraph regarding questions posed by Chevron and Mobil which summarizes the commission's reasons for withdrawing the requirement to necessarily use a physical control with a technical impracticability demonstration. They also pointed out as inconsistent §350.33(f)(3)(E) which requires an institutional control to be placed in the deed records. The commission does not agree with these comments. The commission is not piling additional requirements on the person responsible for responding to a class 1 groundwater PCLE zone. Instead §350.33(f)(3) is included for those circumstances when it is technically impracticable to reduce the concentration of COCs within a groundwater PCLE zone to the critical PCLs. In these circumstances, when the person wants to use a modified groundwater response approach offered by a technical impracticability demonstration, then, because of this action, the person is expected to take the required additional measures. The additional measures are tied "hand-and-glove" with the groundwater response flexibility that the person is seeking.

Concerning §350.33(f)(3)(C), Chevron and Mobil commented that natural attenuation should be allowed as well if it can be shown to be protective. One of the major aspects of a TI demonstration is the difficulty of using available techniques for the removal or in-situ treatment of COCs due to the hydrogeologic conditions of a site (low permeability often a limiting factor in remediation of groundwater). At a minimum, a large complex facility should be allowed to propose monitoring around the zone for which TI was granted (presuming it to be an interior site) as a way to ensure no further action is required. The commentators suggested adding "If natural attenuation can be demonstrated to prevent COCs at concentrations above the critical groundwater PCLs from spreading beyond the existing boundary of the groundwater PCLE zone, physical controls will not be required."

Chevron and Mobil both commented regarding the requirement set forth in §350.33(f)(3)(C) that a person must use a physical control to prevent migration of COCs from that portion of the groundwater PCLE zone which satisfies the technical impracticability demonstration. They contended that the person should not be limited to physical controls if natural attenuation can also be shown to be protective. Based upon these comments, the commission has removed the requirement

that a physical control must be used around that portion of the groundwater PCLE zone which satisfies the technical impracticability demonstration. To be protective, this change to remove the requirement for a physical control is achieved by: striking the words “use physical control(s) to” in subparagraph (C) and retaining the requirement to prevent migration of COCs from that portion of the groundwater PCLE zone which satisfies the technical impracticability demonstration; adding a new subparagraph (D) which requires a person to achieve the performance criteria in §350.33(f)(4)(E) for NAPLs; redesignating the previous subparagraph (D) as subparagraph (E) and amending it to read “establish a plume management zone for the area where COCs cannot be remediated so as to attain the critical PCLs and prevent COCs at concentrations above the critical groundwater PCLs from spreading beyond the existing boundary of the groundwater PCLE zone; and lastly, redesignating the previous subparagraph (E) as subparagraph (F) and amending it to conform with the expanded definition for institutional control.

Concerning §350.33(f)(3)(E), Brown Carls & Mitchell commented that subparagraph §350.33(f)(3)(E) states that, following a demonstration of technical impracticability, institutional controls must be placed on the affected property until the COCs are reduced to the critical groundwater PCLs, presumably via natural attenuation. The commentator asked if it can be assumed that this property is then eligible for No Further Action status, and whether this scenario is possible for all three groundwater classifications.

Brown Carls & Mitchell inquired about §350.33(f)(3)(E) which states that an institutional control must be placed on an affected property, following a technical impracticability demonstration. The institutional control must "prevent usage of and exposure to groundwater from this zone until such time as the COCs may reduce to the critical groundwater PCLs." The reader is referred to the commission's response to questions pertaining to §350.34 (relating to No Further Action) for a fuller discussion of the types of No Further and Conditional Action letters. There are two ways to interpret the question posed by Brown. First, is whether an affected property would be eligible for No Further Action status subsequent to technical impracticability being demonstrated for the groundwater at the site and an institutional control being demonstrated. No, the affected property would not qualify for full, No Further Action status because the response action and post-response action care is likely to involve monitoring and maintenance of groundwater or other physical control. However, as presented at §350.35(2) under Remedy Standard B, a Conditional No Further Action letter will be sent subsequent to the approval of the response action completion report and proof that an institutional control is in effect. This letter will indicate that the person has conditionally completed response actions but must perform post-response action care as described in the response action plan and will also state whether financial assurance is required. As a second interpretation, we will assume that Brown inquired whether, assuming that the COCs are all reduced to the critical groundwater PCLs, it can be assumed that this property is eligible for No Further Action status? And would this apply to all three groundwater classifications? If the groundwater-bearing zone has been restored to below the critical groundwater PCLs and there is no soil PCLE zone, or other affected environmental media, then, yes, the property would qualify for a No Further Action letter as described in §350.34. The classification of the groundwater makes no difference in qualifying for no further action designation, except that the critical groundwater PCLs for class 1 and 2 groundwater are different than those for class 3 groundwater.

Concerning §350.33(f)(3)(E), Chevron commented that the requirement to file an institutional control should only apply if the property is to be sold, or the land use changes.

The commission disagrees with this comment. The commission finds that it is especially important that a technical impracticability waiver have a reliable method to prevent human exposure to contaminated groundwater. In order to use the degree of flexibility provided in this subsection for a groundwater "exposure prevention" response action, the person must establish an

institutional control directly after approval of the response action plan so there can be a high level of assurance that people are not contacting contaminated groundwater.

Concerning §350.33(f)(4), AFCEE commented that as proposed, the rules would substantially increase the cost for remediation of class 1 groundwater. Currently there are not many remedial options available for low-level dissolved phase chlorinated hydrocarbon plumes. These rules potentially eliminate the use of pump and treat, interceptor trenches (because of no physical control provision), down gradient reactive walls (because of no plume growth provision), and monitored natural attenuation (because of 15 year stipulation) for class 1 PCLE zones contaminated with chlorinated hydrocarbons not leaving many response alternatives.

The commission does not agree with these conclusions regarding class 1 groundwater. The person is restricted to removal and/or decontamination methods, rather than controls, because the response objective is to restore the class 1 groundwater to the critical groundwater PCLs rather than just contain the PCLE zone to prevent it from spreading. Clearly, pump and treat would be authorized as a removal method. For the reactive wall, it could not be constructed farther downgradient so as to allow more of the aquifer to become contaminated. However, depending upon the treatment details, a reactive wall could meet the definition of a decontamination method. The commission asserts that interceptor trenches are normally used primarily to halt the spread of a plume of contaminated groundwater rather than to restore that plume to drinking water concentration levels. However, it is possible that an interceptor trench could be constructed to remove more groundwater so as to be effective at restoring the groundwater PCLE zone to the critical PCLs. And finally, there is no 15 year limit on the use of monitored natural attenuation. The length of time for all response actions must be reasonable considering all the circumstances at an affected property.

Concerning §350.33(f)(4), AFCEE commented that plume management zones are not available to class 1 groundwater units. As detailed under our comment on groundwater classifications the current rules could classify some non-primary groundwater resources as class 1 thus precluding the use of a plume management zone. Agency staff should be able to determine if a plume management zone is appropriate on site-specific basis for class 1 PCLE zones. Chevron commented that while they recognize the importance of class 1 groundwater as a resource, there may nonetheless be situations where monitored natural attenuation is an appropriate remedy. Chevron suggested including class 1 groundwater and allow a site-by-site decision to be made by the executive director.

The commission must deny these requests. The decision to pursue restoration of class 1 groundwater is a fundamental policy determination being made by the commission at the highest level and in a uniform fashion. Site by site decisions of this type are subject to unwarranted variability. However, the exact manner (e.g., monitored natural attenuation) in which the class 1 groundwater performance objectives will be attained at individual properties will be determined on a site-specific basis. Through a four year process which involved two conceptual documents and significant interaction with stakeholders, the commission has used its best professional, scientific, and societal judgment in developing and promulgating this rule.

Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP is not consistent with the overall legislative directives to the TNRCC in the Texas Water Code. For example, the agency is directed to ensure the "maximum conservation and protection of the quality of the environment and natural resources" (§5.120.). The proposed TRRP would also allow unnecessary loss of class 2 ground water and the virtual sacrifice of class 3 groundwater, for which there may be many beneficial uses. The rules are in direct conflict with §26.401, Texas Water Code. The proposed TRRP is also inconsistent with SB 1 and the federal safe drinking water programs that seek protection of all potential sources of future drinking water and water for other uses. The TRRP would not protect or conserve Texas' limited water resources. Instead, the TRRP would allow contamination of groundwater. For example, the draft TRRP would allow

for plume growth (without consideration of the total volume of water contaminated). Henry, Lowerre, Johnson & Frederick also commented that TNRCC is directed by the Texas Legislature to "administer the law so as to promote the judicious use and maximum conservation and protection of the quality of the environment and the natural resources." §5.120, Texas Water Code. The proposed TRRP is clearly contrary to this directive. The rules do not maximize the conservation and protection of the state's natural resources. The rules are written to minimize the short-term economic impacts on the regulated entities and TNRCC. (See Attachment 6). The proposed TRRP clearly reduces protection of the public health and the environment, even when there is no showing of added or unjustified costs to the responsible parties. Henry, Lowerre, Johnson & Frederick commented that continuing sources of groundwater contamination should not go unaddressed. They also commented that contamination allowed to remain in place should not continue to pose an ongoing release threat to groundwater. Henry, Lowerre, Johnson & Frederick further commented that current TNRCC and EPA rules do not sanction or allow "plume growth." The TRRP's proposal for "plume management" simply allows plumes to expand significantly, even if there is no justification for the resulting increase in contamination. Often an inexpensive process to create a cone of depression in the ground water will eliminate plume growth. Even if there are cost effective measures that can be taken, however, expansion of the plume of contamination apparently is permitted under the proposed TRRP. One example where the rule is overly protective of the responsible parties is when there is a plume of contaminants that will degrade quickly to background. Controlling plume growth until the degradation has occurred is an alternative that should at least be considered. Henry, Lowerre, Johnson & Frederick also commented that the plume management zone conflicts with the Safe Drinking Water Act. Henry, Lowerre, Johnson & Frederick stated that it conflicts with the efforts of TNRCC to Develop Source Water Assessment and Protection Plans. For many of the reasons explained above, the reduction in requirements for characterizations of the contamination and public notification of known contamination will limit the ability of the state and public drinking water systems to assess the risk of contamination and respond to contamination. Moreover, if drinking water standards change and the responsible party that has been relieved of cleanup to baseline values is no longer available, it will be the drinking water systems that suffer the added costs of monitoring and decontamination. Henry, Lowerre, Johnson & Frederick commented that would like the commission to discuss the details of allowing the facility the option of establishing the point of compliance (POC) at: 1) the property boundary; or 2) at the edge of "an effective institutional control". The commentor is thus concerned that allowing the POC to be moved large distances and, subsequently, allowing large areas of currently un-impacted aquifers to become contaminated above health-based levels, in lieu of remediation, does not seem to be protective of those aquifers. Henry, Lowerre, Johnson & Frederick also commented that this is not protective of the ground water of the State of Texas. Furthermore, the stated limits to the plume growths are not specific enough. At a very large site with a large existing plume, the current rule would allow a significant growth in the total volume of ground water that is contaminated. If any plume growth is allowed, it should be expressed in limits on the volume of growth, not distance of or percentages of current plume length. Plumes can be very deep. The vertical increase in the plume's depth or height also needs to be very limited, if allowed at all. Henry, Lowerre, Johnson & Frederick further noted that allowance of plume management zones will encourage a number of large industrial facilities to forego meaningful cleanups and instead allow proximate zones of contamination to commingle, exasperating any future attempts at remediation.

Also concerning §350.33(f)(4), the PIC commented that protective concentration level exceedence level zones for class 1 groundwater must be removed and/or decontaminated to the critical groundwater protective concentration level for each contaminant of concern; however, the rule allows for the establishment of plume management zones for contaminated class 2 and 3 groundwater. The PIC opposed the establishment of plume management zones for class 2 groundwater. The PIC stated that it would prefer that class 2 groundwater be treated like class 1 groundwater in terms of requiring that exceedence level zones be removed and/or decontaminated to critical groundwater protective concentration levels. The PIC agreed with the rationale stated in the preamble that plume management zones may not be established for class 1 groundwater because the commission considers that groundwater to be a critical groundwater deserving of a pollution cleanup approach; however, the PIC asserted that it should also be the policy of the

State of Texas to consider class 2 groundwater as deserving of a pollution clean up approach. Class 2 groundwater includes resources which are actually supplying water for human consumption or other productive purposes, as well as resources of sufficient quality and productive capacity to be capable of serving as a daily water source for a family of three. Particularly in light of frequent drought conditions in Texas, the PIC believes that wise stewardship of the state's water resources would favor restoring this groundwater, rather than allowing an exposure prevention approach for this productive or potentially productive water resource. EPA Region 6 commented that Region 6 finds the use of the plume management zone concept under Remedy Standard B for class 2 ground water aquifers problematic. It may not adequately protect potential beneficial resources and human health. Class 2 ground waters may be a useable water supply, and with Texas' population growth and ever increasing demands for water supplies, it is not appropriate to allow contamination of useable ground water that could be needed to meet these growing water demands. Class 2 groundwaters may become class 1 ground waters in the future. Remedy Standard B should provide for the use of plume management zones for only class 3 groundwaters. Any contamination above the PCL in ground water should be removed and/or decontaminated to the PCLs for both class 1 and class 2 groundwaters.

Henry, Lowerre, Johnson, & Frederick submitted a substantial number of comments regarding plume management zones. Some of these comments, do not accurately reflect the details of the rule being adopted today because they were originally submitted pertaining to a proposed rule which was different in many regards to today's rule.

The commission does not concur with the comments submitted by Henry, Lowerre, Johnson & Frederick. The commission has commented on these subjects previously and refers the reader to preamble discussions of §350.33(a), (b) and §350.33(f). One of the primary activities in issuing this rule has been to determine those circumstances when a pollution cleanup (i.e., remove and/or decontaminate) response must be used and when an exposure prevention (i.e., remove, decontaminate, and/or control) remedy may be used. The commission does not agree with the assertion that a pollution cleanup response action should always be used for all soil and groundwater PCLE zones, regardless of circumstances. The commission concludes that this rule strikes an appropriate balance between requiring pollution cleanup response actions and allowing physical controls, institutional controls, and financial assurance to prevent the exposure of humans and ecological receptors to unprotective levels of COCs. For example, TRRP under Remedy Standard B will allow a cap to be used provided it will reliably contain the COCs within a soil PCLE zone over time. Also, provided an affected property qualifies, TRRP will allow the establishment of a plume management zone in class 2 and 3 groundwater. The maximum growth of the groundwater PCLE zone in class 2 groundwater is 500 feet. Several other considerations are presented at §350.37(l) which could make this distance shorter. The agency feels that this is far less growth than is implied in the comments provided by Henry, Lowerre, Johnson & Frederick.

The commission notes that it initially considered requiring cleanup of all affected groundwater to the PCLs, but moved from that position because it would have been more stringent than existing regulations at that time. Also, it would not recognize technical and financial limitations. It would not recognize that all groundwater impacts do not have the same threat to human health and the environment, and therefore, do not warrant the same level of restoration. Finally, it does not recognize the effectiveness of exposure prevention approaches, like a plume management zone. The commission determined that allowing the use of exposure prevention response actions in certain situations is consistent with previous regulations and practices and protective of human health and the environment. Also, it should foster the implementation of more response actions since such responses are more feasible to implement. Therefore, the commission has decided not to require a pollution cleanup approach for all groundwater PCLE zones and to allow an exposure prevention approach for qualifying groundwater PCLE zones.

The commission notes that when it agrees to the establishment of a plume management zone within a class 2 groundwater-bearing unit that it is not "writing off" the groundwater within this zone for all time. By including plume management zones in this rule, the commission is making the scientific and policy determinations that there are some groundwater contamination situations which are more appropriately managed by an exposure prevention approach. The agency expects, since the surface and subsurface soil source areas will be controlled to a substantial degree, that natural attenuation over time will decrease the concentration of many COCs as they flow within the plume management zone. Thus, the commission expects class 2 groundwater within the plume management zone at many sites to be restored to the critical PCLs over time. In adopting this policy for currently affected class 2 groundwater-bearing zones, the commission has noted the statement by the legislature in the Ground Water Protection Act (Texas Water Code Chapter 26.401) that "aquifers vary both in their potential for beneficial use and in their susceptibility for contamination." The commission finds in this statement a recognition on the part of the legislature that all groundwater-bearing units, including groundwater PCLE zones, are not the same and some degree of variance in allowed response is necessary.

The commission also does not concur with Henry, Lowerre, Johnson & Frederick comment regarding the effect of plume management zones on class 3 groundwater. A person cannot allow a class 3 groundwater PCLE zone to migrate closer than two years groundwater travel time from an adjoining property boundary without the written approval of that property owner. The agency anticipates that many property owners will not agree to allow a class 3 groundwater PCLE zone from an adjoining property to migrate under their land. Additionally, contrary to the commentor's statement, both EPA's hazardous waste regulations and the agency's current Risk Reduction rule contain an alternate concentration limit process by which a revised COC concentration can be calculated which will be protective of a downgradient point of exposure. Exposure to groundwater is prevented in the area between where the alternate concentration limit is used and the point of exposure.

The commission has already addressed the questions raised in this paragraph regarding plume management zones by the following commentors and this discussion is presented above, at §350.33(a),(b), and at §350.33(f). The PIC stated opposition to the establishment of plume management zones for class 2 groundwater. The PIC would prefer that class 2 groundwater be treated like class 1 groundwater in terms of requiring that exceedence zones be removed and/or decontaminated to critical PCLs. Also, EPA Region 6 concluded that class 2 groundwater should be afforded the same level of protection as class 1 groundwater. EPA Region 6 also stated that plume management zones should be limited to class 3 groundwater.

Concerning §350.33(f)(4)(A)(i)(IV), AFCEE commented that the provision requires parties to assess "existing quality of groundwater including other sources of COCs and their cumulative impact." For PCLE zones that have migrated off-site this assessment could involve other responsible parties. The AF believes that determining the impact of contamination from other responsible parties should be the responsibility of the other responsible party or the agency, not the subject party. Fulfilling these criteria would be unduly burdensome. Source identification and attribution are complicated by the fact that access to private property for assessment is unlikely to be given by commercial operations that could therefore become responsible for some portion of a PCLE zone. Additionally, expending federal dollars for investigating contamination from non-federal sources may not be possible under federal law. The AF strongly believes gathering information to evaluate cumulative impacts from other responsible party sources is not the responsibility of the AF, but rather it is the TNRCC's responsibility to identify the other responsible parties and obtain the required information. The rule should be changed accordingly.

The commission disagrees. First of all, nothing is forcing the commentor to pursue a plume management zone at one of their affected properties. If the commentor makes the choice to pursue

designation of a plume management zone, then the commentor, like any other person under the TRRP rule, must be prepared to collect and submit the information that the agency will need to make a determination whether the site qualifies for plume management zone designation. The commission, in regard to this particular provision, is looking for whether or not the groundwater is really a likely source for future groundwater development. Where it is determined to not be because of unsanitary conditions or regional groundwater contamination problems, the commission is much more comfortable in agreeing with a plume management zone. However, the commission is fully content with restoration of the groundwater in the event the person decides that the requirements for flexibility are too burdensome.

Concerning §350.33(f)(4)(A)(i)(IX),(X), Weston asked how is it intended that "the persistence and permanence of the potentially adverse effects" get taken into account. Weston commented that historically TNRCC has been unwilling to accept that COCs are characterized by short half-lives or that effects are short-lived or reversible.

The part of a sentence that was quoted came from §350.33(f)(4)(A) which is a listing of factors to consider a COC's potentially adverse effects on groundwater quality. The criteria are to be used to help determine whether a plume management zone should be approved. Using the terminology of the commentor, along with consideration of the other factors, the shorter the half-life of a COC or the more short-lived or reversible the effects of that COC, then the more appropriate the designation of a plume management zone would be.

Concerning §350.33(f)(4)(C), EPA Region 6 commented that the TRRP provides for the determination of attenuation action levels that will result in contamination less than the PCL at the point of exposure. Calculation of attenuation action levels higher than PCL levels requires that the fate and transport of contaminants be determined. The reliability of such determinations is highly uncertain. In addition to the uncertainties regarding ground water movement velocities in aquifers that may be heterogeneous and inadequately characterized, the required estimates of chemical reactions and reaction rates, adsorption, biological activity, etc., are also highly uncertain when applied to field scale situations. This uncertainty about contamination fate and transport may result in exposures above health-based levels at the point of exposure. EPA Region 6 stated that the use of attenuation action levels should be deleted from the TRRP. Instead, the PCLs should be obtained at a point of compliance within the facility boundary.

The commission does not agree. The attenuation action levels are the predicted COC concentrations which can remain at an attenuation monitoring point and not result in exceedence of the critical PCLs at the point of exposure. All of the attenuation monitoring points will be sampled over the space of time to determine whether the flow of groundwater and transport of COCs is close to or markedly different than predictions. Attenuation action levels are a fundamental part of the plume management zone approach.

Concerning §350.33(f)(4)(C)(i), Chevron commented that for commercial/industrial property there might be appropriate use of groundwater (e.g., as brine makeup water for a chlor-alkali plant) that would be beneficial use without resulting in exposure. The words "usage of and" are unnecessarily restrictive. TNRCC is requiring that for an RP to establish a plume management zone, one must deed record this zone. This requirement should only apply if the property is to be sold, or land use changes. Chevron requested that the commission delete the words "usage of and."

Chevron pointed out that the rule requires a person to prevent the "usage of and exposure to groundwater" from the plume management zone. Chevron suggested that the words "usage of an" are overly restrictive because there might be some appropriate uses of groundwater, such as brine makeup water for a chlor-alkali plant. The commission disagrees with this suggestion. The commission acknowledges that there may be some beneficial uses for certain groundwaters within

plume management zones. However, the fundamental purpose of a plume management zone is to prevent exposure to and use of the groundwater within the PCLE zone. If use of the groundwater is anticipated or desired, then a pollution cleanup response action (i.e., §350.33(f)(1)) should be employed.

The rule at §350.33(f)(4)(C)(i) is also amended to conform with the expanded definition of institutional control.

Concerning §350.33(f)(4)(C)(ii), Brown Carls & Mitchell asked if the executive director provide guidance and/or requirements for the demonstration commented that with regard to the technical presentation to demonstrate that COCs will not migrate beyond the downgradient boundary of the plume management zone. Brown Carls & Mitchell also asks whether the executive director will provide guidance and/or requirements for determining the natural attenuation action levels and the schedule for their periodic evaluation.

Yes, the agency is planning to develop guidance on a number of subjects with plume management zones being among the group.

Concerning §350.33(f)(4)(E), EPA Region 6 commented that proposed Remedy Standard B as well as Subchapter G, should, at a minimum, include removal or treatment of "principal threat wastes" from both soil and ground water including nonaqueous phase liquids, both identified based on historical releases and reasonably suspected releases. If removal or treatment is technically impracticable then a Technically Impracticable waiver should be filed and containment of sources to protect human health and the environment should be required. Investigation of historical or reasonably suspected releases should be based on historical data, personal interviews, historical maps, aerial photos, etc., to determine if releases are suspected to be present. KOCH supported the proposed provision that non-aqueous phase liquids (NAPLs) within a plume management zone should not have to be removed if specific conditions are met. Chevron, EPA, and KOCH commented that it isn't clear how the definition of a COC, which includes "petroleum product," will affect this. These commentors also stated that is not clear whether an RP will be required to remove the NAPL in order to achieve the No Further Action designation (if, for instance, the NAPL did not make COC concentrations increase, or cause the PCL to be exceeded at any time in the future). They requested that the commission clarify whether a monitored natural attenuation approach could allow NAPL to remain in place, even though the monitoring period could be quite long.

The commission has amended the rule language to make clear that the initial presumption is that at least readily recoverable NAPLs must be removed to the extent practicable, but given that these provisions are within the context of plume management zones, the executive director has also maintained the minimum proposed criteria by which persons can evaluate the appropriateness of leaving NAPLs in place. The agency does prefer that identified NAPLs be removed or treated. However, the agency also recognizes that controls may be appropriate, particularly if the NAPLs cannot be sufficiently addressed such that there is net environmental benefit. Therefore, in the implementation of these rule provisions, the initial premise is that the NAPLs must be removed to the extent practicable; however, flexibility is provided by which persons can make a demonstration that the remaining NAPLs do not represent a significant long term threat to human health and the environment. The commentor also asks whether a person is required to remove NAPL in order to achieve No Further Action even if the NAPL was not causing a problem. Discussion of No Further Action letters for Remedy Standard B is presented at §350.34(2) and (3). Paragraph (2) discusses a conditional No Further Action letter which is issued upon approval of the response action completion report for the affected property. The conditional No Further Action letter states that response actions are complete; however, the person must perform ongoing monitoring and maintenance actions during the post-response action care period. The provisions of §350.33(i) define the conditions for demonstrating that post-response action care is no longer necessary. Upon termination of the post-

response action care period, the agency will issue a final No Further Action letter pursuant to paragraph (3). It is possible that a final No Further Action letter could be issued in a low risk setting with NAPLs in place, provided: that the extent of the NAPLs and the groundwater PCLE zone could be shown to be naturally stable or decreasing in area; that physical controls are not relied on to control the NAPLs; and that all required institutional controls are in effect. The provisions in §350.33(i)(3)-(4) provide the regulatory pathway to making such demonstrations. No Further Action letters for these situations could not be issued under Remedy Standard A unless the remaining NAPLs do not exceed critical PCLs (e.g., critical PCLs exceed solubility). Specifically with regard to monitored natural attenuation, the remedial life span of the matter will be longer with NAPLs in place which serve as a continuing source of dissolved-phase COCs. However, as with any remedy, source area abatement is generally paramount to shortening remedial time frames. The acceptability of the remedial time frame will be made in the context of overall site risks on a site-specific basis. This commentor also questions whether using a monitored natural attenuation remedy, NAPL could remain in place, even though the monitoring period could be quite long. The commission notes that all response actions, including monitored natural attenuation, must be capable of achieving the Remedy Standard B response objectives "within a reasonable time frame". "Quite long" using a monitored natural attenuation approach does not appear "reasonable" if there are any other more prompt and workable response approaches. The commission advocates that remediations be completed in a timely manner and included the institutional control provisions of §350.31(h) to reinforce this point. Nevertheless, the commission also recognizes the fact that corrective action resources are finite and limited, and remedial time frames can be adjusted in a protective manner to provide an effective balance of progress and cost. So there is no elimination of the use of monitored natural attenuation solely for the presence of NAPLs.

Concerning §350.33(f)(4)(F), EPA Region 6 commented that the TRRP requires ground water monitoring along the central flow path to the down gradient extent of the plume management zone. This approach may not provide an adequate picture of contamination in the plume. The central flow path of the plume may or may not represent what is occurring at other cross gradient locations. There may be variations in geology that cause the plume to move faster at some other location than the central area, and may result in exposure of receptors to high contamination levels when the central monitoring wells indicate that no such exposure exists. Therefore monitoring should consist of a series of wells located cross-gradient to the motion of the plume, in addition to any necessary up gradient wells.

The commission agrees that this degree of groundwater monitoring will be necessary at some sites; however, it does not believe that it would be wise to specify this level of detail in the rule itself. Many sites will be monitored adequately with wells down the center line. Instead §350.33(f)(4)(D)(i) states "The number and location of attenuation monitoring points shall depend upon a site-specific evaluation of the hydrogeologic conditions of an affected property, the fate and transport characteristics of the COCs, and the length and configuration of the plume management zone." Also, §350.33(f)(4)(F) has been amended to conform to the expanded definition of institutional control by striking "area for which the landowner has provided concurrence for the placement" and replacing it with "limits". Landowner concurrence may not be necessitated if there is zoning or a governmental ordinance that is equivalent to the deed notice or restrictive covenant that would otherwise be required.

§350.33(g)-(n)

The commission, for the purpose of clarification, is making the following changes to the text of §350.33(g) - (n). First, in the first sentence of §350.33(l), the "and" in "subsections (e)(2) and (f) of this section" is changed to an "and/or". Second, in the first sentence of §350.33(m), the "and" in "subsection (e)(2) and (f) of this section" is changed to an "and/or". Third, in the first sentence of §350.33(m) the reference to subchapter (i) is changed to reference subchapter (j). Fourth, in the

second sentence of §350.33(m) the word "continuing" is being inserted as shown in ". . . and submitted for the cost of continuing the post-response action care activities specified in the approved RAP for the additional post-response action care period specified in subsection (j) of this section." And finally, in the sixth sentence of §350.33(m) the word "smaller" is being deleted because it is repetitive of "less than".

Concerning §350.33(g)-(n), Port of Houston Authority commented that the duration (30 years) implied under the re-proposed rule regarding Post Response Care (Standard B) appears excessive even as the de facto limit. Case closure (no further action) should be view on case-by-case basis for shorter periods.

The commission disagrees. The commission has designed this rule to make sure that funds will be available as long as a threat to human health or the environment is posed by the presence of COCs in any environmental media or physical control. The person always has the option of performing a removal and/or decontamination response action which does not require financial assurance. And finally, both subsections (h) and (i) provide a list of criteria which the person can use to demonstrate that a shorter post-response action care period would be appropriate. This commentor also states that determining clean closure status (i.e., no further action) should be reviewed on a case-by-case basis for a shorter period. The commission is issuing this rule so that under Remedy Standard B at §350.34(2) a conditional no further action letter can be issued upon agency approval of the response action completion report and at (3) a final no further action letter would be issued upon termination of post-response action care. The timing for issuance of these letters will be based on case-by-case evaluations of the status of the response action process.

Ranger commented that the focus of the proposed rules should be on site investigations and cleanups. There is no reasonable justification for the TNRCC to require a responsible party to set aside their money for 30 years because they have to perform post closure care activities. The TNRCC should merely require whatever post-closure care is necessary, and take enforcement actions against a responsibility party if they will not comply with the post-closure care requirements. State control over private monies for a 30 year time period will do nothing to actually clean up a site; however, it will cause severe financial harm to many in the regulated community; once again with small business owners being hit the hardest. Ranger also commented that requiring financial assurance for post closure activities will certainly inhibit future property transactions and add unnecessary costs and cost burdens which will ultimately result in more sites going to a superfund type program. Ranger asked the TNRCC to inform the public of whether it intends to fine a small business owner if he/she decides to take his/her copy of the RAP home with them one night, instead of leaving it at their place of business. Does the TNRCC expect that people will remember to get a formal TNRCC variance to take their report home with them? Ranger stated that it hoped the answer to this is no. If no, then Ranger asked why it is required in a rule? Ranger does not believe that it is a warranted or reasonable concern of the TNRCC where a responsible party maintains their files. Ranger commented that this is one more example of the unnecessary and over-complicated nature of these rules.

The commission does not agree with the views expressed by Ranger. First, the person who has released COCs into environmental media has the option to perform a removal and/or decontamination response action so that no financial assurance would be required. No one is forcing the person to use a physical control which triggers the requirement to provide financial assurance to make sure the control will be maintained and monitored over time. Second, the TRRP rule reduces the emphasis on "pollution cleanup" remedies and makes "exposure prevention" remedies possible under appropriate conditions. However, in order to make this shift in policy protective over the long term, increased emphasis must be placed on post-response action care, and attention must also be paid to guarantee that sufficient money would be available if the "exposure prevention" remedy needed maintenance or additional response action in the future. Moreover, the commission rejects the assertion these financial assurance requirements will hit disproportionately hard on small businesses. The commission has worked very hard to reduce any adverse effect on small businesses

but must, in general, maintain the necessary provision of financial assurance. Additionally, the requirement to keep a copy of the approved RAP at the property or a specified alternative location is simple, straight-forward, and is not burdensome. The agency's purpose in requiring this should be clear. The agency wants to increase the chances that personnel associated with the site will remain aware of the requirements of the post-response action care plan over time. The commission does not envision the agency taking an enforcement action against a person solely for failure to keep a copy of the RAP at the property for an abbreviated period; however, this failure could be noted as an additional item in an enforcement action if the person is failing in a general sense to fulfill the obligation to perform the required post-response action care. And finally, the commission does not concur that this rule's financial assurance requirement for post-closure care will inhibit future property transfers. Rather than inhibiting such transfers, the commission sees the effect as purchasers being more fully aware of a property's limitations and advantages and thus be better able to determine its true fair market value. As explained further in other responses, financial assurance and its related cost is not unnecessary and is a fundamental requirement for this rule to be protective of human health and the environment. This rule has been carefully balanced so that both large and small businesses can participate and the commission rejects the assertion that more superfund-type sites will result from its adoption.

Concerning §350.33(g)-(n), Henry, Lowerre, Johnson & Frederick commented that the proposals to amend rules for financial assurance (at, for example, §37.1321) are inadequate to cover proposed remediation plans. Instead of making the financial assurance cover the remediation, it would only cover the post care amount. Henry, Lowerre, Johnson & Frederick also commented that, in light of these risks, the failure of a new or experimental remediation plan, financial assurance needs to be provided at a greater level necessary to cover the costs that the standard remediation plan would require. Henry, Lowerre, Johnson & Frederick also asserts that any physical controls need to be designed so that local governments can abate nuisance conditions and enforce ordinances controlling weed conditions on the property if the property owner does not abate such conditions. The commentor also stated that it appears that the financial assurance requirements of the TRRP conflict with the requirements of the RCRA Subtitle C & D programs and the plugging and abandonment requirements of UIC programs. Henry, Lowerre, Johnson & Frederick further commented that adequate fees for continued governmental oversight and inspections need to be set to ensure that engineering controls remain in place. A funding mechanism needs to be adopted for transfer of moneys from the fees to local governmental agencies that are willing to perform such duties of inspection and oversight. They stated that they were unclear how confirmation sampling will be coordinated with sampling required in the affected property assessment. Finally, Henry, Lowerre, Johnson & Frederick commented that the reduction in financial assurance for small businesses from 30 to ten years has no basis in science or economics. Given the definition of small business (based on number of employees, not profits) there is no basis for assuming that small businesses are less capable of providing the same type of financial assurance as large companies. In any case, if the 30 year financial assurance is appropriate, the size of the business should not determine how much risk will be transferred to the public if the company seeks bankruptcy protection.

Henry, Lowerre, Johnson, & Frederick submitted an appreciable number of comments regarding subsections (g) - (n). The commission does not agree with Henry, Lowerre, Johnson & Frederick's conclusions. In the first place, the commission evaluated two options with regard to financial assurance: 1) have the person provide financial assurance for the entire response action cost, or 2) have the person only provide financial assurance for post-response action care. The commission determined that the latter of these two options is the most cost-effective. The cost of financial assurance for performance of the full response action would in many circumstances be quite high. The cost of obtaining financial assurance could tie up the funds that the person needs to perform the response action. After a problem has been created, the commission is primarily interested that the person take those actions which are necessary to remove or control the hazards presented by any surface soil, subsurface soil, and/or groundwater PCLE zone(s). The person is likely to be more

available, as compared to the future, for the filing of an enforcement action if work at the affected property is not satisfactory. The post-response action care financial assurance covers: monitoring of environmental media to verify response action effectiveness over time; inspection, operation, and maintenance of physical controls to ensure the effectiveness and integrity of the controls over time; and any other actions after the initial completion of the response action at an affected property which are necessary to protect human health and the environment. Since the financial assurance in this rule is based upon post-response action care, the commission also disagrees with the commentor's second statement that financial assurance should be based upon standard rather than new or experimental plans. Such an approach would discourage the development of new technologies to address the problems at affected properties. The commission also disagrees with the commentors assertion that the financial assurance requirements of this rule conflict with RCRA Subtitle C and D programs. This rule states at §350.2(a) that ". . . the regulations in this chapter do not eliminate the need for the person to meet any more stringent or additional requirements found in the particular rules for the covered program areas or applicable federal requirements." Thus, if federal rules are more stringent and they apply to an affected property, then a person would have to fully comply with them. This rule does not exempt any person from an applicable federal regulation. The commission has previously responded to this question regarding nuisance conditions such as weeds and the breeding of mosquitos in the discussion for §350.33(a),(b). If a local government has adopted ordinances for the purpose of abating nuisances then the local government, rather than the commission, would be responsible for enforcing those ordinances. The commission does not concur with the proposal set forward by Henry, Lowerre, Johnson & Frederick that adequate fees for government oversight and inspection need to be set to ensure that physical controls remain in place and that money be transferred to local governmental agencies that are willing to perform such duties of inspection and oversight. Contrary to this proposal, the legislature has designated the commission as the state agency responsible for managing the solid waste, hazardous waste, petroleum storage tank, voluntary cleanup, spill response, state superfund, as well as other programs. Also, the commission is not isolated in Austin as the agency has 15 regional offices that are distributed across the state. The answer to the sixth question regarding confirmation sampling results is highly site-specific. For example, if a physical control was used to contain an entire PCLE zone, then confirmation sampling would be used to verify over time that COCs are not present beyond the boundary of the physical control at concentrations greater than the critical PCLs. The sample results obtained during performance of the response action would generally be used more in concert with the sample results from the affected property assessment than would be the confirmation samples collected during the post-response action care period. And finally with regard to Henry, Lowerre, Johnson & Frederick's last comment, the rule we are adopting has been carefully balanced to both foster the performance of response actions and to minimize the potential for financial responsibility for problem sites to be transferred to the citizens of Texas. The commission has decided that it is in the best interest of the citizens of Texas that this response action rule be constructed such that both large and small businesses can participate.

Concerning §350.33(g) - (n), Chevron commented that it is not clear what is meant by "or physical controls." and requested clarification.

Chevron asked what the agency meant, with regard to physical controls, when the rule states that "the post-response action care activities . . . until a demonstration is made that there is no longer a threat to human health or the environment from the presence of COCs in any environmental media or physical controls". The commission refers the commentor to §350.33(i)(2) which is one example of how a demonstration of no threat to human health and the environment could be made. The subsection states "the post-response action care activity consists entirely of monitoring the effectiveness of a physical control, and the physical control has been proven successful and secure (i.e., the physical control is permanent and does not require any inspections and maintenance)." Thus, for the post-closure care period to end, there is no requirement that there be no COCs above

the critical PCLs within the physical control (e.g., cap or landfill); however, the physical control itself must attain the stated performance requirements (i.e., be permanent).

Concerning §350.33(g) - (n), McCulley Frick & Gilman commented that §350.33(i) provides the requirements for demonstrating that there is no longer a threat to human health and the environment. One of these requirements is that the post-response action care activity consists entirely of monitoring the effectiveness of a physical control and demonstrating that the physical control has been proven successful and secure (i.e., the physical control is permanent and does not require any inspections or maintenance). Section 350.33(j) notes that if after the end of the initial 30-year post-response action care period one of the demonstrations required under §350.33(i) cannot be made, then an additional 30-year post-response action period (including maintenance of financial assurance) would be required. The commentators stated that, although it appreciated the intent of this requirement, it appears to be even more burdensome than the post-closure requirements for a hazardous waste management unit under RCRA (40 CFR, §264.117(a)(20)(ii)). The RCRA rules allow the Regional Administrator to extend the post-closure care period if he finds that the extended period is necessary to protect human health and the environment (e.g., leachate or groundwater monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment). Consider the example of a capped industrial landfill that has been closed for 30 years and does not generate leachate, but does require cap maintenance activities (e.g., mowing and inspection). It appears that proposed TRRP rule would require a supplemental 30-year post-response action period, while the RCRA rules would likely not. McCulley Frick & Gilman urged the TNRCC to modify the proposed rules with language similar to that in RCRA. The revised language could allow the commission to require extended post-response action care, rather than requiring a demonstration that extended care is not needed. McCulley Frick & Gilman also commented that this section requires that a cost estimate in current dollars of the total cost of post-response action care activities be included in the RAP, and states that if the total response action care cost estimate is \$100,000 or less, then a party may be exempted from providing a financial assurance demonstration. The commentator requested clarification that this discussion refers to the present value of the projected costs over the post-response action care period.

McCulley Frick & Gilman proposed that the commission modify the financial assurance rule language so that the agency could require continued financial assurance, if necessary, rather than requiring the person to demonstrate that financial assurance for post-response action care is not needed. The commentator also wants the agency to clarify whether the financial assurance requirement pertains to present value of the projected costs over the post-response action care period. The commission does not concur. Both Risk Reduction Standard 2 under the current Risk Reduction rule (30 TAC, Chapter 335) and Remedy Standard A under this rule require permanent response actions because they involve only removal and/or decontamination. Risk Reduction Standard 3 of the current Risk Reduction rule requires a remedy to "be permanent or, if that is not practicable, achieve the highest degree of long-term effectiveness possible". We are issuing TRRP so that Remedy Standard B reduces this emphasis on pollution cleanup and allows more exposure prevention response actions (e.g., caps, slurry walls, plume management zones, etc.). However, we must also place a greater emphasis on post-response action care as a balancing aspect of this move away from strict pollution cleanup. And, we must also place an emphasis on maintaining financial assurance for post-response action care as long as it is necessary. The commission recommends that a person consider and weigh as a part of his remedy selection decision the expected length of time that financial assurance would have to be maintained for a Remedy Standard B "exposure prevention" response action. Regarding present value, the commission has clearly stated in the rule that a written cost estimate is to be provided in current dollars for the term of the post response action care period. The use of the word "term" indicates the current value is the amount developed in the written cost estimate for the total cost of the post response action care activities. Present value is not the intended method used for financial assurance.

Concerning §350.33(g) - (n), KOCH commented that the commission should not have the unilateral right to use financial assurance funds for post-response action care. A person must be afforded due process to contest (if appropriate) the commission's actions.

The commission disagrees with this statement. The purpose of the financial assurance is so that the commission will have the necessary funds available to respond, rapidly if need be, to a potential or actual threat to human health or the environment resulting from the person's improper inspection, operation, and/or maintenance of the physical control(s) of a response action. The commission will, of course, communicate with the person to determine whether the person is willing and able to perform the necessary actions unless circumstances dictate that immediate action be taken. The purpose of the financial assurance is clearly stated in the rule. A person will have been afforded his due process rights when he chooses under TRRP to implement a response action which requires financial assurance.

Concerning §350.33(g) - (n), TCC and TXOGA commented that there is no basis or need to submit the financial assurance mechanism at the time of the RAP. First, for many RAPs it will not be known at the time of submittal whether financial assurance will be a required element. Second, even if it is possible to tell at the time of the RAP that financial assurance will be required, it may take many years for the requirement of the remedial action to be implemented. There is no justification for maintaining post response action financial assurance during this period. It would be much more appropriate to have the financial assurance mechanism submitted with the RACR. TCC and TXOGA recommended that TNRCC allow financial assurance mechanism to be submitted with RACR.

The commission does not agree with these statements. The commission states that for a response action which is dependent upon proper functioning of a physical control(s), financial assurance is a critical, fundamental, and necessary requirement to provide adequate assurance that the response action will be protective of human health and the environment over time. In order to use the degree of flexibility provided in the rule for "exposure prevention" response actions, a person will be required to establish the financial assurance directly after the approval of the response action plan so that the agency can be informed early and on a continuing basis whether the person is financially capable of maintaining the necessary assurances. Also, the purpose of the response action plan is for the person to describe the response action which he proposes to use. We see no merit to the argument that no one will know at that time whether or not financial assurance will be required. Finally, maintaining financial assurance during an extended response action period increases the probability that the person will maintain the financial assurance throughout the post-response action care period.

Concerning §350.33(g) - (n), Craig's Cleaners commented that the financial assurance part of the rules are really burdensome for drycleaners. Most cleaners will have a hard time complying with financial requirements to meet TNRCC's requirements. The commentor argued that to make them provide for financial assurance for 15 years or more is really unrealistic, and suggested that the TNRCC should be making it easier, not more burdensome, if they want the environment cleaned up from contamination. Brown Carls & Mitchell asked if the exemption from the requirement to demonstrate financial assurance when the cost estimate for post-response action care is less than \$100,000 applies only when physical controls are used. If it does not, Brown Carls & Mitchell suggested that language in subsection (m) pertaining to this exemption should be segregated out so that its general applicability is clear, or, alternatively, the language should be added to subsection (1) and (n). Also, Brown Carls & Mitchell stated that \$100,000 exemption level is unrealistically low and should be raised to at least \$500,000. Especially since the cost estimate is for a period of 30 years.

The commission does not agree with these statements. The commission points out the text of subsection (n) which reduces the dollar amount of financial assurance for post-response action care

required from small businesses. Dry cleaners are expected to be small businesses. The commission has taken those actions which are realistic to reduce the financial impact and notes that any dry cleaner maintains the right to complete a response action which requires no financial assurance. And yes, since financial assurance is required only when response actions use physical controls, the \$100,000 financial assurance exemption level also applies only when physical controls are used. The \$100,000 level is the maximum exemption from financial assurance that the commission is comfortable adopting. It is the commission's responsibility to assure that adequate financial assurance is provided. Otherwise, if a person fails to adequately perform the required post-response action care, the citizens of Texas, through the response of the commission, would be unfairly burdened with expenses to assure that a facility does not present a threat to human health or the environment over time.

Concerning §350.33(g) - (n), EPA Region 6 commented that financial assurance in the case of Remedy Standard B should be required for at least 30 years, as established under RCRA, or TNRCC should reference specific program requirements in the event that a different time frame may be warranted for a lower risk site. EPA Region 6 also commented that while there may be some latitude in fashioning financial assurance requirements for corrective actions at solid waste management units and regulated units, the financial assurance requirements for closure and post closure care and monitoring of hazardous waste management units where waste is left in place are very specific. (See, 40 CFR 264, Subparts G and H) EPA Region 6 asked which financial assurance requirements will apply when the rule is final, those in the rule or those in the authorized RCRA program. The proposed rule also provides for a waiver of the post closure financial assurance requirements for small businesses. EPA Region 6 asked if this will apply to RCRA regulated facilities. The explanation discussion of the proposed rule suggests that cost savings will be accomplished through these different financial assurance requirements including saving in the Industrial and Hazardous Waste programs. EPA Region 6 asked what this statement means in terms of the authorized RCRA program.

Two comments regarding financial assurance were received from EPA Region 6. EPA Region 6 states that financial assurance under Remedy Standard B should be required for at least 30 years, as established under RCRA, or the agency should reference specific program requirements in the event that a different timeframe may be warranted for a lower risk site. The commission has not adopted this change. The rule states in several places that if there are additional or more stringent requirements expressed in Federal or State statutes or regulations then a person must comply with those requirements. Also, the commission does not view it as feasible, or advantageous, to attempt to amend this rule to note every location where some other regulation may apply. Also, EPA Region 6's Underground Injection Control program expressed concern that the commission might decrease the financial assurance for post-closure care of an underground injection control facility without following proper administrative procedures. This is an example of what was just discussed - an additional or more stringent requirement from a Federal regulation which a person must continue to comply with. The financial assurance requirements expressed in §350.33(g) - (n) of this rule could not be used to modify the federal financial assurance requirements for an underground injection control facility.

Concerning §350.33(i)(4), although no comments were received on this paragraph, the commission has changed the rule to reference the situation where the soil COC concentrations exceed only ^{GW}Soil, otherwise paragraphs (3) and (4) would be essentially identical.

Subsections 350.33(l) and (m) have been amended to correct the format for referencing Chapter 37, Subchapter N.

§350.34. No Further Action

Concerning §350.34, Environmental Fuel Systems, ICE and TPCA commented that they appreciate that TNRCC is allowing up to 15 years for such remedial methods as monitored natural attenuation, without a deed notice requirement in that term, and stated that this may be a good tool. This alleviates some concerns the PST industry had related to the 1998 proposed TRRP rules. However, the commentors stated that it appears that the appeal of this scenario is tied to keeping an LPST case open for a number of years on many sites, as natural attenuation proceeds. Convenience stores may sell one, two or more times in the span of five to 15 years. The commentors stated that it would be helpful if the agency would consider a "Conditional closure" letter for instances when natural attenuation is used. This may aid property transfers in two ways: 1) a potential buyer may be more interested in the property that does not have an active LPST case; 2) property value may be perceived to be less affected by the "conditionally closed" label than if an open LPST case is present.

The commission recognizes the utility of a "conditional closure" status and notes that provision has been made for it in §350.34(2) for Remedy Standard B. A conditional no further action letter will be sent to the person subsequent to approval of the response action completion report and receipt of proof that an institutional control is in effect for the affected property. The letter will indicate that the person has conditionally completed the response actions but must perform post response action care and whether financial assurance must be established. There is not a parallel provision for Remedy Standard A as it does not have a post response action care requirement. The commission understands that a "conditional closure" letter would be useful to persons much sooner in the process than indicated in §350.34(2), particularly to aid in the sale of affected properties which, according to Environmental Fuel Systems can occur one, two or more times for convenience stores, for example, in the span of five to 15 years.

The commission agrees. The rule is amended in §350.34 to allow consideration of "conditional closure" on a site-specific basis and in accordance with individual program area practices, where it is determined that monitored natural attenuation or other remedy will meet the Remedy Standard A requirements within a reasonable time frame.

The commission has added a provision authorizing the implementing programs to issue additional letters acknowledging conditional or partial completion ("conditional closure") of response actions. Persons should be aware that such letters, issued at the option of the implementing program, do not relieve the person of the requirement to continue the response action in full compliance with the requirements of this chapter.

The rule has also been amended at paragraphs (1) and (2) to conform with the expanded definition of institutional control.

§350.35. Substantial Change in Circumstances.

Concerning §350.35, Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP does not adequately assure that contamination left in place will not lead to additional contamination of ground water, especially under changed meteorological or land use conditions.

The commission points out that the rule does contain provisions in addition to the requirements integral to the remedy standards to prevent additional contamination of groundwater as a result of changed conditions. In addition to the monitoring requirements of Remedy Standard B, §350.35(d)(1) can be invoked to re-evaluate a response action if a physical control fails to prevent exposure at the approved performance level. For instance, a landfill cap that was designed to prevent rainfall infiltration of a certain amount could be re-evaluated if rainfall amounts for the affected property were to increase beyond the design limits to the point that the cap no longer functioned as intended. Also, §350.35(b) and (c) address a change in land use (commercial/industrial to residential)

that could result in a decrease in groundwater protective concentration levels due to the differences in exposure assumptions. The greater exposure frequency and duration for residential land use assumptions, for example, would result in a lower protective concentration level thereby necessitating an additional response action to achieve protection at the point of exposure.

Also concerning §350.35, Henry, Lowerre, Johnson & Frederick commented that this section suggests that the requirement to notify TNRCC of significant changes in site conditions detected during remedy implementation would be extended to cover all sites, not just those which TNRCC has previously approved.

The commentor seemed to infer that the requirements to notify the agency of significant changes in site conditions detected during remedy implementation would be extended to cover all sites, not just those which were previously approved. The commission points out that §350.35 applies only to completed response actions. Its purpose is to define the criteria by which a completed response action can be re-activated. Other provisions of the rule such as §350.31(h) and (i) concerning timeliness and notices, §350.32(b)(3) concerning appropriateness of remedies, and §350.53 concerning land use change prior to the approval of the response action completion report, enable the executive director to address changes in site conditions during remedy implementation.

Environmental Fuel Systems, ICE, and TPCA all expressed concern that this rule will make sites addressed under Chapter 334 appear to be unprotective.

The commission disagrees. The existing program is protective and to reinforce this, the rule has been amended in subsections (d) and (e) to allow any sites closed under Chapter 334 to remain under Chapter 334 should there be a substantial change in circumstances which re-opens a closed LPST case (not necessarily to include new releases). Further discussion is provided in responses to comments for subsection (e).

Concerning §350.35(b), Strasburger & Price commented that there is a typographical error at the end of this provision, in that it ends with both a comma and a period. Instead, it should end with the period only.

The commission has corrected a typographical error at the end of this subsection by deleting a comma.

Concerning §350.35(c), TCC and TXOGA commented that the requirement for a property re-evaluation within 30 days of the notification date when the land use change is requested is not reasonable. The commentors stated that a longer duration is more appropriate or a different criteria (such as a requirement that the property can not be used for the changed land use until TNRCC approval is granted) may be needed here. The commentors recommended allowing a longer period of 60 days.

The commission notes that subsection (b) of this section is a prohibition against threats to human health and the environment brought about by changing the land use from commercial/industrial to residential, or by removing, altering, or failing to maintain a physical or institutional control at an affected property. In responding to subsection (b), the commission expects the person to take any actions necessary to maintain appropriate protection at the property. Subsection (c) specifies the time frames and procedures for informing the agency of actions planned or taken. The commission does not intend these subsections to prohibit or delay a land owner from making use of the land in a different fashion, only that conditions of the property be protective for the change in use. The changes to land use or controls cited here require considerable planning on the part of the land owner and the timing of the notice and re-evaluation required by this subsection should be a part of the planning process. That is why the commission has separated this particular circumstance from those of subsection (d) which are generally unplanned and not appropriate for requiring a prior notice.

The commission envisions response to subsection (d) to be self-actualizing in nature. They are also intended to be used as enforceable provisions to compel a re-evaluation if the person fails to maintain appropriate diligence. Consequently, the commission changes this subsection to indicate that the person can self-implement actions to satisfy the requirements of paragraphs (1) or (2) but must obtain the prior approval of the executive director to undertake actions for paragraph (3). The 30-day time frame to submit the re-evaluation has been amended. Instead, the re-evaluation needs to be submitted at least 30 days prior to the date of the planned change.

The commentor should note that the 60-day notice of impending change is a minimum time frame. People are encouraged to make the notice to the executive director with as much lead time as possible so that the commission can be most responsive and not impede any planned development or real estate transaction. The executive director always attempts to be responsive and accommodate the needs of the public and regulated community; however, poor planning on the part of the person could unfortunately result in delays of planned activities if the executive director is given insufficient time to complete the review. Therefore, the rule has been written such that the executive director is given at least 30 days to review and respond to the re-evaluation. The person has as much time as they need to conduct the re-evaluation, but the executive director is also given adequate time to appropriately review the re-evaluation.

Concerning §350.35(d), Chevron commented that the rule states that a substantial change in circumstances shall include, among others, "an actual exposure condition is determined to be occurring at levels not protective of human health or the environment (e.g., unprotective ecological exposure is occurring)." The rule also states that "In response to these substantial changes in circumstances, the person shall use the rule in effect at the time of the substantial change to protect human health or the environment." This provision is overly broad and potentially subject to many interpretations. It could be used to re-open many sites previously closed under the existing Risk Reduction Standards set forth in Chapter 335. If an "actual exposure condition" did occur, that condition should be addressed under the rule in effect at the time the original remedy was implemented, not at the time of the substantial change. Chevron stated that provisions (d) and (e) should be modified to restrict the definition of "substantial change in circumstances", and to delete the requirement to use the rule in effect at the time of the substantial change.

The commentor notes the expression "actual human exposure" as used in paragraph 2 of this subsection, along with other provisions of subsection (e), taken together are overly broad and potentially subject to many interpretations. Chevron proposed a definition for the expression "actual human exposure" to be added to §350.4(a) to clarify its meaning. The commission differs with this recommendation. First, Chevron expands the concept to include situations of a high likelihood of human exposure to COCs but then factors into account the nature and duration of the exposure. These could have a counterbalancing effect: potentially more situations would be encountered but because of very limited duration, the conclusion would be that exposure was not at unsafe levels. Second, the time frame for making a determination of actual exposure (90 days from receipt of laboratory analytical data) is included in the definition. This is not an appropriate place to specify a response requirement. Third, the stated time frame seems excessive. A similar requirement exists in §350.55(e) wherein the response is to be performed as soon as possible but no later than 60 calendar days from receipt of laboratory analysis. Instead of adding this proposed definition to the rule, the commission will continue to apply a literal meaning to this expression, that is, human or ecological receptors are actually in direct contact with COCs above protective levels, such as people ingesting water with COCs above the PCL.

Concerning §350.35(d), Henry, Lowerre, Johnson & Frederick commented that the proposed rule fails to provide for any remedy if it turns out the predictions of the risk assessment and modeling were wrong, and contaminants do migrate off-site above safe levels.

The commission disagrees with this conclusion. Notwithstanding the normal requirements of Remedy Standard B for monitoring of response actions to verify the predictions of modeling, and of the verification monitoring that can be imposed if needed as part of Remedy Standard A, the situation as described can be addressed as a substantial change in circumstances under §350.35(d)(1), (2), or (3).

As a conforming change to the applicability provision (§350.2) of this rule for underground and above ground storage tanks regulated by Chapter 334 of this title, the commission is not applying the change in circumstance provisions to actions of the PST program that precede the applicability date of this rule. This subsection will apply to the PST program according to the applicability date (i.e., September 1, 2003) specified in §350.2(g) and then only for response actions completed according to this chapter.

Concerning §350.35(d)(5), EPA Region 6 commented that OSHA standards, although obligatory for industry, do not constitute the fulfillment of long-term human health protection under RCRA and other waste programs.

The commission recognizes that this assertion is generally correct for uncontrolled situations. This rulemaking allows as an option at §350.74(b)(1) the use of occupational inhalation criteria in a controlled setting so long as certain conditions are maintained, including adherence to a health and safety plan. If use of the health and safety plan is discontinued, a substantial change in circumstances will have occurred and protection for inhalation of COCs in air will have to be evaluated based on chronic exposure assumptions of the type to which EPA Region 6 alludes. This paragraph has been amended to conform to the change made to §350.74(b)(1).

Concerning §350.35(e), KOCH commented that the proposed text states that new toxicity data do not constitute a substantial change in circumstances, unless they present an unacceptable threat to human health or the environment. This restriction should be removed or revised. New toxicity data can also show less risk to human health or the environment. This type of new toxicity data must also be incorporated into risk assessments and response actions. For example, on April 3, 1998, the EPA revised the oral reference dose, added an inhalation reference dose standard and withdrew the oral cancer slope factor for beryllium (i.e., beryllium is now believed to be less toxicity than originally thought). This change resulted in a substantial increase in the soil cleanup value (e.g., about 1,000-times higher) because beryllium is less toxic to humans. If this clearly substantial change in circumstances was not incorporated into a pending RAP, a person or the commission would have to remediate the soil to an excessively low level. KOCH stated that the proposed text, at §350.73(a), should also be revised to allow the immediate use of less stringent toxicity data approved by the hierarchy of listed sources. Chevron commented that the inclusion of subsection (e) is misleading as the substantial change that occurs has nothing to do with the changes at the site. The change is the agency's decision to apply a new set of standards at sites that have been previously closed under the Risk Reduction Standards or other agency closure provisions., and the use of the phrase "of such magnitude" is unclear. The provision should be modified to restrict the definition of "substantial change in circumstances". Concerning §350.35(e), Henry, Lowerre, Johnson & Frederick commented that substantial changes for which appropriate action is required should include widely accepted changes to toxicity data and to levels of acceptable exposures. Currently, Henry, Lowerre, Johnson & Frederick notes the proposed rule states "...a change in numeric cleanup levels or a change in the procedures to calculate those levels does not constitute a substantial change in circumstances unless these changes are of such magnitude to present an unacceptable threat to human health or the environment." If the "cleanup levels" - a term not defined in the rule - go up, then the health risks exceed the standards (1×10^{-5}). Henry, Lowerre, Johnson & Frederick stated that it would appear that this should be considered a "substantial change." If not, that needs to be explained, as well as who will pay to lower the risk to regulatory limits.

The commentors all questioned the commission's meaning of a change "of such magnitude" in reference to the general procedures to calculate protective concentration levels or revisions to reflect new toxicity data, both of which could yield PCLs of lower concentrations than those approved in the response action plan or response action completion report.

The commission notes that this subsection has been carried forward with little change from the current Risk Reduction rule of 30 TAC, Chapter 335 and PST rule in 30 TAC, Chapter 334. The whole concept of substantial changes in circumstances was carefully negotiated with stakeholders in 1993 as part of the 30 TAC, Chapter 335 rulemaking to strike a critical balance between the continuing obligation to ensure that a health-based remedy remains protective and the need for administrative finality to the closure and remediation process. The commission intends to retain this balance and will add a clarification in guidance to be prepared as part of this rulemaking to give a minimum value that would constitute a substantial change. Over the years the commission has used as a general rule of thumb an order of magnitude change to quantify the expression "of such magnitude" (e.g., results in at least an order of magnitude change to PCLs); however, final determination may be for higher or lesser changes depending on the toxic effect of the COC and other factors.

This provision is intended to apply to changes that result in a decrease of acceptable PCLs for an affected property. Changes in toxicity data or procedures to calculate PCLs can also result in an increase in the PCLs, as KOCH has described. To address this situation, the person can use §350.73(a) to incorporate new toxicity data after the submittal of a self-implementation notice or response action plan by indicating the change to the agency and citing the data source from the hierarchy as the published credible authority. The rule does not need to be revised to accommodate this situation.

This section on substantial changes is intended to be self-actualizing by whoever the person might be in the future. The person is expected to take and pay for appropriate actions to evaluate an affected property for continued protectiveness by using the rules in effect at that future time based on property-specific considerations (e.g., use of any tier of Subchapter D). The commission believes it would be problematic and burdensome to retain in active status possibly multiple sets of rules or versions of PCL lookup tables in order to evaluate substantial changes according to the rules in effect at the time of response action completion report approval, as recommended by Chevron.

The commission will however change this provision as a conforming change to the applicability provision (§350.2(g)) of this rule for underground and above ground storage tanks regulated by Chapter 334 of this title. The commission is not applying this provision to actions of the PST program that precede the applicability date of this rule. This subsection will apply to the PST program according to the applicability date (i.e., September 1, 2003) specified in §350.2(g) and then only for response actions completed according to this chapter.

Concerning §350.35(f), the rule has been changed to conform with the expanded definition of institutional control.

§350.36. Relocation of Soils Containing Chemicals of Concern

Concerning §350.36, Craig's Cleaners commented that the disposal of investigation derived waste from monitoring wells and soil from well installation is not addressed in the proposed rules. Craig's Cleaners suggested that this dirt and water should be allowed to be put back into the ground where it came from. The expense of disposing this water and soil is costly. It would hurt nothing to return this to the ground it came from.

The commentor is partly correct that the rule does not directly address disposal of investigation derived waste. Disposal of wastes in general is covered by the statutes, rules and guidance of the applicable program areas. The generator of the waste is responsible for applying the correct classification to the investigation derived waste and then applying the appropriate management techniques. This rulemaking does specify at §350.2(h)(3) that the person can utilize this chapter to determine if COC concentrations satisfy the "contained in" policy of the EPA regarding listed hazardous waste or hazardous constituents contained in environmental media being managed as wastes. The details of this policy are summarized in the EPA document "Management of Remediation Waste Under RCRA" (EPA 530-F-98-026, October 1998). The commission will revise its version of this policy upon promulgation of this rule. The basic impact of this policy to the situation described by the commentor is that investigation derived waste with low enough concentrations of hazardous waste or hazardous constituents need not be managed as a hazardous waste.

Concerning §350.36, Environmental Fuel Systems and ICE commented that they are appreciative of the effort put into §350.36. This language appears helpful, especially in allowing one to "risk out" soil moved from the affected part of a site, then treated through some sort of monitored natural attenuation or other bio-attenuation.

Concerning §350.36, Henry, Lowerre, Johnson & Frederick commented that, even under the less rigorous requirements of TNRCC's non-hazardous industrial waste program, the TRRP will create conflicts. For example, Henry, Lowerre, Johnson & Frederick stated the broad provisions of §350.36 allowing disposal of soils contaminated with non-hazardous wastes, conflict with the requirements of the Texas solid waste laws and TNRCC rules. While there are no issues of conflicts with a federal non-hazardous industrial waste program, the TRRP still must meet the requirements of the Texas Health and Safety Code. Henry, Lowerre, Johnson & Frederick also stated that TNRCC is aware of the obvious conflicts.

The commentor asserts that this section will conflict with the requirements of the Texas solid waste laws and TNRCC rules by allowing the disposal of soils contaminated with non-hazardous wastes. The commentor did not cite specific examples of conflict but characterized them as obvious. The commission disagrees with this generalization. This section is designed to result in relocation of soils containing COCs in such a way as to be fully protective of human health and the environment at the new location. The section contains the caveat that relocation of soils which contain COCs may be subject to additional requirements or limitations.

Concerning §350.36, Henry, Lowerre, Johnson & Frederick commented that surface soil on commercial property is defined as five feet in depth. That is where the majority of the health impacts, and, therefore, cleanup are focused. It is, however, unclear how the rule would control the excavation of soil at depth, which is then brought to and spread on the surface. This is notwithstanding the deed recordation requirements for commercial properties, which will likely have little impact on the working operations of a plant over time.

The commission points out that the rule can address this situation in two different ways. First, the provisions of §350.36 could be applied as a soil relocation action, in which case the person would have to show that the COCs now at the surface are protective for that new location, either by meeting Remedy Standard A or B. Approval in advance is required for this type of action under Remedy Standard B. Second, the situation can be treated as a substantial change in circumstances as described in §350.35, if an actual exposure condition is occurring in excess of protective levels. The person is then obligated by §350.35(d) to protect human health and the environment in accordance with the rules in effect at the time of the substantial change.

Also with regard to §350.36, Henry, Lowerre, Johnson & Frederick commented that this section would allow reuse of soils that are "over" the residential PCLs but below the commercial PCLs as fill material in commercial areas. This could result in a new dangerous cottage industry of clean but low use commercial properties accepting marginally hazardous waste onto their land for disposal. Henry, Lowerre, Johnson & Frederick stated that this is a terrible idea. It is also a very bad idea if the result is that everyone gets a little contamination to spread out the risks. Dilution is not the solution. The contaminated soils need to be managed as contaminated soils, not as clean fill material.

The commission believes a significant feature of this section has been overlooked by the commentor. COC concentrations must be protective for the new location. The end result of a relocation action would be the same as if a release which had occurred at the new location had been remediated to Remedy Standard A or B. Secondly, landowner permission must be secured for the placement of soils containing COCs in amounts above naturally occurring background on land not owned by the person. This is to ensure that the landowner is aware that the soils contain COCs. Chapters 334 and 335 address other requirements or limitations that might apply to or prohibit soil relocation actions.

Concerning §350.36, AFCEE commented that it is not clear if Industrial Hazardous Waste rules regarding handling of contaminated soil supercede the application of this provision. Typically soils that contain COC at industrial facilities are considered industrial solid waste if they are removed from the land or an area of contamination and, as such, cannot be returned to the land without the action being considered waste disposal. AFCEE proposed that the provision be enhanced to specify relocation of soil, under this provision, containing levels of contaminants under the critical soil PCL will not be considered a waste disposal activity.

The commission has described elsewhere in this preamble how the hazardous waste rules can supercede this section. The commission cannot carry out the commentor's suggestion at this time because amending the definition of "disposal" in §335.1 was not a part of this rulemaking or of the conforming rulemaking for Chapter 335.

Concerning §350.36(a), EPA Region 6 commented that clarification of the applicability section regarding reuse of soils under RCRA must be included since the excavations of soils during construction activities given as the example would still constitute management under RCRA, if a listed waste was present. The soil reuse provision also appears to allow for dilution of COCs by spreading across the site while not exceeding PCLs.

The commission concurs with the commentor's conclusion regarding management of soils as a hazardous waste. The commentor also stated that the soil reuse provision appears to allow for dilution of COCs by spreading across the site while not exceeding PCLs. The commission believes the commentor is referring to 40 CFR, §268.3 (Dilution prohibited as a substitute for treatment) of the RCRA regulations and does not disagree if these regulations apply to a particular soil relocation action.

In recognition of these RCRA requirements, the commission proposed and retains a warning in this subsection that "relocation of soils which contain COCs may be subject to additional requirements or limitations (e.g., land disposal restrictions)." This statement is intended to alert persons to this possibility. Within the applicability subchapter of this chapter, §350.2(h)(3) alerts persons to the other regulations of Chapter 335 that can attach if media are managed as wastes, and to the option of making a "contained in" determination utilizing this chapter. Although the commentor's concern was with RCRA hazardous waste requirements, this section also is affected by Subchapter K of Chapter 334 for petroleum release sites of the PST program. The commission intends to develop guidance to clarify the relationship of the soil relocation provisions of this chapter with other applicable chapters. In the interim, persons will find a good summary of options available for RCRA-regulated situations,

including the "contained-in policy," in the EPA document "Management of Remediation Waste Under RCRA" (EPA 530-F-98-026, October 1998).

Concerning §350.36(a), Chevron, TCC, and TXOGA commented that "Naturally occurring background" is no longer defined in §350.2. The commentors recommended removing the words "naturally occurring."

The commission disagrees with this recommendation and retains this provision as proposed. Although the term had been defined separately in the May 15, 1998 proposed rulemaking, the definition of naturally occurring background has been inserted parenthetically in §350.4(a)(6) as part of the definition for background: ". . .naturally occurring (i.e., the concentration is not due to a release of COC from human activities). . .".

Concerning §350.36(a), Mobil supported the adoption of §350.36(a) which would allow excavation and subsequent replacement/reuse of soils containing COCs exceeding critical soil PCLs into the same excavation as long as the soil reuse will be protective of ecological receptors and meet the requirements of Remedy Standard B. Mobil further commented that this is a necessary provision allowing for continuing facility operations and upgrading at facilities where the response action plan will require many years to remediate the site. AFCEE commented that there is an inconsistency between the preamble and the rule for relocation of soils. The preamble stated that "excavation of contaminated soils by non-responsible parties during construction activities (e.g., installation, repair, removal of telephone lines or other utilities, or other construction activities) and the subsequent replacement of those soils back into that same excavation is not considered relocation or reuse in regard to the applicability of this chapter." Provision §350.36(a) omits the restriction to "non-responsible parties" implying that the provision is applicable to responsible parties as well. The language of proposed §350.36 seems consistent with EPA's long-held view that there is no basis for differentiating between RPs and non-RPs where soil relocation is concerned. AFCEE requested that the phrase "by non-responsible parties" be removed from the preamble to avoid misinterpretation.

Mobil supported the adoption of this subsection without modification, however, the commentor's description of the applicability of this section suggests a possible misunderstanding of its limitations. AFCEE pointed out that there is no basis for the distinction between responsible parties and non-responsible parties where soil relocation is concerned. AFCEE requested that the phrase "non-responsible parties" be removed from the preamble to avoid misinterpretation.

The commission reiterates that this subsection excludes certain actions from coverage under this section, such as construction activities involving installation, repair, removal of telephone lines or other utilities. In situations such as these, the person can return the soils to the excavation regardless of the COC concentration (unless non-aqueous phase liquids are present in the soil), barring any other requirements of applicable statutes or rules of the program area. The commission advises such persons to take appropriate precautions for worker exposure and safety and to insure that the replaced soils do not pose a threat to human health or the environment. The commission envisions such work being done by utility owners or their contractors, for example, or others ("non-responsible parties" of the preamble to the proposed rule of March 26, 1999) not directly under the control of the person who is responsible for the remediation of the affected property or maintenance of controls. The commission notes, however, that the person who is responsible for response actions at the affected property could also be performing construction activities. The same exclusion from this section would apply to that person as well. So in this situation, the commission is agreeing with the comments of the AFCEE regarding differentiation between responsible parties and non-responsible parties.

In contrast, the commission does not extend this exclusion to activities of closure, remediation or PST tank removals, for example, that are routinely regulated as waste management activities and for

which additional requirements or restrictions typically do apply. The commission is particularly concerned about facilities conducting closure or remediation by removal of soils exceeding PCLs, then returning these soils without treatment to the same excavation by incorrectly applying this exclusion and claiming that the response action is completed. A variation to this scenario for PST tank removals is addressed by regulations in Chapter 334, as discussed below in response to comments on §350.36(c).

Concerning §350.36(b)(4) and (c)(4), the rule has been changed to conform with the expanded definition of institutional control.

Concerning §350.36(c), Environmental Fuel Systems and ICE commented that under the soil reuse rule language, it still appears contaminated "tank pit" backfill may be placed back into an excavation that abandoned USTs have just been removed from - but a deed recordation must be put in place if COC levels are high enough. In practice, the commentors stated that the agency's PST Division has seldom required treatment and/or off-site disposal of fuel-contaminated soils - especially backfills - in the last four to six years. To avoid the deed notice, the responsible person will perform an expensive soil treatment or "dig and haul" event. If the practices of the last four to six years have been adequately protective of human and ecological health, the commentors asked why drive up the cost of such things as UST removal projects, either by deed recordation and written concurrences, or by the old "dig and haul" approach. Environmental Fuel Systems and ICE stated that TNRCC clarification of this point will yield big changes in potential cost impacts of these rules, in this type of scenario. TPCA commented that the proposed TRRP makes changes to the current policy of handling contaminated soils that are part of a tank removal. Under the current proposal, owners will be forced to remove these soils to appropriate landfills to avoid filing a deed notice for the property because of the existence of the COC. This is a major departure for what has taken place on thousands of properties over the last four years.

This type of action was specifically cited in the examples of actions not considered to be construction activities where soils containing COCs can be returned to the location from whence they came without having to comply with this section. The interpretation follows that backfilling of "tank pits" is therefore subject to this section, a conclusion which would be reinforced by the proposed conforming rulemaking of Chapter 334. In that rulemaking, the commission proposed to delete the variances of §334.503(c)(3)(F) and (G) which formed the basis for the policies regarding backfilling of "tank pits" and addressing any COCs in the backfilled soils as part of the overall response action for the UST site. The commission intends to retain these provisions within Chapter 334 so that this current practice can continue after this chapter applies to UST sites. The commission does not view the return of the excavated backfill to the pit as relocation of soils subject to this section, but rather allows the backfill to be returned to the pit where it will be evaluated for protectiveness and potential remediation in the context of the entire affected property. The commission will reinstate these provisions in the conforming rule for Chapter 334.

Additionally, the commission points out that the applicability of this rule is defined through the program area. If a person conducts a tank removal and no leaking petroleum storage tank release is pursued, then this rule is not invoked. In that regard, this rulemaking does not affect current backfill management practices which today involves the routine return of backfill material to the original tank pit in accordance with the March 2, 1993, Interoffice Memorandum regarding Guidance for the Proper Handling of Backfill Materials Generated from Petroleum Storage Tank System Removals or Repairs.

Concerning §350.36(d), Brown & Caldwell commented that the subsection requires that a person obtain written permission before relocating soils that contain COCs above naturally-occurring levels to a property not owned by the person. Brown & Caldwell recommended that this prohibition be removed if soils meet Remedy Standard A Tier 1 residential PCLs. This is especially important in the case where someone

purchases a property which has undergone corrective action to Remedy Standard A Tier 1 Residential standards. Since no deed notification is required in this instance, the person may not be aware that COCs are present at concentrations which exceed naturally-occurring levels.

The commission notes the apparent incongruity with a response action attaining Remedy Standard A on land not owned by the person but notes that the parallel drawn by the commentor is not completely comparable to a soil relocation action. First, in performing a response action on land not owned by the person, even to Remedy Standard A, Tier 1 residential requirements, the person would have to obtain the landowner's permission to gain access to the property. Secondly, §350.55 would require the person to provide notice of availability of information pertaining to samples collected on the property, thereby continuing to inform the person of actions taking place there. For the soil relocation scenario presented by the commentor, the only proof of contact between the person and landowner required by this chapter would be the written consent of the landowner. The commission believes this is an appropriate requirement since no other documentation would be furnished to the agency establishing the mutual acceptance of the soil relocation action. The commission will retain the provision as proposed.

§350.37. Human Health Points of Exposure.

Concerning §350.37(a), Environmental Resources Management and SRA commented that §350.37 contains over five pages of detailed requirements as to what POEs should be evaluated. The commentors stated that the concept of "prescribed POEs" is an example of where this rule is overly prescriptive, eliminating the use of site-specific information and destroying the relevance of the whole risk-based approach. They suggested that POEs should be determined on a site-specific basis if a risk assessment is to mean anything, and recommended removing §350.37 claiming that the framework of the rule will function just as effectively without it.

The commission disagrees with the comments presented by Environmental Resources Management and SRA with regard to prescribed points of exposure (POEs) for humans to environmental media. These commentors asserted that the concept of prescribed POEs is overly prescriptive; inappropriately eliminates the use of site-specific information; destroys the relevance of a risk-based approach; will increase substantially the cost of corrective action; and will discourage voluntary cleanups. These assertions are incorrect. The additional criteria regarding POEs to environmental media will accelerate the response action process by clearly laying out the expectations of the commission and by reducing disagreements. Additionally, specifying the location where conformance with the PCLs must be demonstrated will establish a consistent level of performance for protection of human receptors which the response actions at all affected properties must attain and then maintain over time. As a result, there will be a much lower possibility for the response actions at various affected properties to have unjustifiable differences which could provide unacceptable variations in the level of protection provided to humans. The procedure promulgated in this rule will mean that the term "cleaned to a residential level" will have a standard, uniform meaning across Texas. The commission's experience has shown that the lack of text which adequately describes criteria for setting POEs within the current Risk Reduction rule (30 TAC, Chapter 335) has caused disagreements and delay, which has compromised the efficiency of the response action process. Further, the lack of objective criteria on which to base decisions regarding POEs has led to the criticism that the establishment of POEs has been inconsistent from site to site and determined more by the personalities of the people involved than the physical characteristics of the site. Detailed criteria for setting POEs will accelerate the response process by clearly stating the expectations of the commission and thereby resulting in less opportunity for a response action plan to be rejected. The response action process will also be hastened since no baseline risk assessment report is required. In summary, the commission concludes that the locations within environmental media where comparison with the PCLs will be performed (i.e., POEs) are appropriately specified within the rule.

Concerning §350.37(a), Chevron commented that the statement, “Consideration of competent, existing physical controls during the pathway analysis does not negate or otherwise supercede the POE locations . . . ,“ is unnecessarily burdensome and restrictive. The presence of e.g. a paved parking lot over e.g. a former spill site that contains COCs in soil would reduce or eliminate exposure pathways. It is not reasonable to eliminate such a feature from the pathway analysis for all tiers, moreover, this provision significantly reduces the opportunity to take site conditions into account in a higher tier analysis (i.e., in Tier 3). Chevron requested that the commission add "for analysis in Tiers 1 and 2" to the end of this sentence.

The commission also disagrees with the comment provided by Chevron that it is unnecessarily burdensome and restrictive for the presence of a parking lot over a former spill site not to reduce or eliminate the soil exposure pathways. Unfortunately, the commentor did not correctly summarize this section of the rule. Section 350.71(d) states in part ". . . the presence of a competent existing physical control which prevents the exposure of receptors to COCs may be considered as sufficient proof that the exposure pathway is incomplete for the geographic area covered by the control when the person is able and willing to incorporate the physical control as a Remedy Standard B response action meeting all associated performance, institutional control, and post-response action care requirements, including financial assurance, for that physical control". However, §350.37(a) states in part "consideration of competent, existing physical controls during the pathway analysis described in §350.71(d) of this title (relating to General Requirements) does not negate or otherwise supercede the POE locations specified in this section." In other words, in the example cited, there must remain a POE to the contaminated soil resulting from the spill; however, the person could use the parking lot cover as a response action under Remedy Standard B, provided it is competent to attain the response action performance requirements and the person is willing to meet the associated remedy requirements. A competent, existing physical control, like a parking lot, could be used to document that the soil exposure pathways are incomplete, but could not be used to remove the POE to soil.

Concerning §350.37(b), Henry, Lowerre, Johnson & Frederick commented that the proposed rule states that the prescribed off-site POE to air would be "within the breathing zone of residents located on the closest off-site property." Henry, Lowerre, Johnson & Frederick is unclear what this describes. EPA has traditionally considered the off-site point of exposure to be set at the property boundary, whether currently occupied by a resident or not. This is to ensure that potential future residents will not be at risk.

The commission is finalizing the air POE language as proposed, without modification. The off-site POE for air begins at the nearest property boundary and continues throughout neighboring off-site properties. There is no requirement that human receptors are currently present. This designation for the off-site POE for air means that an off-site property would be protected for future use even if it is not currently being used.

Concerning §350.37(c), Chevron commented that surface soil is defined in §350.4(a)(84) as 0-15 feet for residential land use and zero - five feet for commercial/industrial land use, or to the top of the uppermost groundwater-bearing unit, whichever is less in depth. Chevron stated that an assumption of 15 feet is overly conservative for residential property activities in Texas. Surface soil should be re-defined for residential land use consistent with regional construction practices. Henry, Lowerre, Johnson & Frederick commented that it does not believe this is appropriate for off-site contamination, where the facility has no control of future activities. This would also not address the possibility of volatilization into the 15-foot zone from underlying contamination. TNRCC should consider some type of soil gas monitoring. Henry, Lowerre, Johnson & Frederick also requested that the commission adopt adequate provisions for cleanup of public rights-of-way and easements to ensure that they are protective of residential uses, and for contact below 15 feet below ground level when contact occurs at these levels. In addition to these comments, the commission received a number of comments on proposed §350.4(a)(82),(83), and (84). The commission refers persons to the comments listed under that section, as well.

The commission received a number of comments expressing divergent points of view regarding the POEs for surface and subsurface soil. Chevron expressed the view that 15 feet is overly conservative as the on-site and off-site POE for surface soil and that the rule should be revised to base this decision on regional construction practices. In a similar vein, McCulley Frick & Gilman recommended that the surface soil definition and later requirements related to surface soil depth for residential properties be revised to indicate that surface soil is considered to be the zero to six inch soil interval. They asserted that deeper surface soil depths, such as zero to three feet could be considered based on site-specific conditions (e.g., building practices and gardening). Environmental Resources Management expressed a similar concern that a 5 foot depth for surface soils on commercial/industrial properties would result in unnecessary remediation. They suggested that industrial worker exposure be considered in the zero - two foot interval and that OSHA-type standards be used to evaluate exposure in the two to five foot depth. EPA Region 6 commented that it was inappropriate to use 15 and five feet as universal definitions for surface soil at residential and commercial/industrial properties, respectively. They also suggested that the definition of surface soils weigh the likelihood of the area being developed, the distribution of contamination, and allow for construction practices. On the other side of this issue, Henry, Lowerre, Johnson, & Frederick were concerned in light of their interpretation that soil contamination below 15 feet would not be required to be addressed, except possibly to prevent cross-media transfer of COCs to groundwater. This commentator also stated that the public would not consider this appropriate for off-site migration where the facility would have no control of future activities. Further, this commentator requested that the commission adopt criteria for the cleanup of public rights-of-way and easements where contact with groundwater and soil may occur deeper than 15 feet below ground levels. The commission emphasizes that it received comments on both sides of this issue some supporting a shallower and others a deeper POE for surface soils.

The commission has decided to promulgate the surface and subsurface soil POEs as proposed. Neither the arguments presented to have a shallower nor a deeper POE to surface soils are persuasive. In response to the comments provided, the commission provides the following discussion.

The commission first considered adopting the soil POEs for residential properties contained in the current Risk Reduction rule (RRRs). The current RRRs establish the soil POE throughout all soils for residential properties under Standard 2. The commission determined that the "bottomless" aspect of the residential soil POE provision of the existing RRRs is unreasonable given that the likelihood of human exposure declines with depth, and beyond the depths of normal construction the potential for human exposure is slight. The PST rule uses a soil POE depth criterion of 15 feet which is based on the practical observation that most subsurface construction at residential properties in Texas commonly involves installation of subsurface utilities, swimming pools, shallow basements, and septic systems which are typically confined to the upper 15 feet of the subsurface. The commentator arguing for a deeper depth for this POE did not provide any persuasive evidence that 15 feet is not adequate. Moreover, the PCLs for ^{GW}Soil to protect groundwater from the transfer of COCs from soil and ^{Air}Soil_{Inh-V} to protect air from the transfer of COCs from soil both apply to subsurface soils. So the presence and allowed quantity of COCs in subsurface soils is not unregulated. The 15 foot depth is also generally consistent with the soil POE depth used by other states in their corrective action regulations. During or after the response action, it is reasonable that excavated soil could be spread at ground surface where human exposure could occur. The commission recognizes that some will perceive this to be a conservative assumption, but given that institutional controls will not be required for Remedy Standard A response actions at residential properties, there would be no notice to residents if subsurface soils containing COCs were excavated. As a reasonable precaution, the commission is setting the depth of surface soils so that the excavation of subsurface soils is quite unlikely. Therefore, the commission has decided to set the POE to surface soils at residential sites as being from the ground surface to a depth of 15 feet.

The commission started its evaluation for the establishment of the POE to surface soil for commercial/industrial properties by considering two alternatives: (1) the two foot depth surface soil POE in the existing RRRs; and (2) the 15 foot depth criterion incorporated into the PST rule. The commission decided that a depth criterion of 15 feet for surface soils at commercial/industrial sites would be unnecessarily costly given that an institutional control is required whenever the response action is based on commercial/industrial use of the affected property. However, the commission also determined that soil excavated during routine maintenance of subsurface utilities and pipelines may be periodically brought to the ground surface and left exposed. The two foot depth of the existing RRRs does not provide adequate coverage for the common depths of subsurface utilities; therefore, the commission is setting a depth of five feet as the POE to surface soils at commercial/industrial properties. And finally, the five foot depth is consistent with and linked to the commission's decision to not specify construction worker exposure as a routine pathway for commercial/industrial land use.

Concerning §350.37(d), Henry, Lowerre, Johnson & Frederick asked that when soil is contaminated but groundwater is not, is it possible that allowing the point of exposure to be moved to the property boundary could provide an incentive to the responsible party to report that the groundwater is contaminated in order to meet soil PCLs that would be less restrictive than those required if the groundwater were not contaminated. Henry, Lowerre, Johnson & Frederick also asked what validation of this condition does TNRCC envision occurring. Environmental Fuel Systems and ICE suggested re-wording §350.37(d)(2) as follows: “Off-site POE. The prescribed off-site POE is throughout the upper-most ground-water-bearing unit at the nearest hydraulically downgradient site boundary and continuing through that nearest hydraulically downgradient off-site property.”

Subsection 350.37(d) regarding the POEs for uncontaminated class 1, 2, and 3 groundwater is adopted as proposed. In a round about way, the comment provided by Henry, Lowerre, Johnson, & Frederick makes the basic point of this subsection. That is, if groundwater, regardless of its classification, does not contain COCs in excess of the critical groundwater PCLs, then the unit, facility, or area must be managed so that groundwater contamination does not occur. The information to initially make the judgment whether groundwater at a site is contaminated will be provided in the Affected Property Assessment Report and will not be subject to easy misinterpretation, without purposeful misrepresentation. Regardless, the commission doubts whether persons will purposefully expose themselves to the liability of managing groundwater contamination solely to argue for higher soil PCLs. Also, the commission does not agree with the suggested wording for the off-site POE for uncontaminated groundwater provided by Environmental Fuel Systems. The term "throughout" as used in the POE description means "from top to bottom" in the upper-most groundwater-bearing unit on the nearest boundary with the closest hydraulically downgradient off-site property. The commission is purposefully not extending the off-site uncontaminated groundwater POE for the source property beneath neighboring properties. The term "uncontaminated", as used by the commission here, means that the uppermost groundwater-bearing unit has not been adversely effected by the source property in question. The commission does not mean by "uncontaminated" that the upper-most ground-water bearing unit is unaffected by COCs throughout its entire regional extent. One effect of this is that a person cannot use the presence of COCs in the upper-most groundwater-bearing unit beneath a neighboring off-site property to conclude that the groundwater-bearing unit under his property is contaminated and therefore base the management of an on-site soil PCLE zone on that assumption.

The commission also points out that the person should also interpret the “upper-most groundwater-bearing zone” to mean not only the unit closest to ground surface, but also to mean the first unaffected groundwater-bearing unit. For example, if there are four groundwater-bearing units, and the first three are affected, but the deepest and fourth groundwater-bearing unit is not affected, then §350.37(d)(1) and (2) would apply to that fourth groundwater-bearing unit, but not to the upper three groundwater-bearing units.

Concerning §350.37(e), EPA Region 6 commented that exclusion of groundwater for consideration in determining the POE may not be consistent with RCRA requirements for regulated units, and the distinction should be noted. Care should be exercised since these units are frequently sources of principal threat wastes which should be removed, and increasing concentrations of COCs do not appear to trigger any action. These concerns with the treatment of regulated units under TRRP extend to all aspects of the rule (e.g., 350.37(e)(1)), and afford TNRCC with opportunities to explicitly refer regulated entities back to specific programs which are in conflict with various sections of the rule.

The commission adopts §350.37(e) as proposed. EPA Region 6 provided a comment which stressed that the exclusion of groundwater beneath a regulated unit as a POE to groundwater may not be consistent with RCRA. EPA Region 6 has here, and at other places throughout the rule, expressed the concern that the commission should note at each location where more stringent or additional federal standards may apply. The commission disagrees. The commission has already stated in several prominent places in the rule that persons must comply with TRRP as well as any pertinent additional regulations (i.e., §350.2(a) and §350.31(j)). Clearly it is the commission's intention that if RCRA regulations do not allow the exclusion of groundwater beneath a RCRA regulated unit as a POE to groundwater then this would not occur. In addition, please see the preamble discussion for §350.33(f)(2) for a discussion of waste control units. Regarding placing notices in the rule of relevant regulations, the commission has two primary concerns. First, itemizing and summarizing EPA's regulations along with all potentially applicable other federal agency, state, county, and city regulations which could in some manner pertain to a response action for COCs in environmental media would be difficult to perform and subject to change. Additionally, the argument would surely be made that any regulations not included in the rule were intentionally excluded even if they were simply overlooked. The commission could also be forced to change its rule in the future simply because of changes to the regulations which were referenced. Second, the commission has tried to keep TRRP as simple and straight-forward as possible. Admittedly, the rule is detailed. However, the rule would become even more detailed and would become confusing if we included references to and the relevance of various EPA regulations. The bottom line is that persons are going to have to understand TRRP as the relevant state regulations and then look at EPA's programs to see whether additional actions are required. Guidance is a more appropriate avenue for explanation of interplay between the rules.

Concerning §350.37(f), Chevron commented that there is no provision to allow groundwater use restrictions on a particular site. The site-specific use of the groundwater (current and future) should be considered for the POE. The text should be revised to indicate that if a groundwater use restriction is filed for the site, the on-site POE does not apply to the entire site.

Subsection 350.37(f) regarding the human health POEs for class 1 groundwater is adopted as proposed. Chevron any filed a comment stating that the rule text should be revised to indicate that if a groundwater use restriction is filed for the site then the on-site POE to class 1 groundwater should not apply to the entire site. The commission does not agree that the requirement for the person to restore class 1 groundwater to the PCLs would be appropriately removed by means of a groundwater use restriction. The commission has defined class 1 groundwater as a primary groundwater resource. Class 1 groundwater is an extremely valuable resource, is a current public water supply for many large municipalities, and has a high probability of future use due to droughts and population growth in large areas of the state. Groundwater is a very valuable and limited state resource impacting the state's economic well-being and public health both now and in the future. The commission considers it imperative to protect uncontaminated groundwater supplies to ensure that present uses are maintained and potential uses are not impaired. Likewise, the commission will require that contaminated class 1 groundwater be restored to drinking water limits because these are the most productive and irreplaceable groundwater supplies in the state.

Concerning §350.37(f), Henry, Lowerre, Johnson & Frederick commented that the proposed rule states that the prescribed on-site point of exposure to class 1 and 2 groundwater under residential land use conditions would be a well for residents completed directly within the groundwater source area. "Groundwater" source area is not clearly defined. Henry, Lowerre, Johnson & Frederick asked if it could include the saturated zone area outside of the site boundary. If so, Henry, Lowerre, Johnson & Frederick asserted that off-site drinking water wells completed in the off-site source area could be at risk, while no on-site area may be above the PCL because of plume migration. Henry, Lowerre, Johnson & Frederick also asked if the groundwater source area moves as the plume moves.

Henry, Lowerre, Johnson, & Frederick have also resubmitted a comment regarding class 1 groundwater POEs that was originally provided in response to a 1996 commission conceptual document. The location of the groundwater POE was originally explained in terms of a "groundwater source area" and Henry, Lowerre, Johnson & Frederick's comment is expressed in this terminology. This comment is not relevant to the adopted language for class 1 groundwater POEs because this subsection is not expressed in terms of a "groundwater source area" and the comment is not pertinent in any other fashion to the current text of the subsection.

Concerning §350.37(g), ARCADIS Geraghty & Miller, Chevron, Fina, and AFCEE commented that the proposed rules dictate that class 2 offsite groundwater contamination must be remediated to MCLs, and suggested that there are no technical or legal requirements that mandate this approach. That in many areas of the state, the shallow groundwater that might be impacted by a release is class 2 groundwater. The commentors stated that class 2 groundwater is generally undrinkable. They also commented that due to the availability in these areas of high quality municipal (or other) water supplies and/or local restrictions on installation of drinking water wells, no landowner is likely to install a well into these shallow zones, nor would residents ingest that class 2 groundwater. The TNRCC has recognized in §350.37(1)(3)(A) that some class 2 groundwater-bearing units may have no future beneficial use, and provided criteria for determining future beneficial use in §350.37(1)(3)(C). The commentors recommended that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater, and should be held to the same criteria (i.e., PCLs) as class 3 groundwater. The commentors also recommended that the site-specific use of the groundwater (current and future) should be considered for the POE. The text should be revised to indicate that if a groundwater use restriction is applicable at the site, the on-site POE does not apply to the entire site. The commentors also offered additional suggestions. They recommended allowing consideration of high quality municipal (or other) water supplies and/or local restrictions on the installation and use of water wells. They also recommended that the off-site POE should be altered to allow for risk assessment based upon standard exposure factors for inhalation and dermal contact.

The commission is adopting §350.37(g) as proposed which pertains to the on-site and off-site POEs for class 2 groundwater. The commission received a number of detailed comments on this subsection with which it does not concur that were provided by Chevron, ARCADIS Geraghty & Miller, and Fina. For various reasons the companies requested flexibility to deviate from the on and off-site POEs for class 2 groundwater specified in this subsection.

Again, the commission disagrees with the commentors requests and maintains the broad definition of class 2 groundwater-bearing unit as initially considered suitable for use as a human drinking water supply. This means that, unless modified, the POE to class 2 groundwater shall be throughout the on and off-site extent of the groundwater protective concentration level exceedence (PCLE) zone. The TRRP rule is designed such that any flexibility for deviation from the general groundwater response objectives is provided in §350.33(f) regarding Remedy Standard B rather than in §350.37 which pertains to POEs.

Consistent with these requirements, the legislature has stated in the Ground Water Protection Act (Texas Water Code Chapter 26.401) that "in order to safeguard present and future ground water supplies, usable and potentially usable ground water must be protected and maintained". Further, the legislature established the policy that state agencies would require the quality of ground water to be restored, if feasible, to "maintain present use and not impair potential uses of ground water . . ." The commission asserts that the present location of water wells or lack of use of groundwater is not a reliable indicator of an aquifer's potential for beneficial use. The lack of water wells in an area means only that a water-bearing unit is not presently being used and does not imply anything about the unit's ability to serve as a future human drinking water supply. The statute further states that "aquifers vary both in their potential for beneficial use and in their susceptibility for contamination".

The rule as promulgated provides no direct flexibility within §350.37(g) regarding the on and off-site POEs to class 2 groundwater. However, following up on the theme provided by the legislature that "aquifers vary . . . in their potential for beneficial use", §350.33 (relating to Remedy Standard B) provides flexibility when warranted regarding the degree and type of response actions which are required for PCLE zones in class 2 groundwater. The general groundwater response objectives are listed in §350.33(f)(1) and must be attained unless the person demonstrates that a site qualifies for one or more of the identified areas of flexibility. §350.33(f)(2) discusses that with the executive director's approval, the groundwater directly beneath a waste control unit does not have to be restored to attain the critical groundwater PCLs. Also, §350.33(f)(3) explains that the person can demonstrate that it is technically impracticable using currently available remediation technologies to restore all or a portion of the groundwater PCLE zone to the critical groundwater PCLs. And finally and most importantly, §350.33(f)(4) provides that the executive director may under Remedy Standard B approve a plume management zone for class 2 or 3 groundwater. The most important characteristic of a plume management zone is that the POE to groundwater is changed from throughout the PCLE zone to the downgradient boundary of the plume management zone. This alternate POE location at the boundary of the plume management zone is established in response to §350.37(l) for class 2 groundwater and §350.37(m) for class 3 groundwater. Thus, while the commission does not agree with the comments regarding class 2 groundwater POEs provided by the previously listed commentors, some of the desired flexibility can be attained through approval of a plume management zone. Persons should realize, however, that unless and until the executive director concurs with the designation of a plume management zone, the person is required to remediate a groundwater PCLE zone using the general groundwater response objectives expressed at §350.33(f)(1). Detailed factors to guide the evaluation of the acceptability of a plume management zone are listed at §350.33(f)(4)(A) and are expressed in terms of potentially adverse effects on groundwater and surface water quality.

Concerning §350.37(g), Henry, Lowerre, Johnson & Frederick commented that groundwater contamination should not be allowed to spread great distances at large facilities, thereby impacting clean, usable portions of aquifers. Also concerning §350.37(g), Henry, Lowerre, Johnson & Frederick commented that the establishment of alternate points of compliance at the on-site boundary of an effective institutional control needs further discussion, and asked how TNRCC envisions preventing potentially large areas of proposed class 2 uncontaminated groundwater from becoming contaminated by plume migration. This commentor is also concerned that class 2 drinking water supplies are being provided significantly less protection under the proposed rules than under current guidelines; that the Safe Drinking Water Act makes no distinction between the protection to be provided to class 1 and class 2 groundwater resources; and that the statute and regulations require protection of current or potential groundwater supplies with TDS content of less than 10,000 mg/l.

Henry, Lowerre, Johnson, & Frederick asked two questions about how the agency envisions preventing potentially large areas of class 2 groundwater from becoming contaminated particularly at large facilities. Both of these questions were originally submitted in 1996 and were resubmitted for this rule-making. Section 350.37(l) explains that the largest possible expansion of a plume

management zone for class 2 groundwater is 500 feet. This commentor is also concerned that class 2 drinking water supplies are being provided significantly less protection under the proposed rules than under current guidelines; that the Safe Drinking Water Act makes no distinction between the protection to be provided to class 1 and class 2 groundwater resources; and that the statute and regulations require protection of current or potential groundwater supplies with TDS content of less than 10,000 mg/l. The commission rejects the assertion that this rule does not adequately protect class 2 groundwater. First, with the exception of class 1 groundwater-bearing units, those groundwater-bearing units with a TDS content of 10,000 mg/l or less and a sustainable yield of 150 or more gallons/day are class 2 groundwaters. Second, the general groundwater response objectives for class 2 groundwater would require the person to reduce the concentration of COCs throughout the groundwater PCLE zone to the critical PCLs. Third, groundwater response action flexibility, such as technical impracticability or a plume management zone, would only be agreed to by the commission based upon submittal by the person of adequate scientific data which supports departure from the standard response objectives. And fourth, when a plume management zone is agreed to, the commission is not "writing off" the groundwater within this zone forever. By including plume management zones in this rule, the commission is making the scientific and policy determination that there are some groundwater contamination situations which are more appropriately managed by an "exposure prevention" rather than a "pollution cleanup" approach. We expect, however, that over time natural attenuation will decrease the concentration of many COCs as they flow within the plume management zone. Also, where there is an underlying plume management zone for class 2 groundwater, the commission is requiring any source area within surface or subsurface soils to be removed, decontaminated, and/or controlled such that the concentration of COCs in groundwater does not increase above the level when the response action plan was submitted. Even though active groundwater restoration is not being required within a plume management zone, the rule requires the sources of COCs to be controlled. The commission expects the groundwater within the plume management zone at many of these sites to be restored to the PCLs over time.

Concerning §350.37(h), Chevron commented that there is no provision to allow a groundwater use restriction on a particular site. The site-specific use of groundwater (current and future) should be considered and there are likely to be no points of exposure to class 3 groundwater. The text should be revised to indicate that the site-specific uses of site groundwater will be considered in the identification of POEs. KOCH commented that because of its high salinity (> 10,000 milligrams per liter (mg/L) total dissolved solids (TDS)), humans will not be exposed to COCs in class 3 Groundwater via ingestion. This class of groundwater is unfit for human consumption. Therefore, there should be no human POE for class 3 Groundwater via ingestion. The proposed rules should be clarified to reflect this fact.

The commission disagrees with the comments submitted on §350.37(h) and has therefore promulgated this subsection without modification. KOCH argues that because of class 3 groundwater's high salinity (i.e., greater than 10,000 mg/l total dissolved solids) there will be no human exposure via ingestion and that the rule should be revised accordingly. This is incorrect since the rule does not assume ingestion of class 3 groundwater in the first place. There are, however, many other uses and potential mechanisms of exposure to this groundwater. The prescribed on-site POE to class 3 groundwater is set at all locations throughout an on-site groundwater PCLE zone defined by COC concentrations greater than $^{GW}GW_{Class\ 3}$. $^{GW}GW_{Class\ 3}$ is derived by multiplying $^{GW}GW_{Ing}$ by 100 but is not based on an ingestion assumption. Also, Chevron suggested that the rule be revised to allow consideration of groundwater use restrictions and the site-specific uses of groundwater in the determination of POEs to class 3 groundwater. The commission disagrees for some of the same reasons presented in the discussion of POEs for class 2 groundwater. Contrary to what would follow logically from Chevron's suggestion, the commission has not adopted a program where unlimited concentrations of COCs would be acceptable in class 3 groundwater. Instead the commission has adopted a plume management zone approach for class 3 groundwater under

§350.33(f)(4) which acknowledges the typical limited use of this resource but also recognizes the potential for human and ecological receptor exposure and the need to limit PCLE zone migration.

Although no specific comments were received on this subsection, an amendment was made to §350.37(i) to clarify that the POE for groundwater discharges of COCs to surface water is within the groundwater at or upgradient of the zone of discharge to the surface water body so that this subsection and §350.51(f) are consistent.

Concerning §350.37(j), Henry, Lowerre, Johnson & Frederick commented that this section does not address the potential use of surface water for a drinking water supply source.

This comment was originally submitted in 1996 in response to a conceptual document published by the commission. The commission is adopting the language as proposed regarding the prescribed POE for releases directly to surface water. The promulgated criterion is protective because it sets the point of exposure at the point of entry of COCs into and throughout the extent of any surface water body. This means that the surface water PCLs must be attained at all locations designated as POEs. Derivation of the surface water PCL^{SW} is explained at §350.75(i)(13) and setting of the PCL^{SW}GW based on dilution of groundwater in surface water is discussed at §350.75(i)(4). Regardless, of all these PCL discussions, the surface water POE location established in this subsection is definitely protective.

Concerning §350.37(l), Chevron and Campbell, George & Strong commented that the TNRCC has recognized in §350.37(l)(3)(A) that some class 2 groundwater-bearing units may have no future beneficial use, and provided criteria for determining future beneficial use in §350.37(l)(3)(C). Chevron stated that it believes that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater, and should be held to the same criteria (i.e., PCLs) as class 3 groundwater. Therefore, alternate POEs for plume management zones for class 2 groundwater with no reasonably anticipated future use should be established the same way as those for class 3 groundwater. Chevron suggested adding a new last sentence to subsection (l): "Alternate POEs for class 2 groundwater-bearing units with no reasonably anticipated future beneficial use as determined in subsection (3)(B) below are established in subsection (m)." Chevron also recommended deleting subsection (3)(A), renumbering subsection (3)(B) to (3)(A), and revising the language as follows: strike "unless the demonstration discussed in subparagraph (A) of this paragraph is made, the" and keep "person shall not allow a plume management zone within class 2 groundwater to extend onto any off-site property which does not currently contain a residential-based groundwater PCLE zone." Renumber subsection (3)(C) to (3)(B).

The commission is adopting the alternate POEs to class 2 groundwater under Remedy Standard B, as proposed in §350.37(l), without modification.

Chevron and Campbell, George & Strong referenced proposed §350.37(l)(3)(A) which the commission provided to help determine whether off-site class 2 groundwater has a reasonably anticipated future beneficial use, and as a result, whether the class 2 plume management zone should be allowed, with the written approval of the off-site landowner, to extend onto the off-site property. Chevron used this language to help assert that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater and should be held to the same PCLs and alternate POEs. The commission agrees that the noted conditions such as demonstration of no reasonably anticipated beneficial use, presence of superior supplies, and the presence of ordinances are relevant and important. The commission does not concur, however, that groundwater should be classified as class 3 groundwater based on man-induced conditions as those conditions could change in the future, particularly in instances where the groundwater would otherwise be of high quality and productivity. Section 350.37(l)(3)(A) only acknowledges that a particular affected portion of the resource and the immediate proximity may not have a potential

beneficial use, but the commission is not implying that the groundwater resource as a whole does not have a potential beneficial use. As stated previously, a class 2 groundwater-bearing unit must initially be considered suitable as a human drinking water supply with the POE extending throughout the PCLE zone. This is consistent with the legislative instructions provided in the Ground Water Protection Act (Texas Water Code, Chapter 26.401). Such conditions in §350.37(l)(3)(A) reinforce the appropriateness of allowing the establishment of plume management zones for the class 2 groundwater, but the commission does not concur that those conditions are a sufficient basis to allow further degradation of the groundwater resource to the degree that would be allowed by managing it with class 3 groundwater response objectives.

Concerning §350.37(l), KOCH commented that the proposed TRRP rules state that residential-based groundwater PCLE zones shall be determined at the time of RAP submittal. The PCLs for groundwater should reflect the overlying land use and could be either residential or commercial/industrial. The erroneous use of only residential PCLs (e.g., §§350.37(m), 350.51(e), 350.52 etc.) should be revised throughout the proposed rules and replaced with a reference to the critical PCL.

On a separate matter, normally the groundwater PCLE zones are based on the overlying land use of a property which would be either residential or commercial/industrial. However, in order to have a well-defined point of reference from which to measure the additional distance for plume growth, the commission has decided that the plume management zones for class 2 and 3 groundwaters shall be based upon residential land use only, as described in §350.37(l) and (m), respectively. The commission disagrees with the “erroneous” characterization of the use of residential PCLs and considers our decision a warranted and necessary simplification.

Concerning §350.37(l)(4), McCulley Frick & Gilman commented that the concept behind the plume management zone is appropriate. They are concerned, however, by the quantification of plume management zones based on plume size. At many large industrial sites, monitoring wells are installed near the source area, downgradient of the source area, and near the property boundary (i.e., the current point of exposure). The exact location of the leading edge of the plume is often unknown. Since the rule proposes that points of exposure (POEs) beyond the plume management zones will be located based on 500-feet beyond the current length of the groundwater PCLE zone or 1.25 times the current length of the groundwater PCLE zone, McCulley Frick & Gilman stated this rule encourages a person to avoid characterizing the exact length of the plume and, instead, install downgradient monitor wells beyond the anticipated leading edge of the plume to create a larger plume management zone. Implementation of this rule will be reasonable for sites with large plumes at small facilities, but it will be overly prescriptive for sites with small plumes at large facilities. McCulley Frick & Gilman recommended that the plume management zone be defined on a site-specific basis.

The commission disagrees. The requirements for a groundwater investigation are specified in §350.51 (relating to Affected Property Assessment). Moreover, designation of a plume management zone is not an affirmative right and the commission will not agree to the establishment of such a zone if it suspects that the distribution of COCs within the groundwater-bearing unit(s) have not been adequately characterized. This commentor also recommends that the plume management zone be defined on a site-specific basis. In a real sense, this is the case with the adopted rule since the additional length of the plume management zone is established as the smallest of the distances described in §350.37(l)(4)(A) - (E). For individual sites, the controlling criterion could be any of the distances listed in subparagraphs (A) - (E).

Concerning §350.37(l), Henry, Lowerre, Johnson & Frederick commented that this approach of establishing an alternate point of compliance, which will effectively be the facility boundary, for Remedy Standards B and C, may allow contamination to spread to unaffected parts of proposed class 2 and 3 aquifers. Large areas of class 2 may be impacted on larger facilities.

Henry, Lowerre, Johnson, & Frederick has resubmitted a comment that was originally provided in response to a conceptual document published by the commission in 1996. Their concern is about "an alternate point of compliance, which will effectively be the facility boundary for Remedy Standards B and C". This comment is not based on the current rule. First, there is no Remedy Standard C. And second, the degree of plume migration allowed in response to language adopted by the commission is dependent upon site-specific conditions in the context of specific criteria set forth in the rule. A person cannot default to the property boundary.

Concerning §350.37(1), EPA Region 6 commented that this section makes allowances for determining future beneficial use by considering; 1) non-point sources of COCs, and 2) lack of use of ground water. These two allowances are of concern since they may not provide protection for a majority of the state's ground water resources. Concerning §350.37(1), Henry, Lowerre, Johnson & Frederick commented that it is not prudent nor in the best interest of the state to make a determination of no beneficial use of a class 2 ground water simply because it is currently contaminated by "non-point sources of COCs" or "the proximity and the withdrawal rates of groundwater users" indicate that it has no beneficial use. It should be the state's goal to restore all useable ground water, even that contaminated by non-point pollution.

The commission agrees with EPA Region 6's concern and does not intend to use these concepts in a general fashion to determine whether a groundwater zone has a reasonably anticipated beneficial use. Generally, the TRRP rule establishes the requirement that a plume management zone cannot be allowed to extend across a property boundary unless the off-site property already contains the PCLE zone. The consideration of reasonably anticipated future beneficial use considering non-point sources will only be used to determine whether a class 2 plume management zone can be allowed to migrate for a limited distance across the property boundary. EPA Region 6 states in their comment that the allowances are of concern since they may not provide protection for a majority of the state's groundwater resources. The commission disagrees since the limited application of the beneficial use evaluation will not endanger the state's groundwater resources. The same plume management zone would have been allowed had the off-site issue not been present. Whether COCs are off-site or not does not speak to natural resource protection, but rather to exposure potential. The commission disagrees with Henry Lowerre, Johnson & Frederick that such groundwater should be restored as the state's goal. The commission in this provision is only determining whether a groundwater which would already qualify for a plume management zone can establish POEs on off-site property, with the concurrence of the off-site landowner. The criteria does not change the classification of the groundwater, but is only a criteria for siting POEs. The commission notes that commentors from the regulated community strongly recommended that groundwater meeting these criteria should be classified as class 3 groundwater. The commission agrees with Henry, Lowerre, Johnson & Frederick that man-induced non-point sources of contamination should not reclassify a groundwater as the non-point sources may only be a temporary phenomenon or be localized.

Concerning §350.37(1)(3) and (4), the rule is amended to conform with the expanded definition of institutional control.

Concerning §350.37(m), similar to several other comments of the same nature, Chevron commented that alternate POEs for plume management zones for class 2 groundwater with no reasonably anticipated future use should be established the same way as those for class 3 groundwater.

The commission is adopting the alternate POEs to class 3 groundwater under Remedy Standard B without modification. Chevron repeated the comment that the PCLs and alternate POEs for class 2 groundwater that has no reasonably anticipated future beneficial use should be established in the same fashion as for class 3 groundwater. The commission disagrees with this proposal for the same reasons previously discussed under §350.37(1) regarding alternate POEs to class 2 groundwater. Likewise, and for the same reasons, the commission does not agree that the phrase "class 2

groundwater with no reasonably anticipated future beneficial use and" should be inserted into the rule language regarding alternate POEs to class 3 groundwater.

Concerning §350.37(m), Henry, Lowerre, Johnson & Frederick commented that allowing growth of a plume to within two years travel of a property line in class 3 ground water is not protective of the waters of the State of Texas. For a large site, in a transmissive aquifer (possibly class 3 because of salinity), this could result in a huge plume with new and potentially significant exposure pathways.

The commission asserts that the plume management zone approach does not endanger the groundwater of the State of Texas. The commission finds it self-evident that certain classes of groundwater (i.e., class 1) containing PCLE zones are more appropriately managed with a pollution cleanup approach while other classes of groundwater (i.e., class 3), depending upon the characteristics of the site, are more appropriately managed with an exposure prevention approach. Class 2 groundwater may be justifiably managed in either pollution cleanup or exposure prevention approaches depending on the particular circumstances and characteristics of the groundwater at the affected property. The commission has used its best professional, scientific, and societal judgment, along with a four year process of meeting with stakeholder groups, to develop this final rule which strikes an appropriate balance between requiring pollution cleanup response actions and allowing physical controls, institutional controls, and financial assurance to be relied upon to prevent the exposure of human and ecological receptors to unprotective levels of COCs and to prevent the degradation of natural resources. In the example provided, the requirements for a plume management zone presented at §350.33(f)(4) would prevent the class 3 groundwater PCLE zone from endangering either any deeper ground water resources or ground water resources outside of the plume management zone. Also, the comment indicates that there would be "new and significant exposure pathways". This is not correct. An institutional control is required which would explain the location of the plume management zone and the potential hazards posed by the remaining COCs.

Concerning §350.37(m) and (m)(1), the rule is amended to conform with the expanded definition of institutional control.

SUBCHAPTER C : AFFECTED PROPERTY ASSESSMENT

§§350.51 - 350.55

§350.51. Affected Property Assessment

Concerning §350.51, TranSystems commented that the proposed Rule is largely silent on the subject of natural attenuation for site characterization. Sufficient field trials of natural attenuation effects have been published in the literature that indicate natural attenuation should be considered as an important tool for site characterization. We recommend that natural attenuation be used as an option for site characterization in §350.51, Affected Property Assessment. In addition, natural attenuation should be allowed to be used as a holistic tool to devise site-specific risk-based exposure limits of §350.74 and for Tier 2 and Tier 3 PCLs of §350.75.

The commission does not agree with the commentor's assertion that natural attenuation effects have been adequately studied to allow consideration of such on the affected property assessment, except for the particular instance of some gasoline releases without recalcitrant COCs from PST sites. It is not appropriate or reliable to assume that COCs are attenuating at a certain location without actual site-specific sampling data to confirm this occurrence. The commission does believe the collection of natural attenuation parameters is valuable and can help persons to better understand the COC distribution and more appropriately locate sampling locations, but only actual sample results

measuring the COC concentrations may be used to meet the rule provisions for affected property assessment.

Concerning §350.51, McCulley, Frick, & Gillman commented that they support the changed rule language that allows flexibility to collect environmental samples according to site-specific conditions.

Concerning §350.51(a), Henry, Lowerre, Johnson & Frederick commented that the TRRP will conflict with the efforts of Texas to develop a generic and site specific "state management plans." As is shown in the majority of cases of known groundwater contamination with pesticides, the extent of contamination can be the result of the combined effects of point and non-point sources. Under the proposed TRRP, TNRCC not only often loses its ability to learn of the additive effects of multiple sources, it will also lose its ability to find the responsible parties who have been released from further work because of incomplete information about other sources of the contaminants.

The commission disagrees that the affected property assessment requirement in any way impact the state's ability to develop "state management plans." Further, there is no distinction made in the rule between point and non-point sources when conducting affected property assessments.

Concerning §350.51(a), Henry, Lowerre, Johnson & Frederick commented that this section states that delineation of off-site contamination above PCLs may be delayed until the remedial design phase. This concerns Henry, Lowerre, Johnson & Frederick because it does not appear to provide an expeditious assessment of potential harm to off-site human or ecological receptors. Henry, Lowerre, Johnson & Frederick believes delineation of off-site contamination should be expedited in order to be protective of human health and the environment.

The commission notes that no such provision or discussion is included in either the proposed or final rule. To the contrary the rule states: "The person shall conduct an assessment in a manner which is timely considering the size and complexity of the situation, and shall comply with an assessment schedule established in any commission rule, order, or permit, or any assessment schedule approved by the executive director."

Concerning §350.51(a), Mobil commented that several sections under Subchapter C appear to require excessive, if not unreasonable data submission requirements. It is understood that one of the tradeoffs involved in moving from a prescriptive target-oriented remediation program to a program that is risk oriented is the need for much greater data upon which to base a decision. However, it will be of no benefit to require submission of large volumes of marginally useful data.

The commission disagrees that the rule requires excessive or unreasonable data submissions. The commission does agree with the commentor that "one of the tradeoffs involved in moving from a prescriptive target-oriented remediation program to a program that is risk oriented is the need for much greater data upon which to base a decision." The degree to which data are collected is dependent on the general characteristics of the affected property and the sophistication under which the affected property is to be evaluated.

Concerning §350.51(a), Chevron commented that "regarding the requirement to conduct an affected property assessment in a manner appropriate for the affected property." The TNRCC should refer explicitly to guidance that has been or will be developed addressing the assessment of affected property.

The commission notes that guidance will be developed to assist persons conducting affected property assessment, however, it is premature to identify such guidance in the rule.

Concerning §350.51(a), Strasburger & Price commented that these regulations use the term "hot spot" which is undefined (see proposed §350.4), and is, in fact, a slang term used within the industry. We believe that this term is inflammatory to lay persons and that slang does not have a place in a formal rule making. In §350.51(1)(5), we suggest that the phrase "then they should be considered as hot spots and" be deleted.

The commission disagrees that the term "hot spot" is a slang term and notes that this term is used both in *Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part A)*, United States Environmental Protection Agency, EPA/540/1-89/002 and *Guidance for Data Usability in Risk Assessment (Part A)*, United States Environmental Protection Agency, Publication 9285.7-09A. Further, the commission notes that the term source area(s) is already used in the rule and has a different meaning. The commission is retaining the use of both terms.

Concerning §350.51(a) TCC and TXOGA commented that a purpose of the assessment is not to collect information necessary to support notification of affected landowners. Such notification may be the consequence of the assessment, but it is not the purpose.

Recommendation: Delete the first clause of the second sentence: "...The assessment shall be designed to collect information necessary to support notification of affected landowners.."

The commission acknowledges that collection of information to support notification to affected landowners is not the only purpose of the assessment but it is one of the purposes. The other purposes are as specified in the rule. The commission is retaining the reference to notification of affected property owners, as notice to affected property landowners (and others as specified in §350.55 (Notification Requirements)) only occurs through the implementation of the affected property assessment.

Concerning §350.51(b), KOCH commented that the assessment level for the vertical delineation of soil can be established pursuant to §350.75(i)(7). This section allows for the use of default leaching equations or an appropriate leachate test. Results from this equation or site-specific test could be coupled with a simple groundwater fate-and-transport calculation to estimate the COC levels at the POE. This definition contradicts the requirement that COCs in soil be delineated to the higher of the Method Quantification Limit (MQL) or background concentrations (§350.51(d)(1)). Additional comments on the assessment levels suitable for the vertical delineation of soil are provided in Comments Numbers 7 and 51.

The commission agrees that the use of assessment level in this subsection contradicts the requirements for vertical soil assessments under subsection (d) and is removing the reference to assessment level in this subsection. This should remove any confusion as subsections (c), (d), and (e) discuss individually their specific requirements, which may use the assessment level as defined or different standards as specified within each subsection. The commission also notes that the removal of the term assessment level from the rule complicates the degree to which environmental media other than soil and groundwater are assessed. Therefore, the commission has added an amendment which allows the executive director to determine the adequacy of the investigation of environmental media other than soil or groundwater to be on a site-specific basis.

Concerning §350.51(c), Chevron commented that this paragraph suggests that off-site investigations are necessary beyond the property boundary of the on-site investigation area. The preamble states the following: In practice, persons may take samples at the property boundary to determine if off-site concentrations are above the residential assessment levels. Change the wording to reflect the above statement in the Preamble (i.e., to clarify that sampling beyond the property boundary is not necessarily required). Specifically change the phrase: However, the person shall also determine whether off-site properties have been affected with concentrations of COCs which exceed the assessment levels, where the human health aspect is based on residential land use (i.e., residential assessment level), using adequate on-

site or off-site data. If the contamination is found to be near the property boundary, the person shall also conduct soil sampling at the property boundary to determine whether off-site properties have been affected with concentrations of COCs which exceed the assessment levels, where the human health aspect is based on residential land use (i.e., residential assessment level), using adequate on-site or off-site data. The executive director may also require the person to conduct soil sampling beyond the property boundary on a property-specific basis.

The commission is rephrasing this subsection to better clarify the requirements of the rule regarding how to determine if COCs have gone off-site and agrees with the commentor that on a site-specific basis, it may be possible to use on-site data to determine if concentrations of COCs above the residential assessment level have migrated off-site.

Concerning §350.51(c), Chevron commented that the rule requires that the person shall demonstrate that all COCs in environmental media which exceed the assessment level have been characterized horizontally in all directions. Also, the rule states "however, the person shall also determine whether off-site properties have been affected with..." This requirement will not always be possible to meet, and may not always be relevant. For instance, it is possible that concentrations are homogeneously distributed horizontally across a region, such that the representative concentration (the 95% UCL) is below the applicable PCL, but not all individual concentrations are below the assessment level. In this case, there appears to be no rationale for requiring the extent determination. The term "determine" implies that sampling of the offsite properties is required to assess whether the offsite properties have been affected. Change language to "in all directions except where doing so will endanger critical structures, such as process units or landfill liners." Substitute "access" for "determine".

The commission does not agree that the requirement to determine the extent of COCs is not always relevant and clarifies that all individual samples with concentrations exceeding the residential assessment level must be identified. It is not appropriate to attempt to satisfy this requirement based upon some "representative concentration." The commission notes that the rule does not direct persons to the exact sample location and that it is not necessary or appropriate to change the rule as suggested to avoid critical structures or landfill liners.

Concerning §350.51(c), Fulbright & Jaworski commented that the agency should divorce the purpose and application of the screening tier from operation of the subsequent tiers. Under the proposed rule, the assessment level (or a surrogate standard such as an MCL) would determine the scope of site assessment for all tiers except Tier 3. Because the assessment level is based on overestimates of risk instead of actual site conditions, the extent of site assessment will be unnecessarily broad and inconsistent in practice.

The commission disagrees that the use of the residential assessment level is inconsistent and in fact, argues that it is a consistent standard. It should be noted that for the on-site soil assessment, the person may use the critical PCL for the applicable on-site land use. The commission also clarifies that the residential assessment level does apply to the off-site assessment for persons using any of the three tiers.

Concerning §350.51(c), Environmental Fuel Systems and ICE commented that thanks to agency staff for a substantial improvement from the rule version proposed in 1998. Critical Tier I concentrations for the major gasoline constituents, especially benzene, have been increased by a factor of about ten. This may have been in response to industry criticism that TNRCC was using overly conservative assumptions, and in multiplicative fashion.

With that said, please recognize that a benzene soil "target level" of 0.02 mg/kg is still much lower than labs have typically quantitated in the past for PST-related work. The PST industry will see higher costs of analysis as soon as this target level is applied - and it will control all assessment laterally and vertically

from a source area if one wants to meet residential closure criteria. If one compares present PST practice of assessing to "background" laterally and vertically, but with labs looking for benzene to less than 0.1 or 0.05 mg/kg, the TRRP rules strike us as more protective and more expensive when there is no call to obtain better protection of human health and the environment than the current program provides.

The commission disagrees that for benzene 0.02 mg/kg will drive soil assessments. The 0.02 mg/kg value is the Tier 1 ^{GW}Soil PCL and is not required to be used for assessment purposes. Within the definition for assessment level, it clearly allows persons to develop ^{GW}Soil under any one of the three tiers which can yield values higher than 0.1 or 0.05 mg/kg on most if not all sites.

Concerning §350.51(c), Environmental Fuel Systems and ICE commented that Subchapter C appears to indicate that TNRCC is looking for much more comprehensive assessment of contaminant plumes, not only delineating out to MCLs in ground water and surface water and - frequently - to MQLs or MDLs in soil, but also looking for a denser pattern of borings and wells throughout every plume. Alternatives available, at lesser costs, might include soil gas surveys to obtain such plume information.

The commission disagrees that the TRRP rule is "looking for a denser pattern of borings and wells throughout every plume." The rule does not specify how many wells are required in any situation. The commission notes that an adequate assessment is necessary but that this is a site-specific decision which TRRP does not deal with on the well-by-well basis. The commission acknowledges that soil gas or innovative assessment technologies are acceptable where appropriate to guide and augment assessments.

Concerning §350.51(c), Environmental Fuel Systems and ICE commented that pertaining to the fraction of organic carbon in soils (foc), that helps protect ground water by retarding contaminant leachates from affected soils, we see the logic in requiring a minimum of ten foc samples. Just as important in foc determination is the choice of sample interval - what could the organic carbon protect, where is the source area vertically, and where should one say foc will be helpful?

The commission notes that there is no discussion in the proposed or final §350.51 pertaining to the collection of samples to determine foc.

Concerning §350.51(c), KOCH commented that they strongly agree that delineation of constituents of concern (COCs) in environmental media should proceed to risk-based assessment levels. These assessment levels should consider residential or commercial/industrial land use, residential or commercial/industrial groundwater use, and groundwater classification.

The commission disagrees that the assessment levels should be either to the residential or commercial/industrial assessment level. The rule does allow persons to use the applicable critical PCL for the on-site assessment but the off-site assessment is required to identify areas exceeding the residential assessment level. It is appropriate to conduct the off-site assessments to the residential assessment level because all areas exceeding the residential critical PCL will either require either a Remedy Standard A response action or some type of institutional control which generally requires landowner concurrence. The off-site landowners will need to know clearly which areas have COCs at such concentration levels that there are limitations on the current and future use of the property. The rule has been amended to clarify that the horizontal assessment is out to the residential assessment level.

Concerning §350.51(c), KOCH commented that the proposed TRRP rules state that a person is only required to determine whether residential off-site properties have been affected, where the adjacent land use is residential. Does this mean that a person can use commercial/industrial criteria to determine if adjacent commercial/industrial property is affected?

The commission disagrees with the commentor that the rule only requires the person to determine whether residential off-site properties have been affected, where the adjacent land use is residential. The rule requires the use of residential assessment levels for off-site environmental media, regardless of the off-site land use classification. The extent of COC concentrations in excess of residential assessment levels are to be characterized. The commission is changing the rule in order to clarify the requirements for horizontal assessments and to specify that they are to be completed to residential assessment levels for all off-site properties.

Concerning §350.51(c), Henry, Lowerre, Johnson & Frederick commented that to prevent the loss of groundwater resources: TNRCC has divided ground water into three classes to allow greater contamination of much of Texas' scarce water resources. There is no justification for creating class 2 ground water. That water may be the sole source of drinking water in some areas, even though it is not abundant or the highest quality. Small aquifers in dry areas may be more important to protect than large aquifers in an area with abundant surface water supplies.

Moreover, TNRCC has made an unjustified decision to sacrifice class 3 groundwater, even though such water may have many valuable uses. Such waters can be used for some industrial and agricultural purposes and to supplement other supplies. Such waters could be extremely important sources of water as groundwater demands for water cannot be met with other supplies. The recent change in the proposed rules to reduce the extent of investigation for class 3 groundwaters to levels 100 times higher than other groundwater investigations simply assures that the groundwater will be eliminated as a future source of water, even in areas where there are no alternative sources.

The commission disagrees that the assessment of class 3 groundwater to 100 times the groundwater ingestion risk-based exposure limit will eliminate these groundwaters as a future source of water. The actual concentration level to which these groundwaters is assessed is more directly related to notice that to the requirement for a response action. Many commentors have argued that this philosophy of investigation of class 3 groundwater to 100 times the drinking water standards is overly conservative. They also argued that it will unnecessarily increase costs and time without a real benefit. An important item to note is the provision in subsection (b) which may require additional assessment beyond the assessment levels when "the executive director determines on a site-specific basis that additional assessment of the extent of COCs is necessary to evaluate a potential threat to human health and the environment." The commentor is referred to the discussion on the development of the class 3 groundwater risk-based exposure limit in §350.74 for further discussion on this matter. The commission also clarifies that groundwater which is the "sole source of drinking water" will more likely be class 1 groundwater than class 2, as suggested by the commentor.

Concerning §350.51(c), Henry, Lowerre, Johnson & Frederick commented that the proposal to eliminate the current requirement for full characterization of a plume of contamination is not based on sound science. The contamination at Kelly Air Force Base is an obvious example. There, because of the complexity and long existence of sources of contamination, the level of the constituents in the ground water contamination plume do not simply drop in a smooth or regular fashion. Instead they rise and fall with distance. If the Air Force had been allowed to stop its investigation when the contaminants in the plume fell below the MCLs or some residential standards, the Air Force would not have found the significant contamination that is above those standards farther away from its base. While assumptions about plume size and characteristics can be made for simple cases, a plume must be fully characterized in the more complex cases. If not, there will be major areas of significant contamination left for future generations.

Henry, Lowerre, Johnson & Frederick and Region 6 also commented that subsection (c) only requires investigation of COCs in ground water to Tier I PCLS, plus some ill-defined proof that it is declining past the point of the PCLS. But how much proof is not clear; one sample? This often may not capture naturally inspired "bursts" of contamination or sheared plumes from prior capture attempts. As Region 6

has pointed out with its comments on Reese Air Force Base in Lubbock, this proposed TRRP will not assure detection of all areas above the PCLs and will allow large areas of contamination to be ignored. Transport is complex. Investigations should go to the non-detect levels to allow a full understanding of the "nature and extent." Moving from the proven concept of determining the nature and extent of contamination will likely result in missed zones of contamination and, therefore, will not address all of the health risks caused by the release. The rules need to be revised to reinstate the requirements for full characterization of the plume of contaminants.

Henry, Lowerre, Johnson & Frederick commented that the current Risk Reduction rule requires that the full nature and extent of the contaminants in environmental media be determined. Under the proposed rules, contaminants below the PCLs would be defined as "below the level of regulatory concern." This presumption and the related reduction in characterization of contamination not only will allow contamination to be ignored, in many more cases than now exist, but major areas of contamination will be missed and left to injure public health and the environment in the future.

Henry, Lowerre, Johnson & Frederick also commented that large areas of contamination above health-based levels should not be left unidentified, and disagrees with the ability of responsible persons to end the investigation of contamination at Tier 1 PCLs because of concerns may go down then increase further out. How would the TRRP ensure that enough information is collected to reasonably prevent this type of situation from occurring?

We are concerned that the proposed rule would not require an investigation of the vertical and lateral extent of contamination to background levels. In order to minimize the risk of missing "hot spots" during an investigation, we believe that the extent of contaminants should be fully delineated to background levels. Furthermore, we believe that the TNRCC, the responsible party, and any other affected property owner would be better able to make educated decisions based on an assessment to background levels.

The commission acknowledges the difficulty in assessing some plumes but does not agree that groundwater should be investigated to background or non-detect levels on a routine basis. It is important to note that for the more toxic COCs (e.g., chlorinated solvents found at Kelly Air Force Base) the difference between the concentration level which may be measured using routine analytical methods and the residential assessment level is very small and for practical purposes is not consistently quantifiable. Of greater importance is an adequate understanding of the subsurface geology, which is the information that will most reliably ensure that environmental media containing COCs is not missed. An important item to note is the provision in subsection (b) which may require additional assessment beyond the assessment levels when "the executive director determines on a site-specific basis that additional assessment of the extent of COCs is necessary to evaluate a potential threat to human health and the environment." No rule change is required to allow for appropriate assessments.

Concerning §350.51(c), PIC commented that under the proposed rule, persons are required to investigate vertically and laterally the affected environmental media to the "assessment level," which is defined as the lowest of the critical Tier 1 human health protective concentration level for the soil-to-groundwater exposure pathway that may be established under Tier 1, 2 or 3. The PIC is concerned that the proposed rule will not require an investigation of the vertical and lateral extent of contamination to background levels. While risk-based exposure prevention methods may be appropriate in determining a remedy, we do not support the concept as the driving force in conducting an investigation. In order to minimize the risk of missing "hot spots" during an investigation, we believe that the extent of contaminants should be fully delineated to background levels.

Particularly with respect to leased and off-site properties, there are even more compelling reasons to require an assessment to background levels and to make the information obtained from such assessments available

to the affected interest holders. While the preamble asserts that conducting an investigation to the "assessment level" supports the goal of consistent health-based notification to landowners, the PIC asserts that many landowners would expect to be informed of the existence of any concentration of contaminant on their property above background levels -- particularly when that contamination has been caused by someone else. From a public policy perspective, the public has "right to know" if a person has caused any contamination of their property above background levels. To argue otherwise advances a paternalistic view that the TNRCC and the person (responsible party) are in the best position to determine the information a party "needs to know" and that there is no need to "upset" a landowner by gathering and disseminating information that "they might misinterpret." PIC believes that affected property owners have a right to expect more information so that they can make educated decisions about their rights, responsibilities and any independent actions they may need to take to protect what they perceive as their interests related to human health and the use of their property. Accordingly, PIC is of the opinion that the public interest would be better served by having the rule require an assessment to background levels.

The commission acknowledges the difficulty in assessing some sites but does not agree that horizontal assessments should be investigated to background or non-detect levels. The commission notes that vertical assessments under subsection (d) are conducted to the higher of the method quantitation limit or background concentrations, unless a groundwater assessment has determined that groundwater is not impacted by COCs. The requirement to investigate off-site properties to the residential assessment level is adequate in almost all scenarios to identify areas which may not be protective of human health or the environment, or that will potentially require a response action. For those rare scenarios where assessment to residential assessment levels may not be adequate, an important item to note is the provision in subsection (b) which may require additional assessment beyond the assessment levels when "the executive director determines on a site-specific basis that additional assessment of the extent of COCs is necessary to evaluate a potential threat to human health and the environment." Also, the adequacy of the subsurface assessment to characterize the geology and hydrogeology has a greater impact on the ability to locate COCs than the decision to assess to assessment levels vs background. Once the commission made the policy decision to implement a risk-based corrective action program, it implicitly acknowledged that it is not necessary to obtain all conceivable information to accomplish the agency's mission of protecting human health and the environment.

Concerning §350.51(c), Ranger commented that the TNRCC has proposed requirements for plume delineation. Ranger believes the language in the proposed rules concerning soil and groundwater delineation is too rigid and inflexible, and clarifying language needs to be added to allow for site-specific circumstances. Without site-specific flexibility language, TNRCC staff, in order to comply with the rules of their agency, will on occasion have to make completely unreasonable demands for plume assessments. The proposed rules must acknowledge that site constraints exist, and that every site will not be able to be assessed in accordance with the preferred plume delineation requirements outlined in §350.51(c).

The commission acknowledges that there may be site-specific circumstances (e.g., inaccessibility due to permanent physical structures) which may impact some affected property assessments. This rule does not prescribe assessment sampling locations, but only sets performance-based requirements to characterize the extent of COCs. The rule is adequately flexible in its assessment requirements to allow for such limitations.

Ranger also believes that the TNRCC has proposed in §350.51(j) that all groundwater sampling must be performed using low-flow "micropurge" techniques. Ranger believes that first of all a rule package is not an appropriate place for technical issues like this to be discussed, and secondly that a blanket requirement for low-flow sampling at all sites is not technically or fiscally warranted, is impracticable and may not be the best or most technically representative method possible for a site. It should be pointed out that this sampling methodology is not presently in use at the vast majority of sites being investigated. Ranger finds

it odd that although this sampling methodology is not in widespread use, the TNRCC has proposed to require it in a rule form. Ranger recommends that the issue of groundwater sampling techniques would be best presented in a written guidance manual. With respect to lowflow sampling techniques, Ranger believes that this sampling method should be an available option (not required under threat of enforcement penalties) for sites where traditional sampling methods have indicated potentially elevated concentrations of metals in groundwater.

There is no such requirement or discussion in the rule.

Concerning §350.51(c), Ranger commented that the proposed requirements for soil sampling and determination of representative COC concentrations are unnecessary, impracticable and extremely expensive. It appears that the TNRCC is proposing to require that the minimum number of soil borings/wells to be installed at a site is ten, and that for a typical 25' boring, six individual samples will have to be collected for laboratory analysis. Thus, the minimum number of samples to be collected at a site which requires 25' borings/wells will be 60. Ranger is not aware of any current TNRCC program area which requires the extensive sampling requirements as discussed above. A typical initial site assessment conducted under the TNRCC's present cleanup rules can be accomplished with the collection of only six to nine soil samples. A comparison of the current TNRCC sampling protocols with that contained in the proposed TRRP rules, would possibly lead one to conclude that the thousands of sites previously closed by the TNRCC have been based upon inappropriate, incomplete and inadequate site assessments; thus posing a threat to human health and the environment. Quite clearly this historically has not proven to be the case. Rather, it is apparent that the sampling methodologies required in the proposed TRRP rules are excessive, and only increase the cost of site cleanups while providing no added benefit to human health and the environment.

The commission acknowledges that there may be site-specific circumstances (e.g., inaccessibility due to permanent physical structures) which may impact some affected property assessments. This rule does not prescribe assessment sampling locations, but only sets performance-based requirements to characterize the extent of COCs. The rule is adequately flexible in its assessment requirements to allow for such limitations.

Concerning §350.51(c), TranSystems commented that §350.55 requires notification to off-site landowners in the event of off-site migration of COCs. If an imminent threat or actual exposure exists then the off-site delineation and notification is clearly appropriate. However if in an actual exposure does not exist, or if it can be proven to be unlikely to exist, then certain mechanisms to minimize off-site delineation and notification should be allowed in the Rule §350.51 and §350.55 to account for such scenarios. We believe the proposed Rule is too rigid for off site investigation and notification especially for class 3 groundwater sites. It is counterproductive to require off-site delineation to a risk-based level (such as class 3 PCL concentration) when possibly no health risk and/or chemical hazard exists. In some instances it might be appropriate for no off-site delineation of sample points and/or to extend the time period allowed for off-site property owner notification if it can be demonstrated that the site conditions warrant for no such action. The burden of proof, of course, would be upon the responsible party to demonstrate such fact to the potentially affected off-site landowner upon such landowner's request. For example, it might be appropriate to monitor groundwater at the property boundary over time if evidence suggests a shrinking plume and no exposure pathway exit. This scenario could be present even if chemical concentrations are present in the (class 3) groundwater at the property boundary at or slightly above MCLs which is commonly a trigger mechanism for off-site notification. In stead of rushing to notify off-site landowners and requesting permission to investigate a plume for the sake of delineation purposes, a grace period should be allowed for off-site notification sufficient such that technical evidence could be used to warrant an off-site no action response. Any legal trespass issues would, thus, be a matter of consequence and possibly resolved equitably rather than used as a leverage hedge purely for monetary gain such as diminution of property value. A technical demonstration should be allowed as a tool to delay off-site notification that

would provide evidence that COCs are either at extremely low concentrations at possible unsampled off-site location or that COCs are naturally abating thus, ensuring no plume growth.

The commission notes that both on-site and off-site assessments can be minimized based upon current exposures or demonstrations that exposure to class 3 groundwater in the future is unlikely. This occurs for class 3 groundwaters through the use of a higher assessment level (i.e., 100 times the assessment level used for class 1 and 2 groundwater). The commission also notes that it is important to determine the impact in these zones even though they may not be a target zone for well completion. There is a potential for cross-contamination with other useable zones if there is no assessment and notice of impacts, as necessary.

In regards to the general requirements for off-site assessment, the commission is retaining these requirements. The commentator assumes unreasonable scenarios in which the off-site landowner would have to request that information be made available or why an assessment was not conducted on their property when they have never been informed. It is difficult to conceive how the landowner could make such request if there has not been an assessment on their property and thus no notification to them has occurred. The commission does not agree that the person conducting the assessment can necessarily anticipate the potential for off-site exposure when they have never assessed the off-site property. None of the arguments to forgo or delay the necessary assessment consider the well-being of the off-site landowner or others (e.g., tenants, holders of easements or right-of-ways, etc.) that may be exposed to COCs while the person with the responsibility for conducting the assessment makes demonstrations to the commission that off-site assessment is not necessary. The commission has amended §350.55 substantially in response to similar concerns regarding notifications.

Concerning §350.51(d)(1), Brown & Caldwell, KOCH, Mobil, Weston, and TCC commented that requiring that a person conduct a groundwater investigation if the uppermost groundwater-bearing unit is encountered before the vertical limit of COCs in soil is determined. A person should not be obliged to perform a groundwater investigation if the vertical extent of soils that leach COCs at concentrations exceeding critical groundwater PCLs has been determined. Either Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characteristic Leaching Procedure (TCLP) testing of soils should be an acceptable method for making this determination.

Chevron commented that the person shall demonstrate that the vertical limit of COCs in soil which exceed the higher of the method quantitation limit or background concentrations have been characterized. This requirement appears to be unduly restrictive, and will result in unnecessary sampling and analyses of affected properties. We propose that sentence (and the requirement) be modified, as follows: "...in soil which exceed the higher of the assessment levels or background concentrations have been characterized." Such a change would still provide an adequate margin of safety, without undue sampling and analysis costs, given that the assessment levels are conservative, risk-based limits established for a given site.

KOCH, Brown & Caldwell, Mobil, Weston, and TCC also commented that according to this proposed text, a person must vertically delineate COCs in soil to the higher of the MQL or background concentrations. This requirement could lead to at least two problems.

First, the stated intent of the proposed TRRP rules is to allow the delineation of COCs to risk-based assessment levels. The assessment level for soil, specifically the soil-to-groundwater exposure pathway, can be established pursuant to §350.75(i)(7). None of the options listed at §350.75(i)(7) require COCs in soil to be delineated to the MQL or background concentrations. To be consistent, a person should be allowed to vertically delineate COCs in soil to risk-based assessment levels rather than arbitrary (non-risk) criteria like the MQL.

KOCH, Brown & Caldwell, Mobil, Weston, and TCC all commented that The proposed rules are not clear on whether the soil-to-groundwater pathway must be delineated to risk-based levels or arbitrary concentrations (i.e., method quantitation limits or background). A person should be able to delineate every pathway to assessment levels. If needed for this pathway, a simple groundwater fate and transport calculation could be used to evaluate the COC levels at a potential groundwater point of exposure (POE).

The requirement that the vertical soil assessment be the higher of the method quantitation limit or the background concentration appears to be an excessive data gathering beyond PCL levels. This section should be amended to require vertical assessment to PCLs only.

TCC, TXOGA, Brown & Caldwell, KOCH, Mobil, and Weston commented that since PCLs include consideration of the soil to groundwater pathway, PCLs should be sufficient for delineation in both horizontal and vertical direction. They recommendation: Modify rule so that assessment to critical Tier 1 PCLs is allowed in both the horizontal and vertical direction.

Weston, Brown & Caldwell, KOCH, Mobil, and TCC suggest changing the phrase "higher of the method quantitation limit or background concentrations" to "the ^{GW}Soil concentrations." There is no technical reason to delineate the vertical extent of COCs beyond the point that it can be demonstrated that the remaining concentrations are protective of the groundwater.

The commission disagrees that it is unnecessary to conduct a groundwater investigation if the vertical extent of soils that leach COCs at concentrations exceeding the critical groundwater PCLs is determined. The subsurface is commonly quite variable in its composition and ability to retard the movement of COCs. The most common methodology of assessing the subsurface involves the placement of numerous small diameter (e.g., eight inch) soil borings. These small borings represent only a "snap shot" of what is actually present beneath the land surface and quite often do not represent what is present only short distances away laterally. Due to the inability of a small diameter boring to fully assess the subsurface soils, as has been demonstrated on numerous sites, it is necessary to delineate soils vertically to the higher of the method quantitation limit or background concentrations in order to better determine if groundwater is or will be impacted. Further, the characterization of soils in excess of ^{GW}Soil only addresses future leachate considerations and does not address whether unprotective concentrations of COCs have previously leached to the groundwater. Therefore, a more thorough soil analysis or adequate groundwater assessment is necessary to determine if groundwater has been affected. However, in order to provide more flexibility, the commission is changing the rule to allow persons to terminate the vertical assessment in soils at the ^{GW}Soil PCL, if an adequate groundwater assessment has been conducted.

The commission notes that the ^{GW}Soil PCL may be determined under any of the three tiers in this instance and not only under Tier 1 as one commentor recommended. To restrict this to only Tier 1 would be overly conservative given the fact that groundwater has been adequately assessed.

The commission also clarifies that the horizontal assessment requirements are not discussed under this subsection but rather in subsection (c). In subsection (c), the assessment level is used, which as defined in §350.4 is the critical PCL with the human health PCLs developed under Tier 1 with the exception of, once again, the ^{GW}Soil PCL.

Concerning §350.51(d)(1), KOCH commented that unless it is clearly demonstrated that NAPLs are present in the soil above the soil saturation limit, there should be no requirement to collect and analyze saturated soil samples below the water table. All of the risk-based PCLs in the proposed TRRP rules are based on potential exposure to unsaturated soil. It is essentially useless in a risk assessment to compare PCLs developed for unsaturated soil to saturated soil samples. However, the commission may wish to

revise this text by stating that saturated soil samples may be collected (but not required) and analyzed for qualitative delineation purposes only. These analytical results would not be compared to PCLs.

The commission disagrees that there should not be a requirement to collect and analyze soil samples below the water table, unless it is clearly demonstrated that nonaqueous phase liquids (NAPLs) are present. It is very difficult to actually locate dense NAPLs, even though dissolved concentrations indicate their presence. The purpose of the vertical soil assessment is clearly stated in subsection (d) ". . . to adequately determine if groundwater has been or will be affected. . ." Also, the rule states ". . . the soil assessment shall continue beyond the uppermost groundwater-bearing unit as appropriate based on the likelihood that COCs have migrated deeper considering the chemical and physical properties of the COCs (e.g., dense nonaqueous phase liquids) and the hydrogeology of the affected property." The commission is not changing the rule as there is adequate discretion allowed to the executive director to omit or modify this requirement on a site specific basis.

Concerning §350.51(d)(1), KOCH commented that the proposed text specifies that the MQL be used for delineation. The MQL is based on the laboratory's initial calibration curve and the final volume of sample extract used by the laboratory. This limit does not account for the sample characteristics, sample preparation or analytical adjustments. The sample quantitation limit (SQL) accounts for these factors. The SQL reported by the laboratory could be higher than the MQL. The SQL (or practical quantitation limit (PQL) defined at §335.552) should be used instead of the MQL. The PQL is used for delineation in the existing rules (§335.554(d) and §335.555(d)(1)).

A person must be allowed to vertically delineate COCs in soil to risk-based assessment levels established at §350.75(i)(7). If the assessment level is less than the SQL, then delineation should proceed to the SQL. A person should also have the option of delineating to background concentrations.

It should be noted that the SQL (not the MQL) is later used when making direct comparisons or using statistical or geostatistical approaches (§350.51(n)).

The commission does not intend to require non-standard analytical practices as a consequence of this rule. However, the commission is not willing to perpetuate the use of inappropriate analytical strategies, such as using an SQL as a default or using the PQLs (MQLs) from less sensitive methods for default PCLs when more sensitive standard methods are available and may be warranted. The commission intends that standard available analytical methods be used, but the commission also intends that the most sensitive of those methods be used, as necessary, to achieve the performance objectives. However, the commission acknowledges that there are instances where the MQL cannot be obtained despite all reasonable efforts to obtain the MQL and instances where the use of methods such as SW 8240 or 8270 may be appropriate. The commission amends the rule to account for the situation where the concentration of a COC in an environmental medium legitimately cannot be measured below an SQL.

Concerning §350.51(d)(2), KOCH commented that if groundwater is impacted, a person should not necessarily have to declare the entire overlying soil column a PCLE zone. A soil PCLE zone should only have to be declared when COCs in the soil exceed the assessment level.

The commission agrees with the commentor but notes that the provision was put in the rule as added flexibility. The commission clarifies that there are two options under subsection (d), one of which allows a person to declare the entire overlying soil column as a PCLE zone so as to provide some flexibility to the rigor of the required vertical soil assessment. This provision allows persons who so choose, to reduce the vertical soil assessment requirements based upon planned response actions and existing knowledge that the underlying groundwater is affected by COCs.

Concerning §350.51(e), Chevron, AECT, Reliant Energy, and TCC commented that in determining the extent of COCs in soil, a comparison to background concentrations is allowed. A similar comparison to background concentrations should be allowed when defining the vertical extent of COCs in groundwater. "The person shall define the vertical extent of COCs in groundwater to below the residential assessment level or background by . . ."

Reliant Energy, AECT and TU commented that comparison to background levels is permitted when defining the extent of COCs in soil. Reliant Energy believes a similar approach should be used for defining the vertical extent of COCs in groundwater. In addition, the commercial/industrial assessment level should be used for commercial/industrial land use.

TCC and TXOGA commented that in determining the extent of COCs in soil, a comparison to background concentrations is allowed. A similar comparison to background concentrations should be allowed when defining the vertical extent of COCs in groundwater.

They recommend that the TNRCC modify the provision to read: "The person shall define the vertical extent of COCs in groundwater to below the residential or commercial/industrial assessment level, as applicable, or background by ..." and;

The commission notes that the residential assessment level is by definition a critical PCL, which as set forth in §350.78 (Determination of Critical Protective Concentration Levels) may actually be the method quantitation limit or background concentration.

Concerning §350.51(e), Brown, Carls & Mitchell, Brown McCarroll & Oaks Hartline, and TranSystems commented that subsection §350.51(d)(1) allows for discontinuing vertical assessment of soils beyond the upper most groundwater bearing unit "if the vertical assessment could exacerbate the vertical migration of COCs." As is stated above, similar language should also be included in §350.51 (e) (see comment above on §350.51 (b) and (e)).

The requirement of demonstrating that COCs are less than their respective MCLs directly below the source area should be waived. An alternative approach, such as the 'outside-in' approach should be used which, in essence, consists of determining vertical extent hydraulically downgradient of the source zone. We are concerned that the rule as written is far too restrictive and does not take into account varying aquifer characteristics and conditions, and that it does not allow for use of advanced or innovative investigation techniques. We would suggest that language similar to that in §350.51(d)(1) allowing for the discontinuation of the vertical assessment of soils be added to this subsection allowing for the discontinuation of the assessment of the vertical extent of contamination in groundwater.

TranSystems, Brown, Carls & Mitchell, and Brown McCarroll & Oaks Hartline also commented that a technical provision should be added to the vertical extent requirement for assessment of potentially impacted substrata beneath groundwater. If it can be demonstrated through investigation at a suspected source region that non dense non-aqueous phase liquids are present in the deepest impacted saturated zone and that the confining layer beneath such zone is absent of chemical concentrations, then no further assessment of the vertical extent of contamination should be warranted. The technical criteria for the presence of DNAPL should be consistent with the EPA (1992) definition for DNAPL characteristics that a chemical is considered to be in the dissolved phase if the analytical concentration is <10% its maximum solubility limit.

The commission notes that the rule is not specific as to the exact location of the placement of wells to make these determinations and does generally support the "outside-in" approach. The commission does not agree that this requirement should be removed from the rule as it is critical to determine if lower groundwater-bearing units are impacted and further notes that reliance upon soil samples to

make this determination is not appropriate. Once COCs enter groundwater, it is not always possible to evaluate their potential to migrate deeper by assessing the intervening soils due to complex hydrogeology and unknown groundwater-bearing units interconnections. The commission does agree that there should be flexibility in this requirement similar to that allowed in subsection (d) since they deal with similar concerns in regard to actions which may actually make matters worse (i.e., cross contamination) and is changing the rule to allow the executive director to omit or modify the requirement for vertical assessment on a site-specific basis if the vertical assessment would exacerbate the vertical migration of COCs. The text of subsection (e) is being modified to be consistent with this same approach.

Concerning §350.51(d) Henry, Lowerre, Johnson & Frederick commented that low permeability units (hydraulic conductivity less than or equal to 10⁻⁶ cm/s) act as reservoirs that slowly release contaminants over time. The failure to investigate and cleanup low permeability zones can significantly increase the time required for contaminants to be removed from groundwater. The effects of low permeability zones on the persistence of groundwater contamination are illustrated in the figures provided in Attachment 6.

The commission agrees that it is important to assess low permeability units and notes that these materials are assessed under the TRRP rule as soils. These soils do have to be protective of groundwater and the assessment requirements are designed to identify areas which require a response action.

Concerning §350.51(e), Brown McCarroll & Oaks Hartline, Brown Carls & Mitchell, and TranSystems commented that they requests that TNRCC remove §350.51(e), which requires sampling of deeper groundwater-bearing units, unless a person can demonstrate that vertical migration to a lower aquifer is not possible. Because of the real possibility of cross- contamination, that sampling of a lower aquifer should only be conducted when intervening soil samples indicate concentrations of COC that exceed the higher of the method detection limit or background concentrations. In addition, whether or not TNRCC makes the revision requested above, a sentence should be added at the end of §350.51(e) stating that "the executive director may omit or modify this requirement on a site-specific basis if sampling of the deeper groundwater-bearing unit could result in contamination of that unit."

The commission does agree that there should be flexibility in this requirement similar to that allowed in subsection (d) since they deal with similar concerns in regard to actions which may actually make matters worse (i.e., cross contamination) and is changing the rule to allow the executive director to omit or modify the requirement for vertical assessment on a site-specific basis if the vertical assessment would exacerbate the vertical migration of COCs. The text of subsection (e) is being modified to be consistent with this same approach.

Concerning §350.51(e), Chevron, KOCH, and TCC commented that the person should have the option of using the commercial/industrial assessment level for commercial/industrial property. Add "or commercial/industrial (depending on the land use classification of the affected property)."

Concerning §350.51(e), KOCH, AECT, Chevron, Reliant Energy, and TCC also commented that the proposed TRRP rules state that a person shall define the extent of COCs in "deeper groundwater" to below the residential assessment level. This is not appropriate beneath a facility where the land use is commercial/industrial. The depth of the groundwater sample should not matter when delineating to residential or commercial/industrial assessment levels. If the overlying land use is commercial/industrial, then all of the groundwater beneath the site, regardless of its depth, should be compared to commercial/industrial assessment levels.

Further, the proposed POE for groundwater is limited to the "upper-most groundwater bearing unit" (§350.73(d)(1)); not "deeper groundwater."

TCC and TXOGA commented that the person should have the option of using the commercial/industrial assessment level for commercial/industrial property.

The commission disagrees that the person should have the ability to use the commercial/industrial assessment level on commercial/industrial property for conducting the vertical groundwater assessment. It is necessary to determine areas (vertical and horizontal) with concentrations of COCs exceeding the residential assessment level in groundwater in order to protect potential off-site residential receptors even though on-site land use is commercial/industrial. For example, the next lower groundwater-bearing unit could be affected at concentrations less than the commercial/industrial PCLs but higher than the residential PCLs and subject to off-site migration. It is also necessary to identify these affected groundwaters to allow natural resource protection measures to be implemented to limit, as appropriate, future migration and degradation of natural resources.

With regard to Reliant's reference to §350.37(d)(1) regarding the setting of the POE as the upper-most groundwater bearing unit, this should be interpreted to mean the upper-most groundwater bearing unit which is not affected by the release of COCs. This provision is intended to prevent the vertical spread of COCs in excess of PCLs to unaffected groundwater. However, the reference to §350.37(d)(1) could have been made to §350.37(d), as the provision applies to both on-site and off-site groundwaters. In the case of §350.51(e), the person is to determine the groundwater-bearing units that have been affected in excess of the residential assessment levels such that the vertical extent of COCs can be properly managed.

Concerning §350.51(e), McCulley, Frick, & Gillman commented that this section describes the requirements for vertical delineation of groundwater plumes. The rule should provide some flexibility in delineating the vertical extent of COCs in groundwater if the deeper groundwater-bearing unit is a class 3 resource. If the deeper groundwater-bearing unit is unusable either because of TDS concentrations above 10,000 mg/L or because the unit will not produce 150 gallons of water/day, there is no risk-based reason for assessing the deeper unit. Assessment of deeper groundwater-bearing zones can be extremely expensive with no benefit provided. This activity should not be required if it does not provide any additional protection of human health or the environment.

The commission does not agree that class 3 groundwaters should not be assessed to determine the presence of COCs. The commission notes that it is important to determine the impact in these zones even though they may not be a target zone for well completion. There is a potential for cross-contamination with other useable zones or other exposure hazards to result. Assessment is necessary to identify any cross-contamination potential and to provide required notice to affected landowners.

Concerning §350.51(f), KOCH commented that a person should have the option of collecting surface water samples from the receiving water body to determine if COCs in groundwater are discharging to a surface water body. Otherwise, a person should be able to incorporate a surface water dilution factor per §350.75(i) (4). Actual sampling data or dilution factor calculations should be used to determine if a receiving water body is an "affected property."

The commission disagrees with the commentor's statement that persons should have the option of collecting surface water samples from the receiving water body or otherwise use a surface water dilution factor when determining if COCs in groundwater are discharging to a surface water body above the surface water risk-based exposure limits as set forth in §350.74(h). It is not appropriate to make this determination with surface water samples due to the inability to collect sufficiently representative surface water samples for this purpose which is compounded by the difficulty presented by sediments acting as a filter. As set forth in §350.51(f) and §350.37(i), the groundwater discharge concentrations must be measured in the groundwater (e.g., monitoring well). This process

is similar to evaluating the need for a permit for a surface water discharge, which is evaluated by analyzing the effluent at the point of discharge, not in the receiving water body. The commission does note that "dilution factors" may be used when determining the ^{SW}GW PCL in certain situations as discussed in §350.75(i)(4), and the person *does* have the option of collecting surface water (and/or sediment) samples in accordance with §350.75(i)(4)(E) to determine if an alternate groundwater dilution factor is appropriate for determining the ^{SW}GW PCL. This sampling data can be used to confirm model projections, and to ensure that sediment concentrations of COCs are not present at concentrations that are harmful to benthic organisms. The rule has been changed in §350.75(i)(4)(E) to clarify that receiving water studies may include collection of surface water samples.

Concerning §350.51(f), McCulley, Frick, & Gillman commented that this section states that the person shall use concentrations measured in groundwater at or immediately upgradient of the zone of discharge to surface water to determine if COCs in groundwater have discharged to surface waters. In some cases, it may be difficult to sample groundwater immediately upgradient from the discharge point, or this approach may be overly conservative. Therefore, we recommend that the determination be based on either delineation of the plume between the source and the potential point of discharge, concentrations measured at or immediately upgradient from the discharge point, or in surface sediments at the potential point of discharge. The potential point of discharge should be located based on projected groundwater flowpaths derived from a properly constructed potentiometric surface map.

The commission acknowledges there may be difficulties on some sites locating a sampling point at or immediately up-gradient of the zone of groundwater discharge but disagrees that this approach is overly conservative. The best location in which to sample is within the groundwater prior to discharge and as close to the point of discharge as is reasonably possible. The commission points out that this sort of evaluation is only necessary when a groundwater discharge to surface water is likely based on proximity and/or COC distribution and hydrogeology. The commission agrees that it may be useful to sample sediments to see if COCs are concentrating in the sediments. Sampling sediments is not, in and of itself, a proper method to determine if groundwater is discharging to surface water because sediments may be scoured and redeposited during flood events. The commission is not changing the rule as recommended but does agree that potential points of discharge should be located based on projected groundwater flowpaths derived from a properly constructed potentiometric surface map.

Concerning §350.51(g), Chevron commented that "the person shall characterize the geology and hydrogeology throughout all areas of the plume management zone." This should be rephrased to allow that it can be shown that there is very little likelihood for geologic or hydrogeologic variation within the plume management zone. "All areas of the zone" could require further assessment beyond that which is truly necessary for the site.

The commission does not agree that a change to the rule is necessary to allow a person to characterize the geology and hydrogeology of the plume management zone without having the ability to demonstrate minimal geologic or hydrogeologic variation. This demonstration may be possible on a site-specific basis and may be related to the length of any additional planned plume expansion. The importance of this subsection cannot be overstated, in that projections about how groundwater will be managed such that the point of exposure is protected is dependent upon these assessments of the geology and hydrogeology.

Concerning §350.51(i), Weston suggest adding "If chemicals have migrated beyond the property boundaries, or may potentially migrate beyond the boundaries in the future, the person shall." There are many instances (surface releases of metals, residual levels of organics in soil or groundwater that are not moving, etc.) when the requested information is not needed.

The commission disagrees with the commentor that this information will only be valuable in situations where COCs have or will migrate off-site. Also, it is necessary to gather some of this information to classify the groundwater.

Concerning §350.51(i), Reliant Energy, AECT, and TU commented that the requirement to conduct a field survey to locate potential receptors, including water wells and surface water to at least 500 feet beyond the boundary of the affected property and a records survey to identify all water wells and surface water bodies within 1/2 mile of limits of groundwater plume for every site investigation, is overly prescriptive and highly conservative. We believe these requirements are unnecessary for many site investigations and tend to circumvent the use of professional judgment and site knowledge. Failure to allow the use of professional judgment will result in significant increases in cost and time of investigations.

The commission disagrees that these requirements are unnecessary on many sites and that they circumvent professional judgment. The commission points out that it is necessary to determine the current use of groundwater within 1/2 mile of the affected property to classify groundwater under class 2 and 3 groundwater. Also, the commission does not understand how the commentor proposes to use “site knowledge” without a gathering such data through a field survey of potential receptors. The commission disagrees that this requirement will result in significant increases in cost and time.

Concerning §350.51(i), Chevron, Groundwater Services, and KOCH commented that this subsection could be interpreted to require the person to collect and submit the environmental information from off-site properties. Add: "., although collection and submittal of this information by the person is not required."

Groundwater Services commented that the purpose and intent of the requirement that the person shall also attempt to identify any off-site properties...that have environmental information is unclear. Do they only need to attempt? What constitutes non-compliance with this provision? Is the person required to contact neighboring properties regarding private information or only check for available data in state files? They recommended Revision on the provision to clarify intent and avoid unreasonable burden on applicant.

KOCH, Chevron, and Groundwater Services commented that they agree that it is important to use existing, relevant environmental information to complete an APAR. However, requiring a person to obtain information collected for submittal to the commission for all off-site properties within 1/4 mile of the on-site property could be burdensome. For example, at large properties this environmental information could represent conditions a substantial distance from the affected property; and therefore not be relevant. In other areas, with numerous adjacent properties, substantial effort could be expended contacting all the parties to determine if they had collected information for submittal to the commission. Therefore, this requirement should be restricted to information actually submitted to the commission and only include information collected at locations within a reasonable distance from the *affected* property.

The commission agrees that the rule only requires persons to attempt to identify and notify the agency of such information, and not actually collect and submit this data. Attempt to identify may include but is not limited to searching agency files for such information or even within one's own company. It is not necessary to contact each neighboring property. The commission is changing the rule to clarify the need to collect and submit this information. The commission agrees with Koch for the reasons stated that the distance should be measured from the affected property and not the on-site property boundary and is changing the rule accordingly.

Concerning §350.51(i), Mobil commented that the section requires the person to collect environmental information developed and submitted to the commission for all off-site properties within one-quarter mile of the affected property. It appears this section will require every person to file multiple Freedom of Information Act requests with the commission to obtain information from the commission for submission to the commission. The last sentence of the section should be deleted.

The commission clarifies that the rule does not require submission of this information to the agency, only identification that the information exists. Also, the commission does not anticipate that persons will be required to submit Freedom of Information Act requests to identify if such information exists. In order to better understand a person's own affected property, it seems reasonable that they would want to know of the existence of this local information and its potential impact on their site conceptual model. The commission does agree with the commentor that "one of the tradeoffs involved in moving from a prescriptive target-oriented remediation program to a program that is risk oriented is the need for much greater data upon which to base a decision." The commission is not changing the rule as the requirements are reasonable.

Concerning §350.51(i), TCC and TXOGA commented that the requirement for field survey within 1/4 mile of the affected property to obtain environmental information is overly burdensome and may not be balanced by the potential benefit. Our recommendation is that this requirement should be removed and reside with the various programs triggering the use of TRRP.

The commission disagrees that the requirement is overly burdensome, not balanced by the benefit, and best retained within the various programs. There is no difference in implementation if the same requirement is in the TRRP rule or within each individual program's rules and it will lessen the length of the rule and potential for confusion if retained within a single rule. In order to better understand a person's own affected property, it seems reasonable that the person would want to know of the existence of this local information and its potential impact on their site conceptual model. There is no rule change.

Concerning §350.51(l), Brown McCarroll & Oaks Hartline commented that as a general note to §350.51, we believe that detailed requirements for the Affected Property Assessment, such as those contained in paragraphs (l) - (n), should be placed in guidance rather than in the rules due to variability from site to site that should allow flexibility in assessments.

The agency does not agree with the commentor's belief that the "detailed requirements" for Affected Property Assessment, "such as those contained in paragraphs (l) - (n), should be placed in guidance rather in the rules due to variability from site to site that should allow flexibility in assessments. The agency believes that this portion of the rule provides adequate flexibility, particularly with respect to the choice of statistical methods for performing an assessment (albeit subject to the approval of the executive director). Flexibility has been added to §350.51(k) concerning surface water to reflect that sampling methods other than those provided in the *Implementation Procedures* are available and may be used, subject to the approval of the executive director.

Concerning §350.51(l), KOCH commented, what are statistical and geostatistical methods? Will the 95th percentile upper confidence limit (95% UCL) or other similar approach be suitable for comparing laboratory results to PCLs or risk-based exposure limits (RBELs)?

Because of the variety of statistical methodologies the agency felt that a more detailed discussion of this topic would best be left to development and/or reference in guidance. To give a very brief answer to the commentor's first question, the term "statistical methods" as used in the rule refers to the set of commonly used statistical procedures that do not explicitly account for the spatial information in the samples. For instance, while available sample concentrations are explicitly substituted into whatever equations constitute a particular statistical procedure in order to estimate various useful parameters (e.g., means, standard deviations) the locations of the samples (in terms of their spatial coordinates), also available as numerical data and containing information about the spatial distribution of the samples, are not utilized in the equations constituting the procedure. Thus, often such "statistical methods" are described as zero dimensional. Geostatistical methods, on the other hand, make explicit use of all sample locations and seek to exploit the information about the

spatial distribution of concentrations to make optimum predictions regarding constituent concentrations at unsampled locations.

Concerning §350.51(1)(1), Environmental Fuel Systems and ICE commented that in terms of assessment requirements, discrete and judgmental sampling can be used, probably in similar fashion to the "Plan A Assessment" currently practiced in the PST program. As few as five background borings/samples must be used to model COC background concentrations on site.

Weston and Chevron also commented that the use of judgmental samples if it is demonstrated that they are not biased low is a very reasonable approach, and should be included in the final rule. Most environmental samples are typically judgmental and biased high since sampling is generally performed first in areas of greatest potential for impacts.

The commission agrees with the comment that for assessment requirements, discrete and judgmental sampling can be used when appropriate, and notes that the proposed rule already describes the circumstances when this type of sampling data can be used in §350.51(1)(1).

Concerning §350.51(1)(2), Chevron commented that "An appropriate number of samples for the statistical method shall be used. If site-specific background is determined using the upper confidence limit or similar statistical method, then a minimum of eight samples shall be used. If the person uses an arithmetic average to determine the background concentration, then a minimum of five samples shall be used."

In the preamble, it is stated that the commission is proposing general performance standards for the use of statistics rather than prescriptive requirements. Performance standards for statistical methods are requirements such as bounds on the uncertainty associated with estimated values, required significance levels for hypothesis, or required power to detect a given difference. The sample size requirements given above are prescriptive and it is not clear what standards of performance they are intended to achieve. We recommend that the performance standards be specified. For example, if a site mean is to be compared to a background mean it is reasonable to specify that the test be performed at the 0.20 significance level and to require at least 80% power to detect a 100% increase in the site mean above the background mean. Typically, eight samples from both site and background will be sufficient to achieve this. If a background threshold value for comparison of individual site sample results is to be computed, it is reasonable to require enough samples so that the estimated background mean is 80% certain to be within 50% of the true mean. Typically, five samples will be sufficient to achieve this.

Chevron suggested the following as one possible alternative: "An appropriate number of samples for the statistical method shall be used. If a site mean is to be compared to a background mean, the test shall be performed at the 0.20 significance level and the person shall demonstrate that enough samples have been collected to achieve at least 80% power to detect a 100% increase in the site mean above the background mean. If a background threshold value for comparison of individual site samples results is to be computed, the person shall demonstrate that enough samples have been collected to estimate the background mean to within 50% of true mean with 80% certainty."

The commission notes that the type of statistical performance standards requested by the commentor are provided in §350.79. These are utilized when conducting a two-sample statistical test comparing site concentrations to background in determining whether a response action is necessary for a specific COC. While this option is available, §350.51(1)(2) also provides the person the opportunity to develop a statistic which will be considered to be reflective of site-specific background for use in determining the critical soil PCL. In these cases, the suite of performance standards mentioned by the commentor are not strictly relevant, and the sample size requirement merely provides some guidelines in developing a background estimate when the type of two-sample statistical comparison described in §350.79 is not desired.

Concerning §350.51(1)(2), TCC and TXOGA commented that in the preamble, it is stated that the commission is proposing general performance standards for the use of statistics rather than prescriptive requirements. Performance standards for statistical methods are requirements such as bounds on the uncertainty associated with estimated values, required significance levels for hypothesis, or required power to detect a given difference. The sample size requirements given above are prescriptive and it is not clear what standards of performance they are intended to achieve. We recommend that this be moved to guidance.

Concerning §350.51(1)(2), Weston commented that the use of upper tolerance limit (UTL) as currently recommended under the VCP should be included as a method of establishing a site-specific background concentration.

Please refer to responses for §350.79(2)(B) for the TCC, TXOGA and Weston comments.

Concerning §350.51(1)(3), Weston commented that the 1/8-acre area may be appropriate for a single family dwelling, but it is not appropriate for an apartment complex, a hospital, or a hotel. Using the 1/8-acre criteria results in an incredible number of samples for large tracts being redeveloped for non-single family use. Consideration should be given to an alternate for these non-single family residential uses.

Concerning §350.51(1)(3) and (4), Strasburger & Price commented that these regulations require deed recordation/restrictive covenants when there is a variation from a default assumption used in determining representative concentrations of chemicals at a site. The TNRCC is straying far from its original goal, as set forth in §335.5, of using deed recordation to indicate the permanent placement of chemicals at a property. The end result is needless cluttering of property deed records. Under the TNRCC's proposal, a complicated remediation may require the recordation of multiple forms regarding the minutest of remediation details. The rationale the TNRCC gives for requiring deed recordation is that deed recordation provides notice. Notice may be achieved by other, more appropriate, means. Affecting the chain of title is a serious matter and should be reserved for permanent or near permanent conditions at a property and not as a substitute for other avenues of public notice. Notice regarding the status of activities at a property are generally widely available through commercial databases as well as the TNRCC web page, e.g., LPST database. To the extent that certain programs are not yet covered, the TNRCC could expand their existing databases to include any missing information. Moreover, the TNRCC's legal authority to require deed recordation in these instances is unclear. The Texas Legislature has only granted the TNRCC authority to require "innocent owners/operators" to deed record as a condition of receiving immunity from certain liabilities. See Texas Health & Safety Code §361.753(g). The third and fourth sentences of §350.51(1)(3) should be deleted in their entirety. Similarly, the second and third sentences of §350.51(1)(4) should be deleted in their entirety. Sections 350.111(b)(8), 350.111(b)(9), 350.111(b)(10), 350.111(b)(11) should be deleted in their entirety.

Chevron commented that the exposure area specifications are listed under the criteria that must be met in order for the statistical methods to be used. The size of the exposure area should not be related to the use of statistical methods and, if anything, the larger the area, the more necessary it becomes to use a statistical approach to adequately characterize the region. Although it is not overly burdensome to require the approval of the executive director to define a larger exposure area than 1/8th acre or 1/2 acre, the requirement to file an institutional control is overly burdensome.

Additional options for the use of statistical methods are discussed in Attachment 2 of Chevron's comments. The requirement to file an institutional control should only apply if the property is to be sold, or if land use changes. See further discussion of institutional controls in Chevron's Attachment 4.

Environmental Resources Management commented that specifying maximum exposure areas for use of statistics may result in elimination of statistics for estimation of exposure point concentrations and force the

erroneous assumption that individuals are exposed to the maximum concentration throughout the entire assumed 25-30 year exposure period. Determine exposure areas on a case-by-case basis based on site-specific information to be documented in the assessment report.

In Attachment 2-B: The total soil exposure areas, based on a policy decision, have been set at 1/8-acre for residential sites and 1/2-acre for industrial/commercial sites unless documented and verifiable activity pattern information is provided to justify a larger area. Because of the cost of developing information to justify alternative exposure area sizes, this policy will result in small hot-spot data driving cleanups or in requiring a much greater amount of analytical data than is justified by the purchase price and development value of most residential and commercial properties.

Given the proposed requirements, a Responsible Party has several options: Do nothing and wait for enforcement. Spend an unnecessarily large sum of money to do what the Rule requires. Set exposure areas (and randomize the sampling) to the extent that hot spots are more likely to be avoided. Clean up an unnecessarily large area, that otherwise would not warrant cleanup, based on true hot spot sampling. None of these options is desirable.

To demonstrate the significant increase in cost that will result from this proposed policy, the following example is provided: consider a one-acre property that has been landscaped with three feet of urban fill which is assessed before redevelopment of the property for residential land use. Based on the proposed Rule, to avoid a small hot spot driving a larger unnecessary cleanup, this property would have to be divided into eight 1/8-acre exposure areas, then each 1/8-acre will be randomly sampled, utilizing vertical soil intervals (i.e., 0 to 6 inches, 6 inches to 5 feet, 5 feet to 10 feet, and 10 feet to 15 feet), and fulfilling agency requirements for a sufficient number of samples for each data set (e.g., minimum of ten samples per data set) resulting in a total of >300 soil samples for a one-acre site. In addition to the sampling cost per 1/8-acre, there is the analytical cost per 1/8-acre. The sampling requirements set by the agency will result in significant and unnecessary cost. Has the agency considered the significant property assessment cost that will result due to a decision that appears to be based on an undocumented policy? This policy will discourage redevelopment of Brownfields and voluntary cleanups. The basis for the exposure area size criteria is not provided and should be made available for comment.

Additionally, it is unclear from the proposed rule as to how this policy decision to use standardized exposure area sizes will be integrated into the complexities of a risk evaluation. Is the site to be divided up into arbitrary 1/8 or 1/2 acre plots and separate PCLs to be identified for each plot and then compared to the maximal soil concentration reported for each constituent in each plot or will the overall site maximum soil concentration be used to evaluate risk for the whole site without consideration of reasonable exposure areas? Both methods are inappropriate. Environmental Resources Management recommends that the rule be rewritten to encourage the use of a statistical (95% UCL) estimate of the average for the whole site unless it is unreasonable to assume that an individual would be exposed to the whole site. We also suggest that clarifying language be added that allows for reasonable flexibility in defining exposure areas based upon site-specific considerations.

Groundwater Services commented that requirements to limit soil exposure areas to 1/8 acre in residential areas and 1/2 acre in industrial areas is unnecessary and will result in excessive soil sampling to demonstrate compliance with PCL. For example, for statistical evaluation of a one-acre residential site, 80 soil samples would be required, entailing extreme expense with no added value. Recommended Revision: Revise rule to set exposure areas equal to either the proposed default values or the actual PCLE, whichever is greater. This approach prevents dilution of representative concentrations by inclusion of samples outside the PCLE and avoids excessive sampling costs.

Requirement to record deed notice in the event that affected soil concentrations are not derived based on mandated exposure area is unnecessary and overly restrictive. As noted in Comment 7 above, use of

mandated exposure areas imposes unreasonable sampling requirements and level of conservatism on risk-based site evaluation. Requiring deed restriction if those values are not used is highly invasive of property development plans and will prove very problematic for property owners and the TNRCC. They recommended the following revision: Even if mandated exposure areas are retained, delete requirement for deed notification if default exposure areas are not used.

Port of Houston Authority commented that the re-proposed TRRP rule address affected property assessment exposure areas with requirements to limit soil exposure areas to 1/8 acre in residential areas and 1/2 acre in industrial areas. This is unnecessary and will result in excessive soil sampling and delays in addressing corrective action for large facilities while awaiting executive approval.

AFCEE commented that potentially aggravating the problems associated with the institutional control provisions is the fact that some of the proposed sections of the TRRP require the filing of an institutional control long before the response action is completed. Proposed §350.51(l)(3) - (4) require the filing of an institutional control if the size of exposure assumptions are changed but do not specify when the control must be filed.

Modify the institutional control requirements in §350.51(l)(3) - (4) so that institutional controls are not mandated prior to completion of a response action unless the affected property is conveyed or as otherwise required by §350.35 due to a "substantial change in circumstances."

Chevron commented that the use of a soil exposure area for commercial/industrial properties not to exceed 1/2 acre is unreasonable and not necessarily consistent with industrial land use. As this regulation has implications for a large variety of sites from the typical UST/AST closure of less than 1/2 acre to the large facilities in corrective action with hundreds of acres, this approach will cause delays by requiring executive approval for every action not similar in size to an UST/AST action.

The impact of this requirement is that all large facilities, by the nature of their use, have assessment areas of tens of acres, and therefore are required to file an institutional control in the county records. This seems to be biased against all large operating facilities in Texas. The agency should be looking for a performance criteria that relates the size of the site to the size of the assessment area, or management zone. Blanket statements about plume size seem to reflect a PST model of site conditions. This requirement should be changed to allow site-specific development without having special approval; options for providing such additional flexibility are discussed in Attachment 2 of Chevron's comments. In addition, the requirements for deed notices and restrictive covenants as they pertain to a soil exposure area should not be necessary unless the property is to be sold, or if land use changes. See Attachment 4 of Chevron's comments for additional discussion of institutional controls.

KOCH commented that the proposed TRRP rules state that the soil exposure area for commercial/industrial properties shall not exceed 1/2 acre without approval from the executive director. The rules or preamble do not contain any explanation or rationale for this 1/2 acre exposure area. For large commercial/industrial properties, it is very unlikely that workers would limit their long-term activities to a small portion of a large site. We are not aware of a similar EPA or state restriction on the exposure area at a commercial/industrial property. The soil exposure area should be revised in the rules to reflect site-specific conditions and be tailored to the size of the property.

McCulley, Frick, & Gillman commented that §350.51(l)(4) relates to the exposure unit. We recommend identifying the exposure area on a site-specific basis similar to EPA guidance (1994a) that suggests that the exposure area may range in size from the entire geographic boundaries of the site to the smallest size area that presents an exposure to the receptor. The implications of the 1/2 acre delineation for commercial/industrial exposure units on sampling seem overly burdensome and may often add little value when characterizing site conditions and risks. For example, if contamination is released through point

source emissions and transported through air dispersion, the exposure area affected by deposition onto an off-site residential area may be adequately characterized through sampling an area larger than a single residential property. Although this example represents a specific source term and transport mechanism, it demonstrates the need for flexibility and site specificity in the definition of exposure area. At a minimum, we suggest some discussion on the rationale for basing the policy decision on these exposure units and how such a decision reduces data variability and decreases uncertainty in risk estimates since data variability is a function of sampling data and distribution while an exposure unit describes the receptors activity pattern. We also suggest that the proposed rule be revised to allow for the use of site-specific information to define exposure areas without prior executive director approval. Also, we are confused about the justification for defining a residential exposure area as 1/8 acre parcel when EPA suggests assuming a residential exposure area of 1/2 acre, or less if supported by site-specific information (EPA, 1994a and 1996a). In addition, the requirement to place a deed notice with the property record when the evaluation considered a deviation from the prescribed exposure unit size seems overly burdensome and unnecessary. We suggest that this provision be removed from the proposed rule.

Commentors requested that the commission provide the basis for the default exposure area sizes proposed in the rule. The residential default of 1/8 acre (or the size of the front or back yard of an existing residential lot), was selected based on the reasonable assumption that a resident may spend larger amounts of time in either the front or back yards of their home. The 1/8 acre default reference is cited in Chapter 6 of the 1989 USEPA Risk Assessment Guidance for Superfund. As literature data on general worker activity patterns is somewhat limited, the 1/2 acre default for commercial/industrial sites is based on TNRCC professional judgement as to a conservative size of a typical process area.

While the commission maintains that the concept of developing default exposure areas is consistent with the protection of both current and future activities at a site, several changes to §350.51(l)(3) and §350.51(l)(4) are being made in order to account for site-specific differences and to further expedite the remediation process. For existing residential lots or platted residential land, the commission is maintaining the 1/8 acre (or size of the existing front or backyard) default exposure area language. However, language has been added to §350.51(l)(3) which states that the executive director may approve larger exposure areas for other properties which meet the definition of residential land (e.g., parks, hospitals), if justified based on site-specific conditions.

The commission points out that for commercial/industrial properties, §350.51(l)(4) allows the executive director to approve site-specific exposure areas that are larger than the default of 1/2 acre, when supported by documented and verifiable activity patterns at a site. Commentors expressed concern about the amount of effort involved in gathering this type of information. In order to clarify the intent of the commission in this regard, §350.51(l)(4) is being amended to state that, in approving an exposure area for an active commercial/industrial scenario, the executive director may consider any appropriate site-specific information which documents typical worker activity patterns. Further, the commission is adding a provision which states that if COCs are relatively homogeneous over a larger area at any commercial/industrial site (either active or inactive), the executive director may allow concentrations to be averaged over this larger area.

For both residential and commercial/industrial property, the commission is maintaining the specified institutional control requirements in order to be adequately protective of current and future site uses. However, §350.51(l)(3) and (4) have been amended such that this type of notice shall not be required for properties when a larger exposure area was approved due to the homogeneity of COCs. With regard to Strasburger & Price's point that notices on the deed should be for permanent or near-permanent conditions is precisely the concern with the use of other than the default exposure areas. The commission fully believes that such exposure areas will be non-permanent and very highly subject to change, even while the person uses the property. As such, an effective record should be kept of the changes so that persons can understand the basis of past response action decisions.

Institutional controls are the best long term method to keep track of the limits on the use of the property. However, the commission points out that there is no specific requirements in the rule as to the timing that an institutional control must be filed. The commission agrees with Chevron that it may be appropriate to wait until the property is sold before institutional controls are filed when the person sufficiently demonstrates that internal procedures and protocols to ensure exposure assumptions are not being violated during the intervening period. Where such demonstrations cannot be sufficiently made, the executive director may require the filing of an institutional control earlier. However, the commission does note that a final no further action letter will not be issued until the required institutional control has been complied with. If a conditional no further action letter is issued, then one of the conditions would be that the exposure area assumptions are complied with. Additionally, the commission also notes that §350.31(i) would also need to be complied with until such institutional control was filed. Finally, if the property is subject to zoning or governmental ordinances that is equivalent to the deed notice or restrictive covenant that would otherwise be required, then the institutional control requirements are met. The commission has changed the rule in §§350.51(1)(3) and (4) to conform with the expanded definition of institutional control.

The commission disagrees with commentors who stated that the use of default exposure areas precludes the use of statistics, forces the use of the maximum COC concentration, or establishes stringent sampling requirements. The commission points out that the rule does not mandate any data collection requirement in association with the exposure area defaults, but rather, the defaults describe how existing data are to be combined in making comparisons with the critical soil PCL.

Concerning §350.51(1)(5), TPWD commented that language in §350.5(1)(5) regarding a determination of a hot spot that may require separate evaluation as having a hazard quotient of 50 or greater for ecological receptors is arbitrary and artificial. Because of the multitude of potential receptors and exposure scenarios, the determination of the presence of a hot spot with respect to ecological risk is best determined on a site by site basis.

Chevron commented that if the purpose of the rule is to undertake a tiered evaluation of human health and ecological risks, the end result of that process will be to determine the PCLs and whether media concentration exceed those PCLs. The use of risk levels to identify hot spots is: (1) not consistent with the process laid out in the rule; and (2) creates unneeded anxieties regarding the agency's pre-determined mind set towards a risk level. It is possible that early in Tier 2 of either the human health or ecological evaluation, a comparison to default values could lead to levels that, under this provision, would be considered hot spots. Yet, proceeding into later phases of Tier 2 or into Tier 3 presents a more complete picture that show such levels are not occurring.

TNRCC should provide the basis for use of a hazard quotient of 50 to identify hot spots affecting ecological receptors. For both human health and ecological, hot spots that may lead to interim actions should be evaluated on a case-by-case basis and a set value should be avoided. We request that the text be changed to reflect that sentiment, otherwise, the agency should demonstrate and justify the use of these human health and ecological risk levels for identifying hot spots.

KOCH commented that "Hot spots" are defined in the proposed TRRP rules as distinct areas where the COC concentrations "significantly exceed" specified risk levels. A clear definition of "significantly elevated" should either be provided in the rules or quickly developed in a guidance document.

Strasburger & Price commented that these regulations use the term "hot spot" which is undefined (see proposed §350.4), and is, in fact, a slang term used within the industry. We believe that this term is inflammatory to lay persons and that slang does not have a place in a formal rule making. In §350.51(1)(5), we suggest that the phrase "then they should be considered as hot spots and" be deleted.

Groundwater Services commented that current hot spot definition corresponds to all areas exceeding PCLs, which does not represent a concentrated area of contamination. Under this approach, even a single sample location could constitute a hot spot, which undermines appropriate use of statistical methods.

Recommended Revision: Either delete this provision or redefine such that hot spot truly corresponds to a principal threat. For this purpose, a hot spot should represent a portion of the PCLE with a mean COC concentration exceeding 100 x 95% UCL for full PCLE.

McCulley, Frick, & Gillman commented that they find the criteria for defining a hot spot to be vague. A distinct area containing concentrations significantly greater than the PCL does not necessarily indicate a hot spot that would require a separate evaluation. This could be mis-interpreted to include the majority of an impacted area, which would in turn obscure an otherwise appropriate view of hot spots. The concept of a hot spot should be introduced to the investigation planning process early, when existing knowledge through a site history of land use evaluation suggests that small areas of high concentrations may exist within a larger area of contamination. Furthermore, the definition of a hot spot should be based on the site-specific spatial distribution of a COC, not a risk-based level. The evaluation of hot spots may be appropriate for an abandoned chemical processing plant where production, storage and transport of hazardous chemicals may have resulted in isolated areas of very high concentrations within a larger area of lesser concentrations. However, the hot spot concept may not be appropriate for assessing impacts to soils associated with the operation of leaking underground or above-ground storage tank which was fixed in its location during operation. We recommend that the criteria for hot spot definition be removed from the proposed rule. Instead, we suggest that the TNRCC allow each investigator the flexibility to consider, on a site-by-site basis, whether the concept of a hot spot is appropriate.

McCulley, Frick & Gillman commented that they find the criteria for defining a hot spot to be vague. A distinct area containing concentrations significantly greater than the risk-based concentration does not necessarily indicate a hot spot that would require special separate evaluation. This could be misinterpreted to include the majority of an impacted area, which would in turn obscure an other wise appropriate view of a hot spot. In our opinion, the hot spot or the concept of hot spot should be introduced into the investigation process early, when existing knowledge through a site history or land use evaluation suggests that small areas of high concentration may indeed exist within a larger area of contamination. We recommend that the criteria for the hot spot definition be removed.

TCC and TXOGA commented that if the purpose of the rule is to undertake a tiered evaluation of human health and ecological risks, the end result of that process will be to determine the PCLs and whether media concentration exceed those PCLs. The use of risk levels to identify hot spots is not consistent with the process laid out in the rule, is overly prescriptive, and does not appropriately handle the data statistically. Recommendation: Change the wording to: "If there are distinct areas of elevated COC concentrations that are associated with the significant risks or hazards for individual COCs which significantly exceed . . . then they those areas should be investigated as potential hot spots. Based on the distribution of sample concentrations in the area or interest, the executive director may require these areas to be evaluated separately."

Concerning §350.51(1)(5), Port of Houston Authority commented that hot spots are currently defined as all areas exceeding PCLs, which do not represent a concentrated area of contamination; therefore, undermining the use of statistical methods.

The intent of the hot spot requirement in the rule is to minimize the potential for critical areas of COCs to be “averaged out” by being combined with sampling data from relatively unimpacted areas. In situations where it is clear that an individual can be expected to move randomly over a given exposure area, it would not be necessary to assess hot spots. While it is not the intent of the commission to necessarily require remediation of all discrete areas of COCs regardless of the size of the hot spot area, the commission would be concerned when the activity pattern over an area which

includes a hot spot is difficult to establish and may not truly be random (e.g., worker exposures around the infrastructure of a work area, exposures to soils within a child's play area). The commission agrees with the comment that use of risk levels to identify hot spots is not consistent with the process established in the proposed rule whereby the end result is calculation of PCLs. Therefore, the commission has removed the language which identifies hot spots in term of risk levels and has amended §350.51(l)(5) to state that the executive director may require assessment of smaller but notable areas of soil contamination (i.e., "hot spots") when site-specific features are likely to result in preferential exposures to this area of contamination. The rule has also been amended to clarify the commission's position that the presence of hot spots should be determined on a site-specific basis when evaluating ecological risk. It is not clear to the agency on what basis the commentor claims that the current definition of hot spot will "undermine the use of statistical methods" as no supporting argument is presented.

Concerning §350.51(m), KOCH commented that they agree that 1/2 of the SQL should be used when conducting direct comparisons or when using statistical or geostatistical approaches.

McCulley, Frick, & Gillman commented that in Figure 350.51(m). Please clarify why there are no background concentrations provided for cadmium and magnesium. Also, please clarify if the chromium background concentration provided in the Figure is for total chromium, trivalent chromium, or hexavalent chromium.

Section 350.51(m) addresses the use of the Texas-Specific Background Concentrations. The Texas-Specific Background Concentrations specified in Figure 30 TAC 350.51(m) exceed some of the Tier I Residential Soil PCLs specified for the following constituents: Aluminum; Lead; Manganese.

Section 350.51(m) also states that in the absence of site-specific background evaluation, the Texas-Specific Background Concentrations may be used to determine the critical PCL. Therefore, should residential land use assumptions be appropriate for a site, the critical PCL values for aluminum, lead and/or manganese could be less than "background" levels. In many residential areas in Texas, the "Texas-Specific Background Concentrations" may be more appropriate target concentrations, especially considering the uncertainty associated with the development of Tier I Residential Soil PCL's. Please clarify how the TNRCC intends to use the Texas-Specific Background Concentrations when they exceed the Critical PCL. Also, please allow the flexibility to use the "Texas-Specific Background Concentrations" as target concentrations on a site-specific basis.

TCC and TXOGA commented that they do not follow TNRCC's logic for recommending that a background median concentration be compared with discrete constituent concentration data, as such comparison by definition will fail to distinguish at least half of constituents as being in the range of background. In addition, TNRCC's language regarding comparisons of median concentrations with "representative concentrations" of COCs is unclear, for the comparison should be limited to median-to-median concentrations.

Conducting background determinations using median-to-median comparisons is only one of several methods that can be used to determine whether a constituent is present at concentrations exceeding naturally occurring concentrations. While it is TNRCC's prerogative to suggest a method for conducting background comparisons, selection of the alternative methods used in making background comparisons should lie with the regulated community provided that those methods are defensible. Recommendation: We recommend that TNRCC make the statewide background data sets available on the Internet. If desired, TNRCC may present the median concentrations as part of the data set. Thus, any person wanting to conduct background comparisons by using TNRCC-recommended median-to-median comparisons would be free to do so. However, TNRCC should insert a provision in the Rule that would allow the flexibility to conduct any defensible statistically based comparisons of site data with TNRCC's statewide background

data set. Persons wanting to use alternative methods for conducting background comparisons simply could download the data sets of interest from the web page and conduct the appropriate analyses.

Weston commented that a value for cadmium should be included on Figure 30 TAC 350.51(m). The use of default background concentrations is a very good addition to the rules. This will prevent sites from having to establish site-specific values if they do not want (or need) to, and will allow investigation costs to be used more efficiently. We do suggest that a value for cadmium be included on the table.

Chevron commented that The proposed use of the Texas-specific median background concentrations is not reasonable, either for the individual measurement comparison or for the representative concentration comparison. In the case of comparing individual concentrations, it is never reasonable to require all individual concentrations to be below the median background concentration. The median is the 50th percentile of all background concentrations. By definition, 50% of all background, or unimpacted, concentrations are expected to exceed this value. The second case, comparing a representative concentration (presumably a UCL) to the median, also is inappropriate. A UCL is a summary statistic related to the arithmetic average. A comparison between this value and the background median does not have a clear interpretation, and is not a defensible statistical comparison. We recommend that Texas-specific background upper tolerance limits be computed based on the data that were used to compute the medians. These UTLs should be the comparison values for individual measurements. If a person wants to compare a representative concentration to the Texas-specific background, we recommend that a means comparison be performed, using the Texas-specific background data. TNRCC could easily make the data available by posting e.g. an Excel file on the web page.

The commission received a number of comments concerning the use of default Texas-specific background concentrations. The commission wishes to clarify that the intent of providing default background concentrations was to establish a framework which allows persons the option of proceeding without having to conduct a site-specific background study, thereby avoiding the cost and delays associated with such studies. These default background values serve as conservative but useful comparison values which can provide a basis for eliminating a specific metal from further consideration under the rule, as described in §350.71(k).

The commission disagrees that it would be appropriate to use upper percentiles of the Texas-specific data or utilize the entire distribution of Texas-specific data in making comparisons to site concentrations (e.g., two-sample t-test). Background concentrations can vary widely in Texas soils, and the commission believes it would be inappropriate to make decisions concerning remediation of a site in Houston, for example, based on consideration of an extremely elevated background level of lead associated with volcanic soils in specific areas of West Texas. For this reason, the commission selected the median of the dataset, as it provides an estimate of “typical” Texas background and is not as influenced by the presence of data outliers as are other statistics (e.g., mean, UTL).

The commission strongly disagrees with commentors who stated that the use of the Texas-specific median values is unreasonable, and will automatically result in cleanup of 50% of the sites in Texas. The rule provides various options for making comparisons with background levels on a site-specific basis, and many of the statistical comparisons recommended by commentors (e.g., direct comparison between average site concentrations and average background concentrations) are in no way precluded by the rule. Therefore, the Texas-specific median default values only provide a reasonable starting point for determining background, and are not intended to represent the range of background concentrations likely to be encountered at sites subject to this rule.

Further, the commission disagrees with the comment that because the default Texas-specific background concentrations are median values, 50% of the samples analyzed could exceed the listed Texas-specific background concentration. This rationale is incorrect given that the Texas-specific

background concentration reflects the median of all values collected across the entire state, not across a typical affected property. Clearly, there is no scientific basis for drawing inferences about the distribution of background concentrations on a specific affected property based on a value which represents a median concentration for the entire state.

Commentors noted that a few metals had Tier 1 PCLs which were below the Texas-specific median background levels, and questioned how this issue would be addressed. As described in §350.78(c), one available option is to use the Texas-specific background concentrations as the critical soil PCL for a specific metal in cases where the PCL determined in accordance with §350.78(a) is less than the default Texas-specific background concentration. Thus, just as if site-specific background were determined, the higher of background or the pathway-specific PCLs would become the critical PCL for that COC. The commission also notes that the Tier 1 PCLs for these metals are lower than the Texas-specific medians due to the conservative fate and transport assumptions which are applied to the groundwater protection pathway (consistent with the purposes of Tier 1). It is likely that these groundwater protection PCLs (^{GW}Soil PCL) could be altered under Tiers 2 and 3 (e.g., through the use of pH-specific K_a values), to yield soil PCLs which are higher than the Texas-specific background values.

In response to requests to add cadmium and magnesium to the list of default Texas-specific background values provided in Figure 30 TAC §350.51(m), the commission notes that cadmium was not one of the metals for which Texas-specific data are available. Magnesium was not added to the figure, as it is an essential soil and dietary mineral with low potential toxicity, that is generally not included as a COC in risk assessments.

One commentor noted that it was not stated whether the Texas-specific background concentration for chromium was for the trivalent or hexavalent form. This type of speciation was not provided in the original study (United States Geological Survey, 1981), but it can be inferred that the total chromium value is overwhelmingly in the trivalent form, as this is the form most likely to be encountered under typical soil conditions. The commission is amending Figure 30 TAC §350.51(m) to state that the value is representative of total chromium. More detailed speciation information on measured levels of chromium or any other COC should be determined through site-specific background sampling and analysis.

Concerning §350.51(n), Brown & Caldwell commented that §350.51 (n) requires that the quantitation limits that should be used as a proxy for non-detected analytical results is the sample quantitation limit, except in cases where there is reason to believe that the COC is present below the quantitation limit, then the use of 1/2 the sample quantitation limit may be appropriate. This section should be rewritten so that the use of 1/2 the quantitation limit should be used for all non-detected analytical results.

Concerning §350.51(n), Chevron commented that this paragraph could be interpreted to recommend the use of the sample quantitation limit when there is no reason to believe the COC is present (i.e., not detected), and 1/2 the sample quantitation limit when there is reason to believe the COC is present. The proposed change clarifies the presumed intent of this recommendation.

The proposed recommendation to consider non-detected values in statistical calculations is consistent with the preponderance of the literature, standards, and EPA guidance that recommend the use of uncensored data in statistical calculations (e.g., EPA, 1992, Guidance for Data Useability and Risk Assessment, Part A Final, Gilbert, 1987, Statistical Methods for Environmental Pollution Monitoring, and American Society for Testing and Materials (ASTM) D-44210-89). Therefore we propose to clarify that the use of uncensored data is applicable for statistical methods.

Given that the method detection limit, to which the sample quantitation limit is tied, requires 99% confidence, the requirement to use the sample quantitation limit as the proxy for non-detects is unnecessarily conservative, and will overestimate the concentration of the COC actually present in a given environmental medium. No guidance is provided here or elsewhere in the document as to what constitutes "reason to believe that the COC is present below the sample quantitation limit. "TNRCC should establish the proxy for non-detected compounds at 1/2 the sample quantitation limit, consistent with EPA guidance. Alternatively, proxies could be assigned on the basis of the actual censoring level.

Chevron suggested the following: "Analytical results below the sample quantitation limit, including non-detected analytical results, should be considered whether doing direct comparisons of individual measurements or using statistical or geostatistical approaches. The preferred approach is to use actual measured concentrations (i.e., uncensored data) for statistical calculations. When proxies must be assigned for non-detected analytical results, the sample quantitation limit should be used as the basis for assigning proxy values. Typically 1/2 the sample quantitation limit should be used as the proxy value. Other statistically-based approaches for handling non-detected results or assigning proxy values may be appropriate."

Groundwater Services commented that compounds not detected at the sample detection limit should not be assumed to be present at 1/2 of the detection limit. This approach will trigger response actions for ghost COCs when the PCL is less than the SQL (e.g., dioxins). Also, if the compound is non-detectable, the response action can never be shown to have achieved the cleanup.

Recommended Revision: If COC not detected using appropriate analytical method at appropriate SQL, the only practical response is to conclude that COC is not present, regardless of other reasons to believe that it could exist. Delete requirement that assumed concentration be set equal to 1/2 SQL.

TCC and TXOGA commented that this paragraph could be interpreted to recommend the use of the sample quantitation limit when there is no reason to believe the COC is present (i.e., not detected), and 1/2 the sample quantitation limit when there is reason to believe the COC is present. Issues related to statistics or manipulation of analytical chemical results should be moved to guidance and this guidance should use the recommended approaches to clarify the presumed intent of §350.51(m).

Recommendation: This section (n) should be deleted from the rule. Treatment of non-detects, as it applies to statistical methods used at sites, should be addressed in the statistics guidance.

And in guidance, this provision should consider non-detected values in statistical calculations consistent with the preponderance of the literature, standards, and EPA guidance that recommend the use of uncensored data in statistical calculations (e.g., EPA, 1992, Guidance for Data Usability and Risk Assessment, Part A Final, Gilbert, 1987, Statistical Methods for Environmental Pollution Monitoring, and American Society for Testing and Materials (ASTM) D-44210-89). Therefore we propose to clarify that the use of uncensored data is applicable for statistical methods.

Change: "Analytical results below the sample quantitation limit, including non-detected analytical results, should be considered whether doing direct comparisons of individual measurements or using statistical or geostatistical approaches. The preferred approach is to use actual measured concentrations (i.e., uncensored data) for statistical calculations. When proxies must be assigned for non-detected analytical results, the sample quantitation limit should be used as the basis for assigning proxy values.

Typically 1/2 the sample quantitation limit should be used as the proxy value. Other statistically-based approaches for handling non-detected results or assigning proxy values may be appropriate."

The Port of Houston Authority commented that treatment of non-detection in sample detection limits should not be assumed to be 1/2 of the detection limit present. It should be assumed the constituents are simply not present.

The commission does not agree with the commentors who suggest that 1/2 the sample quantitation limit or zero should be routinely used as a proxy value for non-detected results. Clearly it would be inappropriate to assign a proxy value equal to 1/2 the SQL for a non-detected result in a sample that is temporally/spatially related to samples containing detected results above the SQL. However, the commission acknowledges that for many samples, it may in fact be appropriate to assign a proxy value equal to 1/2 the SQL. To clarify the commission's intent in this regard, §350.51(n) has been amended such that if the non-detected result is reported as less than the sample quantitation limit for a COC that is temporally/spatially related to samples containing detected results above that sample quantitation limit, or is in an area where the COC is likely to be present but is being "masked" by the concentrations of other COCs, a value equal to the sample quantitation limit should be assigned as a proxy concentration. If, based on available analytical data and the location of the sampling point relative to probable source areas, it is determined that the COC is likely to be present below, but not near to, the SQL, then 1/2 the SQL should be used as an appropriate proxy. The second sentence of the proposed rule has been deleted from the final rule so as not to confuse the commission's intent. Further, the proposed sentence that proxy values do not need to be assigned for COCs removed from the COC list due to §350.71(k) has been removed since proxy values are necessary for §350.71(k). Other statistically-based approaches for handling non-detected results or assigning proxy values may be appropriate if the basis of the approach is technically sufficient and sound. The commission is considering allowing the use of uncensored data, as opposed to data censored at the method detection limit, or sample quantitation limit. If this approach is deemed appropriate, the commission will provide guidance to staff and stakeholders. Historical data will be evaluated by the commission on a site-specific basis. The use or non-use of the data will be determined by the risk standards that were in place at the time the data were submitted to the commission, the nature of the "reporting limits" used by the person to censor the data, the potential site risk, the current status of the affected property (e.g., active or closed), and the location of the affected medium (i.e., on-site versus off-site).

Concerning §350.51(o), Brown McCarroll & Oaks Hartline commented they are unsure as to the purpose/intent of §350.51(o) and questions whether it is appropriately within §350.51. The paragraph seems to address classification of an affected property instead of affected property assessment.

Chevron commented that there is no performance standard for this and it could be perceived to be an opportunity to introduce arbitrary decisions. The rationale for adding this provision should be provided, or it should be removed.

EPA commented that this section of the proposed rule refers to a risk-based classification system for classifying affected property. There are no other specifics on this system that could be found within the proposed rule.

Henry, Lowerre, Johnson & Frederick suggests TNRCC include the potential future on-site and off-site land use to the site classification data needed.

KOCH commented that the proposed TRRP rule states that a person shall classify an affected property in accordance with a risk-based system established by the executive director. There is no information in the proposed rules or preamble to explain this requirement. We assume that this will be provided in subsequent guidance documents. Additional clarification should be provided in these rules to establish the parameters for this risk-based classification system.

Weston questioned what is the "risk-based system" that may be established by the executive director? Is this a ranking system that is anticipated, it should be included. If this can not be better defined, it should be deleted.

The commission may need to develop and implement a risk-based classification system to manage the vast number of affected properties it is regulating. The system that most likely would be used is one similar to that currently implemented in the Leaking Petroleum Storage Tank (LPST) Program which has proven to be a very valuable tool. The LPST classification system is similar in nature to the one included in the ASTM RBCA standards. The commission does not intend to provide any greater detail in the rule, as it would not be appropriate to lock such a system in rule. Any such classification system is more appropriately addressed in guidance.

§350.52. Groundwater Resource Classification

Concerning §350.52, Region 6 commented that in the first paragraph of ground water classification section, last sentence, delete the last phrase, ". . . unless otherwise approved by the executive director." Ground water classification should not be this arbitrary.

The commission disagrees that there should be no discretion allowed for the executive director to exercise judgement in evaluating site-specific groundwater classification where it is unclear which particular class of groundwater is most appropriate. The commission needs the flexibility to exercise sound judgement and evaluate factors such as the significance of the resource relative to what may be other superior sources of water for the area, the area and real potential for it's use, and other practical considerations so that unwarranted actions may be avoided.

Concerning §350.52, Reliant Energy, AECT, and TU commented that the proposed groundwater resource classification scheme for class 2 and 3 groundwater requires that a four-inch diameter well casing be used to determine the groundwater yield. Every site evaluated under the proposed program will be forced to install several four-inch diameter wells at a greater expense. We believe this requirement is unnecessary because the aquifer yield can be effectively calculated using smaller diameter wells. We request that the TNRCC develop guidance that would allow the use of alternative methods to determine groundwater yield.

The commission disagrees with the commentors that the rule requires the use of a four-inch well to determine aquifer yield. The rule requires persons to determine what the yield would be to a four-inch well. This may be determined in other than a four-inch well. However, the commission is altering the rule in §§350.52(1)(B) and (C), 350.52(2)(B) and 350.52(3) to allow equivalency to be demonstrated using different size wells in order to make certain this is clear. The commission notes that guidance may be needed to help explain acceptable methodologies to determine groundwater yield; and that in some circumstances the best determination may only be made with a well designed to maximize yield, as opposed to a well constructed solely for the purpose of sampling groundwater quality. The commission will consider this matter as plans are made to develop guidance for the rule.

Concerning §350.52, Reliant Energy and AECT commented that the commission proposes to establish three classes of ground water. The class 2 groundwater classification system presented would in essence categorize any saturated zone with less than 10,000 ppm TDS as current or potential groundwater supply. The proposed definition of any class 2 groundwater-bearing unit, which is capable of producing water at a sustainable rate greater than 150 gpd, is easily met by most saturated zones, including shallow, perched zones, which are seasonal and would not reasonably be expected to be used as long term water supply. Although the TNRCC has stated that the 150 gpd is based on the minimum amount necessary to sustain a family of three, we affirm that this criteria has absolutely on relationship to the flow characteristics of a economically, useable groundwater well. Reliant Energy recommends that 1,000 gpd be used as the yield criterion, which is generally accepted as the minimum yield required for completing a marginal water well.

The commission disagrees with the commentors that a higher value than 150 gpd is more appropriate. The suggested value of 1,000 gpd would not be protective of groundwaters which can supply an individual household. It is important to note that the aquifer must be able to yield at least 150 gpd each day, throughout the entire year. It would not be appropriate to make this determination during extreme drought conditions, which could temporarily cause even much more productive aquifers to go dry which have a documented use.

Concerning §350.52, ARCADIS Geraghty & Miller commented that the classification system is intended for each groundwater-bearing unit which contains COCs at concentrations equal to or greater than the residential groundwater assessment level. As discussed under §350.4 Definitions, ARCADIS Geraghty & Miller believes that the TRRP and the Groundwater Resource Classification System should apply to aquifers and not all groundwater-bearing units. With this change, the Groundwater Resource Classification system would address those geologic units, aquifers, which are truly the ground-water resources of the state, and not "any ground-water bearing unit", which would include geologic units that would not reasonably be considered "resources".

The commission notes that the term "groundwater-bearing unit" is synonymous with "aquifer" as it is defined and used in the rule. However, it is important to note that the term aquifer commonly means a zone which can yield groundwater in economically useable quantities. The commission is avoiding any economic connotation that may be associated with the use of the term "aquifer" as such connotation may not adequately recognize the future potential use of the groundwater. The commission preferred that the term used to describe groundwaters (i.e., groundwater-bearing units) be economically neutral such that the groundwater classification system could factor in some economic considerations (well yields, 800 foot depth, etc). The commission notes the use of the term aquifer in §350.51(e) and is changing the rule to reference groundwater-bearing unit instead in order to be consistent in its use of terminology and avoid any potential confusion.

Concerning §350.52, Craig's Cleaners commented that the groundwater contamination levels on water that is not used for drinking water and will not be used should be higher, a lot higher. In Houston the groundwater is discouraged to be used from wells from the Harris County Subsidence District. They do not allow us to drill wells now, from what I understand. You cannot achieve a permit. I understand the EPA will allow different levels for water not used for drinking. We need to be able to get a closure, too, as we know it today with a higher contamination level in water not being used for drinking. I think it is unreasonable to try to get to what EPA wants us to get to for all water if the water is not used for drinking.

The commission notes that the rule requires that groundwater is classified as one of three different classifications based upon use, availability of other supplies, potential yield and natural quality. The specific example provided, "water that is not used for drinking water and will not be," is most likely a class 2 groundwater based upon the classification system in the rule. The commission has defined class 2 groundwater-bearing units to be potentially suitable for use as a human drinking water supply. However, this groundwater is not required to be restored to drinking water levels if in fact no one is using this groundwater and through the appropriate institutional controls the commission is assured that the groundwater is currently not used and will not be used in the future. The revised definition of institutional control to include zoning or governmental ordinance may resolve the commentor's issue if that zoning or governmental ordinance is equivalent to the deed notice or restrictive covenant that would otherwise be required. The commission has limited the class 1 criteria to protect the most valuable groundwater resources in the state. If the commentor has the agreement of the landowner, the person most likely under Texas law to control the use of groundwater on their property, then there should not be a concern. If the commentor cannot reach agreement with the landowner, then the commission suggests that the commentor evaluate Texas law, particularly concerning the right-of-capture, to seek resolution to the problems concerning groundwater impacts on such use.

This policy is consistent with the instructions the legislature has provided the agency in the Ground Water Protection Act (Texas Water Code, Chapter 26.401) that "in order to safeguard present and future ground water supplies, usable and potentially usable ground water must be protected and maintained." Further, the legislature established the policy that state agencies would require the quality of ground water to be restored, if feasible, to "maintain present uses and not impair potential uses of ground water. . . "

Concerning §350.52, Region 6 commented that they expect that the TRRP and Subchapter G will not be used as the vehicle to reclassify ground water aquifers. The state's Comprehensive Ground Water Protection Program should be the avenue used to ensure broad public input for decisions impacting the future use of ground water resources, including the designation of aquifers.

The commission disagrees with Region 6 that the TRRP rule is not a proper instrument to classify groundwater for the purposes addressed within the TRRP rule and further notes that the current Risk Reduction rule and PST also classify groundwater for similar purposes. In regards to public input, the TRRP rule has been subject to extensive public input over the last three years through the publication of two concepts papers and a previous rule proposal, and numerous public meetings.

Concerning §350.52, Environmental Resources Management commented that the agency proposes to establish three classes of ground water. The class 2 ground water classification system presented would in essence categorize any saturated zone with less than 10,000 ppm TDS as a current or potential ground water supply. The proposed definition of sufficiently permeable geologic zone as one which is capable of producing 150 gpd sustainably at some location is easily met by most saturated zones, including shallow zones, which would not reasonably be expected to be used as a water supply. For example, a ten-foot deep, four-inch diameter well with a recharge time of one hour is capable of producing approximately 150 gpd. The basis for 150 gpd is apparently an estimate of the minimum amount of water used by an individual in a day. Based on the agency's proposed definition for class 2 ground water resource, it would seem that, for all practical purposes, every site that is evaluated under the proposed TRRP with TDS <10,000 ppm will be forced to comply with drinking water standards. Environmental Resources Management recommends that the yield criterion be to require remediation if an aquifer reliably yields greater than 1,000 gpd, which is the minimum yield generally required for completing a marginal water well. If the majority of holes drilled at a site do not yield 1,000 gpd or greater, then the zone should not be considered a usable aquifer for realistic scenarios.

In addition, ground water at affected sites that are located in urban areas, which have public water supplies from another zone, should not be forced to meet the above TRRP criterion. Isn't it unrealistic for ground water impacted by urban runoff and sanitary sewer leakage, that are limited to shallow zones and are not hydrologically connected to surface waters or deeper aquifers, be forced to comply with the proposed classification standard? It seems that the agency's proposed classification of ground water does not take into account the current land use trends. The agency's Leaking Petroleum Storage Tank (LPST) guidance provides a more realistic and appropriate classification of ground water. The agency should consider integrating the LPST program's approach to the cleanup of ground water, and consider adopting similar language for the proposed rule to allow the agency to approve no action criteria for other classes of constituents following the LPST program's approach.

The LPST program's exit criteria are based on empirical data that have been used to establish when remediation is required to protect human health and the environment. The proposed rule eliminates the existing LPST program approach for the sake of uniformity, an apparent policy decision that is not consistent with the agency's overall policy of requiring cleanups only when they are warranted. Hence, LPST sites will be discovered as a result of environmental assessments for property transactions.

The commission disagrees with the recommendation by Environmental Resources Management that a higher value than 150 gpd is more appropriate and notes that PST uses this same yield. The suggested value of 1,000 gpd would not be protective of groundwaters which can supply an individual household.

The commission clarifies that shallow groundwaters as described would mostly likely be class 2 groundwater and that the rule does not necessarily require that class 2 groundwater be restored. The rule does allow plume management zones within class 2 groundwater. The commission disagrees that the rule does not take into account land use trends and notes that landowners and local governments are the ultimate authorities on land use trends. Accordingly, the rule allows landowners with class 2 groundwater beneath their property to make many land use decisions, including the use of their groundwater. In regards to the use of the LPST program's approach, the commission is concerned about possible "takings" lawsuits from landowners who are not in agreement with leaving contamination on their property. In these instances, where the landowners are not agreeable to the contamination remaining on their property and to the necessary deed notice or restrictive covenant, assuming no equivalent zoning or governmental ordinance is in place to protect against future use, the commission is requiring the same actions as are currently required for other contaminated (i.e., in accordance with the current Risk Reduction rule) properties.

The commission disagrees that the TRRP rule is not consistent with the agency's overall policy of requiring cleanups only when they are warranted. The vast majority of releases at LPST sites have historically occurred in groundwaters that TRRP will classify as class 2, thus not mandating cleanup. The commission agrees that the PST exit criteria would not be used under this rule. The commission discusses the reason for their change in this section of the preamble where response to comments on the RIA are presented.

Concerning §350.52, Environmental Resources Management commented that ground water classification scheme (particularly class 2) will require shallow ground water at many sites to meet drinking water standards even though shallow ground water is not in use or likely to be used in the vicinity. PST sites which previously met the Exit Criteria will require remediation to meet drinking water standards. The additional costs to remediate these sites will not result in a commensurate reduction in risks to the public. Increase production rate criteria from 150 gpd to 1000 gpd (the minimum yield generally required to complete a marginal water well). Utilize PST RBCA criteria which takes into account whether there is actual beneficial use within a radius of site.

The commission disagrees with the recommendation by Environmental Resources Management that a higher value than 150 gpd is more appropriate. The suggested value of 1,000 gpd would not be protective of groundwaters which can supply an individual household. The commission also clarifies that the rule does take into account whether there is an actual beneficial use within a specified radius of the affected property. The reader is also referred to the response to Environmental Resources Management's similar comment on this matter.

Concerning §350.52, KOCH commented that the screened interval for the four-inch well should be specified in the rules. The specified screened interval should be of reasonable length and typical of wells in the particular groundwater bearing unit. Similar clarification should also be provided for the 12-inch well at §350(1)(C) and the four-inch wells at §350(2)(B) and §350(3). Without this clarification, if the screened interval was long enough, almost any well could yield 144,000 gpd.

The commission disagrees that the rule should limit the screened interval, as this is a site-specific factor. It is not uncommon for water wells to be screened throughout the entire thickness of the aquifer. The intention of the rule is that the yield criteria should be that of a single well drilled and completed to make the maximum yield. Any more detailed discussion may be developed in guidance,

however, the limitation on screen interval is not appropriate to limit by rule and thus the rule is not changed.

Concerning §350.52, KOCH commented that this definition of background includes naturally occurring and (with some conditions) anthropogenic COCs. The discussion of groundwater resource classification (§350.52) only includes naturally occurring background. This discussion should be expanded to include anthropogenic sources including prior commercial/industrial activities and the potential for future use as affected by institutional controls.

The commission disagrees with the commentor that groundwater classification should consider anthropogenic sources including prior commercial/industrial activities. Most contamination of groundwater that has occurred associated with commercial/industrial land use clearly does not meet the definition of background. Further, the commission is concerned about protecting the State's valuable natural resources (e.g., class 1 groundwater) and is limiting the criteria by which groundwater which would otherwise be class 1 can instead be classified as class 2. To include anthropogenic sources (which are generally low in concentration) would weaken the protection for these most valuable groundwater resources. If a class 1 groundwater is impacted by anthropogenic sources, these impacts can usually be addressed much easier by municipalities than higher concentrations from other sources. Such information is valuable under §350.33(f)(4) in determining the appropriateness of plume management zones.

Concerning §350.52, KOCH commented that the proposed TRRP rules state that a person must classify groundwater using residential groundwater assessment levels. The assessment level to classify groundwater should be based on the actual or reasonably anticipated exposure to COCs in the groundwater. This residential requirement is clearly inappropriate for class 2 and 3 groundwater and could be inappropriate for class 1 groundwater more than 1/2 miles from an existing public water supply well. With these types of groundwater, residential exposure might not be occurring. For class 3 groundwater, residential exposure via ingestion is definitely not occurring. Long-term residential exposure, for which MCLs were developed, is also not occurring with class 2 groundwater (§350.51(1)(A)). Also the land use overlying and adjacent to class 2 groundwater could be commercial/industrial; therefore eliminating the need to use residential assessment levels. The only situation where residential groundwater assessment levels should be required is for class 1 groundwater near an existing public water system (§350.52(1)(A)). In all of the other situations, a person should have the option of using commercial/industrial groundwater assessment levels if the overlying land use is commercial/industrial. If the land use should revert in the future to residential, then the person would have an obligation to re-assess COC levels in the groundwater using residential criteria.

The commission disagrees that groundwater should be classified only if it exceeds the commercial/industrial assessment level instead of the residential assessment level on commercial/industrial properties. This would not be protective in situations where concentration levels of COCs exceed the residential assessment level on commercial/industrial properties and the COCs will migrate off-site onto residential properties. Also, in order to control future expansion of plumes in class 2 groundwater, it is necessary to establish the down-gradient extent of the residential-based groundwater PCLE zone. Further, prudence dictates that the full extent of the problem be determined when the person is available to complete the action rather than wait for a future chance that no responsible party is available when the time comes to “re-assess” COC levels. To clarify the intent of the commission, in response to this comment and others, the commission has amended the definition of affected property to mean all property with COCs in excess of the assessment level for residential land use.

Concerning §350.52, Henry, Lowerre, Johnson & Frederick commented that the TRRP endangers future groundwater supplies through the classification system and that the proposed TRRP allows ground water to

be classified without consideration for significant factors such as historic uses, and the extent to which the ground water is a sole source of water in an area for domestic and other uses. TNRCC should return to the two classes of groundwater under Texas law. TNRCC has presented no justification for a division into three classes. Such a division (with the resulting changes in protection for class 2 waters) will violate both Texas law and the Federal Safe Drinking Water Act.

The commission disagrees with the commentor's interpretation that the groundwater classification system does not consider the use of groundwater (e.g., a sole source). One of the specific provisions by which groundwater can be classified is the "sole source" example in §350.52(1)(B). The commentor states that there are two classes of groundwater under Texas law. The commission has no knowledge of any such designation under Texas law which would be relevant to the TRRP rule. Also, the commentor states that using three classes of groundwater will violate Texas law and the Federal Safe Drinking Water Act. The commission disagrees with the commentor on both accounts and notes that the Federal Safe Drinking Water Act and Texas law establish safe standards of purity and require all owners or operators of public water systems to comply with primary (health-related) standards. In fact, the EPA's December 1986 Technical Fact Sheet entitled *Draft Guidelines for Classifying Ground Water* issued by the Office of Ground-Water Protection and December 1986 *Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy* contain multiple groundwater classes. The TRRP does not preempt, violate or conflict with Texas law or federal law. Owners and operators of public drinking water supplies must still comply with the safe federal and state drinking water standards.

Concerning §350.52, Henry, Lowerre, Johnson & Frederick and Region 6 commented that class 2 drinking water receives significantly less protection under the proposed rule than under current guidelines. The Safe Drinking Water Act makes no distinction between the protection to be provided to class 1 and class 2 groundwater resources. The statute and regulations require protection to current or potential groundwater supplies with TDS levels of 10,000 mg/l.

The commission agrees that there is no restriction on yield specifically mentioned in the Safe Drinking Water act, however, as the EPA has done previously, it is necessary to have such restrictions for practical implementation. Specifically, in a December 1986 Technical Fact Sheet entitled *Draft Guidelines for Classifying Ground Water* issued by the Office of Ground-Water Protection, EPA, a restriction for subclass IIB - Potential source of Drinking Water is provided. One of the three restrictions is that "It can be obtained in sufficient quantity from a well or spring to meet the needs of an average household. This quantity is defined as 150 gallons per day." This same 150 gallons per day "restriction" appears in EPA's guidance document *Guidelines for Ground-Water Classification* under the EPA Ground-Water Protection Strategy December 1986.

Concerning §350.52, Henry, Lowerre, Johnson & Frederick commented that general Groundwater - Efforts should be made to finalize the State's Comprehensive Ground Water Protection Program to ensure broad public input for decisions impacting the future use of the groundwater resources.

The commission agrees with the commentor that the State's Comprehensive Ground Water Protection Program should be completed. However, the commission notes that the Comprehensive Ground Water Protection Program is a separate effort, not part of the TRRP rule and Futher notes that the rule has undergone at least as much if not more public input than the Comprehensive Ground Water Protection Program will likely undergo.

Concerning §350.52, Henry, Lowerre, Johnson & Frederick commented that no mention is made of the uppermost aquifer, which may or may not have TDS in excess of 10,000 mg/l. These aquifers are the typical zones that are monitored at land disposal units in the RCRA program. The uppermost aquifer, as defined in 40 CFR §260.10 means the geologic formation nearest the natural ground surface that will yield

water. These are in many cases hydraulically interconnected to lower aquifers. If no consideration is given to releases to the uppermost aquifers which may not be usable, but may be hydraulically interconnected to other usable aquifers, then the potential for migration to usable aquifers may not be addressed. TNRCC should address the potential for this situation to occur in the rule.

Moreover, TNRCC has made an unjustified decision to sacrifice class 3 groundwater, even though such water may have many valuable uses. Such waters can be used for industrial and agricultural purposes and to supplement other supplies. Such aquifers could be extremely important sources of water as growing demands for water cannot be met with other supplies.

Henry, Lowerre, Johnson & Frederick also commented that under §350.52, TNRCC has divided groundwater into three classes to allow greater contamination of much of Texas' scarce water resources. There is no justification for creating class 2 ground water. That water may be the sole source of drinking water in some areas, even though it is not abundant or the highest quality. Small aquifers in dry areas may be more important to protect than large aquifers in an area with abundant surface water supplies.

The commission disagrees with the commentor and notes that the purpose of groundwater classification is to provide more consistent and appropriate protection of Texas' groundwater resources. Not all groundwater in Texas is equally valuable based upon natural characteristics (e.g., yield or natural quality). In order to make certain that the truly most valuable groundwater resources are given the appropriate level of protection, the commission developed a groundwater classification system. As part of this classification system, it is necessary to identify the less valuable resources (i.e., class 3 groundwaters). These class 3 groundwaters may be remediated as the landowner deems necessary but the State of Texas is not relying upon these groundwaters for either current or future groundwater supplies. Class 2 groundwaters are usable but are not the best or most valuable groundwater supplies and thus the rule does not mandate their cleanup to drinking water standards in all circumstances. The commission notes that groundwater which is the sole source of drinking water in an area would most likely be class 1 groundwater, which is afforded the highest level of protection. It is important to note that the groundwater classification system when combined with the remedy standards does ensure that groundwater is protected such that no unacceptable levels of COCs reach a potential point of exposure (e.g., a drinking water well).

Concerning §350.52, TU commented that with respect to groundwater classification, the TNRCC concludes that: (1) that the most important site-specific factor is groundwater classification, and (2) that "the potential use of plume management zones should be restricted to class 2 and 3 groundwater because potential use as a public water supply is not likely." TU believes that there are several problems with this approach. The most significant benefit under the proposed rule will result from a class 3 groundwater resource. However, due to the restrictive definitions use for groundwater classification, it is likely that many sites will not meet the class 3 definition.

The treatment of certain sites (that may be considered a class 2 groundwater resource and for which plume management zones may be an option) will still result in significant expense to manage and assess. This may in turn result in environmental costs and expenditures which are not proportional to the nature of the risks potentially presented. TU believes that it would be more efficient to allow for the possible use of both regional and site-specific factors. For example, if a municipality obtains its drinking water from surface sources (due to prior investment and local decision making), why should it not be able to benefit from such an investment? If there is not use or planned use of local aquifers, the TNRCC should not require strict environmental guidelines if they have historically not been used as drinking water sources or if there is not reasonable likelihood that they will be in the future.

The commission disagrees with the commentor's assertion that groundwater will not be used or is not worthy of protection in areas where municipalities obtain their drinking water from surface sources. Such determinations are very site specific. In fact, in many such instances groundwater is hydraulically connected to these surface waters. It is important to note that class 2 groundwater is a significant source of drinking water for many residents living near municipalities which obtain their municipal drinking water from surface water. Further, it should be noted that the expense associated with assessing and managing plume management zones will be relative to the risk posed by the COCs in the groundwater. The commission has amended the rule to recognize zoning or governmental ordinances which are equivalent to the deed notice or restrictive covenant that would otherwise be required as effective institutional controls and this may help address the commentor's concerns.

Concerning §350.52, TranSystems commented that several municipalities in Texas restrict the use of groundwater for potable supplies via local ordinances. The verification and proof of such local ordinances should be allowed as a site groundwater resource classification mechanism for class 3 groundwater in lieu of the technical requirements of §350.52.

The commission disagrees with the commentor that verification and proof of local ordinances which "often prohibit" use of groundwater for potable supplies should be allowed as a site groundwater resource classification mechanism for class 3 groundwater. These local ordinances do not record the fact that COCs are present, which is necessary to ensure future protection. Such arguments may have merit, but the commission has made the decision to reserve such possibilities for the future after there has been thorough evaluation of the implications and regulatory requirements, and sufficient and specific input from stakeholders. However, as a bridge, the commission has expanded the definition institutional controls to obviate the need for specific filing of deed notices or restrictive covenants when such local ordinances contain the appropriate level or rigor and notification tenets (i.e., are equivalent to the deed notice or restrictive covenant that would otherwise be required).

Concerning §350.52, AFCEE commented that the rule describes criteria for "sustainable rate", however, there is no language suggesting how the agency staff will interpret this. Over what time period will the aquifer need to sustain the prescribed rates in order to meet the qualification? The AFCEE believes this is a critical parameter and how the agency plans on interpreting the language should be included. In addition, language on how sustainability will be determined is not included. Because many aquifers are highly heterogeneous it is likely that one well could sustain the specified rate whereas a well 20 feet away would not be able to sustain the rate. This complexity is not acknowledged in the current provision. The AFCEE requests that language be added to the preamble: (1) describing how agency staff will interpret "sustainable rate", and (2) how complex heterogeneous aquifers will be evaluated against this criteria.

KOCH and AFCEE commented that the proposed TRRP rules state that one criterion for class 1 groundwater is that groundwater must be delivered to a four-inch well at a sustained pumping rate of at least 5,000 gallons per day (gpd). The rule should clearly state that "sustained rate" means that this yield must be maintained throughout the entire year (pages 60 and 61 of 76 from the RIA).

The commission notes that guidance will likely be developed to further clarify the question of sustainability as it relates to groundwater-bearing units. As a practical matter, agency staff will evaluate "sustainable rate" to determine if the subject groundwater-bearing unit can produce the specified daily rate, throughout the calendar year. Groundwater-bearing zones which cannot yield the "sustainable rate" throughout the year (e.g., during summer months) will not meet the criteria. Of course, such evaluations must also look at climatic factors, well design, and the general hydrogeology of the area. The guidance will also likely provide clarification on groundwater classification in complex hydrogeologic environments.

Concerning §350.52, AFCEE commented that acknowledging that some groundwater-bearing units are highly heterogeneous, AFCEE proposed to allow site-specific groundwater classifications. For large multi-site facilities the groundwater-bearing units under particular sites behave in vastly different manners. If the rule makes one groundwater classification for the entire facility it would appear that such would result in an oversimplification. Allowing site-specific determinations, as has been allowed in the PST program, would account for this complexity.

The commission clarifies that its intention is to allow site-specific groundwater classifications in accordance with the criteria set forth in this section.

Concerning §350.52, Weston recommends increasing the sustainable rate to 400 gallons per day. A production rate of 150 gallons per day is too low to be used for a domestic water supply. There are a number of water-bearing units in large urban areas, including Houston and Dallas, that produce at or just above the 150-gpd mark; however, they hardly produce enough water to sample, much less to supply a family. Requiring evaluation of human ingestion of this water is overly conservative, results in significant resources being used to address zones that are truly not useable, and provides a significant disincentive for redevelopment of these properties.

The commission disagrees with the recommendation that a higher value than 150 gpd is more appropriate. The suggested value of 400 gpd would not be protective of groundwaters which can supply an individual household. Based upon waste water flows measured in individual households across the United States and Canada, the annual use is approximately 50 gpd per person. Assuming an average of three individual per household results in a yield of 150 gpd to supply the average individual household. It is important to note that the aquifer must be able to yield at least 150 gpd each day, throughout the entire year. It would not be appropriate to make this determination during extreme drought conditions, which could temporarily cause even much more productive aquifers to go dry. The commission also disagrees that requiring evaluation of the potential for human ingestion in these groundwater-bearing units is overly conservative, that these zones are truly not useable, and that this will provide a significant disincentive for redevelopment of these properties. It should be noted that class 2 groundwaters may have plume management zones which do not require the restoration of these groundwaters if appropriate institutional controls are implemented. This flexibility should reduce disincentives associated with redevelopment of properties which have COCs present while still promoting the protection of human health and the environment.

Concerning §350.52(1), Brown & Caldwell commented that the rule defines groundwater as class 1 if it is the only reliable drinking water source not more than 800 feet below the land surface. We recommend that if more than one water bearing unit is available within 800 feet below land surface, the person be allowed to designate one of the units as class 1 groundwater. The other units would be classified according to the other classification criteria provided in §350.52, including §350.52(2) and §350.52(3). We recommend that the designation be subject to executive director approval.

The commission disagrees with the commentor's recommendation and clarifies that if there is more than one groundwater-bearing zone present within 800 feet of the land surface which can yield water with a naturally occurring TDS content of less than 1,000 milligrams per liter and at a sustainable rate of greater than 5,000 gallons per day to a well with a four inch diameter casing, then none of these zones are class 1 based upon §350.52(1)(B). Section 350.52(1)(B) is intended to protect groundwater-bearing zones which are essentially "sole-source aquifers," not meaning to imply they qualify as a sole-source aquifer under the federal definition.

Concerning §350.52(1), AFCEE commented that for class 1 groundwater-bearing units meeting the criteria in §350.37(1)(3)(C). The AFCEE proposes that they be considered class 2 groundwater-bearing units. This "re-classification" would be documented in a deed notice to inform affected landowners. In addition

§350.35 - Substantial Change in Circumstances can be modified to include any changes in the anticipated future use of the groundwater-bearing unit. The AFCEE believes this proposal is in keeping with reserving class 1 designations for primary groundwater resources and would allow flexibility for site-specific situations. Section 350.37(1)(3) allows a party to demonstrate that a class 2 groundwater-bearing zone has no "reasonably anticipated future beneficial use based upon the existing quality of groundwater, considering non-point sources of COCs and their cumulative impact on the groundwater quality, or the lack of use of the groundwater based on the presence of superior water supplies, and proximity and withdrawal rates of groundwater users".

The commission disagrees with the proposal to include this additional criteria in the determination of class 1 groundwater resources. The commission further notes the importance of class 1 groundwater resources, not only as current sources of drinking water but as valuable natural resources that must be protected and restored where feasible in order to meet future needs.

Concerning §350.52(1), AFCEE commented that the preamble defines class 1 as a class of groundwater which is a class of "primary groundwater resources" such as high yield, high quality groundwaters and sole-sources of drinking water. As a general comment, AFCEE believes that class 1 determinations should be reserved for their intended target "primary groundwater resources". Shallow groundwater in urbanized areas often are not and will not be utilized as "primary groundwater resources". We believe the rule should recognize this and have the flexibility to reserve class 1 determinations for only "primary groundwater resources." The provision as written could classify non-primary groundwater resources as class 1. The limitations to class 1 groundwater-bearing units in attaining Remedy Standard B (no use of physical controls and no plume management zone) would dramatically increase the cost of remedial action. These limitations would disable AFCEE from using sound science and judgement to achieve solutions that will meet the intended goal to clean up contamination in a way that protects human health and the environment. These increased costs should not be applied to groundwater-bearing units unless they truly are "primary groundwater resources".

The commission agrees that shallow groundwater in urbanized areas often is not and will not be utilized as "primary groundwater resources" and notes that the rule does not include these shallow groundwaters unless they meet one of the three criteria, which would make these groundwaters a class 1 groundwater resource. The commission chose not to recognize urbanized areas as part of the groundwater resource classification system. Groundwater resource classification is a process by which to determine the groundwater's value as a natural resource and as such is based upon the groundwater's intrinsic value. This intrinsic value is based upon potential yield, natural quality, and the availability of other groundwater supplies. The consideration of urbanization is not part of a groundwater's intrinsic value and the commission is not changing the groundwater classification system to include urbanized areas.

Concerning §350.52(1)(A), Brown Carls & Mitchell questioned is it the person's responsibility to determine if the COCs from the affected area are likely to migrate to the groundwater production zone of any existing, public water supply well within one-half mile of COCs in excess of the residential assessment level?

Yes, the commission affirms that it is the person's responsibility to determine if COCs are likely to migrate to the groundwater production zones indicated by the commentor.

Concerning §350.52(1)(A), Region 6 commented that this section describes a class 1 groundwater resource (the highest quality classification for a ground water resource) makes mention of concentrations of COCs. The purpose of the statement is unclear especially in light of the fact that it is inconsistent with the descriptions of class 2 and 3 groundwater resources. Determination of groundwater classifications should be based on pre-contaminated status and not on COC concentrations. Sustainable rates for the

classification of ground water should remain as they are (e.g., 150 gpd for class 2) in order to remain protective of small users.

The commission agrees with the commentor that the inclusion of the presence of COCs in the class 1 groundwater resource classification is not clear and is not consistent with the other classes. The classification criteria have been changed to better reflect the vulnerability of these particular groundwater resources, which is the reason these particular groundwater resources are classified as class 1.

The commission agrees with the commentor that the sustainable rates for the classification of groundwater should remain as they are (i.e., 150 gallons per day for class 2) in order to remain protective of small users.

Concerning §350.52(1)(B), KOCH commented that the classification of groundwater is based, in part, on whether a connection is provided to a public water system or whether a connection will be provided as part of the RAP. In the DRIA the commission argues that "exposure prevention response objectives" (page 68 of 76) are not appropriate. However, in the rules the commission is clearly using this criterion (i.e., exposure prevention by connection to a public water system) to classify groundwater. Where appropriate, the commission should allow the use of exposure prevention (or well head treatment) response objectives for groundwater.

The commission should allow the use of site-specific "industrial regions" (page 68 of 76 of the DRIA) or institutional controls to prevent exposure to COCs in groundwater. Individual property owners within an industrial region should have the option of working cooperatively to restrict exposure to COCs in groundwater. This is not inherently difficult to accomplish. For example, the Ohio Voluntary Action Program (VAP) allows an Urban Setting Designation (USD) for groundwater (Ohio Administrative Code Rule 3745-300-10(D)). The Ohio VAP recognizes that many commercial/industrial properties are in highly urbanized or built-up areas which rely on public water systems. In these areas, the groundwater may contain COCs from prior commercial/industrial activities. However these COCs pose no appreciable risk to the community because the groundwater is not being used and will not be used for drinking water purposes in the foreseeable future. In these settings a USD or "industrial region" may be appropriate.

In commercial/industrial or residential areas institutional controls should be allowed to restrict exposure to COCs in groundwater. For example, the Illinois Environmental Protection Agency allows the use of institutional controls to prevent exposure (35 Illinois Administrative Code 742.320). A local ordinance can be adopted to prohibit the installation and/or use of potable water supply wells. A similar provision should be included in the TRRP rules.

In regards to the classification of groundwater, the commission does not consider the ability to implement remedies (e.g., exposure prevention or treatment) when evaluating the intrinsic value of the groundwater with one exception. When determining if a groundwater-bearing unit should be protected as class 1 groundwater due its being a "sole source," the commission has allowed the consideration of alternative water supplies. Otherwise, the rule does not take potential remedies into consideration when classifying the groundwater. The commentor suggested that the rule should provide for "industrial regions" to prevent exposure to groundwater. The rule has been amended in §350.111 to allow for the use of zoning or governmental ordinances that are equivalent to a deed notice or restrictive covenant which would otherwise be required and this may address the commentor's concern. This rule amendment in response to comments on §350.111 may allow for the use of local ordinances, such as the recommendation to follow the Illinois Environmental Protection Agency's use of local ordinances.

Concerning §350.52(1)(B), AFCEE commented that the rule makes a classification distinction based on depth to the groundwater bearing unit. There is some inconsistency between the preamble and the rule:

Section 350.52 (1) (B) "A groundwater-bearing unit which is the only reliable source of water (i.e., a connection to a public water system is not currently available and will not be provided to the affected property as part of the RAP) not more than 800 feet below the land surface that is capable of producing groundwater.."

Preamble - "(2) a groundwater-bearing unit is the only reliable source of water, is not more than 800 feet below the land surface, has a total.."

The inconsistency is whether or not the groundwater-bearing unit must be the only reliable source of water between land surface and 800 ft below land surface. The rule implies that to be considered class 1, the groundwater-bearing unit would be the only reliable groundwater-bearing unit in this depth range and makes no consideration for other reliable sources of water below 800 feet. The preamble language allows for another reliable source of groundwater without any depth criteria.

This inconsistency needs to be clarified. In addition, the use of 800 feet as a discriminatory factor seems arbitrary. The proposed rule gives no justification for using 800 feet as criteria. There are many primary groundwater resources in the state of Texas that are below 800 ft below land surface, e.g., the Edwards Aquifer in San Antonio. Groundwater depth does not affect the quality of the resource and the AFCEE requests that this criteria be eliminated.

The commission clarifies that the rule language is correct, in that the groundwater-bearing unit must be the only reliable source of water between the land surface and 800 feet below land surface to be considered a class 1 groundwater for this sole reason. The commission disagrees that deeper groundwater-bearing units should be considered because these deeper zones may very well be too expensive for an individual to develop and is therefore not removing the depth criteria. The 800 foot depth criteria is important because this is generally the depth below which an individual landowner cannot be expected to complete a water well due to excess cost (per discussions with the Water Well Drillers Licensing at the Licensing and Regulation Department). This is an important consideration in evaluating the intrinsic value of a groundwater-bearing unit as a class 1 groundwater resource.

Concerning §350.52(1)(B) and (C), Brown Carls & Mitchell commented that the rule as proposed provides that a groundwater-bearing unit which meets the requirements of §350.52 (1)(B) or §350.52(1)(C) is a class 1 groundwater resource. This is true regardless of its proximity to public water supply well. Is this classification valid if for example, the groundwater-bearing unit is located in a highly-urbanized area and is subject to forced injection of untreated urban storm water runoff and the resulting COCs from various undefined sources? This is a common practice, and in our opinion, should be considered in the classification of groundwater. The rule is too restrictive in its definition of class 1 groundwater.

The commission disagrees with the commentor's statement that the rule is too restrictive in its definition of class 1 groundwater and notes that other commentors have expressed concern over the creation of class 2 groundwater. The other commentors suggest that all groundwater-bearing units classified as class 2 should be class 1. The commission has developed its criteria for class 1 groundwater with over three years of public input in the form of discussions with numerous stakeholders, public meetings, and numerous publications with opportunity for comment. The commentor asked if the classification is valid if, "for example, the groundwater-bearing unit, (which would otherwise meet the definition of class 1 groundwater resource under §350.52 (1)(B) or §350.52 (1)(C)), is located in a highly urbanized area and is subject to forced injection of untreated urban stormwater runoff and the resulting COCs from various undefined sources?" The commission clarifies that a groundwater-bearing unit will be a class 1 groundwater if it meets the criteria under

§350.52 (1)(B) or §350.52 (1)(C) and is located in a highly urbanized area with injection of untreated urban storm-water runoff. In regards to the commentor's description of forced injection of untreated stormwater runoff into groundwater-bearing units, it is most likely that the occurrences are actually dry wells which act under gravity drainage. The commission is aware of only limited occurrences of this type of well (i.e., Class V injection wells), which were constructed prior to the commission obtaining authority to permit such activities, that are still used. Currently, no such new wells are permitted unless there is adequate treatment of the stormwater runoff prior to injection. The commission is protecting these class 1 groundwaters from all potential sources of COCs. The reader is also referred to comment by TU, TranSystems Inc., and Weston who raised similar concerns.

Concerning §350.52(1)(C), AFCEE commented that language on how to compare "natural quality" to primary drinking water standards is not provided. Is this a one-time comparison with an upgradient well? Are anthropogenic background considerations acceptable? These criteria will become critical as parties attempt to classify their groundwater. Further discussion on how to compare natural quality to primary drinking water standards should be included.

Concerning the comparison of the natural quality of groundwater to the primary drinking water standards, this is typically done simply through direct comparison of the concentration of a particular COC in groundwater, based upon naturally occurring concentrations of the COC, to the primary drinking water standard for the same COC. This commonly can be accomplished with a "one-time comparison with an up-gradient well," as the natural quality of the groundwater is not expected to change measurably over time. The rule specifically refers to the natural quality to distinguish from anthropogenic concentrations, that cannot be used for this comparison. The commission disagrees that further discussion on how to make this comparison should be included in the rule. As numerous comments indicated on the May 15, 1998 proposal, this level of detail should be included in guidance and not in rule.

Concerning §350.52(2)(A), Weston suggest adding to the definition of class 2 groundwater, "groundwater that would otherwise be classified as a class 1 but for which local restrictions have been placed to prohibit use of the groundwater."

The commission disagrees with the commentor's suggestion to allow what would otherwise be class 1 groundwater to be classified as class 2 based upon local restrictions. Class 1 groundwaters are generally the most valuable groundwater resources and it is imperative that these resources be protected for future if not for current uses. The recent severe droughts and the passage of SB 1 in the 76th Texas Legislature both reflect the need to protect and ensure the availability of future groundwater supplies. However, the commission has expanded the definition of institutional controls to obviate the need for specific filing of deed notices and restrictive covenants when such local ordinances contain the appropriate level or rigor and notification tenets.

§350.53. Land Use Classification.

Concerning §350.53, KOCH commented that the land use should first be determined and then the affected property assessment (APA) should proceed to either the residential or commercial/industrial assessment levels. The proposed TRRP rule states that the APA should proceed to residential assessment levels and then later the land use be determined. The proposal is clearly backwards and should be revised to allow the land use classification first followed by selection of residential or commercial/industrial assessment levels.

The commission agrees with the commentor for the reasons stated and is removing any reference to the timing of the land use determination relative to conducting the affected property assessment. However, persons should not take this to mean that the person does not need to identify the properties, regardless of land use classification, which have been affected in excess of residential

assessment levels. Therefore, in this respect, the timing issue is moot as the person does not comply with the rule when the extent of COCs in excess of only commercial/industrial levels have been assessed. The point of the rule is that the land use must be determined for all properties affected in excess of residential assessment levels (i.e., the affected property).

Concerning §350.53, Brown McCarroll & Oaks Hartline commented that the last sentence of this provision states: If off-site property or leased affected property is determined to be commercial/industrial, the person must provide written landowner concurrence for the associated institutional control. First, Brown McCarroll & Oaks Hartline does not believe that landowner concurrence should be required for either off-site property or leased affected property if the property in question is zoned commercial/industrial or non-residential. Instead, Brown McCarroll & Oaks Hartline suggests that the person be allowed to provide proof of the zoning status. Second, Brown McCarroll & Oaks Hartline suggests that the provision be revised to reference and coordinate with §350.111(e), which states that proof of written landowner consent is not required when the provisions of §350.111(d) are met.

Weston commented that §350.53 Land Use Classification - Suggest that there should be no requirement for landowner concurrence for commercial/industrial property if it is already zoned non-residential.

The commission does agree that the landowner concurrence provisions should agree with those in §350.111 and is changing the rule to only reference §350.111, as it is important to avoid any confusion and make certain persons are aware of the requirements of §350.111 when making land use determinations. The commission also agrees that landowner concurrence is not required if the zoning or governmental ordinance is equivalent to the deed notice or restrictive covenant that would otherwise be required.

Concerning §350.53, Chevron commented that exposure scenarios in all local, state or federal parks are not sufficiently similar to dwelling to warrant the same exposure scenarios as dwellings. For example, exposure frequency is not similar for users of parks and home dwellers. In addition, the consumption of site-grown vegetables must be evaluated under residential conditions, but is not relevant to parks.

IT Corporation and SRA commented that the proposed rules provide for residential and commercial/industrial land use categories only. Because of the sensitive nature of potential receptors and the similarity of exposures, day care facilities, educational facilities, hospitals, and parks (local, state or federal) are classified as residential areas. While potentially sensitive populations use day care facilities, schools and hospitals similar to residences, not all parks are used frequently. Local, state, and federal parks are used for an extremely wide range of recreational activities. Some parks contain playgrounds used by children daily and are reasonably approximated by a conservative residential scenario. Other large parks have designated campgrounds and other remote primitive areas that are used far less frequently and are not reasonably assumed to approximate a residential scenario. The proposed rules require a person to develop PCL concentrations for a site adjacent to a park that would be protective of a resident at the park. A definition in the final rules of a recreational land use scenario for local, state or federal park lands would provide the flexibility to develop PCL concentrations appropriate to the specific parks and adjacent land and would still provide a conservative evaluation of potential exposures.

First, the commission notes that it is important in circumstances where the on-site property is being addressed to a commercial/industrial land use that the on-site response action also be protective of off-site receptors. If the adjacent off-site land use is a park, where children may play and be exposed to COCs emanating from the on-site property, then the rule requires that the on-site response action be protective of these off-site receptors based upon residential land use. Second, the commission disagrees with the assertion that some local, state, or federal parks should be allowed to retain concentration levels of COCs which would not be protective of a residential exposure scenario. Due to the fact that some of the state's most valuable natural resources lie within these local, state, and

federal park lands, the commission is protecting these areas at the most conservative land use scenario (i.e., residential land use). Third, the commission disagrees that parks should be treated on a site-specific basis. Due to the unknown variability and potentially sensitive receptors (e.g., children) which may frequent these areas, the commission is retaining the residential land use classification. The commission evaluated the possible mechanisms (e.g., signs) to limit the use of parks to some specified exposure frequency but did not find any of these mechanisms suitable. While it is possible to limit exposure frequency on some privately owned lands with a reasonable degree of certainty, it is not reasonable to assume the same for publicly owned lands and thus the commission is not changing this land use classification.

Concerning §350.53, Henry, Lowerre, Johnson & Frederick commented that land use designation is too poorly defined, and it is not appropriate for the responsible party to select the use. There should be community input on the reservation of land for commercial use for all time. Also, if the commercial land is not developed, secure, or in use and is adjacent to residential properties, it may well become an inner city playground. Such reasonable scenarios are not reflected in the cleanup levels or the TRRP approach. Also, highly localized/isolated commercial sites should not be allowed a commercial designation (i.e. an old car repair shop deep in a neighborhood).

The commission disagrees that the land use designation is poorly defined. Both definitions which govern land use are specific as to which types of land use fit the respective definition. The commission also clarifies that responsible parties do not select land use, landowners and local governments select land use. The commission notes that local zoning is the proper mechanism to provide community input on the reservation of land for commercial use. The commission's objective is to ensure that the use of the property is protective, however the property is used.

The commentor's scenarios in which commercial property is located near residential properties and there is a trespasser on the commercial property is not an adequate reason to require all such commercial properties to be remediated to residential standards. If in fact a property is actually being used as an inner city playground, then this property would be classified as residential and would have to be addressed as such under the TRRP rule.

Concerning §350.53, Henry, Lowerre, Johnson & Frederick commented that this section does not understand what land use would apply to agricultural lands. As many plants have the ability to absorb and concentrate constituents, agricultural uses could result in exposure through consumption of contaminated agricultural crops, or animals which were fed contaminated plants

The commission clarifies that agricultural land use is included with the two land use classifications included in the rule. Areas in which there is not a residence, such as large areas of crop land are commercial/industrial land use. The exposure scenario in this instance is a worker like that for commercial/industrial properties. Any areas in which there is a residence (e.g., a limited area of a farm) is classified as residential. Further, there is flexibility within the rule §350.71 (c)(8) (General Requirements) to require the inclusion of additional pathways, such as crop or animal uptake and subsequent human exposure, as necessary to ensure the protection of human health and the environment.

Concerning §350.53, Henry, Lowerre, Johnson & Frederick suggests that the potential for off-site migration be considered in determining priority, as prevention of off-site contamination is a very high priority in the corrective action program. Also, the site classification described only covers potential impacts within ten years. An unintentional impact of this process may that large facilities are always low priority.

The commission notes that future land use is included, in that land use (i.e., commercial/industrial) that would require potential future remediation prior to a change in use to residential land use is noted in the real property records of the subject property and is subject to §350.35 Substantial changes in circumstances. With regard to the last two sentences of this comment, the commission is not certain what the commentor is referring to. No such provisions are included in this rule.

Concerning §350.53, Henry, Lowerre, Johnson & Frederick commented that general public participation increase, not reduce, the role of local governments: Allowing responsible parties to determine future land use without input from local government or the community will create serious problems. The City of Austin provides a good example. Zoning in the first half of this century left a mixed use of residential and industrial in East Austin. Austin is attempting to re-zone some areas that had been zoned for industrial uses in the past to residential or commercial uses. If a responsible party can limit the clean-up of its site to industrial standards because the site is zoned "industrial," that person can limit future use of the site to industrial activities. The City's ability to change the zoning would then be foreclosed.

The commission clarifies that responsible parties can only determine future land use for purposes of establishing protective concentration levels when they are the actual landowner. Responsible parties cannot determine future land use, even for determining protective concentration levels, for property they do not own. The commission disagrees that allowing responsible parties where they own the subject property or allowing the landowner when they are not the responsible party to determine future land use will create serious problems. Under current state law and in accordance with applicable local zoning, a landowner may be limited in the manner in which they use their property currently or in the future. However, the landowner cannot be required to actually use or develop their property for future use. The commentor asserts that a responsible party can limit the cleanup of its site to industrial standards because the site is zone "industrial." This is correct under some circumstances, i.e., "equivalent" zoning. However, in such case it is not the landowner to accept this limitation. Rather, it is the municipality. The landowner may protect their interests at the municipal level of government.

Further, the commission disagrees that a city's ability to change zoning will be foreclosed. City's may change zoning currently and in the future without regard to actions taken on individual properties to ensure protection of human health and the environment. Cities have condemnation powers that may be utilized in such situations. After condemnation, the city may choose to perform additional clean up and impose zoning on the property such that different uses of the property will be appropriate considering residual COCs.

Concerning §350.53, Henry, Lowerre, Johnson & Frederick commented that the commission should assure that cities can change zoning and not be forced to accept a landowner's designation of an area as industrial for all future uses.

The commission disagrees that a city's ability to change zoning is impacted. Cities may change zoning currently and in the future without regard to actions taken on individual properties to ensure protection of human health and the environment in accordance with the TRRP rule. Cities have condemnation powers that may be utilized in such situations. After condemnation, the city may choose to perform additional clean up and impose zoning on the property such that different uses of the property will be appropriate considering residual COCs.

Concerning §350.53, the commission notes that the term "residential human health assessment levels" includes human health PCLs and ^{GW}Soil but not ecological PCLs.

§350.54. Data Acquisition and Reporting Requirements.

Concerning §350.54, Strasburger & Price commented that the TNRCC's re-proposed rule provides much less specificity in regard to data acquisition and reporting requirements, instead using performance standards. This approach appears inconsistent with the TNRCC's goal to provide certainty to the regulated entity, and consistency within the program and among TNRCC staff members. Our concern is that one project manager may require extensive QA/QC procedures including, for example, independent validation of analytical results for a PST site while another will not. Alternatively, our concern is that the TNRCC uniformly will enforce the extensive data requirements set forth in the rules proposed on May 15, 1998, through these performance standards and therefore the true costs of this regulatory program are not reflected in the fiscal analysis. In other words, the TNRCC will require surreptitiously through these generic requirements what it could not obtain through the rule making process.

The commission acknowledges the commentors' concern that the performance standards specified in the rule may be inconsistently interpreted. However, the commission points out that comments received from the regulated community have been recommendations to drop specificity from the rule. The data acquisition and reporting requirements under the existing Risk Reduction Rule, and clarified in the July 23, 1998, TNRCC Interoffice Memorandum *Implementation of the Existing Risk Reduction Rule*, will generally meet the requirements of the TRRP rule. The commission is planning to prepare guidance for implementing this section of the rule. That guidance will be developed with input from interested stakeholders. Regarding the PST program, the data reporting requirements will be similar to those specified in RG-14/PST and the PST Quality Assurance Project Plan. This rule does require that the person keep on file, and have readily available for up to three years from the submittal date of the APAR, the information necessary to fully validate the data. The rule does not require that the laboratory report all of the data, but rather the rule requires only that the person have the data on file and readily available. The term "on file" can be interpreted to mean on file in the laboratory, provided the person has ready access to the data if requested by the commission. The intent of the requirement is to ensure that the data are available to support appropriate decision making. The requirements of this rule are similar to the requirements under the current rules. Under the existing Risk Reduction Rule in §335.8(c)(5), the commission has the authority to request "such information as may reasonably be required to enable the executive director to determine whether the closure or remediation is compliant."

Concerning §350.54, Ranger commented that Ranger had discussed the proposed QA/QC requirements with personnel at several analytical laboratories. These personnel informed Ranger that the rules outlined data requirements that are essentially the same as those required for CLP laboratories. Ranger states that due to the extensive QA/QC and paperwork requirements for CLP labs, the costs of sample analyses at these labs are typically two to three times more than non-CLP labs. Ranger does not believe that this level of QA/QC and paperwork is necessary for the average site. Ranger states that what the TNRCC appears to be proposing is to unnecessarily impose Superfund-style QA/QC requirements onto all other agency program areas.

The commission offers that the commentor was referring to the rule proposed in May, 1998, which was subsequently withdrawn in August, 1999, and the commentor may have mistakenly interpreted that all of the QA/QC parameters specified in that now defunct rule were required as deliverables under the current proposed rule. This interpretation of the current rule is not correct. If the person is generally meeting the reporting requirements specified in the PST program guidance PST/RG-14 and/or the reporting recommendations in the July 23, 1998, TNRCC Interoffice Memorandum on *Implementation of the Existing Risk Reduction Rule*, the requirements under §350.54 will generally be met. Section 350.54 of the TRRP rule requires that all of the supporting data be retained on file for a period of three years but does not require all of the data to be reported to the commission. The supporting data may remain on file at the laboratory in electronic format, as long as it is retrievable for the required time period. The actual deliverables required under §350.54 are a subset of those QA/QC parameters required under the contract laboratory program (CLP). The commission

considers the QA/QC deliverables specified in §350.54 to be the minimum required for technical defensibility of the data generated by analytical laboratories. This rule requires that the laboratory perform all the quality control steps to demonstrate that the method was appropriate for the medium, the COC, and level of required performance for the COC. Many commercial laboratories have routinely provided this level of QA/QC deliverable in the past. Based upon conversations with some of these laboratories who are routinely performing the appropriate QA/QC and reporting the appropriate data, the commission concludes no cost increase should be experienced by the person unless the specifications within the method have changed or laboratories were previously not meeting requirements of the methods.

Concerning §350.54, ARCADIS Geraghty & Miller commented that §350.51 discusses in general terms what kinds of information must be collected in order to delineate the lateral and vertical extent of contamination in all affected media and for all appropriate exposure pathways.

This subchapter is silent on how historical information that has been collected prior to the effective date of the TRRP may be incorporated into the assessment of the impacted property. ARCADIS Geraghty & Miller suggests that the TRRP should acknowledge that any data collected in compliance with a work plan previously approved by the TNRCC should be useable in any subsequent submittal under the TRRP.

The commission agrees with the commentors that historical data collected under existing requirements should be fully eligible for use in future activities performed under TRRP; however, the historical data must meet the existing requirements. This rule does not change the benchmark for data acceptability. It is realistic to expect that not all data will meet the performance expectations under TRRP. However, if a general problem or concern exists with data quality under this rule, then it is likely that a legitimate data quality issue exists for that same data under the current rules. To date, persons have not been generally mindful of data quality when demonstrating that performance objectives/requirements were met. For example, the national primary drinking water standard for pentachlorophenol is 1 ppb. That standard has been in place since 1994 and is included as the groundwater MSC under Remedy Standard 2 of the existing Risk Reduction Rule. Persons attempting to demonstrate attainment of that standard under the existing rule for pentachlorophenol have continued to submit data from Method SW-846 8270 which has an estimated quantitation limit of approximately 50 ppb and a method detection limit in the range of 10 ppb, neither of which could be used to demonstrate attainment. If pentachlorophenol is a COC and the person is anticipating approval from the commission that attainment has been reached, a more sensitive method, such as Method SW-846 8151, which provides a method quantitation limit below the 1 ppb MCL standard, would be required under the current rule. As another example, the national primary drinking water standard for vinyl chloride is 2 ppb. That standard has also been in place since 1994 and is included as the groundwater MSC under Remedy Standard 2 of the existing Risk Reduction Rule. Persons have submitted Method SW-846 8260 data to demonstrate attainment; however, the quantitation limit reported by most laboratories is five ppb which exceeds the MCL. Method SW-846 8260 has provisions for a method modification to allow for a quantitation limit of 1 ppb for vinyl chloride. However, that provision in the method which allows for the lower quantitation limit of 1 ppb has not usually been exercised by the person. If vinyl chloride is a COC at an affected property, the data should be considered unusable for demonstrating attainment under the current rule. For another example, persons have instructed, or allowed, the laboratory to report data to an arbitrary “reporting limit” which exceeds both the laboratory’s lowest calibration standard and the MSC. The rationale for this approach is not clear, but the data are essentially unusable for demonstrating attainment of the MSC under the current rule. For a final example, persons have allowed the laboratory to report results at elevated sample quantitation limits without requiring that the laboratory provide the justification for the elevated sample quantitation limits and the documentation indicating that the laboratory took the method-recommended or industry-accepted

steps to minimize interference from the sample matrix. Historical data collected under the current Risk Reduction Rule with this type of problem will be evaluated on a site-specific basis.

To minimize these types of data quality problems, the commission recommends that the person clearly identify the data quality objectives (DQOs) of the project and communicate those DQOs to all persons collecting, generating, and using those data (i.e., the field team, the laboratory, and the data user(s) such as the risk assessor). The commission would be considered a user of the data if the data are being submitted to the commission to support a decision being made. The DQOs should include the standard measurement quality objectives (bias, precision, completeness, representativeness, and comparability and the analytical level that the laboratory must meet), but should also include the intended use of the data being collected (e.g., what decision is being made with the data and what information is needed to make that decision) and any special considerations in the collection and generation of the data. All of these considerations dictate the level of quality control needed to support the data. For example, to determine the lateral extent to which a semivolatile COC exceeds a PCL on an area of an affected property, the outcome of the DQO Process might indicate that, based upon the level of the PCL and the nature of the COC and the affected medium, a screening method with minimal quality control and minimum confirmation using definitive data would initially be appropriate. If the screening method can reach the sensitivity requirements for the project (i.e., below the level of required performance) then the screening data could potentially be used to demonstrate attainment, provided adequate QA/QC procedures and appropriate confirmation data (with more rigorous QC steps) were collected to support the screening data. If the level of required performance is below the limits of the screening method and once the results of the screening method indicate that the COC is not detected using the screening method, then the use of a more accurate and precise method, such as SW-846 8270, might be appropriate.

Concerning §350.54, Chevron commented that historic data collected under the existing requirements should be fully eligible for use in future activities performed under the TRRP. Unless historic data can be relied upon, significant resources will be expended on data re-generation and re-verification, without improving the quality of the end result. Unless significant changes are made to the applicability provisions to alleviate all of these adverse cost impacts, the TNRCC is statutorily required to identify and adequately assess and document the benefit derived from the greater expenditure of resources and time.

Concerning §350.54, Environmental Resources Management commented that historic analytical data collected under existing permits or rules, or following previous EPA or other standard methods should be allowed without the need to collect additional data (as required by §350.54). Professionals in the industry as well as agency staff should be allowed to apply appropriate judgement in utilizing such information. Otherwise, as written, the proposed TRRP infers all past cleanups are invalid because they did not use the latest methods.

As the agency moves further into risk-based decision making, the integrity of the data becomes more and more paramount. The commission issued guidance in July 1998, for the existing Risk Reduction Rule as a measure to clarify the data reporting procedures under the current rule. Therefore, usability of historical data will be evaluated on a site-specific basis. If the data submitted to the commission cannot support the decision being made, the person may be required to collect appropriate data to support the decision. The commission notes that the requirements in this rule are not a new high bar, but in fact represent the level of data quality that was expected with the adoption of 30 TAC Chapter 335 in 1993 through the references to EPA document SW-846. The use or non-use of the data will be determined by consideration of factors such as the risk standards that were in place at the time the data were submitted to the commission, the nature of the "reporting limits" used by the person to censor the data, the potential site risk, the current status of the affected property (e.g., active or closed), and the location of the affected medium (i.e., on-site versus off-site).

Concerning §350.54, EPA Region 6 commented in reference to page 2263 of §350.54 that it should be noted that limits for solid waste analytical methods are more typically based on practical quantitation limits or estimated quantitation limits; whereas method quantitation limits are mentioned in the proposed rule. The EPA Region 6 requests that the rule refer to the solid waste analytical method terminology, i.e., practical quantitation limits or estimated quantitation limits or that the different terminology be cross referenced to ensure clarity.

The commission does not agree with the commentor that limits for solid waste analytical methods are more typically based on practical quantitation limits or estimated quantitation limits. Based upon conversations with EPA within the Office of Solid Waste and the EPA's Methods Information Communication Exchange, the terms "practical quantitation limit" and "estimated quantitation limit" are used in SW-846 to provide the laboratory and the data user with general guidance for the method's expected performance. The values associated with these terms are usually not part of the regulation as mentioned in Footnote 6 in 40 CFR Part 264, Appendix IX. An exception to this case is in 40 CFR Part 261.24 where the regulatory level included in the regulation is set at the quantitation limit which is considered routinely achievable when the calculated regulatory TCLP level is below the level at which the compound can be detected. The commission considers that the term "quantitation limit" as used in 40 CFR part 261.24 to be analogous to the method quantitation limit described in §8000B (SW-846 Update III). The commission cannot easily cross reference the terms "practical quantitation limit" or "estimated quantitation limit" with terms in the TRRP rule, except to say that the method quantitation limit is the lowest level at which the laboratory can report quantified values because it is the lowest point on the calibration curve. When required to meet the DQOs, detected results between the method quantitation limit and the method detection limit should be reported as the value estimated by the laboratory and flagged to note that the result is estimated. Under §350.78(c) of this rule, the method quantitation limit (or background, whichever is higher) is used as a regulatory limit when the PCL is less than the method quantitation limit of the most sensitive standard available method.

Concerning §350.54, Environmental Resources Management commented that the rule requires Superfund-type data quality objectives be met for all sites. This will result in increased laboratory costs and data validation costs that will not significantly impact the conclusions of the assessment. This level of data QA/QC in a process that incorporates multiple thousand-fold uncertainty factors is "straining at a gnat while swallowing a camel". The QA/QC requirements should be made more in line with the bigger objectives of the Program.

Concerning §350.54(a), Eastman commented that it is appropriate that the person submitting the data is responsible for the quality of the data. In the Risk Rules, TNRCC has established data quality objectives/measurement quality objectives that must be met for the data being submitted. Therefore, laboratories/project managers should not be required to routinely submit supporting excessive laboratory data quality documentation. The data quality verification required in §350.54(f), if done properly, should eliminate the need to submit supporting documentation for routine submissions. On-site audits and/or subsequent requests for additional data should be used to investigate questionable or inadequate submissions.

Concerning §350.54, TCC/TXOGA commented that it is appropriate that the person submitting the data is responsible for the quality of the data. In the existing Risk Reduction Rules, TNRCC has established data quality objectives/measurement quality objectives that must be met for the data being submitted. Therefore, laboratories/project managers should not be required to routinely submit supporting excessive laboratory data quality documentation. The data quality verification required in §350.54(f), if done properly, should eliminate the need to submit supporting documentation for routine submissions. On-site audits and/or subsequent requests for additional data should be used to investigate questionable or inadequate submissions.

Recommendation: Modify the rule similar to existing rules regarding established data quality objectives/measurement quality objectives.

Concerning §350.54, Ranger commented that the requirements of §350.54 are unnecessary and unwarranted in a rule package. Sampling plans are best discussed in regulatory guidance packages, not rule packages. By and large, the PST and VCP programs have not required field QA/QC samples and Ranger does not believe that there have been any adverse impacts to human health and the environment because of this. This is merely another added cost to be imposed on responsible parties that do not get a project any closer to regulatory closure.

The commission disagrees with the commentor's position that the TRRP rule requires Superfund-type data quality objectives (DQOs) be met for all sites. The proposed TRRP rule requires only that site-specific goals be established and documented in the APAR to ensure that the data being reported meet the project requirements. In response to this comment and to all comments critical of the commission's efforts to enhance the data quality over past practices, which have often been significantly lacking, the commission is removing the DQOs as a rule requirement by replacing the word "shall" with "should" in §350.54(b), but leaving the text as a recommended reference to the person who is intending to comply with the rule. The commission will review any DQOs included in reports, and the commission highly recommends that the person follow a systematic planning process, such as the DQO process outlined in the EPA *Guidance for the Data Quality Objectives Process* (EPA QA/G4, September 1994) and the guidance that will be included in the 1999 revised Chapter 9 of SW-846, which should be available before or by December 1999. If the person does not specify the DQOs in the report, the person must meet all of the provisions set in §350.54, unless directed otherwise by the commission. The person is responsible for ensuring that the quality of the data is sufficient to demonstrate attainment of the rule. The commission will not be sympathetic to poor quality data submittals, particularly when it is apparent there was a general lack of planning or DQO development. The commission will not make decisions that have health and safety implications or environmental ramifications with less than the appropriate quality data.

The commission agrees with the commentor from Eastman who states "... The adoption of PBMS (Performance Based Measurement Systems) will provide labs the flexibility needed to ensure that the quality of the data is acceptable for its intended use. The establishment of project data quality objectives and measurement quality objectives in project plans prior to project initiation will also ensure the proper coordination of efforts among laboratories, data users, and project managers." The commission is convinced that data quality will improve as communications between the data collector, data generator, and data user are improved. In developing the DQOs, the person should consider: the demonstration to be made to the commission, the location of the affected property, the affected property characteristics, the question to be answered with the data, and other appropriate considerations; however, the commission can require the person to meet all of the provisions in §350.54 to meet the commission's needs, when warranted. In general, the laboratory costs should not increase unless the laboratory has not been performing all of the quality control steps recommended in the method and guidance in the past. In fact, the DQOs for a project may specify that certain quality control steps/samples may be eliminated from the project at certain phases, thus potentially decreasing analytical costs. For example, if the concentration in a sample greatly exceeds the critical PCL, then the importance placed on the quality control criteria by the commission may be less than that required by the persons who are responsible for addressing the medium represented by the sample. However, if the data are to be used to demonstrate that a critical PCL has been met, or has not been exceeded, then the commission may require more stringent quality control steps be taken as allowed in the rule and documented. The TRRP rule requires that the person identify, document, and report all laboratory and field problems or anomalies that would affect the quality of the data, and to keep on file, and have readily available for up to three years from the submittal date of the APAR, the information necessary to fully validate the data. Sections 350.54(b), 350.54(g) and

350.54(h) provide the commission authority to request the data necessary to conduct a full data validation on a site-specific basis when, and if, the executive director deems it is necessary. However, supporting documentation, beyond what is required under the existing rules (with some minor modifications), will usually only be requested by the commission for random program auditing purposes, or if needed on a project specific basis, to investigate questionable or inadequate submissions. Data quality objectives/measurement quality objectives are project specific and not amenable to rule language. The rule has been changed in §350.54(b) to clarify that including the DQOs is a recommendation and not a requirement. The rule has been changed in §350.54(c) to provide examples for the “type” of sample, to clarify that “present/absent” means “present or absent”, and that the samples shall represent the environmental media of the affected property being monitored or assessed. The rule has been changed in §350.54(e) to clarify that the use of intra-laboratory performance standards can be used, as opposed to requiring only method-recommended performance standards, provided “that those performance standards are sufficient” to meet the project DQOs, and the term “proper” was replaced with the term “appropriate” which means that the method used should be an appropriate method for the medium sampled, the COC, and the level of concern for that COC at the sample location. The rule has been changed in §350.54(e)(2) to clarify that “the relative percent difference” can be used in place of the relative standard deviation when using duplicate analyses to determine precision. The rule has been changed in §350.54(e)(3) to specify that COCs that meet the conditions in §350.71(k) are not subject to the §350.54(e)(3). The rule has also been changed in this section to clarify how sensitivity requirements can be met. The rule has been changed in §350.54(e)(6) to clarify the phrase “a standard available method,” to clarify that the term “agency” indicates “executive director”, that the quality control criteria specified in the SW-846 guidance are recommended, rather than specified, and the misuse of the term “strenuous” was corrected with the use of the term “stringent”. For clarification, the rule has been changed in §350.54(f) to include that the person shall identify any data that may be affected by improper field procedures to ensure that all aspects of the sampling and analysis event that might affect the quality of data are identified by the person. The rule has been changed in §350.54(h)(2) and (3) to clarify the term “non-detected results” and to clarify that the reporting requirements specified in (h)(1) and (h)(2) may not always be required by the commission.

Concerning §350.54, Ranger commented that sampling QA/QC plans are best left in site-specific sampling plans.

The commission agrees with the commentor that sampling QA/QC plans should be included in the site-specific sampling plans. The commission intends to provide guidance on recommended field QA/QC procedures and samples. The purpose of many field/sampling QC samples is to document that the presence of a COC in an environmental sample may be attributable to blank contamination or poor decontamination procedures rather than to the medium represented by the environmental sample. Therefore, the entity providing the funding for any assessment may wish to include some field/sampling QC samples. Additionally, split samples sent for QA purposes to a laboratory other than the primary laboratory can be useful in identifying problems prior to demobilization, thus potentially saving time and money, or can be used to support the decision if the primary laboratory fails. The level and type of quality control included in the sampling approach is dependent upon the project-specified DQOs. However, the commission is not requiring such QA/QC, when poor quality in the data would not have a negative impact on human health or the environment.

Concerning §350.54, Environmental Resources Management commented that comprehensive quality assurance reviews of analytical data as required for some Superfund sites (as required by §350.54) should be unnecessary for most sites as long as the laboratory and consultant perform standard reviews.

The commission disagrees with the commentor’s assessment that the TRRP rule requires comprehensive quality assurance reviews. Section 350.54(f) requires that the person identify any

data that may be affected by laboratory deviations from the analytical method or by the laboratory's performance not meeting the project-required and/or method-required quality control acceptance criteria. The commission agrees with the commentor that the laboratory and consultants should routinely review the data. The person will meet the requirements under §350.54(f) when any problems or anomalies are identified that were experienced or observed in the field or laboratory during the collection and/or generation of the data.

Concerning §350.54, Environmental Fuel Systems and ICE commented that lab data acquisition, QA/QC and reporting requirements appear "softened" in this rule version compared to last year, at least at first glance. In the PST program, project data quality and completeness objectives are seldom defined project by project; we may see some increased lab burdens under the new rule, with attendant increases in costs.

The commission acknowledges the commentor's concern, but disagrees with the characterization as provided by the commentor. Usually, fuel hydrocarbons are the concern under the PST program, and the QA/QC requirements can be approached in a fairly standardized manner. However, when other COCs are of concern, for example, product methyl ethyl ketone, the QA/QC necessarily is amended and has been so amended historically at PST sites. However, if the data reporting guidance specified in RG-14/PST has been implemented in the past, attendant increases in costs should be minimal.

Concerning §350.54, KOCH commented that the SQL (or PQL) should be used instead of the MQL.

The commission disagrees with the commentor's recommendation that the sample quantitation limit should be used as the critical PCL instead of the method quantitation limit. The sample quantitation limit varies from sample to sample, therefore, it is not feasible to use the sample quantitation limit as a regulatory limit. Further, the experience of the agency is that elevated sample quantitation limits are frequently an artificial result of the capability, or in some cases, the effort of a laboratory to modify the method to eliminate matrix interference. Poor performance by a laboratory should not result in a higher PCL than that achievable by a better performing laboratory. The commission acknowledges that some of the critical PCLs may be less than the achievable lowest method quantitation limit based on the best available technologies. The commission also recognizes that for some media and some samples, the method quantitation limit used as the critical PCL may not be achievable. Therefore, the rule has been changed in §350.79 to allow for compliance at a sample quantitation limit when a sufficient demonstration is made that all reasonably available technology (e.g., select ion monitoring) has been used to demonstrate that the COC cannot be measured to the method quantitation limit due to sample specific interferences. The intent of this section of the rule is to allow some flexibility when the critical PCL is below the level which a laboratory can measure using the most sensitive, standard, available method and the sample matrix prevents the measurement of a COC at the method quantitation limit. Please note that some COCs may be screened out at the sample quantitation limit in accordance with §350.71(k), but for COCs determined to be applicable and important to an affected property, the person must demonstrate that reasonable alternatives have been exercised to correct the sample quantitation limit.

Concerning §350.54(a), Ranger commented that another concerning aspect of this proposed rule provision is that the TNRCC is proposing to put responsibility, under the threat of enforcement penalties, onto responsible parties to require the responsible parties to be liable for all of the laboratory QA/QC of the laboratory they choose to utilize. Ranger does not believe that this is an appropriate liability to place upon the regulated community. It appears that the TNRCC expects that a responsible party will hire an experienced chemist for every project who will conduct a formal audit of the laboratory to be utilized for the project. This will be another very significant and unfair expense put upon the regulated community by the TNRCC. The TNRCC on this issue must seriously consider whether it wants to take enforcement actions against a responsible party if they do not ensure, for example, that the laboratory they hired (which

they naturally assume is conducting their business in a legitimate and professional manner) did not follow (as required in the proposed rules) ""the quality assurance program specified in the International Organization of Standardization "Guide 25: General Requirements for the Competence of Calibration and Testing Laboratories (ISO 25, 3' Edition, 1990)."

The commission strongly disagrees with the commentors' position that the person should not be responsible for the quality of the data. TCC/TXOGA and Eastman are responsible parties and in their comments supporting the use of the DQO process they were also supportive of the person having responsibility for the quality of the data. In addition, Eastman recognizes the benefit for the person in having ISO 25 and/or the NELAP standards as references. The rule has been changed in §350.54(d)(2) to recommend that all of the quality standards of the NELAP should be considered by the person when evaluating the laboratory, not just Chapter 5. The commission anticipates that: 1) the person will select a laboratory that has an established and documented quality assurance program in place that generally meets the standards in ISO 25 and/or the NELAP, 2) the person will ensure that the laboratory's standard operating procedures are documented and available for review, 3) the person will verify that the laboratory has the capability and the capacity to meet the project objectives, 4) the person will clearly communicate the project objectives to the laboratory to ensure that the laboratory understands the project objectives, (e.g., the level of sensitivity required for the project), and 5) the person will review the data to ensure that the project objectives were met. However, if the person, or the commission, determines upon review that the data are not usable or the data generated do not meet the project objectives, then the person must take corrective action, which may include recollecting and reanalyzing samples, to meet the requirements under this rule.

Concerning §350.54(d)(2), Eastman commented that the TNRCC should be congratulated for encouraging laboratories to conform to the requirements of the National Environmental Laboratory Accreditation Program (NELAP). The quality systems standards developed under NELAP comprise an excellent set of national consensus standards that are rapidly becoming the standard of choice for all environmental laboratories.

The commission agrees with the commentor.

Concerning §350.54(e)(3), KOCH commented that the proposed TRRP rules state that standard analytical methods must be used to provide an MQL below the critical PCL. This requirement contradicts the statement at §350.78(c) which states that if the critical PCL is less than the MQL, then the greater of the MQL or background should be used as the critical PCL. We believe that the provisions at §350.78(c) should be used.

The commission disagrees with the commentor that §350.54(e)(3) is in conflict with §350.78(c). In §350.54(e)(3), the rule states that the MQL must be below the critical PCL. Section 350.78(c) allows for use of background as the critical PCL if background is greater than the PCL. If, however, background is less than the PCL and an analytical method is not available that provides an MQL below the PCL, then the person must use the standard available analytical method that provides the lowest possible MQL. The intent of the commission has been clarified in 350.54(e)(6)(a) by replacing the term "is" with the phrase "has been determined to be" and by adding a reference to §350.78(c) concerning the necessary level of required performance.

Concerning §350.54(e)(4), Chevron commented that verifying and routinely checking the method detection limits (MDLs) for reasonableness via method detection limit check samples does have technical merit and should improve the quality of analytical data. However, it is very likely that many environmental laboratories currently do not verify MDLs exactly as described in this section. In particular, the method detection limit check sample requirements in this section are not consistent with the methods prescribed in

the Federal Regulations. The rule should allow some leeway on how to demonstrate the appropriateness of MDLs, with the analysis of method detection limit check samples as one possible approach. Suggested Change: "The reasonableness of the calculated method detection limit values shall be determined. One approach that can be used is to analyze a method detection limit check sample by spiking an interference free matrix with all COCs at about two times the determined method detection limit . . ."

Concerning §350.54(e)(4), Eastman commented that "the method detection limit check can be analyzed on a quarterly basis, in lieu of the annual method detection limit study" and "The method detection limits are acceptable when they are determined using procedures presented in 40 CFR, Part 136, Appendix B, or an equivalent statistical approach" implies an existing mandatory requirement to do an annual method detection limit study. This requirement does not exist elsewhere in regulations. If this is a new requirement from TNRCC, the requirement should be clearly stated.

Concerning §350.54(e)(4), Dow commented that a large section was added concerning analytical chemical testing method detection limit. Dow believes this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Dow believes that the prescriptive language in this section should be deleted from the proposed rule and the issue addressed in guidance.

Concerning §350.54(e)(4), TCC/TXOGA commented that a large section was added concerning analytical chemical testing method detection limit. TCC/TXOGA believe this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Our recommendation is that it be placed in guidance and in guidance, the modifications listed below should be made.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: Comment: The statements "the method detection limit check can be analyzed on a quarterly basis, in lieu of the annual method detection limit study" and "The method detection limits are acceptable when they are determined using procedures presented in 40 CFR, Part 136, Appendix B, or an equivalent statistical approach" implies an existing mandatory requirement to do an annual method detection limit study. This requirement does not exist elsewhere in regulations. If this is a new requirement from TNRCC, the requirement should be clearly stated. Recommendation: Modify rule so that it is clearly understood.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: TNRCC Statement: "The results of a method detection limit check sample shall be used to document the reasonableness of the determined method detection limit values. If any of the COCs are not detected (in the method detection limit check sample), then the method detection limit study shall be modified and repeated for the failed COCs, until each COC is detected in the method detection limit check sample."

Comment: Requiring that method detection limits (MDLs) be verified and routinely checked for reasonableness via method detection limit check samples does have technical merit and should improve the quality of analytical data. However, it is very likely that many environmental laboratories currently do not verify MDLs exactly as described in this section. In particular, the method detection limit check sample requirements in this section are not consistent with the methods prescribed in the Federal Regulations. The rule should allow some leeway on how to demonstrate the appropriateness of MDLs, with the analysis of method detection limit check samples as one possible approach.

Recommendation: "The reasonableness of the calculated method detection limit values shall be determined. One approach that can be used is to analyze a method detection limit check sample by spiking an interference free matrix with all COCs at about two times the determined method detection limit . . ."

The commission is not deleting all of the requirements, but agrees with the commentors that some of the requirements for the method detection limit should be moved to guidance. The validity of the method detection limit determines the usability of data reported at the sample quantitation limit. The rule has been changed accordingly to allow flexibility in the approach used to establish the method detection limit and to routinely check the reasonableness of the method detection limit. The rule has also been modified to clearly state that the person shall ensure that the laboratory has performed and documented an initial demonstration of proficiency for each COC and each method used. The rule is also changed in response to Eastman's, TCC's, and TXOGA's requests that the frequency of MDL studies be clarified to state that the method detection limit must be verified after major instrument maintenance or major changes in instrumentation or instrument conditions."

Concerning §350.54(e)(4), Eastman commented that the implied requirement in §350.54(e)(4) to perform MDL's is not consistent with the requirements of §350.54(e) and §350.54(e)(3). Section 350.54(e)(3) only requires that the method quantitation level (MQL) be below the level needed to demonstrate conformance with critical PCL's. The sensitivity requirement of §350.54(e) can be met by other means than the MDL. Sensitivity can be measured at any concentration. Depending on the PCL, an MQL significantly higher than the MDL may make the MDL study a useless effort. For instance, if a PCL of 100 ug/l for compound A is to be evaluated, it serves no purpose to demonstrate that a method can achieve an MDL of 2.0 ug/l for that compound.

TNRCC should clarify §350.54(e)(3) and §350.54(e)(4) to make it unmistakably clear that the sensitivity requirement for data collection can be met by either an MDL demonstration or a demonstration of an MQL that is less than the PCL, whichever is higher.

Concerning §350.54(e)(4), TCC/TXOGA commented that a large section was added concerning analytical chemical testing method detection limit. TCC/TXOGA believe this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Our recommendation is that it be placed in guidance and in guidance, the modifications listed below should be made.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and the issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: The implied requirement in §350.54(e)(4) to perform MDL's is not consistent with the requirements of §350.54(e) and §350.54(e)(3). Section 350.54(e)(3) only requires that the method quantitation level (MQL) be below the level needed to demonstrate conformance with critical PCL's. The sensitivity requirement of §350.54(e) can be met by other means than the MDL. Sensitivity can be measured at any concentration. Depending on the PCL, an MQL significantly higher than the MDL may make the MDL study a useless effort. For instance, if a PCL of 100 ug/l for compound A is to be evaluated, it serves no purpose to demonstrate that a method can achieve an MDL of 2.0 ug/l for that compound.

Recommendation: TNRCC should clarify §350.54(e)(3) and §350.54(e)(4) to make it unmistakably clear that the sensitivity requirement for data collection can be met by either an MDL demonstration or a demonstration of an MQL that is less than the PCL, whichever is higher.

The commission disagrees with the commentor's assessment that the implied requirement under §350.54(e)(4) is not consistent with the requirements under §350.54(e)(3). It is reasonable to assume that if the method quantitation limit is below the PCL, the person can demonstrate conformance.

However, non-detected results should be reported at the sample quantitation limit which is a function of the method detection limit. The commission acknowledges that the term "sample quantitation limit" is a misnomer and the more appropriate term is "sample detection limit"; however, the rule uses the term "sample quantitation limit" because that term is commonly used throughout the risk assessment community and available guidance documents. The commission acknowledges the commentor's assessment that if the PCL is 100 ug/L, then the need for a method detection limit study may not be warranted. However, if a sample of concern were diluted 50-fold, the person would need to know, and may be required to demonstrate, that the method detection limit was below 2 ug/L before compliance at that PCL would be approved using non-detected results. To minimize the reporting of false positive results, the commission changed the rule in §350.54(h)(1) to ensure that only COCs meeting the qualitative identification criteria specified in the method are reported as detected.

Concerning §350.54(e)(6)(B), Chevron commented that "The (laboratory control sample) matrix must be similar to the medium of the environmental samples." This requirement is appropriate, when it is feasible and reasonable. However, what would be considered "similar" is not specified. And for some environmental samples, such as waste, it will not be possible to use a similar matrix for the laboratory control sample. Therefore, the language should be changed to require the use of a matrix for the laboratory control sample that is as similar as possible to that of the environmental samples. The (laboratory control sample) matrix should be as similar as possible to the medium of the environmental samples.

Concerning §350.54(e)(6)(B), TCC/TXOGA commented that a large section was added concerning analytical chemical testing method detection limit. TCC/TXOGA believe this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Our recommendation is that it be placed in guidance and in guidance, the modifications listed below should be made.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: "The (laboratory control sample) matrix must be similar to the medium of the environmental samples."

Comment: This requirement is appropriate, when it is feasible and reasonable. However, what would be considered "similar" is not specified. And for some environmental samples, such as waste, it will not be possible to use a similar matrix for the laboratory control sample. Therefore, the language should be changed to require the use of a matrix for the laboratory control sample that is as similar as possible to that of the environmental samples.

Recommendation: "The (laboratory control sample) matrix should be as similar as possible to the medium of the environmental samples."

The commission acknowledges the commentor's assessment that the term "similar" in reference to matrix is not specified. The commission also offers that the commentors have mistaken the laboratory control sample for a matrix spike sample. The laboratory control sample is a sample of laboratory reagent grade matrix that is free of the analyte of concern, which is spiked at known concentrations of the analyte, taken through the method used on the environmental samples, and analyzed. Whereas, on the otherhand, a matrix spike sample is an environmental sample that is representative of the matrix from the affected property. The matrix is spiked with the COCs at the affected property at known concentrations, taken through the method, and analyzed. The commission anticipates that the person will understand the term "similar" to mean that an aqueous laboratory control sample should not be used for solid or soil environmental samples. The laboratory choices for matrix used in the laboratory control sample are usually limited to an aqueous or solid

matrix, i.e., reagent-grade water or reagent-grade sand. The commission notes that the person should consider the project DQOs to determine when the spiking level in the laboratory control sample needs to be at, or below, the PCL. The commission disagrees with the commentor that these provisions should be removed from the rule. The phrase “clean matrix” has been changed in §350.54(3)(6)(B) to “clean laboratory matrix” for clarification.

Concerning §350.54(f), although no comments were submitted for this subsection, the commission is clarifying that all problems or anomalies which might affect the quality of the data should be identified.

Concerning §350.54(g), although no comments were submitted for this subsection, the commission is clarifying that the term “analytical method” as used in the TRRP rule is intended to include the preparatory method, the analytical method, and any cleanup method performed on the sample.

Concerning §350.54(h)(1), Eastman commented that this paragraph requires the reporting of all data between the MDL and the MQL as estimated with a qualifier. This requirement is in conflict with paragraph 7.4 of Method 8000B of SW-846, which indicates that extrapolation beyond the calibration range for a chromatography method is not appropriate.

Current instrument software, when extrapolating non-linear curves, often gives values that are obviously incorrect solutions, such as negative values or very large values from small ion counts. Reporting such values or using such values to calculate recoveries is inappropriate.

Concerning §350.54(h)(1), TCC/TXOGA commented that a large section was added concerning analytical chemical testing method detection limit. TCC/TXOGA believe this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Our recommendation is that it be placed in guidance and in guidance, the modifications listed below should be made.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: This paragraph requires the reporting of all data between the MDL and the MQL as estimated with a qualifier. This requirement is in conflict with paragraph 7.4 of method 8000B of SW-846, which indicates that extrapolation beyond the calibration range for a chromatography method is not appropriate.

Current instrument software, when extrapolating non-linear curves, often gives values that are obviously incorrect solutions, such as negative values or very large values from small ion counts. Reporting such values or using such values to calculate recoveries is inappropriate. If this requirement is a program-specific requirement, TNRCC needs to justify the need for a requirement that differs from the norm. Recommendation: Guidance should explain justification.

The commission acknowledges the commentor's recommendation. The commission also agrees that the values reported as detected between the MDL and the MQL should not be used to calculate recoveries. The requirements in this section of the rule provide the commission the authority to request data down to the method detection limit, when needed, and in §350.54(h)(3) allows for alternate reporting requirements that would meet the project-specified DQOs. Statistical literature, national standards, the EPA and TNRCC advocate the use of actual uncensored measurements (i.e., estimated concentrations) rather than proxy values in statistical calculations (Gilbert, 1987, *Statistical Methods for Environmental Pollution Monitoring*, American Society for Testing and Materials, ASTM D4210-89 (96), EPA 1998, *Guidance for Data Quality Assessment*; and TNRCC, July 1998, *guidance memorandum on implementation of the existing risk rule*). The commission recognizes that

measurements can be made by the laboratory below the method detection limit, but for the purposes of this rule, data can be "censored" at the method detection limit, unless otherwise requested by the executive director under §350.54(h)(3). The term "censored" is included to mean the action taken by the laboratory to replace a measured value below the method detection limit with an ordinal value. If data were reported using an uncensored approach, the laboratory would report the measurements observed and/or estimated during the analysis or experiment, regardless of the measurement's value or distance from any defined limit, including zero. The commission is considering allowing the person to use uncensored data, as opposed to data censored at the method detection limit. If this approach is deemed viable, the commission will seek stakeholder input to develop guidance. For clarification the rule has been changed. The rule has been changed in §350.54(h)(1) to clarify that detected results for COCs are those results based on analytical responses that meet the qualitative identification criteria recommended in the analytical method used to perform the analysis.

Concerning §350.54(i), Chevron commented that "When reasonably appropriate, the executive director shall require persons to perform confirmation analysis for tentatively identified compounds." Most tentatively identified compounds have no toxicity values, and their significance in environmental media is uncertain. Moreover, confirmation analytical methods may not be available. This requirement is overly restrictive. Change "shall" to "may."

Concerning §350.54(i), Environmental Resources Management commented that the examination in risk analyses of tentatively identified compounds (TICS) for which toxicity data are generally unavailable is unwarranted and costly. TICS and less prevalent constituents chemical of concern (COC) are remediated usually as part of the cleanup of the primary COC. The rules should allow for and encourage the use of indicators when they mathematically constitute over 90% of the estimated risk, a level of certainty significantly greater than analytical precision.

Concerning §350.54(i), TCC/TXOGA commented that a large section was added concerning analytical chemical testing method detection limit. TCC/TXOGA believe this is the type of detail previously removed from the May 15, 1998, proposed rule and that TNRCC previously indicated this information would be placed in guidance. Our recommendation is that it be placed in guidance and in guidance, the modifications listed below should be made.

Recommendation: TCC/TXOGA believe that the prescriptive language in this section should be deleted from the proposed rule and issue addressed in guidance. Below are recommendations on how this section should be addressed in guidance: Identification of TICS - "shall" should be changed to "may". In addition, guidance should be developed to determine when it would be necessary to look at Tentatively Identified Compounds (TICS). Most TICS have no toxicity data, by definition, cannot be accurately identified and are typically remediated in conjunction with COCs. Thus, in many cases, devoting resources to identify and characterize the distribution of TICS is inappropriate and does not contribute to understanding and addressing site risk. Recommendation: Change the word "shall" to "may," and address TICS in guidance.

The commission agrees with the commentors' assessment that most tentatively identified compounds have no toxicity values, and their significance in environmental media is uncertain. However, most of the organic compounds listed in the Tier 1 PCL tables or in 40 CFR Part 264, Appendix IX do have toxicity values. Laboratories do not routinely, nor are they expected to, include all of these organic compounds in their initial calibration curves. This section of the rule allows the commission flexibility to request that tentatively identified compounds be reported to ensure that the commission is aware of the COCs present in a medium. The person responsible for confirming and addressing a tentatively identified compound may, or may not, be the person who reports the compound. The commission intends to limit the library search for tentatively identified compounds is limited to: 1) the organic compounds included in the Tier 1 PCL tables, 2) the organic compounds included in 40 CFR Part 264, Appendix IX that are amenable to detection using gas chromatography/mass

spectrometry and/or high performance liquid chromatography/mass spectrometry, and 3) any specific organic compound identified by the executive director that warrants being included in the search. The commission notes that subsection (i) would be triggered by a commission request. To promote consistency, the commission intends to develop guidance with stakeholder input to guide the person to reasonable circumstances under which the commission would make such a request. Recommendations like those of Environmental Resources Management are best addressed in the guidance.

§350.55. Notification Requirements Pertaining to Off-site Properties and Leased Lands.

Concerning §350.55, Amoco expressed their support of the comments of BP Amoco, Chevron, Conoco, and Fina pertaining to public awareness/notification.

Concerning §350.55, Fulbright & Jaworski commented that in order to substantiate the need for and validity of the proposed rule, the published record should have provided the following information: Information regarding the need for or impact of default driven notice to affected landowners.

The commission notes that the preamble did discuss the facts which lead the rule to contain what the commentor refers to as “default driven notice.” As stated in the proposal preamble, “The commission is proposing that all interest holders be notified because the commission believes that interest holders should be aware of any investigation of conditions potentially affecting them or their property. The commission has no basis to determine which of those parties who have an interest in the property are likely or not likely to frequent the property or to disturb contaminated media.” (These provisions are actually modified in the adopted rule.) The proposal preamble provides additional discussion in this regard which clearly discusses the need for notice. Additionally, the TRRP rule addresses the disparate level of notice currently required across the various agency program areas and established one uniform standard. However, the commission notes that the term interest holders is no longer used in the rule, and the rule has been amended substantially in response to comment.

Concerning §350.55, Fulbright & Jaworski commented that if promulgated, the proposed rule would not meet the goal of facilitating a consistent process of notification to owners of affected land. In part, the TNRCC desires administrative consistency in order to "facilitate a consistent process of notification to owners of affected land." 24 TexReg at 2224. The proposed rule would compel such notification on the basis of default assumptions and requirements rather than on actual need as dictated by site conditions. Specifically, proposed §350.51 would require that site assessment be conducted vertically and laterally until media samples fall below the assessment level. 24 TexReg at 2224. Because this is the most stringent default level calculated pursuant to the rule, its use would result in notification where none is necessary. The use of site-specific data and risk assessment methods in determining the extent of site assessment would result in more appropriate notification requirements.

The commission disagrees with the comment that the rule does not meet the goal of a consistent process of notification. The commission is allowing assessments to appropriate and consistent residential assessment levels off-site and is allowing site-specific data and appropriate risk assessment methods (i.e., the critical PCLs) for on-site investigations. The commission is of the opinion that notice based on consistent standards is consistent although the commission acknowledges that risks may be variable across affected properties. The commission is concerned that potentially harmful exposure could occur for substantial periods if the commission disagrees with the assumptions used in a very site-specific risk evaluation that is not submitted at the time COCs are discovered. Basing notice on risk equivalency is another form of equal notice, but it is not the only or not necessarily the most appropriate basis of equal notice.

Concerning §350.55, Henry, Lowerre, Johnson & Frederick commented that TRRP rules should allow public and local government comment. The proposed rules only require notification to the city clerk or city secretary rather than participation in the remedy selection. The application of the TRRP will allow companies and individuals the ability to leave significant levels of pollutants in our business districts and neighborhoods simply by deed restricting the property. This has the potential to directly impact local property taxes and the ability of a city to promote community redevelopment.

Concerning §350.55, Henry, Lowerre, Johnson & Frederick commented that the rules clearly eliminate to a very significant degree the opportunities for public input on: 1) the risks (including the degree of risk, type of land uses that will be affected in the future, and the willingness of a person to accept the risk), 2) the standard for cleanup and 3) the long term impacts on the community. We support and adopt the comments of EPA on these matters. (See Attachment 2)

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that there must be adequate notification and opportunities for participation for impacted individuals and the general public.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP appears to decrease significantly the number and extent of notices to the public and local governments of contamination. The rules eliminate the requirement for notification for detection of significant conditions of contamination.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented this section limits notification to affected property owners and people who, in the future, will have access to contaminated property. TNRCC's current rules and other state and federal programs require much greater and much more effective notice.

Concerning §350.55, Michelle A. McFaddin commented that land owners living around and adjacent to contaminated facilities will not be being provided with notice or an opportunity to participate in the development of cleanup standards and remediation programs that directly affect our surface property and mineral interests under these revised risk reduction rules.

Concerning §350.55(a), Michelle A. McFaddin commented that owners and operators of active facilities that have contaminated the groundwater in and around their sites should be required to notify affected, neighboring landowners of the existence of contamination under their properties.

Concerning §350.55(a), Mobil commented that it appears that the notification requirements in this proposal when combined with notification and public participation requirements in existing programs could result in duplicative requirements for notification if TRRP were adopted as proposed.

Concerning §350.55(a) Phillips commented that notification requirements in the TRRP should be in concert with existing public participation requirements in the programs that usher entry into the TRRP.

Concerning §350.55, TCC and TXOGA commented that compounding the onerous notification requirements in the rule, with existing public participation requirements in the existing programs will result in an inconsistent application of the TRRP.

Concerning §350.55(a), AFCEE commented that they believe the proposed notice provisions will be unnecessarily burdensome to facilities which are extensive both in physical size and in the nature of the operations and that already have existing notice systems in place.

In response to the Henry, Lowerre, Johnson & Frederick, and Michelle A. McFaddin comments, the commission disagrees that the rule eliminates the opportunities for public input on risks, the standard

for cleanup, or the long term impacts on the community. The commission also disagrees that the rule will not provide notice to those whose surface property is directly affected. The notice provisions clearly require notice to those who own affected property which has been affected above residential assessment levels or where samples are collected, as well as to those who could be exposed to concentrations of COCs in excess of Tier 1 human health PCLs. There is adequate notification and opportunities for participation by landowners, although as discussed elsewhere, the commission acknowledges that persons owning only a mineral interest in the property are not required to receive notice. The commission agrees with the commentor that the rule does not provide a direct mechanism for all interest holders in all situations to participate in the development of cleanup standards and remediation programs. The commission has sought to balance the need for notice and the need for expeditious cleanup. The required notice to landowners, easement holders and lessees who may be exposed along with private remedies available to mineral interest holders will act to protect other interests or concern. However, through the requirements for landowner concurrence in §350.111, landowners have a means to influence the development of cleanup standards and remediation programs to the extent that their property is not restored to residential PCLs. If a person is able to demonstrate technical impracticability or if the property is subject to zoning or governmental ordinances which is equivalent to a deed notice or restrictive covenant that would otherwise be required to exercise some of the flexibility the rule offers, then the landowner may have less indirect control or influence. In fact, the TRRP rule contains more provisions for public input (e.g., the opportunity to comment on requests to vary default exposure frequency and duration as adjacent landowners, local governments, or members of the community) than the current Risk Reduction rule (30 TAC 335). Finally, this rule will not lessen any public participation requirements that are provided through other federal or state statutes or regulations such as the RCRA regulations which specify public participation at specific junctures in the process. In fact, the regulated community expressed concern that the additional notice provisions would further burden the level of notice that they are already obligated to provide.

In response to regulated community comments, the commission disagrees that the notification provisions will result in inconsistent application of the TRRP rule, as the TRRP requirements are very specific and can be clearly distinguished from other potential requirements (e.g., RCRA). Certainly for large facilities which have existing notice systems already in place, the TRRP notice provisions will not present a large burden. The TRRP notice provisions may be conducted in concert with other public participation requirements provided the TRRP notice provisions are satisfied. With two exceptions, amended §350.55(e)(3) and the requirement in subsections (a) and (b) to provide direct notice to the chief clerk or city secretary when providing notice to municipal entities, the TRRP rule does not specify how notice is to be provided. For example, if the person is already conducting a public meeting, then the person could document the information provided and who attended, and structure the meeting to satisfy some if not all of the TRRP notice provisions.

In response to Michelle A. McFaddin's comment regarding notice due to groundwater contamination, the rule clearly requires the assessment to be extended to off-site properties as necessary to identify areas exceeding the residential assessment level. The residential assessment level is at or below the concentration of a COC which is safe for ingestion of the groundwater, and is therefore adequately protective. Thus, the commission disagrees that notice should be provided to off-site persons if COCs at concentrations in excess of residential assessment levels are present in only the on-site groundwater, unless samples are collected on that off-site property, as such notice is unwarranted from a human health protection standpoint. Notification is reserved for those who have property affected above the residential assessment level and those who may be exposed to COCs at levels that are in excess of Tier 1 human health PCLs. The commission notes that the proposed rule and this adopted rule require notice to those who own easements, such as cities. Thus cities will have the opportunity to get information which will indicate the presence or absence of COCs within easements which is in excess of Tier 1 human health PCLs.

Concerning §350.55, Chevron and Campbell, George & Strong commented that they recognize that the common thread among these issues is public awareness/notification. We further recognize the need and support the agency's commitment to adequately inform and seek the participation of the public in managing affected properties under the proposed rule. By raising these as issues of concern, we are not at all suggesting that public notice/participation should be eliminated, only that the timing, extent, and context of notification should be reconsidered. If adopted as presently worded, the rule will impose a heavy burden, with unintended impacts on not only those subject to the rule but many others that are affected directly and/or indirectly.

Concerning §350.55, Chevron and Campbell, George & Strong commented that the commission should adjust the notification requirements applicable to off-site and leased properties to ensure that the method and timing of such notification facilitates effective public input without substantial disruption of the corrective action process. Changes are necessary to focus resources on affected party input and to curtail premature concerns and needless conflict that will hinder the corrective action process. Although the stated purposes of the TRRP notice provisions are laudable, the method and timing of notices appear to be unduly burdensome.

Concerning §350.55(a), Chevron commented that the universe of notice recipients should also be streamlined because there is no compelling reason for providing notice to parties that have no contact or only limited contact with an affected property (e.g. holders of easements or rights-of way and, in some situations, lessees and franchisees).

Concerning §350.55(a), Campbell George & Strong suggested that the commission modify the requirement to notify parties that have limited to no contact with an affected property; as drafted, this provision is overly burdensome on the party required to notify and serves no clear public interest (30 TAC §350.55(a)). As presently drafted, this provision contains a broad requirement regarding notification (including sampling data) for the fee owners of adjacent or leased properties, but also to other persons such as easement holders, lessees and franchisees. These persons have no contact or only limited physical contact with the properties, and as a practical matter will be difficult to identify and locate.

For example, if a groundwater plume extends off-site to a property occupied by a 50-story office building, notification must be provided to all the lessees in that building, regardless of the fact that they will never come into contact with the groundwater. This and other examples are further described in Figure 3. The rule would also require title examinations to determine and notify all potential rights-of-way and easement holders of the off-site properties from which samples were collected. In addition, the notification requirement would encourage premature law suits simply because, once the notification is provided, the statute of limitations for filing a claim arising out of the release of COCs to the property begins to run. Off-site owners and interest holders would have no incentive to await a forthcoming remedy, which may in fact mitigate the basis for the initial notification.

Concerning §350.55(a), Environmental Fuel Systems and ICE commented that under §350.55, regarding notification, what is TNRCC's reasoning for notifying all possible interest-holders (except those with mineral rights)? Some of these parties have no opportunity for exposure to contaminants, or exposure to the possible costs related to the presence of contaminants. Shouldn't this be re-worded to only involve those parties who could have such exposures?

Concerning §350.55 Groundwater Services comments that the scope of this provision is unclear. Is the applicant to disclose all site data from a petrochemical facility to an interest holder in a right-of-way covering a small segment of the facility? Do each of the tenants of a high-rise building need to be notified of a site investigation in the parking lot?

Concerning §350.55, Mobil commented that the notification requirements in the proposed rule appear to be excessive and will place an unnecessary burden on the regulated community with little apparent benefit to public participation.

Concerning §350.55(a), Phillips commented that while Phillips supports public participation in the remediation process, the notification requirements in the proposed TRRP as currently drafted, will place an unnecessary burden on the regulated community with no additional benefit to public.

Concerning §350.55(a), Ranger believes that the current off-site landowner notification requirements of the PST program are sufficient, do not create unnecessary legal fees and litigation, and adequately protect human health and the environment. These guidelines should be considered for usage by the TNRCC in other program areas.

Concerning §350.55(a), TCC and TXOGA requested that the agency create a more systematic notification process that is more reasonable and tied to the potential for human exposure to COCs.

Concerning §350.55(a), TCC and TXOGA commented that while TCC/TXOGA support public participation in the remediation process, the notification requirements in the proposed TRRP as currently drafted, will not result in meaningful communication with the public and will place an unnecessary burden on the regulated community with no additional benefit to the public.

Concerning §350.55(a), TCC and TXOGA commented that notification within the context of this section is to prevent unintended/uninformed exposure by potentially exposed persons, notification requirements should be limited to those potentially exposed. For many such properties, there is no compelling reason for providing notice to parties that have no contact or only limited contact with an affected property. For example, if a groundwater plume extends off-site to a property occupied by a 50-story office building, notification must be provided to all the lessees in that building, even if there is no exposure pathway. The rule would also require title examinations to determine and notify all potential rights-of-way and easement holders of the off-site properties from which samples were collected.

Concerning §350.55, AFCEE commented that the proposed rule requires direct mailed notice of the availability of sample data when samples are taken on off-site property and on on-site property when other interest holders are involved. The rule also requires notice when data indicates that levels of COCs exceed residential assessment levels and when actual human exposure to a COC occurs at levels above the critical PCL level. The rule also requires that information be provided to parties requesting the information within 14 days of the request. Information that must be provided includes all sample data information and historical sample data. Finally, the rule requires that confirmation notice be provided to TNRCC whenever notices to interest holders are required under the rule.

Concerning §350.55(a), AFCEE commented that we are a strong proponent of providing the public with health and safety information. In fact, our installations are required to provide notice to parties under federal law and executive order and already have several mechanisms in place for routinely updating the public on environmental situations and alerting the public when necessary.

One of the fundamental keystones of a risk-based rule (e.g., the TRRP rule) that increases the reliance on exposure prevention and reduces actual pollution cleanup is timely notice of the presence of COCs. However, the commission understands the commentor's concerns that §350.55(a) as proposed may have at times resulted in an unwarranted level of notification, such as in the extreme, but possibly common example of COCs in the groundwater at depth beneath a 50 story high-rise building. However, the commission also acknowledges the earlier comment from Henry, Lowerre, Johnson & Frederick and Michelle A. McFaddin stating that adequate notice must be provided to affected parties and the general public. The commission does not fully agree that the expense of

notification of the general public and attendant delays in actual cleanup is always appropriate. Nevertheless, the commission does continue to take the position that providing notice to property owners is always appropriate and warranted and is maintaining the proposed requirement in the rule that notice be provided to owners of property from which samples have been collected, or when COCs are in excess of residential assessment levels. Owners of property should have a right to know what information has been submitted to the commission for their property as the commission could be making decisions which have direct implications for that property. Several of the regulated community comments expressed general support for providing notice, and in particular to landowners, just as long as it is not excessive and burdensome. To clarify requirements in response to the Groundwater Services comment, the proposed rule did not require a person to notify tenants that a site investigation is going on. The rule is focused on the fact that samples were collected and the results of the investigation.

The commission however, disagrees that easement holders/franchisees as identified in the proposed rule have no opportunity for exposure to contaminants. As commented on by the City of Houston as incorporated by Henry, Lowerre, Johnson & Frederick, their workers do have a real potential for exposure to contaminants on these properties. Such determinations are best made on a site-by-site basis.

The commission disagrees with the commentor's suggestion to use the existing notification requirements of the PST program. The commission intends that notification be required in an equivalent manner across program areas. This could not be achieved if the PST notice provisions are solely relied on for the PST program.

Concerning §350.55(a), Brown McCarroll & Oaks Hartline commented that subsection §350.55(a) addresses the requirement for a person to make sample results available to those who own a fee ownership in the affected property. Brown McCarroll & Oaks Hartline supports TNRCC's clarification that "fee ownership" includes fractional interest holders in the surface rights but not mineral interest owners. They also support the TNRCC's decision to require that information be made available to those with the specified interest in off-site property and leased lands at the time the information is submitted to the TNRCC in a plan or report, rather within a certain number of days.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that the recent changes in the proposed rule to eliminate notice to mineral owners also is not justified. Owners of mineral interest can be determined relatively easily, and they have very valid interests in obtaining notice of activities that could affect their interests.

Concerning §350.55(a), TCC and TXOGA commented with respect to other fee owners in the property, notification should only be required if their fee ownership entitles them to use or occupancy of the property in such a manner that they are likely to be exposed to concentrations of COCs in excess of the critical PCLs.

With regard to property owner, the commission has dropped the term fee ownership from the rule to simplify the rule, but maintains the same interpretation that mineral interest owners are not required to be provided notice and that owners are those whose ownership allows them to use or occupy the property (landowners). However, the commission does not concur with the TCC and TXOGA that ownership is limited to the situation where the property could be used or occupied such that exposure could occur. For example, if the person could occupy the property as owner, but because of ordinances could not legally install a water well which is the only potential for exposure, the commission still intends that the property owner would receive notice unless no samples were collected from that property and COC concentrations on that property are less than residential assessment levels. The fact that the owner cannot legally take an action at the property which could

result in exposure is not a basis to limit or obviate the need to provide notice to the owner of the property. The commission does agree with Michelle A. McFaddin as she commented elsewhere in this section that surface property use must be protected and has full confidence the surface use of the property will be protected. In response to Henry, Lowerre, Johnson & Frederick's comment and Michelle A. McFaddin's comments regarding mineral interests, the commission disagrees that mineral interest holders should be included on the list of parties to receive notice. Mineral interest holders do not generally have sustained, regular contact with affected properties, unless they own the surface rights of the affected property, in which case they would already receive the notice as a landowner. Further, mineral interest holders do have access to agency records and it can be expensive and burdensome to identify all mineral interest holders.

Concerning §350.55(a) Chevron and Campbell, George and Strong commented: We request that the agency create a more systematic notification process, one that is more reasonably tied to the potential for human exposure to COCs. We agree that the landowner should be notified any time samples are collected from his or her property. That notification would include all analytical data and a listing of the critical PCLs.

As to the other parties (e.g., holders of leases, rights-of-way, easements, and franchises), notification should only be provided to these parties if the samples collected from the off-site or leased property exhibit COCs that are greater than the human health PCLs. As the purpose of this provision is to warn these parties so that inadvertent or accidental exposure to COCs does not occur, notification need not occur in instances when the human health PCLs are greater than COCs in the surface soil, groundwater or other environmental media.

Concerning §350.55, Environmental Resources Management commented that the public notification requirements for off-site and leased properties (as outlined in §350.55) should be revised to require notification when a real risk is posed, or when a proposed remedy is a concrete proposal on which to comment.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that if the release of a chemical of concern is off-site, the landowner and any tenants should be notified. The off-site parties should be allowed to make informed decisions regarding these property issues.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that if contamination is potentially off-site, every effort should be made to identify those areas and to notify affected persons directly.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that it is imperative that governmental entities holding street rights-of-way or municipal utility easements be informed as soon as is it known or likely that an easement may have been impacted. Henry, Lowerre, Johnson & Frederick is concerned that under §350.55(a), cities would not be notified of contamination in city rights-of-way.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that the commission should require notice to any governmental body or public utility that maintains or has ownership of a public right-of-way or easement whenever contamination is found to extend, or reasonably could be expected to extend, into such an easement if the levels exceed residential protective levels.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that the rules also leave owners of easements at risk. Without notice of contamination, work done on buried pipelines, electric lines or other utilities can expose people to unacceptable risks of exposure to the contaminants.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that notice to municipalities should be to the city clerk or city secretary rather than to the Planning Board.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented notice is also not adequate to persons leasing properties that are discovered to be contaminated by off site third parties.

Concerning §350.55 Henry, Lowerre, Johnson & Frederick included as a part of his comments a copy of the statement that Charles Lesniak, Watershed Protection Department, City of Austin made on HB 1953 during the recent Texas Legislative Session. His testimony states in part that: "The proposed Texas Risk Reduction Rules do not include public or local government. This bill would increase the level of public and local government involvement in environmental cleanups that can effect an area for decades. The City of Austin supports the effort to make the public and municipalities a part of this process. This legislation would improve this situation by providing an opportunity for us to be involved in the process, making it easier to identify these areas of contamination left behind by the Risk Reduction process earlier and recover costs from parties responsible for contamination".

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that since TNRCC began using various forms of Risk Reduction methods in cleanups, the City of Austin has had a number of construction projects encounter unanticipated contaminated soil or groundwater. This has resulted in major financial impacts and long construction delays.

Concerning §350.55(a), KOCH commented that the proposed rule states that "innocent" landowners must be notified if samples are collected off-site or if it is more likely than not that COCs have migrated off-site above residential levels. This notification must be made to property owners, lessees, franchisees, holders of easements or rights-of-way, full or fractional interest holders, and municipal entities. For many sites, it is very unlikely that all of these off-site entities will be exposed to COCs. This proposed notification requirement should only have to be made to the property owner or municipality.

Concerning §350.55, KOCH commented that the proposed TRRP rule states that property owners, lessees, franchisees, holders of easements or rights-of-way, full or fractional interest holders, and municipal entities shall be notified when a person collects samples from adjacent property. A person is also required to notify these numerous entities if they believe it is more likely than not that COCs exceeding residential levels are on the adjacent property. This very broad notification requirement is excessively lengthy and not consistent with protecting human health or the environment.

A person should only have to notify the property owner or, in certain situations, the municipality. Most of these other entities could have no or very limited contact with the COCs in environmental media at the property. Without exposure to COCs there is no compelling reason to notify all of these other entities. It should also be noted that only the adjacent property owner has to be contacted when a person requests a variance for an exposure factor (§350.74(j)(2)(E)(i)). Other entities (e.g., local municipality planning board, local taxing authority, mayor and health authorities, county judge and county health authority, the commission's Public Interest Council, and others requesting the notice) are also notified, but this is apparently done to satisfy other unspecified requirements not related to COC exposure.

Concerning §350.55 Mobil commented that section would require easement, right-of-way, and non-resident leaseholders, to receive all notifications, although there is little risk of exposure to these people. It is Mobil's belief that notification requirements should apply to persons with exposure potential or are owners of the property.

Concerning §350.55(a) AFCEE comments that the property holder's interest also has been defined too broadly by TNRCC. This will result in over-notification to interest holders who will have little interest in the sample information. For example, when samples are taken on property containing a high rise building,

under this provision every tenant in the building will receive the notice of availability. As another example, if samples are taken due to a small release on the southern end of a ten acre site, and there is a utility line, railroad track, access easement, etc., running across the northern tip of the site, this provision would require notice to each of those interest holders. The rule should be restructured such that only potentially affected property owners and key interest holders are provided with notice. In the case of the high rise building example cited above, notice should be provided to the landlord and the landlord should be left with the decision of whether additional notice needs to be provided to the tenants.

The proposed notice requirement is also too broad in that it requires notice to off-site interest holders other than fee holders of the property. This raises two issues of concern. First, while finding the fee title holder to the property is simply a matter of reviewing the county property records, finding the other interest holders of property not owned by the responding person could be a laborious and time consuming task with uncertain results. Second, notifying the leaseholder of sample collection or potential contamination on property owned by others will invite potential conflict between the lessee and lessor, franchisee and franchiser, etc. The decision whether to notify other property interest holders should be left to the fee owner.

For many of the reasons provided by the regulated community, such as the cost and time to identify and locate many parties who may not be readily apparent or exposed to the COCs, the commission has amended the rule to require notice to parties other than the landowner when there is a risk-based/exposure-based reason for doing so. To require notice for other than risk-based/exposure-based reasons may subject the person actually trying to take effective action to address COCs to time delays and additional expenses which could have been better used to address the COCs. The commission acknowledges the specific concerns raised by Henry, Lowerre, Johnson & Frederick, and Michelle A. McFaddin that persons who may be exposed to COCs, such as municipalities, other units of local governments and entities who may have workers on the affected property (e.g., utility workers), lessees, tenants, and off-site landowners. The commission takes the position that it is important to provide notice to these persons when they could become exposed to what may be unprotective levels of COCs and as noted by KOCH and Mobil, the proposed rule required such notice. Therefore, with regard to who should receive notice, the rule has been amended in two respects. First, the commission disagrees that the rule as proposed would require easement, right-of-way, and non-resident leaseholders to receive all notifications; however, to clarify, the rule has been amended to require current easement holders/franchisees to receive the required notice when samples which have been collected from those easement/franchise areas demonstrate that the concentration of a COC is in excess of Tier 1 human health PCLs. Second, the rule is also amended such that other persons such as lessees and tenants are no longer addressed under this subsection, but are now addressed in also amended subsection (e) which addresses Henry, Lowerre, Johnson & Frederick's concern about notice being provided to persons leasing property affected by COCs from an off-site third-party source.

The commission is convinced that this amended level of notice will provide current easement holders/franchisees with sufficient information to anticipate and suitably prepare for the presence of COCs, the concern raised by Henry, Lowerre, Johnson, & Frederick's City of Austin matters. The commission has also focused on *current* easement holders/franchisees to avoid levels of work to identify past holders and to reinforce that as holders change, those new parties would then require notice. The commission also points out for the benefit of Henry, Lowerre, Johnson & Frederick that the commission has maintained the proposed provision in the rules that the required notices of availability shall be made to the chief clerk or the city secretary for municipal entities. Also, to clarify for Henry, Lowerre, Johnson & Frederick all notices required under §350.55 are equally applicable to both on-site and off-site properties.

The commission disagrees with the statement that notification should only be required when “a real risk is posed.” The rule notice provisions are such that the person receiving notice gets to determine what constitutes “a real risk” and is allowed to decide if they want further information. The commission does not intend to preclude potentially affected parties from having all the information which the agency has when it makes decisions concerning the protection of human health and the environment. In regards to making the information available “when a proposed remedy is a concrete proposal on which to comment,” the commission notes that persons may do so if they desire. However, the requirement is to make the information available no later than at the time of submission of a plan and/or report for executive director review which contains this same information. This allows persons to provide the information the same time that an affected property assessment report and response action plan is submitted under Remedy Standard B. Further responses to comments regarding the timing of notice are provided elsewhere in responses to comments on §350.55(a).

KOCH’s suggestion that only property owners or in certain situations, the municipality should be notified is vague as to when municipalities should be notified and does not recognize that others (e.g., those with easements or franchisees) may be exposed to COCs. The commission is retaining the requirements to notify these others who could also be exposed.

The commission disagrees with the AFCEE example of a small release on the southern end of a ten acre site and a utility line, railroad track, etc. on the northern end of the site requiring notice to interest holders on the northern end of the site. In the example provided, a small release on the southern end of the site should not result in sample collection on the northern end of the site. If it is necessary to collect samples in this area to define the extent of the COCs, then it is appropriate to provide this information to the applicable parties. The commission disagrees with the commentor that only potentially affected property owners and key interest holders should receive information about the potential presence of COCs on property to which they have legal access. The landowner should not be placed in a position of having the burden to notify tenants when another person is responsible for the COCs. A rule which relies more upon exposure prevention and less pollution cleanup must have adequate notice provisions to be protective. However, the commission does agree that notice to tenants can be handled best based upon an actual or probable exposure to COCs, and has shifted such notice requirements to subsection (e) of this section.

The commission also disagrees with the AFCEE that the decision to provide information on sample collection activities to interest holders (e.g., easement holder, franchisee, etc.) should be left to the owner. The commission agrees with the AFCEE that the proposed rule may have at times resulted in an unwarranted breadth of notice, and has amended to rule focus more on exposure potential as the basis for providing notice to interest holders. However, the commission notes that interest holders (e.g., those with an easement, franchise or right-of-way) do have legal access to the subject property and may be at risk to exposure as is noted by other commentors. If they are at risk of exposure, then it is appropriate that they be noticed. Further, there is no basis for making any distinction between on-site or off-site notice when relying upon exposure prevention.

Concerning §350.55(a), Brown McCarroll & Oaks Hartline commented that they support TNRCC's decision to require that information be made available to those with the specified interest in off-site property and leased land at the time the information is submitted to the TNRCC in a plan or report, rather than within a certain number of days.

Concerning §350.55(a) Campbell, George & Strong commented that for instances where the COCs are greater than the human health PCLs, notification to these parties should only be provided when there are complete or reasonably anticipated to be complete exposure pathways. To accomplish this, we propose two notice options: (1) provide notice to only those parties that might reasonably come into contact with COCs in surface soils, groundwater, or other environmental media. The person would make this

determination based upon the exposure pathway analysis done as part of the Affected Property Assessment and provide the executive director with a listing of those parties notified; or (2) provide notification by the way of visible signage or markings at or in the vicinity of the PCL exceedence area zone. The signage or markings must inform the public or other parties who potentially come into contact with the COCs (e.g. utility workers).

If either of these approaches were to be employed in the office building example, the incongruous requirement to notify all the tenants in the building would be avoided because there is no reason to believe that the tenants would ever come into contact with the groundwater. However, the affected property owner would still be obligated to notify, either directly or through the use of signage or markings, other parties such as municipal workers digging up a sewer line in the vicinity of the building so that they are not inadvertently exposed to COCs.

Concerning §350.55(a) Chevron commented that direct noticing too many people may also result in premature law suits by triggering statutes of limitation and placing "due diligence" burdens on the notice recipients, resulting in duplicative investigations that may well be obviated by future remediation. Chevron suggests specific revisions to the method of notice to ensure that public participation remains meaningful without substantial disruption of the corrective action process. For example, direct notification could be limited to the landowner. Signs or markings at the affected property could provide adequate notification to other parties and interest holders that may come into contact with the COCs (e.g. utility workers). Alternatively, the process might require actual or potentially complete exposure pathways to be identified so a notification list could be developed based on potential exposure to COCs.

Concerning §350.55(a), Chevron commented that the method of notice should ensure that the information provided and the universe of recipients will add value to the corrective action process. The content of notices and distributed information should ensure that recipients will not be overwhelmed by preliminary data, confused by laboratory reports, and otherwise alarmed by misunderstood information.

Concerning §350.55(a) Henry, Lowerre, Johnson & Frederick strongly encourages TNRCC to require direct notification of potentially affected landowners and tenants, as well as newspaper notifications to the general public.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick recommend that direct notification to affected landowners and tenants be required rather than notification only through newspaper notice.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that the commission may wish to consider including a requirement that the facility provide in the public notification the appropriate regulatory program's mailing address and telephone number.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented some representatives of the regulated industries argue that repeated notification about contamination and the responses to the contamination only confuses the public and is not needed. They argue that the number and type of public notifications (including those to local governments) should be very limited and much less often than required in the current rules. They argue that ongoing notifications might alarm or confuse interested parties. The argument underestimates the intelligence of the public. The argument makes the assumptions: 1) that the public is not intelligent, 2) that the notice of an environmental finding or proposed action cannot be made in plain language, and 3) that affected persons do not have access to experts who can assist them. All three assumptions are wrong in many cases. The rules should recognize that there are many cases, like Kelly Air Force Base, where the local landowners have experts and want to participate in decisions that affect the future uses of their lands. We believe that it is important that effected parties have the opportunity to review the information as it becomes available so that they can gain a full understanding of the facts and risks.

Concerning §350.55(a) Henry, Lowerre, Johnson & Frederick commented that if PCLs are exceeded, notification should be within 15 days.

Concerning §350.55, PIC comments that they would further urge that the rule prescribe the format of the required notice, rather than relegating this issue to guidance. The importance of public notice in this situation should be emphasized. The PIC appreciates that the agency's prior drafts of this rule were criticized by some segments of the regulated community as being too prescriptive. However, for the same reasons that this notice is required to begin with, this notice should be prescriptive. As noted in other sections of the preamble, the commission has a goal of "consistent health-based notification to landowners." If a uniform notice is not required which ensures that pertinent information is laid out in a comprehensible format concerning the results of the assessment and the various parties' rights and responsibilities concerning access to further information, the goal of consistent notice is undermined. The need for a prescribed, uniform, notice format is even more compelling in instances where an actual exposure exists, as contemplated under §350.55(e).

Concerning §350.55(a), AFCEE comments that technical and analytical information will also be confusing to many property owners. For example, under the proposed rule a responding party will provide a notice of availability to a typical homeowner when the first report containing the sample information is provided to the TNRCC. It is not unlikely that many property owners will request the information. If the homeowner requests the information, within 14 days the homeowner will receive anywhere from several pages to several volumes of field report logs, chain of custody information, lab reports, QA/QC data, and other information related to the samples, along with the critical PCL values for the applicable land use classification. This requirement is more likely to confuse and raise anxiety than it will meaningfully inform the homeowner. As a practical matter this requirement will waste untold reams of paper by providing many copies of technical documents to parties who will not understand the information.

Under the TNRCC rule there is also no standard for how this information is presented to the requestor, and it will likely arrive as a package of raw information. Note that the TNRCC staff would not accept information provided in this raw format, but instead expects professional reports that provide background information, assessment protocol, etc., so that the staff can properly evaluate the information presented to them. The breadth and timing of the notice requirement does not afford a realistic opportunity for the information in question to be distributed to the public in the same understandable format. It is likewise unreasonable to set a requirement that information be provided to the average homeowner in a format that would not be acceptable to the TNRCC.

Concerning §350.55, Weston commented that it is unclear throughout this section whether the requirement is to provide a "Notice of Availability" of certain data, and provide the data on request, or to provide the data initially.

With regard to these comments regarding the method of notice, the commission points out that the proposed rule did not state how notice had to be provided. The rule in §350.55(f) only listed copies of letters as an example of what may constitute proof of providing notice. However, the commission does acknowledge that discussion in the draft RIA referenced postage and letters. In response to Weston's comment, the proposed rule required only that a notice of availability be provided initially. The commission is retaining this provision. Only if the person receives a written request for further information, does the person need to provide the data. The commission is not prescribing the method by which notice is to be provided, except in the instance of providing notice to a municipality entity in which case notice must be directly provided to the chief clerk or city secretary and in the case of newly amended §350.55(e)(3). The performance requirement is simply that the notice be effective in meeting the requirements of the rule. So, in response to CSG, the commission will accept the use of signs and the commission has added new performance criteria to §350.55(d) regarding the use of

signs. The commission disagrees with Henry, Lowerre, Johnson & Frederick that the rule should specify or require notice to be provided by a specific method. Because of the vast differences in the characteristics of affected properties that will be regulated under these provisions, the commission has determined that it is best to allow all effective options in order that the person can determine the best balance of effectiveness and cost.

In response to the PIC, the commission attempted to develop a notice form suitable to accurately communicate the necessary information. It is not included in the rule because it was not possible to create a form that is suitable for all occasions. Placing such a form in the rule will effectively make it impossible to modify as necessary and appropriate to accommodate certain site-specific situations. Alternatively, a form will be placed in guidance and the commission will encourage persons to use the standardized form but allow modifications as necessary and appropriate. The commission also notes that the rule states the minimum information that must be included in the form. However, in response to this comment the commission amends subsections (d) and (e) to allow the executive director to require that information which documents notice was completed and to verify its sufficiency, and where it is not sufficient, re-notification in an acceptable form will be mandated. The commission also points out the sufficiency of notice carries the expectation that the method of notice would be in English, or other language, such as Spanish, which is appropriate for the community or individual.

The commission agrees with Henry, Lowerre, Johnson & Frederick that the public is capable of assessing the information required to be made available under the rule and that as necessary, expert advice can be obtained. The commission also agrees with Chevron and the AFCEE that recipients should not be overwhelmed by preliminary data, confused by laboratory reports, and otherwise alarmed by misunderstood information. However, the commission disagrees that the rule requires the persons requesting the information to receive volumes of field report logs, chain of custody information, lab reports, QA/QC data, and other information related to the samples. The proposed rule specifically stated what information was to be made available, "The information made available shall include at a minimum, all analytical results from the sample analyses along with the critical PCL values for the applicable land use classification . . ." It should be noted, that this section sets the minimum information that must be made available and that persons may submit additional factual information as they desire. It is up to the person conducting the applicable notice activities to do so in a manner which will not result in the situations the commentor lists. The commission has confidence that the persons responding to the rule have an adequate knowledge of the risk-based process such that they can clearly communicate the facts to the appropriate parties.

With regard to the timing of notice, the commission has determined that the timing of the notice of availability of information under §350.55(a) is most appropriately made at the time that same information is provided to the commission. Accordingly, the commission adopts the rule as proposed regarding the timing of this aspect of notice. The commission disagrees with the AFCEE that the breadth and timing of the notice requirement does not afford a realistic opportunity for the information to be distributed in an understandable format. The commission concludes that this breadth and timing of providing notice affords a realistic opportunity for the information to be distributed and is appropriate for several reasons. First, the commission agrees that the proposed breadth may have at times been unwarranted, but notes that the breadth of notice has been focused on exposure potential under the adopted rule. Therefore, the default breadth of notice has now been reduced to an appropriate scale. Second, the commission agrees with Chevron, Environmental Resources Management in their earlier listed comment about concrete proposals, and the AFCEE that sufficient time should be provided to ensure the information is conveyed in as clearly and accurately a manner as possible. However, as proposed and adopted, the person should have ample time to prepare the information. Obviously, if the person has adequate time to prepare a plan and/or report for executive director review, then they have had time to prepare the required material for

submission to the applicable parties. Third, more timely notice, such as the 15 day recommendation provided by Henry, Lowerre, Johnson & Frederick is not warranted. Such short fuse notice is typically warranted only when there is an actual or probable, as opposed to a potential, exposure concern. The commission has specifically set forth requirements for providing notice in exposure situations under subsection (e), and therefore the commission sees no need to mandate a set timeline for providing notice other than as adopted.

The commission disagrees with Henry, Lowerre, Johnson & Frederick that a requirement that the facility provide in the public notification the appropriate regulatory program's mailing address and telephone number should be in the rule. There may be instances where notice is provided quickly to the party potentially exposed and the executive director at the same time. In this instance, the person should be directed to contact the person providing notice as they will have the most important information. The commission does note that the person providing notice may include this information but does not wish to make this a mandatory requirement.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented they would prefer to see assessments carried out to background levels of contaminants. We would also prefer to see notice given to affected property owners when contamination is detected above background levels, rather than when results are above the protective concentration levels as proposed. We believe that individual property owners have a right to know when contaminants above background levels have been placed on their property.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick recommend that TNRCC required the facility to provide complete results of any off-site samples to the landowner and any tenants, along with the PCLs and the basis for the PCLs, regardless of whether the PCLs are exceeded. Henry, Lowerre, Johnson & Frederick believes the public is entitled to be fully informed of potential impacts to their property.

Concerning §350.55(a), Henry, Lowerre, Johnson & Frederick commented that they note that the rule does allow parties to request all test results, but we would like to see the affirmative obligation of the responsible party to provide results expanded to include those situations where off-site testing documents levels above background.

Concerning §350.55, PIC commented that they would prefer to see assessments carried out to background levels of contaminants. We would also prefer to see notice given to affected property owners when contamination is detected above background levels, rather than when results are above the protective concentration levels. We believe that individual property owners have a right to know when contaminants above background levels have been placed on their property. With this information, such property owners would be allowed to make their own decisions concerning whether they are comfortable with the levels of contaminants discovered and whether they may wish to take action based on this information -- realizing that the levels have been deemed adequately protective by the state. We note that the rule does allow parties to request all test results, but we would like to see the affirmative obligation of the responsible party to provide results expanded to include those situations where off-site testing documents levels above background.

Concerning §350.55(a), AFCEE commented that this section requires that when samples are collected "all information related to those samples, and any samples subsequently collected from that property" be made available to property interest holders. This provision is an unnecessary intrusion into the business negotiations of parties involved in the sample collection. A responsible person should not be able to take samples on the property of another without obtaining permission to enter the property and to take samples. Such action would expose the responsible person to allegations of trespass, theft, and possibly slander of title. As part of any agreement to provide access, a property owner may require copies of all sample analyses, reports, etc., as a condition of providing access. Further, if the property interest holder is a

lessee, franchisee, etc., the duty and decision of whether to provide information on sample collection activities should be left to that property owner.

Concerning §350.55(a), AFCEE requested eliminate this provision since sample collection should not be a trigger for providing notice.

Despite AFCEE's recommendations to the contrary, the commission has maintained the collection of samples from a property as the "trigger" for notification to the property owner. The commission has earlier responded to the AFCEE's comments regarding the breadth of notice regarding interest holders. Notwithstanding those responses, the commission takes the position that persons should be provided an opportunity to access the information for their property that will be submitted to the commission. The commission agrees that a responsible person should be able to take samples on the property of another only with permission to enter the property and take samples, and that providing the results to the person may be typically arranged by contract. However, the commission is concerned that this is exactly what may not occur. In order to ensure that the owner does have the opportunity to acquire this information, the commission is retaining this important provision in the rule. To this end, the commission does not agree with the AFCEE recommendation to eliminate sample collection as a trigger for notice to persons who are most likely to be exposed (i.e., owners, and easement holders/franchisees and lessees when COCs exceed Tier 1 human health PCLs in those easement/franchisee areas) and maintains such a trigger in the rule.

In response to Henry, Lowerre, Johnson & Frederick's and the PIC's request for the notice to required at concentrations above background, the commission has chosen to require that notification be tied to the assessment requirements. The Public Interest Council's concern regarding the level of assessment is best addressed under §350.51. However, in response to this comment, the assessment requirements are adequate to identify areas on off-site properties with COCs in excess of residential PCLs, and as such, meets the mandates of the commission to protect human health. Therefore, §350.51 and this section have not been amended to link assessment or notice requirements to background COC concentrations. However, if a person collects samples from a property under this Chapter, then that property owner does get to obtain the same information pertaining to those samples that is submitted to the commission. If the information is not submitted to the commission, then the person must rely on private sector resolution of the matter. The commission notes the rule provisions in §350.2(a) which states: "Additionally, no person shall submit information to the executive director or to parties who are required to be provided information under this Chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information." Therefore, accountability is placed on the person to comply with all notice requirements with integrity and in an appropriately comprehensive manner.

Consequently, in certain situations, persons may be providing information to owners of property where samples were collected which will document levels of COCs in excess of background, but at concentrations less than Tier 1 human health PCLs. The person is still also required to provide the critical PCLs for the applicable land use as part of the notice. If the person does not otherwise provide the derivation of the PCLs to the landowner or current easement holders/franchisees, such information will be on file at the agency's Central Office in Austin and available to the public unless it has not been submitted to the commission. In response to Henry, Lowerre, Johnson & Frederick's comments regarding notice to tenants, the principal requirements for providing notice to tenants are now concentrated in subsection (e). Under subsection (e) tenants, as well as others, will receive notice any time it is determined that they are actually or probably exposed to COCs which exceed the Tier 1 human health PCLs. The commission determined that reliance on Tier 1 human health PCLs ensures the most consistent and timely basis for notice.

Concerning §350.55(a) AFCEE comments that the standard set by this provision is also vague since the phrase "all information" does not define or limit what information might be "related" to the samples. For example, this requirement could be defined so broadly as to include unverified data, draft reports, or even a responding party's internal memoranda or confidential information concerning its investigation to determine the source of the release. This would be contrary to policies that encourage facilities to perform internal investigations and audits to help prevent reoccurrence of the events causing the release. Along a similar vein, this requirement could also erode existing privileges recognized by existing law. For example, if an attorney hires a consulting expert to take samples on a client's property, this proposed TRRP notice provision could be interpreted to require that such samples and all related information be provided to the tenants, lessees, etc., who might have an interest in the property. Under state and federal law this information would be protected from discovery under the attorney client and attorney work product privileges. A more practical standard would be to make the same information available to property owners that would otherwise be submitted and available to TNRCC. TNRCC has a statutory duty to evaluate the investigation and assessment of environmental releases. However, it does not impose a requirement that "all information" be provided to the staff. Instead, TNRCC requires submittal of the information necessary for TNRCC's technical staff to make an informed evaluation of the situation.

The commission does concur with AFCEE that the proposed rule requirement that persons are to provide "all information" related to those samples is vague and potentially problematic and has amended the rule to clarify that analytical results related to the samples which is provided to the executive director is required to be made available to the persons requesting such information. Subsection (a) further specifies the minimum information which must be made available.

Concerning §350.55(a), Campbell, George & Strong suggested that the commission delete notification to parties other than the landowner for exceedances of ecological PCLs (30 TAC §350.55(a)). Section 350.55(a) goes on to require notice to the same group of persons and interest holders mentioned above when information becomes available regarding exceedances of ecological PCLs. Since the purported purpose of the notification provision is to make people who use or might use the affected property aware of the existence chemicals on the property, what purpose is served by providing these same people with notice of exceedances of ecological PCLs? Notification to persons other than the landowner where sampling and analysis is conducted for ecological purposes should be eliminated from the rule.

Concerning §350.55, Region 6 commented that subsection §350.55(a). In not requiring that both the human health and ecological risk-based evaluation be submitted concurrently, the rule gives the appearance that ecological protection is of secondary importance. Ecological resources should be given equal protection.

Concerning §350.55 KOCH comments that for sites with a complete ecological exposure pathway, what is the purpose of providing human health PCLs to the adjacent property owner? A person should be able to wait until the ecological risk assessment is approved before having to notify adjacent property owners. This proposed requirement assumes that COCs on the adjacent property trigger an ecological risk assessment.

Concerning §350.55(a), TCC and TXOGA commented that although we believe that notification should be based solely on the critical human health criteria, if the agency intends to require notification based on ecological PCLs, it should be restricted to the landowner only.

With regard to ecological PCLs the commission disagrees with the Campbell, George & Strong, TCC and TXOGA, that only landowners should be provided ecological PCLs if ecological PCLs are developed. However, the commission agrees that it makes sense to limit this information to landowners and tenants. It is important to provide this information to tenants (leaseholders), as they may also have or own ecological receptors on the property. The commission does not believe that the

“high rise” scenario mentioned in earlier comments should be much of a factor for ecological concerns as such site conditions would not likely be suitable habitat/areas and would generally be excluded from further consideration following evaluation under the Tier 1 Exclusion Criteria Checklist. The commission has amended the rule in response to comment to restrict notice to the owner of each property where exceeded and to leaseholders.

With regard to the basis of notice and timing of notice for ecological concerns, Region 6 and KOCH raised concerns. In response to KOCH, the rule sets forward different bases for notice. Any time samples are collected from a property, the rule requires a notice of availability of information and critical PCLs to be provided to the property owner. Human health PCLs are always part of the critical PCL evaluation in order that persons may have a context within which to evaluate the sample results with regard to human health. These could be Tier 1, 2, or 3 PCLs. If ecological exposure pathways are complete and final ecological PCLs are developed under Tier 2 or 3 of the ecological PCL development process, and the ecological PCLs are the driver, then the ecological PCL would ultimately become the critical PCL. The commission sees no basis to await providing information that pertains to human health matters because an ecological PCL evaluation has not been completed. Property owners will still want a human health protection context. However, the commission is concerned that because preliminary ecological PCLs may be developed as one works through Tiers 2 and 3, that persons might misinterpret the rule such that development of any preliminary PCL could trigger notice. That is not the commission’s intent. In order to clarify the commission’s intent in this regard, the commission has further amended the rule to tie notice to the *final* ecological PCLs that have been approved by the executive director as the basis for remedial decisions. The commission also points out that the person does not need to provide notice for ecological purposes unless the approved final ecological PCL is the critical PCL for a property. In that case, the person would need to provide updated critical PCLs to the owner and leaseholder for the property where the ecological PCLs are the critical PCLs. Therefore, for some individual portions within an affected property critical PCLs may be based on a human health driver whereas critical PCLs for other individual properties within the same affected property may be based on an ecological driver. Until the final ecological PCL is approved by the executive director, the person is not required to provide notice based on ecological concerns. Also in response to KOCH’s comment that the proposed requirements assume an ecological risk assessment is triggered because COCs are present on an adjacent property, the commission agrees that an ecological risk assessment may not be required. However, a release of COCs does trigger at least a Tier 1 ecological evaluation for the affected property which could be on-site or off-site. If the evaluation stops at Tier 1, then the commission agrees that no ecological risk assessment was performed. The proposed rule is correct in referencing an Ecological Risk Assessment as that is how ecological PCLs are established.

In response to Region 6’s concern about the timing and relative importance of ecological evaluations as it relates to concurrent submission of ecological PCLs and human health PCLs, the commission notes the concern but emphasizes that ecological receptors are provided appropriate protection and that the relative timing of the development of the PCLs is not important, as the person must determine the critical PCL which is the lowest of either the human health PCL or ecological PCL. Ecological PCL evaluations are not as straight forward as human health PCL evaluations. Due to potential time delay to establish ecological PCLs, the commission is requiring more timely notice of the availability of critical PCLs based on human health considerations. This is not to imply that the commission somehow does not place importance on ecological protection, but it is just a matter of real world circumstance. Further, the commission is perplexed at the inference on the part of the Region 6 that the commission is not placing importance on ecological protection as it is the commission and not Region 6 that is adopting corrective action regulations which lay out a framework for rendering affected sites ecologically protective.

The commission has added these same notice provisions regarding the ecological exposure pathway to §350.55(b) in order to avoid confusion, as the same basis for notification would exist under subsection (b) as it would for subsection (a).

Concerning §350.55(a), Brown Carls & Mitchell questioned how do the notification requirements of this section apply in the VCP, which has its own notification requirements? Brown Carls & Mitchell believes that the TRRP public notification rules should supercede the VCP public notification rule at 30 TAC, §333.11, and that the public notice rules at §333.11 should be withdrawn.

Concerning §350.55, Environmental Resources Management commented that the proposed notification requirements under §350.55 will disrupt the corrective action process and discourage many from voluntary cleanups for fear of unwarranted lawsuits and tort claims.

The commission clarifies that the provisions of §350.55 do apply to the Voluntary Cleanup Program (VCP) and that through a companion rule change the existing notice provisions of the VCP rules are withdrawn. The commission disagrees with Environmental Resources Management that the notification process will disrupt the corrective action process and discourage many from voluntary cleanups. In fact, the TRRP rule's notice provisions are less stringent than the current notice provisions VCP rule, which will be replaced by the TRRP notice provisions.

Concerning §350.55(b), Henry, Lowerre, Johnson & Frederick believes that the duty to notify should not turn on submission of this information, but rather should be required whenever a party receives the information.

The commission disagrees with the commentor and notes that persons may have protection under state law, which limit requirements to provide to others some environmental information collected for specific purposes (e.g., environmental audits).

Concerning §350.55(b), AFCEE is concerned with this section are the same as those expressed above for subsection (a). Namely, "all information" is a vague and overly broad standard, even the minimal required information will be confusing to the average property owner, and the property ownership criteria is overly broad. The AFCEE's proposals for addressing these concerns are the same as proposed for subsection (a).

The commission notes that there is no reference to "all information" in this subsection and that the property ownership criteria is changed to match the revision discussed earlier in regard to subsection (a). Additionally in response to this commentor and the fact that the comments received for subsection (a) are equally applicable to subsection (b), subsection (b) was amended to conform with the changes to subsection (a). In regard to the comments received on subsection (b) requesting the timing and breadth of notice to be revised so that information can realistically be made available, the commission refers the reader to the discussion of subsection (a). Further to define the breadth of notice and clarify some vagueness in the proposed rule, the commission added the example of COC distribution maps as an illustration of what might constitute the "other information" that triggers notification under subsection (b).

Concerning §350.55(b), AFCEE recommends revising the timing and breadth of this section so the information can realistically be made available to the landowner in the same format provided to the TNRCC.

The commission disagrees with the commentor's assertion that information cannot be made available to the applicable parties in the same format provided to the executive director. In fact, persons can provide copies of the same information provided to the executive director to satisfy this subsection as

well as subsections (a) and (c). The commission refers the reader to this same subject matter under subsection (a) as the response is the same.

Concerning §350.55(c), Strasburger & Price commented that to clarify what historical information is to be provided, we suggest that this provision be rewritten to provide: "The person shall provide notice of the availability of historical information (i.e., actual sampling and analysis data collected on the property described in subsection (a) of this section prior to these rules being applicable to that property) . . . "

The commission agrees with the commentor's suggestion for the reason stated and is making the recommended rule change.

Concerning §350.55(c), Brown McCarroll & Oaks Hartline commented that this subsection requires that certain historical information be provided to persons with a fee ownership in off-site properties or leased land. Brown McCarroll & Oaks Hartline supports TNRCC's revision to this provision which clarifies the type of historical information to be made available.

Concerning §350.55(c), Chevron and Campbell, George & Strong recommends modifying the requirement to provide historical information pursuant to §350.55(c) to only that information that was collected by the party making the notification (30 TAC ,§350.55(c)).

Concerning §350.55(c), Environmental Fuel Systems and ICE commented that in paragraph (c) of this section, does this imply that the person has control of the historical information? Does it also assume that the validity of the information is good, or may be presumed to be?

Concerning §350.55(c), TCC and TXOGA commented that the rule language should be changed to read that only the historical information (i.e. actual sampling and analysis data) collected by the person be subject to the Notice of Available requirement. The person should not be required to provide notice for data collected by other public or private parties.

The commission disagrees with the commentors and notes that if the person submits the data to the commission, regardless of who collected the data, then this information is a part of the public record unless confidential by law. Submitting this information to the commission and to the requestor does not necessary imply that the person has control over the collection or validity of the data. If the person asserts that they are not responsible for the collection or accuracy of the data, this clarification should be provided to both the commission and all persons requesting a copy of this information.

Concerning §350.55(c), AFCEE's concerns with this section are similar to those expressed above for subsection (a). In addition this provision imposes a duty to provide additional historical information that may have little or no relevance to the assessment and evaluation of potential risk to the landowner. This provision may encourage requests for historical information for no other reason than a fishing expedition for records for potential lawsuits. The AFCEE's proposals for addressing these concerns are similar to those proposed for subsection (a).

The commission disagrees that the rule requires historical information that may have little or no relevance to the assessment and evaluation of potential risk to be made available. Further, the commission clarifies that the rule only requires "historical" information be made available that is submitted for review to the executive director. Any information that is submitted to the executive director for use in decision making on these properties should also be available to the public, specifically those with legal access to these areas.

Concerning §350.55(c), AFCEE commented to revise the section to provide the requesters with only that historical information required to be provided to the TNRCC.

The commission notes that this subsection only pertains to information which is included in a plan and/or report submitted to the executive director for review under these rules which includes this same historical information.

Concerning §350.55(c), Weston commented that the requirement to provide notice of the availability of historical information should only be required of a responsible party or the party collecting the data. For instance, a new property owner that is obtaining an IOP should not be required to submit a notice of availability for information that they were not responsible for collecting.

The commission notes that the TRRP rules are not applicable to the Innocent Owner or Operator Program for affected property assessments or notification requirements.

§350.55(d)

Concerning §350.55(d), Brown McCarroll & Oaks Hartline commented that TRRP sets out the time frame for providing information requested by persons with a fee ownership in off-site property or leased land. Brown McCarroll & Oaks Hartline supports TNRCC's revision of this provision to allow 14 days rather than seven days to supply requested information. However, given the fact that large volumes of information may be involved, Brown McCarroll & Oaks Hartline continues to believe that 21 days is more appropriate.

The commission disagrees that 14 days is not enough time to respond to requests for information because, at this point in time all parties which may request information are known and it is simply a matter of making the appropriate number of copies and sending the information to a known address. Also, it is very unlikely that all requests for information will be received by the person on the same day, thus the response due dates will actually be spread over some time period. The commission notes that the rule originally proposed as subsection (d) has been moved to subsection (f).

Concerning §350.55(d), Strasburger & Price commented that to facilitate the notification process, this regulation should be clarified to provide that the third parties must make their request in writing to the person and address specified in the notification (§350.55(a)(b)(c)) they receive. We suggest that the language be revised to read: "Once the leaseholder, franchisee, property owner or interest holder of record requests in writing that the information required to be made available in subsections (a), (b) or (c) of this section from the person providing the notice and at the address provided on the notice, the person must deliver"

The commission agrees with the commentor for the reasons stated and is making the recommended rule change in amended subsection (f).

Concerning §350.55(d), KOCH commented that they agree that a person should provide information to a requestor within a reasonable time. However, this requirement should have a clear expiration date.

For example, a person would only have to provide information for a maximum of three years after these data are submitted to the commission.

The commission agrees that there should be a reasonable time limit in which the person is responsible for providing the recommended language. However, in lieu of three years the commission has amended subsections (d) and (e) to add a requirement to maintain the information related to notice (e.g., sample results, exposure assessments, documentation of who was noticed, when, and what

information was provided) for a minimum of five years following issuance of a no further action letter. It is reasonable that the person should therefore be able to provide the information up to this point in time. Beyond this period of time, the requirement of keep providing this information upon request is burdensome in the opinion of the commission. If requests are received after this time period has elapsed, then the person may direct the request to the commission.

Concerning §350.55(d), AFCEE commented that this provision should be revised to make delivery of the information more practical, especially where a large number of parties might request the information. First, the rule should recognize and allow the use of already existing public information systems that may be in place at some facilities. Second, the rule should make it clear that to "deliver the information" includes the ability to place the information in an accessible location for inspection by members of the public. Requiring direct delivery of data to large numbers of requesters will result in a significant administrative and financial burden, especially when many requesters may only need to browse through the information, rather than obtain copies. Third, the 14 day time period will not be a reasonable time if a large number of parties request the information unless the information can be provided by placement in a central repository as described above. Finally, parties who do request copies of the information should pay the reasonable copy cost for the requested information. Under the Texas Open Records Act and the Freedom of Information Act state and federal agencies require the public to pay the reasonable cost of obtaining copies of public information. This should likewise be a requirement if members of the public wish to obtain copies of data under the TRRP. Without such a requirement there is no incentive for a requestor to exercise discretion in the amount of information requested.

The commission disagrees with the commentor that the rule should allow the person to place the information in an accessible location for inspection by members of the public instead of providing actual copies of the applicable information upon request. To only require placing the information in an accessible location will be an undue burden on potentially impacted parties (e.g., where an easement, franchise or right-of-way is held by another person). The commission notes that persons can place information in an accessible location for inspection by members of the public and make this fact known in the notice of availability of information as long as it is clear that the person can request the information directly from the person providing notice. The availability of information in this accessible location may reduce the number of parties who request copies of the applicable information. The commission disagrees that 14 days is not enough time to respond to requests for information because, at this point in time the party(ies) requesting the information are known and it is simply a matter of making a copy(ies) and sending the information to a known address(es). Also, it is very unlikely that all requests for information will be received by the person on the same day, thus the response due dates will actually be spread over some time period. The commission notes that these 14 day provisions originally proposed as subsection (d) have been moved to subsection (f).

The commission agrees that there are costs associated with the notification requirements of the rule and that in some circumstances (e.g., large areas of off-site contamination) there could be a significant administrative and financial burden. However, the commission disagrees with the commentor that parties who request copies of information should pay the copy costs for the requested information. The commission is not developing a notice process which could limit a person's ability to receive information on their ability to pay for copies of the applicable information. The commission believes there is a significant distinction between the cost it charges for copies requested under the Texas Open Records Act and those costs associated with the notice provisions of the rule which are borne by the person potentially responsible for contamination.

Concerning §350.55(e), Strasburger & Price commented that the proposed regulation requires notification to third parties when there is "exposure to a COC at a concentration which exceeds the critical PCL." The only purpose this regulation seems to serve is to invite litigation. Moreover, the TNRCC is requiring regulated entities to make statements to third parties that, in all probability, will be used against them in

litigation. This regulation will have a chilling effect on conducting voluntary remediations, particularly when the person required to make the notification is not responsible for the contamination.

The commission disagrees that the only purpose this regulation serves is to invite litigation. Clearly, the purpose is to alert those parties required to receive notice that exposure to COCs is likely. The commission intends to prevent exposure to COCs where possible and to correct exposure where it is already occurring.

Concerning §350.55(e), Brown McCarroll & Oaks Hartline supports this provision as revised to clarify that notice is to be provided no later than 35 days from receipt of the laboratory analysis from the performing laboratory.

The commission notes that the time frame has been extended to 60 days and refers the commentor to the response below which provides further discussion on the time frame required under this subsection.

Concerning §350.55(e), Brown McCarroll & Oaks Hartline believes that the notification requirement should be based on a comparison of site concentrations to risk-based exposure levels (RBELs) rather than protective concentration levels (PCLs).

The commission is revising the text to provide more specific criteria to trigger notification under this subsection. However, the commission disagrees with the commentor that the comparison should be to risk-based exposure limits (RBELs) rather than protective concentration levels (PCLs). While some comparisons can be made to RBELs (e.g., the air inhalation pathway for off-site receptors) others cannot be made to RBELs and must be made with PCLs. The $^{Tot}Soil_{Comb}$ PCL includes cross-media transfer (e.g., a concentration in soil which is protective of the associated inhalation of vapors and particulates) and adds across pathways. Thus for soils, the comparison must be made to a PCL. Also, only PCLs can be used to evaluate exposure to multiple COCs.

Concerning §350.55(e), Chevron commented that the timing of notification requirements should also be revised. Regarding the 35-day notice, for example, the agency should provide sufficient instruction in the rule as to what constitutes an actual exposure condition.

Concerning §350.55(e), Chevron and Campbell, George & Strong commented that the TNRCC should clarify the requirement to provide immediate notification (i.e. within 35 days from receipt of laboratory data) for "actual human exposure to a COC at a concentration which exceeds the critical PCL"; the terms "actual human exposure" are not expressly defined. Is there actual human exposure if a property contains potable water wells, now plugged or otherwise inactive? Does it occur when surface soils exceed critical PCLs and people walk across the ground? The range of exposure scenarios that might be encompassed within these terms is virtually limitless. The agency should provide sufficient instruction in the rule as to what constitutes an "actual exposure condition".

Concerning §350.55(e), Chevron commented that while the focus of the immediate notice requirement is on "human exposure," the requirement provides notification of exceedances of "critical PCLs". A critical PCL is defined as the lower of the human health and ecological PCLs for a given COC. If the critical PCL for a COC is the ecological PCL, there is no purpose served by providing immediate notification of an "actual exposure to human health." The rule language and perhaps the preamble should be modified to clarify that the comparison is only made to the human health PCL.

Concerning §350.55(e), Groundwater Services commented that the definition of an actual human exposure condition which might trigger an immediate notification requirement is unclear. PCLs represent chronic exposure limits which only pose risk for long-term exposure. For example, the presence of exposed surface

soils exceeding a soil direct contact PCL does not represent an exceedence of a target risk limit unless persons are actually touching the soil on a daily basis for 25 or 30 years. An immediate hazard is posed only by exceedence of an acute exposure limit, which is typically orders of magnitude higher than a PCL. Furthermore, the scope of those exposed is unclear and may prove highly problematic for buildings with visitors, none of whom are likely to be exposed at harmful levels.

Recommended Revision: Revise rule to state that immediate exposure control measures and notification of property owners and interest holders will be required for site conditions determined to result in: i) actual human exposure to acutely hazardous concentrations of COCs, or ii) consumption of groundwater in excess of drinking water standards.

Concerning §350.55(e), KOCH commented that if actual human exposure is occurring, why would a notice state that "exposure to COCs is only possible?" Further, what type of information must be provided upon request?

Concerning §350.55(e), Phillips commented that they disagree with the §350.55(e) provision that requires a notice for "actual human exposure" to a COC that exceeds a critical PCL. First, any notification should be based solely on PCLs based on human health. An ecological-based PCL has no relevance with regard to human exposures. Second, "actual human exposure" must be further defined and should reflect an exposure that would result in a substantial or imminent threat. If this test is not made, considerably more time than 35 days should be allowed for notification in order to allow time for verification by resampling, reanalysis or comparison with higher order (e.g. Tier 2) PCLs.

Concerning §350.55(e), AFCEE commented that this section does not define how to establish whether "actual human exposure" has occurred. This phrase might be interpreted to require notice when a site evaluation concludes that a COC is likely to be present at levels above the critical human health PCL for a completed exposure pathway. However, this is based on the assumption that an analytical demonstration that there are COCs present at levels above the critical PCL level is conclusive proof that there has in fact been an actual human exposure to COCs. There is also concern with the current wording of the rule because it tends to presume that a party has been exposed to COCs and may unnecessarily alarm a party notified under this provision. In addition, once a responding person provides notice under this provision it may be used in a civil law suit as evidence in support of a negligence per se allegation that the responding person has exposed the party to COCs. While it is important that a party is made aware of the potential exposure, it is equally important that the notice be based on sound science and be factually and accurately stated.

Concerning §350.55(e), AFCEE recommends that the commission revise the sections to clarify the meaning of "actual human exposure" and ensure that the clarification is based on sound science.

The commission agrees that the reference to “actual human exposure” is unclear and is revising the rule to be more specific. The commission agrees with the criteria of requiring notice when there is, for example, ingestion of groundwater with concentrations of COCs exceeding the $^{GW}GW_{Ing}$ PCL. Accordingly, the commission has amended the rule by adding specific examples of actual human exposure conditions. The commission disagrees that the rule tends to presume that a party has been exposed to COCs. The commission anticipates that persons will evaluate conceptual exposure models to determine if persons are actually exposed or not. However, in response to KOCH’s comment regarding possible exposures, the commission has amended the rule to focus notice on actual or probable exposures. The term “possible” is very subjective and opens to door for unrealistic, but possible situations to be assumed. The term probable is more definitive in the commission’s estimation. Therefore, now as amended, the notice provision is only triggered when an individual is actually or probably being exposed to COCs in excess of Tier 1 PCLs.

The commission does agree with the commentor that the notice should be based on sound science and be factually and accurately stated, as it is in no one's best interest to unnecessarily alarm someone. In this regard the commission has amended the rule to allow the executive director to require the notice to be re-completed when it is the executive director's evaluation that the notice was not sufficiently factual or clear.

The commission does not agree that it is appropriate to limit timely notification for contact with contaminated soils to only those situations where there is acutely hazardous concentrations. The commission's goal is to prevent acute or chronic exposure; to only provide this early notice when there is acutely hazardous concentrations would not be consistent with this goal.

With regard to the concern regarding ecological PCLs, the commission agrees for the reasons stated and the rule is changed to limit notice to situations where concentrations exceed the Tier 1 human health PCL.

Concerning §350.55(e), Chevron commented that the deadline for notification should be extended to at least 90 days so that the person can efficiently process available data and more accurately assess exposure risks using Tiers 1, 2 or 3.

Concerning §350.55(e), Chevron commented that since notification must be provided within 35 days of receipt of laboratory data (we assume final validated data), a comparison with the Tier 1 PCLs is likely, given the brevity of time to develop more realistic PCLs under Tier 2 or 3. Accordingly, such information is likely to arouse unfounded concerns among the parties being notified, especially where the same exceedence poses no problem based on a comparison of Tier 2 or 3 PCL values with the COC concentrations.

The commission agrees for the reasons stated and the rule is changed to limit notice to situations where concentrations exceed the Tier 1 human health PCL. The commission notes that the rule is amended to extend the time period to 60 days, which is more than adequate to allow for resampling and data validation. Although the trigger for notice is Tier 1 human health PCLs, the extra time will allow the person to develop Tier 2 or 3 PCLs by which to explain what the protective concentration actually is for the affected property. The commission does note that the performance goal is that notices are conducted as soon as possible, but no later than 60 days. With regard to Chevron's assumption of final validated data, the commission notes that the 60 days includes the time required to validate the data. However, because the exposed populations may change over time, the commission has also included a new provision within subsection (e) to require notice to those additional parties exposed within 14 days of the date actual or probable exposure is documented, unless new sampling is the basis of the determination in which case 60 day maximum still applies.

Concerning §350.55(f), Brown McCarroll & Oaks Hartline commented that this subsection specifies requirements for documenting notice required by §350.55. Brown McCarroll & Oaks Hartline supports TNRCC's inclusion of language allowing a person to document failed attempts to notify an off-site interest holder or the owner of leased land. Brown McCarroll & Oaks Hartline is concerned, however, that evidence of two failed attempts (i.e., two returned letters) will not be available to provide to TNRCC within 30 days of the notice date. Typically, one would not know to resend a letter until the first letter is returned undelivered. Letters are often not returned promptly. The last sentence of this section should be revised to read: A person may satisfy this requirement by demonstrating through two documented (e.g., return receipt requested letters) failed attempts that they were unsuccessful at notifying all persons required to receive notice. Documentation of the failed attempts should be provided to the executive director as soon as possible (which may be more than 30 days after the required notice date).

The commission agrees with the commentor that 30 days may not be adequate time for the reasons stated. The commission is revising the rule to extend this time period to 60 days and is moving this requirement to subsection (d). However, with regard to providing proof of notice in regard to actual or probable exposures as addressed in subsection (e), the commission has amended subsection (e) to require the person to provide documentation certifying that notice has been provided within 30 days of the date notices are due, thus the discussion relating to documenting failed attempts has been removed.

Concerning §350.55(f), Henry, Lowerre, Johnson & Frederick commented that the proposed rules should require proof that notice has occurred.

Concerning §350.55(f), AFCEE recommends the commission clarify the notice provision to allow certification as a more practical and economical means of demonstrating proof of notice to TNRCC. Existing public information and communication systems should be recognized as an allowable means of demonstrating compliance with the rule.

The commission agrees with Henry, Lowerre, Johnson & Frederick that proof of notice should be required. The commission also agrees with the AFCEE that certification is an effective method to document that notices have been appropriately completed as it places the responsibility where it should be, on the person, but allows the person to conduct the notice in the most effective and efficient manner. Therefore, the commission maintains the provision for persons to document that proper notice has been conducted, and has amended the rule in subsections (d) and (e) to require the person to submit a notarized statement signed by the person and certifying that all notice requirements are met. The statement must identify any persons notified directly. The statement must identify any persons notified directly. Also, as discussed earlier, the use of existing public information and communication systems may possibly be used to satisfy some the notice requirements. The person is responsible for making this determination.

Concerning §350.55(f), AFCEE commented that the requirements in this subsection may work adequately for limited notice situations, but will prove to be cumbersome, expensive and provide inadequate time to address situations where broad notice is required. For example, if a fairly expansive release to groundwater is suspected in a downtown, high rise office environment, or in a metropolitan densely populated apartment complex or residential neighborhood, hundreds or even thousands of parties could require notification under each of the various requirements of §350.55. Each time the responding person would be required to notify each party by certified mail, return receipt requested. Each time, assuming a certain percentage of the return receipts were not received from notified parties, a second certified mailing would be sent to a subset of the initial group. After all return receipts were received, and after documentation of two failed attempts to notify non-responding parties, copies would be made of all 10,000 receipts for delivery to TNRCC.

The commission clarifies that the method of notice is not specified in most circumstances. In subsection (d) and (e), signs and the requirements for their use are referenced. In fact, in response to this comment and earlier comments from Campbell, George & Strong and Chevron, signs are required to be used under subsection (e) to provide notice within public areas such as parks or playgrounds since direct notice via other means is not possible. Generally, the person may choose the method as long as they can demonstrate that the appropriate parties actually received the notice. The commission does not specify in the proposed rule or in today's rule that certified mail must be used to document notice.

SUBCHAPTER D - DEVELOPMENT OF PROTECTIVE CONCENTRATION LEVELS

§350.71. General Requirements.

Concerning §350.71, KOCH commented that it would be very helpful to have a general discussion of how PCLs are calculated and applied. The tiered approach should also be briefly described. For example, the tiered approach is not discussed until §350.74. Similar general discussions are provided at §350.3 and §350.31.

The commission is hesitant to include such a description as it adds length to the rule, but KOCH is correct in that a very short explanation of how PCLs are calculated and applied may be beneficial. The commission amends §350.71(a) accordingly to provide a short explanation of the PCL calculation and application process. The commission anticipates the development of guidance which will provide a more thorough overview of the PCL calculation and application process.

Concerning §350.71, Henry, Lowerre, Johnson & Frederick commented that the risk assessments do not rely upon evaluations of the most sensitive persons who will be affected. Even if the contamination is next to a grade school, the greater sensitivity of children who will be exposed is not considered. Likewise, the synergistic effects of exposure to multiple sources in an area is not considered.

The commission disagrees with the statement that the TRRP is not protective of sensitive subgroups such as children. The methodologies, along with their accompanying toxicity values and exposure parameters, which serve as the basis for the TRRP, address protection of sensitive subgroups in several ways. First, in calculating toxicity values for noncarcinogens (e.g., RfDs and RfCs), an uncertainty factor of 10 is incorporated to account for variation in the general population (intraspecies variability). Such an adjustment is purposefully incorporated to account for the fact that some individuals may be more sensitive than others. Second, in establishing the exposure scenarios for residential land use, the commission evaluated a young child (0-6 years old) exposure scenario, an adult exposure scenario, and an age-adjusted (0-30 years old) exposure scenario. In the course of conducting this evaluation, carcinogens and noncarcinogens were evaluated separately and the most conservative exposure scenario was selected as the basis for the carcinogenic and noncarcinogenic RBEL calculation. Further, as outlined in §350.71(g) of the TRRP rule, a person must establish separate PCLs for both carcinogenic and noncarcinogenic effects for COCs which induce both spectra of responses and then must use the lower (i.e., more conservative) of the two PCLs. Finally, in establishing the critical Tier 1 soil PCL for each COC, §350.78(a) requires persons to select the lowest of the $^{Tot}Soil_{Comb}$ (i.e., the human health based PCL), the $^{GW}Soil$ (i.e., the groundwater protection PCL for soils overlying class 1 and 2 groundwaters), and the $^{GW}Soil_{Class3}$ PCLs (i.e., the groundwater protection PCL for soils overlying class 3 groundwaters). For the majority of COCs (i.e., 92% of the residential values and 94% of the commercial/industrial values), the Tier 1 $^{GW}Soil$ PCL is in fact the lowest value and therefore, the critical Tier 1 PCL is set at a level well below that necessary for protecting against potential adverse health effects associated with exposures to affected soils.

With respect to the statement that TRRP does not consider synergistic effects, the TRRP rule does address the fact that individuals may be exposed to multiple chemicals via multiple routes of exposure. For example, §350.71(c)(4) requires persons to calculate a soil PCL based on consideration of combined exposures via inhalation of volatile emissions and particulates, ingestion, dermal contact, and ingestion of above- and below-ground vegetables. Further, §350.72(b) requires persons to consider the effect of exposure to multiple COCs when establishing the PCLs for the human health exposure pathway. The equations to be used to establish PCLs when considering exposures to multiple COCs are provided in Figure 30 TAC 30: TAC §350.72(d) and reflect consideration of additive responses to multiple chemicals. Such consideration serves only to lower the PCL, that is, make it more conservative. Such an approach is considered an adequate means of addressing synergistic effects for the following reasons: 1) although individuals may be exposed to multiple COCs, all such COCs may not all act on the same target organ(s); 2) the response of an individual to combinations of chemicals may be increased or decreased at the site of action dependent upon the

complex interplay of chemical interactions including additive, synergistic, and antagonistic responses; 3) if a COC mixture contains a variety of COCs that do not act on a common target organ or by a similar mechanism of action, or if each similarly acting COC is present at level well below its threshold, neither additive nor synergistic effects would be expected; and 4) of the few studies which document the occurrence of synergistic effects in the scientific literature (e.g., smoking and asbestos), those studies indicate that such multiplicative interactions typically occur at extremely high levels, not at levels generally encountered in the environment.

Concerning §350.71(a), Brown McCarroll & Oaks Hartline requested that §350.71 be revised to allow a person's compliance with OSHA standards to constitute an institutional control that prevents a human health exposure pathway.

The commission agrees that OSHA standards have a place in this rule making, but does not agree that they should be considered institutional controls. The provisions of §350.74(b)(1) include allowance for consideration of OSHA standards as RBELs when addressing the inhalation exposure pathway. However, the OSHA standards are not in and of themselves an appropriate basis to warrant a qualitative screening of the exposure pathway. Additionally, the commission takes the position that the required use of personal protective equipment is not an adequate remedial endpoint. If a property cannot be used in the absence of personal protective equipment such as impermeable clothing or air purification due to the presence of environmental contaminants, then that property has not been sufficiently restored or otherwise rendered adequately protective. The goal of the rulemaking is to restore the active and productive use of land, and not perpetuate such unprotective conditions into the future.

Concerning §350.71(b), Chevron, Environmental Resources Management, and SRA commented about the lack of flexibility to use site-specific exposure scenarios. TNRCC requires evaluation of an industrial worker scenario even when site conditions indicate another scenario may be more appropriate.

Environmental Resources Management commented that this will produce results that do not accurately represent the true risks associated with a site based on actual or likely exposure scenarios, and requested that the commission allow use of site-specific exposure scenarios based on documented and verifiable information. Chevron and SRA commented that in some cases, a site may not support full time residential or industrial usage. For example, Texas has thousands of miles of utility corridor right-of-way (ROW) land. These areas do not have full time workers or residents on them, but rather have periodic workers or maybe "passer-bys". However, the proposed program requires that these sites be evaluated under the hypothetical assumption that individuals spend their entire careers working in one area of a ROW. Exposure scenarios should be selected based on the characteristics of the property being evaluated.

The commission understands the conceptual logic of setting exposure scenarios site-specifically for current land use conditions. However, a goal of the commission in this rule-making is to ensure affected properties are rendered protective and productive for the future as well as the present. First, to set site-specific low exposure scenarios, such as "trespasser," "periodic worker," or "site visitor" scenarios, effectively locks in the use of the land for it's current purpose, and does not adequately consider future use of the land. PCLs calculated under such exposure assumptions can be sufficiently high such that the affected property could not be used for any more productive use without extensive re-evaluation and response. Second, the commission has provided a process in §350.74(j)(2) by which a person can seek to vary exposure duration, averaging time and exposure frequency to reflect such low exposure scenarios for when the standard commercial/industrial exposure scenario is not appropriate and reasonable. The commission acknowledges that the adjusted exposure scenario would be for a commercial/industrial worker and not a trespasser or site visitor, but significant flexibility is available provided the basis for the variance is sound. Third, the experience of the commission with regard to such "site-specific" evaluation of trespasser and site visitor exposure scenarios is that the justifications are often not well documented and verifiable, or

lack sufficient merit. With regard to this rule provision, the commission is adopting the rule as proposed.

Concerning §350.71(b)(4), EPA Region 6 commented that this section describes the human receptor in a commercial/industrial scenario as an industrial worker. The description should be changed since the commercial/industrial land use may apply to churches and other establishments where the human receptor is not an industrial worker.

The commission disagrees with the commentor that the rule should be amended. The rule does not draw a distinction between commercial and industrial workers and churches which have full time employees. Further, if the church also functions as a day care or school beyond normal worship service hours, then it meets the definition of residential land use, and not commercial/industrial land use. In that case, the receptor is a resident.

Concerning §350.71(c), Henry, Lowerre, Johnson & Frederick and the PIC commented that it supported the rule's requirement that responsible parties must determine protective concentration levels for certain soil and groundwater exposure pathways on a mandatory basis at all affected properties. Henry, Lowerre, Johnson & Frederick also supported the TNRCC's ability to require the consideration of other contingent pathways as conditions warrant. Chevron commented that the criteria provided in the subsections to this paragraph are inconsistent with the definition of "reasonably anticipated to be complete" in §350.2(a)(67). Moreover, this wording suggests that PCLs must be determined for these pathways regardless of the Tier of the analysis, and does not provide sufficient allowance for site-specific conditions in Tier 3. Chevron recommended adding "In a Tier 3 analysis, the criteria for considering a human health exposure pathway to be incomplete may take additional site conditions into account subject to the approval of the executive director."

The commission disagrees that the requirements set forth in this subsection are inconsistent with the definition of "reasonably anticipated to be completed." The commission did not characterize exposure pathways as mandatory in the proposed rule, but the commission maintains that certain pathways are applicable to all sites either currently or in the future, while other exposure pathways may be applicable only under certain site conditions. The PCL development strategy employed by the commission in this rule making incorporates exposure assessment tenets, but also factors in the preservation of the active and productive use of the land surface and the natural resources of the state. Although such an approach may be intellectually offensive to some persons who are strong advocates of a conceptual exposure assessment model approach, it is warranted in the context of the goals of the commission. Setting out the criteria for the evaluation of exposure pathways specifically in the rule will expedite the overall PCL development process and move sites more effectively toward the evaluation of the need for response actions.

Concerning §350.71(c)(1), Chevron commented that in many areas of the state, the shallow groundwater that might be impacted by a release is class 2 groundwater. Due to the availability in these areas of high quality municipal (or other) water supplies and/or local restrictions on installation of drinking water wells, no landowner is likely to install a well into these shallow zones, nor would residents ingest that class 2 groundwater. Chevron stated that the TNRCC has recognized in §350.37(1)(3)(A) that some class 2 groundwater-bearing units may have no future beneficial use, and provided criteria for determining future beneficial use in §350.37(1)(3)(C). Chevron stated that it believes that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater, and should be held to the same criteria (i.e., PCLs) as class 3 groundwater. Similarly, AFCEE commented that for Tier 3, the requirement to assume ingestion for class 1 or class 2 groundwater is overly restrictive. In some situations, the party can demonstrate that the affected groundwater will not flow beyond the person's property, or deed restrictions will be placed on affected property to prevent the use of that class 1 or 2 groundwater thereby eliminating the ingestion risk. The AFCEE requests the groundwater ingestion

pathway not be mandatory for Tier 2 and 3 and the rule have flexibility for situations where the groundwater will not be ingested (no off-site impacts, institutional controls).

Class 1 groundwaters are the primary groundwater resources of the state and class 2 groundwaters are potential beneficial use groundwaters. Therefore, the commission has made a policy decision to manage affected class 1 and 2 groundwaters in terms of current or future potential drinking water supplies. However, the commission acknowledges that class 1 and 2 groundwaters have different potential for use as a drinking water supply for reasons such as quality, productivity, location, proximity to superior water supplies, and susceptibility to contamination. The commission has elected to recognize this different potential for class 1 and 2 groundwaters to be used as a drinking water supply in terms of groundwater response objectives rather than in terms of exposure pathway analysis. By taking this approach, the standard to be met at a point of exposure is not in question, but rather the location where the standard must be met. The commission believes this groundwater resource management strategy is the most protective, reasonable, and streamlined for several reasons. First, the commission is charged with the protection of the groundwaters of the state. Given the gravity of this responsibility and the reliance on groundwater to meet state water needs, the commission has justifiably taken a conservative view of the groundwater deemed to be potentially useable in order that the state's groundwater resources are protected. Second, defaulting to a groundwater ingestion exposure pathway for class 1 and 2 groundwater minimizes further degradation of the groundwater resources. Third, the evaluation of the exposure pathway in a pure site-specific manner would result in inconsistent management of the affected groundwater resources and may not adequately consider future use. Fourth, the commission is able to establish clear and consistent groundwater restoration and management strategies through the establishment of criteria for locating points of exposure that can be applied in a consistent and streamlined manner considering site risk and resource value.

Therefore, in the interest of natural resource protection, the commission maintains that class 1 groundwater should be restored to drinking water standards regardless of threats to off-site groundwaters and ability to emplace an effective institutional control. However, the commission fully supports such considerations for some class 2 groundwaters and accordingly developed and proposed the groundwater plume management zone concept.

The commission acknowledges that the current PST program is a receptor-based program, but does base standards for major and minor aquifers on human ingestion, albeit the cleanup levels are risk-based and not MCL-based when there are not threatened receptors. However, the commission points out that Standard 3 of the current Risk Reduction Rule at §335.563(h) states "Media cleanup levels for groundwater that is a current or potential source of drinking water . . . shall not exceed MCLs . . . " Thus, the current Risk Reduction Rule also mandates that useable groundwater be cleaned to MCLs. This provision is not obviated under the current Risk Reduction Rule by the baseline risk assessment process. Section §335.563(h)(2) does provide some flexibility, but persons should note that the criteria for such judgements are in the context of §335.160(b). The commission notes that those are the same criteria that are included under §350.33(f)(4)(A) of this rule. Given that, the commission makes the point that this rulemaking provides more specific conditions under which the commission may favorably consider approval of the use of the flexibility provided under §335.563(h)(2). Therefore, the commission takes the position that an equivalent to class 1 groundwater under the current rule would not as readily satisfy the criteria for the flexibility allowed under §335.563(h)(2)(A) and (C). On the other hand, an equivalent to class 2 groundwater under the current rule would more readily satisfy the criteria for the flexibility provided under §335.563(h)(2)(A) and (C), notwithstanding of course the land use considerations (e.g., residential vs. non-residential).

Concerning §350.71(c)(1), Chevron commented that this approach does not allow the consideration of groundwater use restrictions on a site-specific basis. Because there are cases where site groundwater will not be used, there should be a mechanism to conclude that the groundwater pathway is incomplete. Chevron recommended that TNRCC adopt one of the following options: (1) Revise the text as follows to recognize that class 2 groundwater with no reasonably anticipated future beneficial use should be considered the same way as class 3 groundwater. Add the following sentence to this subsection: If it is determined that class 2 groundwater has no reasonably anticipated future beneficial use as described in §350.37(1)(3), then PCLs for that groundwater shall be established as for class 3 groundwater consistent with subparagraph (2). (2) The text should be modified to allow for the assumption of an incomplete pathway where appropriate.

The commission agrees that the noted conditions such as demonstration of no reasonably anticipated beneficial use, presence of superior supplies, and the presence of ordinances are relevant and important. However, such conditions in class 2 groundwater reinforce the appropriateness of allowing the establishment of plume management zones as established in this adopted rule. Section 350.37(1)(3)(A) does not mean that the groundwater resource as a whole does not have a potential beneficial use, but just that particular affected portion of the resource and the immediate proximity. The commission does not concur that the conditions described in §350.37(1)(3)(A) are a basis to allow further degradation of the groundwater resource to the degree that would be allowed by considering it class 3 groundwater. See the definition of a reasonably anticipated to be completed exposure pathway.

Concerning §350.71(c)(2), Chevron commented that this subparagraph should also address COCs in class 2 groundwater with no reasonably anticipated future beneficial use. Moreover, TNRCC should take into account site-specific activities and facility land use as part of the determination of the PCLs to be established for these classes of groundwater. Insert text as follows: (2) COCs in class 2 groundwater with no future beneficial use and in class 3 groundwater. The person shall establish PCLs for class 2 groundwater with no future beneficial use and class 3 groundwater as necessary to protect human health and safety, and the environment, and to comply with the groundwater response objectives in accordance with Subchapter B of this chapter (relating to Remedy Standards).

The commission agrees that class 2 groundwater with no reasonably anticipated beneficial use should not be treated the same as class 2 groundwater with a high potential for beneficial use and accordingly would allow the establishment of plume management zones as defined in rule. The commission does not concur, however, that groundwater should be classified as class 3 groundwater based on man-induced conditions as those conditions could change in the future, particularly in instances where the groundwater could otherwise be of high quality and productivity. Rather, the commission maintains that designation as a class 3 groundwater resource should be generally based on characteristics that are natural and unlikely to change over time.

Concerning §350.71(c)(2), Groundwater Services commented that the rationale for establishing PCLs and implementing corrective actions for class 3 groundwater is unclear. Class 3 groundwaters are not subject to human use or consumption. Therefore, no action is needed to protect human health and safety, and the environment, particularly as NAPL issues and surface water discharge concerns are addressed by other provisions. Implementing a corrective action when a class 3 PCL is exceeded (i.e., 100 x MCL) will in no way serve to reduce risk to public health, as none is posed. Given the common occurrence of class 3 groundwater-bearing units (e.g., thin silt layers), this provision is likely to be the key cost driver for many site remediation efforts, with zero public health or environmental benefit. Groundwater Services, Inc., recommended revising or deleting the requirement to achieve human health protection limit (100 x MCL) in unusable class 3 groundwater. It suggested limiting class 3 groundwater response objectives to: i) NAPL management and ii) protection of interconnected class 1 or 2 groundwater or surface water resources.

The commission has actually found that determining the exact approach to take for class 3 groundwaters is the most perplexing of any of the three classes of groundwater as there very likely is low probability of use or exposure, but there is also a need to ensure that high concentrations of COCs in class 3 groundwater are not flowing in an uncontrolled fashion. However, the commission strongly disagrees with the position that there is zero benefit to establishing PCLs for affected class 3 groundwater. Neglecting to establish PCLs frustrates the application of any plume management strategy and substantially deregulates affected class 3 groundwaters. The commission maintains a goal, even for class 3 groundwater to control and limit the future extent of affected groundwater. Without a plume management zone strategy there is not an effective basis to protect against unchecked plume growth which raises concerns of interconnection with a class 1 or 2 groundwater or some other future hazard resulting from the expanding extent of the plume. The commission is not advocating restoration of the groundwater to a PCL, but rather management of the groundwater affected in excess of a PCL. The commission is determined that vigilance be applied to class 3 groundwater PCLE zones in order that affected groundwater is managed in a protective manner over the long term. Such a position is incumbent to the success of any risk-based decision making corrective action program. The commission takes the position that it has given ample flexibility through the increased PCL level and reduced criteria for the plume management zone for class 3 groundwater.

Concerning §350.71(c)(3), Chevron and Weston commented that this sentence appears to require direct soil vapor monitoring, without the provision to apply modeling of soil vapor emissions, in lieu of direct measurement. Given the conservative nature of models applied to estimate soil vapor emissions, the commentors stated that TNRCC should allow either "soil vapor monitoring data, or results from appropriate soil vapor emissions models." They suggested adding "or results from appropriate soil vapor emissions models" after "soil vapor monitoring data." Weston suggested deleting this pathway from consideration to simplify the rules. Weston also made this comment in reference to §350.71(c)(6). Based on a check of the Tier 1 Tables for several common volatiles (benzene, trichloroethylene, and vinyl chloride), Weston stated the risk-based values for $^{Air}Soil_{Inh-v}$ and $^{Air}GW-Soil_{Inh-v}$ are greater than the $^{Tot}Soil_{Comb}$ and/or the value for $^{GW}Soil_{Class3}$. Weston commented that this suggests that the inhalation pathways will not likely drive the cleanup levels. Chevron further commented this text is too vague. It is unclear what constitutes a "known vapor hazard" and how such hazard is determined. Moreover, the person should have the ability in Tier 3 to demonstrate through technical data analysis that this pathway is incomplete rather than having to choose between performing soil vapor monitoring or considering physical controls. With regard to §350.71(c)(3)(B), Chevron also commented that subsection (d) presents unreasonably stringent requirements for maintaining the physical control in order to consider it as part of the pathway analysis. Chevron suggested adding "for analysis performed under Tiers 1 and 2."

The commission does not agree with the removal of the pathway from the rule based on the fact that the Tier 1 PCLs for groundwater ingestion are a driver relative to the Tier 1 PCLs for this pathway. In fact the rule itself suggests if groundwater management zones are not utilized there may be no basis for consideration of this pathway. However, the fact that plume management zones will be commonly established for class 2 and 3 groundwater and substantial concentrations of volatile COCs may remain in the groundwater source area, this pathway could become a driver for the areas of higher COC concentrations in the groundwater.

However, the commission does agree that the proposed language was not sufficiently clear and has amended the proposed rule language at §350.71(c)(3) to drop the reference to a known vapor hazard and also added the phrase "at a minimum" to clarify when the pathway should be considered complete. In addition, the commission agrees with the commentors that the proposed rule was unnecessarily restrictive in that it only referred to soil vapor monitoring and amends §350.71(c)(3)(A) to strike the term "soil" to allow other vapor monitoring methods. The commission also added the

allowance for “other technically appropriate methods” to evaluate the completeness of the exposure pathway, which could include use of vapor emission models.

The commission disagrees with the commentor that the treatment of physical controls in §350.71(c)(3)(B) is unreasonably stringent. If the physical control is not or will not be competent to keep volatile emissions from reaching the air at concentrations that are unprotective for a chronic exposure to that air, then the only appropriate conclusion is that the presence of the physical control does not adequately render the exposure pathway incomplete.

Concerning §350.71(c)(4), Chevron commented on the following language: "...and for affected residential properties, ingestion of above- and below-ground vegetables grown in surface soils containing COCs." Inclusion of the indirect exposure pathway, through ingestion of homegrown vegetables is highly uncertain, and should not be required under the TRRP. In particular, as currently written, it appears that the PCL for this pathway would apply to the entire residential "surface soil" interval, which is currently defined as extending from the surface to 15 feet below ground surface (bgs). If the vegetable ingestion pathway is retained, despite the high degree of associated uncertainty, Chevron stated that it is clearly inappropriate to consider absorption of COCs into vegetables from soils deeper than 18-24 inches.

The commission does not agree with the commentor that this pathway should not be evaluated and has not amended the rule to drop this exposure pathway. In fact, the commission maintains that the science is sufficient such that we can demonstrate that a background cleanup is not required to address this pathway. Additionally, this rulemaking is addressing both current and future use and the presumption is that soils down to 15 feet could be brought to ground surface under typical residential activities.

The commission notes that the person could impose controls as a remedy, with required landowner concurrence, to prohibit excavation of the deeper soils and thus limit any needed physical response action to the existing root zone to address the vegetable ingestion exposure pathway (i.e., upper two feet of soil). This same concept could be applied to address the soil ingestion and dermal contact exposure pathways, but may be more problematic if volatilization is the driving exposure pathway.

Concerning §350.71(c)(6), KOCH commented that a person should have the option of using soil vapor monitoring data or otherwise demonstrate that this pathway is incomplete. A similar option will be allowed for volatile emissions from COCs in groundwater.

The proposed rule did not place any limits on how the exposure pathway could be evaluated for completeness. However, in order to give sufficient clarity as to what types of evaluations can be conducted, the commission amended the rule to reference the use of appropriate vapor monitoring data or other technically appropriate methods, which could include other vapor emission models.

Concerning §350.71(c)(7), Chevron commented on this paragraph which pertains to contact with surface water or sediment containing COCs originating from the source area. Specifically, the proposed language stated, "The person shall consider this to be a complete or reasonably anticipated to be completed exposure pathway when a COC has been discharged or will discharge to a surface water body or sediment." Chevron stated that this requirement is unrealistic for many sites. There will be sites where surface water is inaccessible in some areas, resulting in an incomplete pathway. Sediments are often inaccessible, either below surface water or because of another barrier, and therefore represent an incomplete exposure pathway. Chevron argued that the text should be modified to indicate that the completeness of the surface water and sediment exposure pathways may be determined on a site-specific basis, particularly in Tier 3.

With regard to surface water, the rule as proposed was sufficiently clear that surface water exposure pathways need to be considered where there is or will be surface water contamination issues. However, with regard the sediment, the commission agrees with the commenter. Given that this subsection addresses human health exposure pathways, the completeness of this exposure pathway is particularly site-specific with regard to sediment. The commission amends the rule to direct persons to evaluate these exposure pathways to determine if the sediment exposure pathway is completed or reasonably anticipated to be completed rather than to automatically assume it is complete or will be completed.

Concerning §350.71(d), PIC commented that it supports the position of the executive director that persons should not be able to exclude human health exposure pathways in the development of protective concentration levels based on the existence of a physical control such as a parking lot. The PIC agrees with the executive director's reasoning that the rules already allow for consideration of the existence of such a control if the person can demonstrate the adequacy of the control in pursuing a Standard B Remedy. The person should not be allowed to circumvent the requirement of filing an institutional control (noting the use of the existing physical control) by "screening out" the affected exposure pathway and thereby creating a fiction that the person has achieved a Standard A Remedy. The PIC also supports the TNRCC's ability to require the consideration of other contingent pathways as conditions warrant.

The commission agrees with the PIC. The commission continues to maintain that the proper place to factor in physical controls is as a response action. However, the commission does point out that it did not characterize pathways as mandatory in the proposed rule.

Concerning §350.71(e), Chevron commented that the provision stating, "Consideration of physical controls during the exposure pathway analysis does not negate or otherwise supercede the POE criteria of §350.37 of this title," is unreasonably restrictive and effectively negates the consideration of physical controls altogether. Chevron recommended to delete this sentence or confine its applicability to Tiers 1 and 2.

The commission disagrees with Chevron as flexibility is provided to adjust how the assessment is conducted and to use the physical control as a remedy for the POE. However, to presume a pathway is incomplete because of the existing presence of a physical control without any evaluation of its adequacy results in qualitative exposure pathway screening with no substantial basis for concluding the physical control is adequate or that the physical control will be kept intact over the long term. The proper place to factor in physical controls is as a response action. This ensures that the adequacy of the physical control can be evaluated and the long-term effectiveness of the control will be maintained through the completion of necessary institutional controls and financial assurance requirements.

Concerning §350.71(h), Chevron commented that the concept of on-site and off-site receptors is inconsistent with the concept of protecting wider ranging ecological receptors. Replace "both on-site and off-site" with "applicable."

The commission agrees that the "both on-site and off-site" provision may be inconsistent with the concept of protecting wider ranging ecological receptors at a particular affected property, and has amended the rule as recommended.

Concerning §350.71(j), EPA Region 6 commented that the TRRP does not require the combination of exposure pathways, e.g., combination of the exposure to soil and groundwater. The EPA maintains the policy of evaluating cumulative potential risk in an effort to be adequately protective of potential exposures based on the conceptual site model. Basing the calculation of the PCLs on separate exposure pathways may minimize the potential risk and yield underprotective cleanup levels. The EPA bases the decision to combine exposure pathways upon current conditions (i.e., the conceptual site model) which shows whether

there is an expected exposure to both soil and groundwater contaminants. EPA Region 6 also commented that the lack of the requirement in the proposed rule to consider cumulative risk from all relevant exposure pathways (i.e., soil and groundwater) in establishing PCLs is a major regulatory inconsistency with CERCLA and NCP.

The commission disagrees with the comment that the PCLs may be underprotective simply because persons are not required to routinely evaluate the cumulative risk and hazard across environmental media (i.e., soil and groundwater). The rationale provided by the commentor is that the calculation of PCLs based on separate exposure pathways may minimize the potential risk and yield underprotective cleanup levels. This is clearly a misinterpretation of the proposed rule. The TRRP rule does in fact require persons to address the potential for exposures via multiple pathways, as well as to address the potential for simultaneous exposures to multiple COCs. Section 350.71(c)(4) of the proposed rule requires persons to calculate a soil PCL based on consideration of combined exposures via inhalation of volatile emissions and particulates, ingestion, dermal contact, and ingestion of above- and below-ground vegetables. Further, §350.72(b) requires persons to consider the effect of exposure to multiple COCs when establishing the PCLs for the human health exposure pathway. Such consideration serves only to lower the PCL, that is, make it more conservative.

The commentor is correct in stating that the proposed rule did not routinely require persons to consider the cumulative risk and hazard across exposure media (i.e., soil and groundwater). However, the commission is convinced that sufficient conservatism has been incorporated into the development of critical Tier 1 PCLs such that the cleanup levels will in fact provide adequate protection of human health. The supporting justification for this conclusion include the following: 1) the conservatism inherent in assuming that a single individual would consistently experience reasonable maximum exposures (RME) for each of the exposure pathways considered in developing the human health PCLs (i.e., $^{Tot}Soil_{Comb}$); 2) the unlikelihood that a single individual would consistently experience reasonable maximum exposures to both soil and groundwater; 3) the conservatism inherent in requiring persons to add across COCs and pathways regardless of the affected target organ; 4) the fact that the EPA typically does not require remediation of groundwater to levels below federal MCLs regardless of additional risk and hazards associated with exposures to soils; and 5) the fact that 92% of the residential critical Tier 1 PCLs and 94% of the commercial/industrial PCLs are based on protection of underlying groundwater (Tier 1 $^{GW}Soil$) and therefore, are set at levels well below the human health-based PCL (i.e., of those critical Tier 1 PCLs which are based on protection of underlying groundwater (Tier 1 $^{GW}Soil$), 84% are more than an order of magnitude lower than the corresponding residential human health-based PCL ($^{Tot}Soil_{Comb}$), while 88% are more than an order of magnitude lower than the corresponding commercial/industrial human health-based PCL ($^{Tot}Soil_{Comb}$)).

Finally, §350.71(j) of the proposed rule did in fact give the commission the authority to require persons to consider cumulative exposures to soil and groundwater in cases where "the executive director determines that such combination is necessary to address actual situations where receptors are simultaneously exposed to COCs present in multiple source media."

Concerning §350.71(k), Brown McCarroll & Oaks Hartline strongly objected to language in this section. Brown McCarroll & Oaks Hartline asserted that no legal justification exists to treat a reported non-detect at a sample quantitation limit as if the constituent of concern were present at that concentration. TNRCC has addressed this general issue within its water quality standards program and reached a different and more equitable determination on how to handle non-detects. In that program, TNRCC determined that, unless some analyses of a particular constituent within a set of samples are above the quantitation limit, then a zero should be assumed when a constituent is not detected at the quantitation limit. In instances where the constituent is detected in some samples of a sample set, a non-detect is not recorded as the quantitation limit, but is recorded as one-half the quantitation limit. Brown McCarroll & Oaks Hartline &

Oaks Hartline went on to state that this apparent policy decision by TNRCC indicated in this proposed rule could have very significant cost impacts on a response action. For example, §350.71(k)(1) - (3) and (4) contains conditions that, if met, allow a particular chemical of concern to be "kicked-out" of the requirement to develop protective concentration levels within an environmental medium. In the §350.71(k)(1)(C) analysis, if the sample quantitation limit exceeds the assessment level for the environmental medium, then a non-detect reading could cause a person to not be able to meet the requirements of paragraph (1), even if provisions (A), (B) and (D) are achieved. This would be a particularly illogical result because (1)(D) requires a finding that there is no reason to believe that the COC may be present based upon historical operations at the affected property. Brown McCarroll & Oaks Hartline asserts that the potential for such an outcome is not good public policy.

The commission disagrees with the comment that, when assigning proxy values to non-detected sample results, zero should be assigned when a COC is not detected at the sample quantitation limit. In fact, when a COC is reported as less than the sample quantitation limit (<SQL) in a specific sample, all the data users know is that the COC is not present at concentrations greater than sample quantitation limit, *not* that the COC is not present. The COC could in fact be present at concentrations just below the sample quantitation limit (SQL). Therefore, assignment of appropriate proxy values is critical, especially in cases where the SQL is greater than the assessment level. The commission stresses that the appropriate proxy value assigned to a COC should be based on available analytical data. In cases where there is reason to believe, based on available analytical data that the COC could be present at the sampling location and the concentration of the COC is suspected to be near but below the SQL, then the full value of the SQL should be assigned as the proxy value. If, however, there is reason to believe, based on available analytical data, that the COC could be present at the sampling location and the concentration of the COC is suspected to be below, but not near to, the SQL, then 1/2 the SQL should be used as the proxy value. For example, if a COC was detected in an area of concern at levels greater than the SQLs reported for non-detected results in that area, then those non-detected results for the COC in the near vicinity should be assigned the full value of the SQL. If, however, the COC is expected at the affected property, but based on available analytical data is not expected at concentrations near the SQL (i.e., sample point is not located near the area where the COC was detected at concentrations above the SQL), then the person could reasonably assign a proxy of 1/2 the SQL. This approach is wholly consistent with that recommended by the EPA in both the *Risk Assessment Guidance For Superfund, Volume 1, Human Health Evaluation Manual (December 1989)* and the *Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9 (July 1996)*. In regard to the use of zero for non-detect levels in the water quality standards program, it is important to recognize that the objectives of water program, where a facility must demonstrate compliance with permit discharge limits for specific chemicals known to be present in the discharge, are clearly different from those objectives within the Remediation Program where the goal is to determine what COCs are present on the affected property. Thus, the water quality standards program is more concerned with the presence of chemicals in excess of permit limits (i.e., levels much higher than detection limits) rather than the absence of the chemicals (i.e., at or below detection limits). The commentor is also referred to the commission's response to comments concerning §350.51(n).

The commission acknowledges that the commentor is correct in the interpretation that the provisions included under §350.71(k)(1)(C) and the conditions outlined in §350.71(k)(1) of the rule as proposed would prevent a person from eliminating non-detected COCs from further consideration in cases where the sample quantitation limit exceeds the assessment level for the environmental medium. The intention of the commission in establishing §350.71(k)(1)(C) of the proposed rule was to ensure that even though a COC was detected in less than 5% of the samples, the COC would not be eliminated from further consideration if it was detected at levels greatly exceeding the assessment value. The commission disagrees with the comment that because §350.71(k)(1)(D) requires a finding that there is no reason to believe that the COC may be present based on historical operations at the affected

property, the provisions of §350.71(k)(1)(C) would yield illogical results. The commission has determined that it is critical that consideration be given to the magnitude of the concentration of a COC relative to the level of concern (i.e., the applicable assessment level), including consideration of the relationship between the SQL and the assessment level in cases where a COC is reported as not detected in a specific sample, whenever persons are attempting to eliminate a COC from the list of COCs for which PCLs must be calculated. The rationale for the commission's position on this issue is the following: 1) the commission has found over time that it is often difficult to either confirm or deny a person's claims that a particular COC was never used on an affected property; 2) past experience of the commission indicates that persons have used, or have allowed the laboratory to use, arbitrarily selected reporting limits that exceed the level of concern; 3) past experience of the commission indicates that it is common to see Figure 30 TAC above the level of concern as a result of matrix interferences or when the broad spectrum analytical methods used by the person to characterize a site are not adequate to demonstrate attainment of the performance standard; and 4) the COC could in fact be present in the environmental medium at concentrations up to the sample quantitation limit. In most cases, standard analytical methods capable of achieving better quantitation limits are readily available and can be used to better characterize sample concentrations. Given the availability of more sensitive standard analytical methods, it is the responsibility of the person to make the necessary cost-benefit decisions to determine if it is more cost effective to proceed with a response action assuming that the COC is present at the appropriate proxy concentration as defined in §350.51(n) or to develop better analytical data.

Many commentors, including this one, expressed concern that the provisions of §350.71(k) of the rule as proposed would potentially compel response actions where the actual presence of a COC was in doubt (i.e., the commission would potentially be chasing "ghost" COCs). The commission notes that the intended purpose of §350.71(k) is solely to eliminate those COCs for which the commission has a high degree of confidence that those COCs are either not present or are present at concentrations in the environmental medium that are unlikely to pose an unacceptable health or environmental risk, are detected in the environmental medium as an artifact of the sampling and analysis procedures, or are clearly not associated with on-site historical operations (except where consideration of such criteria is expressly prohibited by a specific program). Additionally, the commission intended that each environmental medium would be evaluated separately based on the environmental data available at a specific point in time. To clarify the commission's intent in this regard, §350.71(k) has been amended. It is important to note that the provisions of §350.71(k) apply solely to the establishment of PCLs at a fixed point in time and do not extend to other actions that may be required at the affected property now or in the future. For example, if benzene is detected above the residential assessment level in soil and does not meet the provisions of §350.71(k)(1) or (2), the person would have to calculate a soil PCL. If at the same time at the same affected property, however, benzene is reported as not detected in all groundwater samples and the provisions of §350.71(k)(3) are met, the person will not have to calculate a groundwater PCL for benzene at this point in time, but may be required to monitor groundwater for benzene to verify the effectiveness of the soil response action as well as to ensure that the benzene does not in fact migrate to groundwater at some point in the future. In addition, should it be determined at some point in the future that benzene has in fact migrated to groundwater, the person may need to develop a groundwater PCL for benzene. Therefore, it is important to understand that §350.71(k) only drops a COC from PCL development which may or may not have any bearing on whether that COC is monitored or further assessed. Those decisions are made by the program area.

It is important to note that the ultimate determination of COCs for which PCLs must be calculated is handled on two levels. First, a determination regarding the COCs that must be analyzed for is made prior to conducting any sampling and analysis on the affected property and is based on program-specific requirements. Clearly, in cases where little is known about the historical use of the affected property, in cases where highly varied activities have occurred over time, or in cases where otherwise

required by a specific program, it may be necessary to initially utilize broad-spectrum analytical methods. Second, once analytical data have been obtained, persons are allowed to reduce the list of COCs for which PCLs must be developed based on the provisions of §350.71(k).

The commission emphasizes that its intention in establishing the provisions of §350.71(k) is to provide the person with the framework and conditions which apply to any evaluation of a COC for removal from the list of COCs for which PCLs must be established, not to arbitrarily require a response action for COCs that are in fact not present in the environmental medium of interest or are not the result of activities on the on-site affected property. In fact, just because a COC cannot be dropped from the list does not mean that a response action will have to be taken. To clarify the commission's intent in this regard, §350.71(k) has been amended. As such, the person must first determine whether the COC is detected in any samples in the environmental medium from which the person is attempting to eliminate the COC from the list of COCs for which PCLs must be developed. This section explicitly states that a detected COC is one that has a reported concentration that exceeds the method detection limit and has an analytical response that meets the qualitative identification criteria recommended in the analytical method used to generate the data. This condition prevents the person from having to evaluate potential false positive detections that meet the quantitative aspect (i.e., the quantitation criteria are greater than the method detection limit), but fail to meet the qualitative identification criteria (i.e., the laboratory cannot definitively state that the specific COC is present).

Under §350.71(k)(1), if the COC is detected in an environmental medium but all detected values and Figure 30 TAC are below the residential assessment level for that environmental medium, as well as in all other environmental media from which samples were collected, then the person may eliminate the COC from the list of COCs for which PCLs must be established. If, however, the COC is detected in the environmental medium but the detected value or sample quantitation limit in any sample of that environmental medium, or any other environmental medium from which samples were collected, exceeds the residential assessment level, then the person would proceed to §350.71(k)(2). If, on the other hand, a COC is not detected in any sample of an environmental medium, the person may proceed directly to §350.71(k)(3) to determine if the COC can be eliminated from the list of COCs for which PCLs must be established.

Section 350.71(k)(1) allows the elimination of COCs that are present at concentrations below levels that could impact human health and/or the environment in all environmental media sampled.

Section 350.71(k)(2) allows the person to evaluate the COC under different scenarios with §350.71(k)(2)(A) being the frequency of detect screen as included in §350.71(k)(1) of the proposed rule with several modifications. Those modifications are: 1) Dividing §350.71(k)(1)(A) of the proposed rule into two separate provisions §350.71(k)(2)(A)(i) and (ii) in order to enhance the readability of the provision; 2) eliminating §350.71(k)(1)(B) of the proposed rule because it conflicted with the commission's intention to require the person to evaluate each environmental medium separately (the commentor is referred to the commission's response to comments submitted by Chevron on §350.71(k)(1)(B) of the proposed rule); and 3) consolidating of the concepts embodied in (k)(1)(C) and (D) of the proposed rule, along with additional qualifying criteria, into §350.71(k)(2)(A)(iii) of the rule (the commentor is referred to the commission's response to comments submitted by Weston on §350.71(k)(1)(C) of the proposed rule). Sections §350.71(k)(2)(B) - (D) are as proposed in §350.71(k)(2)-(4) with the following minor changes: 1) §350.71(k)(2)(B) and (C) now require the person to consider whether the COC is a daughter or companion product of a COC present on the on-site affected property when evaluating the anticipated presence of a COC based on knowledge of on-site historical operations at the affected property; and 2) the movement of the statement concerning how to define a maximum concentration for the purpose of comparing to the Texas-specific background concentrations from up front in §350.71(k) of the proposed rule to the end of the subparagraph specifically addressing the use of Texas-specific background concentrations

(§350.71(k)(2)(D)) to improve the readability of the rule. In addition, §350.71(k)(2)(E) was added to allow the person to remove a COC from the list of COCs for which PCLs must be established if the person demonstrates that the on-site affected property is not the source of the release of that COC as the person is not held responsible for contamination that did not originate from the on-site affected property subject to this regulation.

Section 350.71(k)(3) allows the person to evaluate COCs that are not detected in any sample of the environmental medium being evaluated under this paragraph, as well as to evaluate non-detected results for the COC as a part of satisfying the requirements of §350.71(k)(2). Section 350.71(k)(3)(A) allows for the elimination of the COC if all of the Figure 30 TAC for all samples of the environmental medium being evaluated under this paragraph are less than the residential assessment level. Section 350.71(k)(3)(B) allows the person to evaluate those COCs that have Figure 30 TAC greater than the residential assessment level in some samples of the environmental medium being evaluated under this paragraph. In accordance with §350.71(k)(3)(B), the person may eliminate a COC from the list of COCs for which PCLs must be established provided that all of the conditions of clauses (i) - (vi) are met. Under §350.71(k)(3)(B)(i), the person must ensure that an appropriate analytical method was used. To determine if the analytical method is appropriate, the person must consider why the samples are being taken and analyzed (i.e., clearly identify the question to be answered by the data). If the intended use of the data is to determine the nature of the contamination (i.e., what COCs are present at the affected property), the person should use a broad spectrum analytical method that provides confirmation of analyte concentration and identification. Broad spectrum methods include, but are not limited to, gas chromatography/mass spectrometry and high performance liquid chromatography/mass spectrometry methods. COCs not detected in these types of analyses can be removed from the list of COCs for which PCLs must be established if they meet all of the requirements §350.71(k)(3)(B). If the intended use of the analytical data is to determine the extent of the COC in the environmental medium, the person should use a method appropriate for the COC, the medium, and the anticipated concentration level of the COC, and when attempting to demonstrate attainment, the appropriate performance standard. For example, in areas of high to medium contamination, a field screening method with supporting confirmation data or a broad spectrum method may generate adequate data to make a decision regarding some of the COCs at the affected property, but not be sensitive enough to provide detection/quantitation data for some of the other COCs. If the data support the decision to take action in the sampled area based on detected concentrations of some COCs, and that action would effectively lower the concentrations of those COCs that were not quantified using the method, then the person would not need to use another method to attempt to quantify those other COCs in the area subject to the initial response action. However, if and when, the analytical data are being used to support a “no further action” decision for the affected property, the method would not be considered appropriate, because the non-quantified COCs would need to be addressed. As such, persons would have to demonstrate that concentrations of those COCs not quantified in the area subject to the initial response action are in fact below the applicable assessment level outside of that area (unless expressly prohibited by a specific program).

Section 350.71(k)(3)(B)(ii) requires the person to demonstrate that the COC is not anticipated to be present in the environmental medium based on, but not limited to, knowledge of on-site historical operations, source area information, and characteristics of the COC and the affected property. For example, trichloroethylene (TCE) was used on the property and was detected in soil but not in groundwater. However, the SQLs for groundwater samples exceed the assessment level. In such a case, the person would need to make a cost-benefit decision to either gather additional groundwater data using a more sensitive analytical method or to proceed with developing a groundwater PCL for TCE.

In §350.71(k)(3)(B)(iii), the person must demonstrate that the SQL is below the method quantitation limit of the appropriate analytical method in critical samples. For example, the person may use a

broad spectrum method that cannot provide quantitation limits below the residential assessment level for all of the COCs. If the COC meets all of the other criteria in §350.71(k)(3)(B) and the quantitation limit exceeds the residential assessment level, the person needs to demonstrate in the critical samples that the COC can be reported as not detected at SQLs less than the method quantitation limit for that broad spectrum method. Whether a sample is considered to be a critical sample depends upon the decision to be made and depends upon the commission's assessment of the exposure potential in §350.71(k)(3)(B)(vi). If the exposure potential is high, then source area samples could be considered critical samples. If the exposure potential is low, the critical samples may be those samples that are located proximal to a source area, but at a distance that allows the laboratory to report the non-detected COC at a SQL that is less than the method quantitation limit for the method used.

Section 350.71(k)(3)(B)(iv) requires the person to demonstrate that the COC is not a companion or daughter product of a parent COC that can not be eliminated under the conditions of §350.71(k), while §350.71(k)(3)(B)(v) requires the person to demonstrate that no companion or daughter products to the parent COC being considered for elimination are detected. Finally, under §350.71(k)(3)(B)(vi), the person must demonstrate that the exposure potential is low based on consideration of the nature of the source area and the COC, the use and conditions of the affected property, the nature of the groundwater, local water use, proximity to potential receptors, and any other appropriate site-specific factors affecting potential exposure to the COC should it in fact be present. It is important to note that the person shall not consider either existing or future physical or institutional controls in the course of demonstrating that exposure potential is low. For example, if a surface cover is present over the area of the potential COC, but the surface cover is not part of a Standard B remedy, then that cover cannot be presumed to be a basis for not developing a PCL as there is not sufficient assurance that the surface cover would be maintained over time.

Finally, the provision in §350.71(k)(5) of the proposed rule was eliminated based on comments received. The commentor is referred to the commission's response to comments received specifically on §350.71(k)(5) of the proposed rule for a more detailed discussion of the commission's rationale for eliminating this provision.

Concerning §350.71(k), ARCADIS Geraghty & Miller commented that it did not understand the technical justification for the use of a sample quantitation limit (for an undetected constituent) as a proxy value to represent a maximum detected concentration. Some constituents have extremely low risk-based action levels that can even be less than the SQLs reported by laboratories. In these cases, this requirement could result in risk-based remediation decisions being derived for COCs that are not actually present at the affected property. ARCADIS Geraghty & Miller did not think that the TNRCC intended to compel remediation where the presence of COCs is in doubt. Instead, ARCADIS Geraghty & Miller suggested that the TNRCC continue the commonly accepted use of one-half of the SQL as the proxy value so that nondetectable COCs do not drive the assessment of risk.

The commission acknowledges the commentor's concerns that risk-based remediation decisions should not be required for COCs that are not actually present at the affected property. To clarify the commission's intent in this regard, §350.71(k) has been amended. The commentor is referred to the commission's response to Brown McCarroll & Oaks Hartline on this subject for details concerning the changes made to §350.71(k). Specifically, §350.71(k)(3) deals with COCs that are not detected in samples of the environmental medium being evaluated under §350.71(k). However, the commission anticipates that the commentor would agree that where historical operations knowledge for an affected property is not available or is not complete, or the person is unwilling to document the operations knowledge, then the burden falls to the person to demonstrate through the collection and generation of analytical data that a COC is not present. As to the commentor's concern that 1/2 the value of the SQL be used when a compound is not detected, the commission would stress that the

proxy assigned to a COC should be based on available data. For example, if a COC was detected in an area of concern at levels greater than the SQLs reported for non-detected results in that area, then those non-detected results for the COC in the near vicinity should be assigned the full value of the SQL. If, however, the COC is expected at the affected property, but based on available analytical data is not expected at concentrations near the SQL (i.e., sample point is not located near the area where the COC was detected at concentrations above the SQL), then the person could reasonably assign a proxy of 1/2 the SQL.

It is important to note that assigning a proxy value equal to the SQL to non-detected analytical results for data screening purposes would not necessarily result in a response action for COCs on the affected property. Several sections of the rule specifically address non-detected analytical results and it is critical that persons understand the differences between these sections. Section 350.54(h) specifies how all non-detected analytical results should be reported to the commission and states that all non-detected results should be reported as less than the value of the SQL. Once analytical data have been obtained, the next step in the process is to determine those COCs for which PCLs must be developed. Allowable procedures for determining if a PCL must be established for specific COCs are described in §350.71(k). This step in the process essentially represents a data screening step. The intended purpose of §350.71(k) is solely to eliminate those COCs for which the commission has a high degree of confidence are present at such low concentrations that it is unlikely that they would pose an unacceptable health or environmental risk, are clearly not present at levels exceeding the assessment level (e.g., the SQL < assessment level), are detected as an artifact of the sampling and analysis procedures, or are clearly not associated with historical operations at the affected property. Inclusion of such COCs does not, however, indicate that a response action will be necessary, just that PCLs must be developed.

Once PCLs have been developed, the next step in the process is to establish or calculate the site concentration term for each COC. Acceptable procedures for handling non-detected analytical results for the purpose of calculating the site concentration term for each COC are described in §350.51(n) of the proposed rule. The provisions of §350.51(n) allow persons to assign, based on available analytical data for the affected property, a proxy value equal to either the SQL or 1/2 the SQL to non-detected analytical results, except in cases where the executive director may require the person to use alternative statistical methods.

The final step in the process is to determine if a response action is necessary at the affected property. This step is described in §350.79 and requires persons to compare the site concentration term determined in accordance with the provisions of §350.51 to the critical PCL determined in accordance with the provisions of §350.78 of the proposed rule.

Concerning §350.71(k), with regard to the statement that "A COC should be considered detected in a particular environmental medium if it is present at concentrations above the method detection limit", Chevron, TCC, and TXOGA commented that the designation of detect or non-detect should be based on the sample specific method detection limit. The commentors recommended the following language be substituted for the proposed language: "A COC should be considered detected in a particular environmental medium if it is present at concentrations above the sample quantitation limit, where the sample quantitation limit is defined as the method detection limit, adjusted to reflect sample-specific actions."

The commission acknowledges the commentors' recommendation that "a COC should be considered detected in a particular environmental medium if it is present at concentrations above the sample quantitation limit . . .". However, the commission points out that the reporting of detected results and non-detected results is specified in §350.54(h). As specified in §350.54(h)(1) and (2), non-detected results and detected results are reported as the commentor recommends. For example, if a

COC is present at a concentration that exceeds the method detection limit and the analytical response meets the qualitative identification criteria recommended by the analytical method used, then, the COC is “detected . . . at concentrations above the sample quantitation limit”, because the SQL is a function of the method detection limit. The purpose of the SQL is to advise the data user of the concentration above which the COC was not detected in a particular sample. The screening provisions of §350.71(k) have been amended to clearly distinguish between detected and non-detected COCs. COCs detected at the affected property are handled under §350.71(k)(1) and (2), and COCs not detected at the affected property are handled under §350.71(k)(3). The commentors are referred to the commission’s response to Brown McCarroll & Oaks Hartline on this subject.

Concerning §350.71(k), Weston commented that they strongly support the screening approach to eliminate "noise" in the data and allow the person conducting the work to quickly focus on the constituents of true environmental interest. One of the problems with the existing program is the amount of time and energy that is required disproving that a constituent that was reported above the detection limit in a limited number of samples is a problem.

The commission intends these screening procedures to accelerate corrective actions.

Concerning §350.71(k)(1)(B), Chevron commented that Subsection §350.71(k)(1) states that all of the criteria must be met (subparagraphs A - D) for a COC to be considered not related to site activities. As currently written, Chevron suggested that subparagraph B is not necessary, and unrelated to the presence or absence of a site-related COC in a given environmental medium. Meeting the criteria of subparagraphs A, C, and D should be sufficient to document that a given compound is not site-related, and it is recommended that TNRCC remove subparagraph B.

As discussed in the commission’s response to comments from Brown McCarroll & Oaks Hartline on §350.71(k), the provision in §350.71(k)(1)(B) of the proposed rule has been removed as it conflicted with the intention of the commission to evaluate each environmental medium separately. It is critical to note, however, that the elimination of a COC for one medium when it may have been detected in another applies solely to the establishment of PCLs at a fixed point in time and does not extend to other actions that may be required at the affected property now or in the future. For example, if benzene is detected above the residential assessment level in soil and does not meet the provisions of §350.71(k)(1) or (2), the person would have to calculate a soil PCL. If on the same affected property, however, benzene is reported as non-detect in all groundwater samples and the provisions of §350.71(k)(3) are met, the person will not have to calculate a groundwater PCL for benzene at this point in time, but may be required to monitor groundwater for benzene to verify the effectiveness of the soil response action as well as to ensure that the benzene does not in fact migrate to groundwater at some point in the future. In addition, should it be determined at some point in the future that benzene has in fact migrated to groundwater, the person may need to develop a PCL for benzene.

Concerning §350.71(k)(1)(C), Weston suggested deleting this criterion. It is assumed that the purpose of item (1) is to eliminate from further consideration constituents that were detected in a very few samples, but which are not of significant environmental interest at the site due to the low frequency of detection. With the required sample frequency, it seems that the agency could be fairly confident that a COC could be eliminated from consideration strictly on the frequency of detection criteria (A) and (B). Weston stated that limiting the criteria to these two provides an option to eliminate "noise" in the data. If criteria (C) is included, the whole point becomes moot since the "COC" has already met the Standard A criteria, and further consideration is not needed. If this criterion is included, you might as well delete all of item (1) because it doesn't help any.

The commentor is correct in stating that the purpose of the screening criteria outlined in §350.71(k)(1) of the rule as proposed is to eliminate those COCs which are detected so infrequently

that they are not likely to be of environmental significance. However, such a criterion can not be employed in the absence of knowledge concerning the levels measured in the environmental media of concern. Clearly it would be inappropriate to eliminate a COC from further consideration at this point in the process in cases where, for example, although detected in only 4% of the groundwater samples collected and not detected in any of the soil samples collected on the affected property, the measured levels significantly exceed levels of concern for groundwater, or when considering the location of sample points reported as not detected and those points with the measured values, the area could be considered a source area. However, the commission agrees that the terminology used to describe the provision in §350.71(k)(1)(C) may have been confusing, as it essentially was equivalent to demonstrating attainment with Remedy Standard A. Therefore, as described in the commission's response to comments on §350.71(k) from Brown McCarroll & Oaks Hartline, the commission has amended the rule such that the concept of considering the magnitude of the concentration, whether it be for a detected value or the SQL in cases where the COC is reported as non-detect, has been incorporated in §350.71(k)(2)(A)(iii).

Concerning §350.71(k)(4), Chevron commented that the Texas-specific background concentrations listed in the referenced figure are median concentrations. Therefore, even at an unaffected site, one would predict that 50% of the samples analyzed could exceed the listed Texas-specific background. Similarly, as previously noted, the methodology required for establishing property-specific background concentrations would similarly be expected to result in exceedences, even with no site-related impacts. It is recommended that TNRCC provide a range, or an appropriate statistical limit (e.g. UCL) against which background concentrations are to be determined.

The commission disagrees that use of a range of Texas-specific soil background concentrations, or other statistical limits (e.g., 95% UCL on the mean), would be an appropriate comparison value for data screening purposes under §350.71(k)(4). The commission has in fact determined that it would be inappropriate to use upper percentiles of the Texas-specific background soil concentration data or to utilize the entire distribution of those data in making comparisons to the concentrations of COCs measured in samples from the affected property (e.g., two-sample t-test). The reason for this determination is that the database used to construct the median background concentrations is based on data collected across the entire state of Texas and in this database, the background soil concentrations for individual COCs were found to vary widely across the state. Given this variability in the range of background soil concentrations detected across the entire state, the commission believes, for example, that it would be inappropriate to eliminate lead as a COC at an affected property in Houston based on use of an extremely elevated background soil lead concentration associated with volcanic soils in El Paso. Therefore, the commission has determined the only way the Texas-specific background soil concentration data can be used generically is to set the default background soil concentration for each COC equal to the median value of the data set, as this value provides an estimate of "typical" Texas soil background concentrations and is not as influenced by the presence of data outliers as are other statistics (e.g., 95% UCL on the mean). It is important to note that the inclusion of COCs measured at levels above the default Texas-specific background soil concentrations does not indicate that a response action will be necessary, just that PCLs must be developed.

Further, the commission disagrees with the comment that because the default Texas-specific background concentrations are median values, 50% of the samples analyzed could exceed the listed Texas-specific background concentration. This rationale is illogical given that the Texas-specific background concentration reflects the median of all values collected across the entire state, not across a typical affected property. Clearly, there is no scientific basis for drawing inferences about the distribution of background concentrations on a specific affected property based on a value which represents a median concentration for the entire state.

Finally, it is important to note that the proposed rule provides various options for making comparisons with background concentrations on a site-specific basis, and the alternate statistical comparisons recommended by the commentor are allowed in determining whether the concentration of a COC in an environmental medium at the affected property is greater than the COC concentration for background areas, provided they meet the performance criteria of §350.79(2)(B).

Concerning §350.71(k)(5), AFCEE commented that, for Tier 3, reporting limits for many COC exceed 1/10th the residential Tier 1 $^{Tot}Soil_{Comb}$ PCL, 1/10th of the residential Tier 1 $^{GW}Soil$, or 1/10th of the residential Tier 1 $^{GW}GW_{Ing}$ PCL. These compounds would proceed through the PCL determination process. Additionally, AFCEE asserted that no justification is provided for the 1/10th benchmark that seems very restrictive. AFCEE proposed to provide flexibility for chemicals whose reporting limits do not meet the criteria and requests that TNRCC revisit this restrictive provision. Chevron commented that it is inappropriate to apply a residential PCL to an industrial/commercial site for eliminating COCs. In addition, the assumption of a 30-acre source area is unrealistically conservative. The screening level of 1/10 of the residential Tier 1 $^{GW}GW_{Ing}$ will be overly conservative for sites with only a few COCs, and for those with few chemicals acting on the same target organ or with few potential carcinogens. It is entirely inappropriate under any circumstances to require use of a 30 acre source size to calculate a residential PCL when the maximum residential exposure area cannot exceed 1/8 acre without a deed notice, and can never exceed 1/2 acre in any case. Chevron stated that the text should be rewritten to indicate that industrial/commercial PCLs can be used in screening industrial/commercial sites, the factor of 0.1 may be increased appropriately to account for the number of COCs at a site, and the source area size may be determined on a site-specific basis. Environmental Resources Management commented that PCLs should be established for constituents which exceed 1/10th of the PCL. The logic is circular here but the point understood. However, Environmental Resources Management stated that this screening criteria should be based only on the direct contact PCL ($^{Tot}Soil_{Comb}$) similar to the current Risk Based Screening Values from the July 23, 1998, Consistency Guidance Memorandum. The commentor recommended us of the Risk-Based Screening Values (RBSVs) presented in the July 23, 1998, Consistency Guidance Memorandum. KOCH commented that the proposed TRRP rule states that COCs do not have to be considered if the maximum concentration is less than 1/10th of the $^{Tot}Soil_{Comb}$, $^{GW}Soil$, or $^{GW}GW_{Ing}$ defined at §350.4(d). However, the proposed rule also states that COCs do not have to be considered if the maximum concentration is less than the assessment level (§350.71(k)(1)(C)). Koch commented that these two requirements appear to contradict each other. Because the proposed TRRP is risk-based, the assessment level should be used to select COCs. This is consistent with the requirement that COCs in environmental media be delineated to the assessment level (§350.51(b)). KOCH commented that use of 1/10th of the $^{Tot}Soil_{Comb}$, $^{GW}Soil$, or $^{GW}GW_{Ing}$ is arbitrary and is not risk-based. Therefore, this proposed requirement should be removed from the rules. Weston suggested deleting this criterion stating that if the maximum concentration of the COC is less than 1/10 the lower of the Tier 1 residential $^{Tot}Soil_{Comb}$ or the Tier 1 residential $^{GW}Soil$ PCL then it has already demonstrated that the constituent meets the Standard A requirement and no further consideration is needed. This does not help to focus the evaluation effort. In addition, it does not appear that this constituent should have ever been considered a COC. EPA Region 6 commented that no technical justification is provided for the 30 acre assumption or for the use of a 1/10th fraction of the PCL. Clarification of these assumptions and values is necessary.

AFCEE, Chevron, Environmental Resources Management, KOCH, and Weston all questioned the conservative nature of the data screening criteria allowed under §350.71(k)(5) of the proposed rule, while the EPA questioned the basis for assuming a 30-acre source area and using 1/10th of the of the PCL. The intended purpose of §350.71(k)(5) was solely to eliminate those COCs for which the commission has a high degree of confidence are present at such low concentrations that it is unlikely that they would pose an unacceptable health risk, even in cases where individuals are exposed simultaneously to multiple COCs. Clearly, COCs should not be eliminated on an individual basis unless there is a high degree of assurance that the concentrations detected on the affected property are in fact so low that they will not likely contribute to the overall cumulative risk and hazard posed

by simultaneous exposure to multiple COCs. Therefore, the commission determined that it was necessary to develop conservative screening limits. Given this decision by the commission, a single set of screening values was developed for all land uses, and those screening values were derived based on conservative assumptions (i.e., 1/10th of the residential values, 30-acre source area, the lower of the health-based ($^{Tot}Soil_{Comb}$) and groundwater protection ($^{GW}Soil$) PCLs). The commission determined that such an approach was warranted based on the uncertainty concerning the cumulative risk and hazard posed by COCs on an affected property given their concentrations in conjunction with the number of COCs present. It is important to note that just because the maximum concentration of a specific COC on the affected property exceeds the conservative screening limits described in §350.71(k)(5), a response action is not necessarily warranted, just that a PCL must be calculated. If the COCs in question truly do not pose an unacceptable risk to human health or are not likely to impact underlying groundwater, this should become evident as the person moves through the process outlined in the proposed rule.

In response to comments received on this subsection, the commission has reviewed the provisions of §350.71(k)(5) and has determined that the values cannot be made any less conservative because of the uncertainty concerning the overall cumulative risk and hazard associated with exposure to multiple COCs on the affected property. Therefore, since commentors have questioned the utility of having such conservative values as a part of the data screening criteria and the commission has determined that the risk-based screening values cannot be made less conservative for the reasons described above, the commission has decided to eliminate the data screening criteria provided in §350.71(k)(5) of the proposed rule altogether. The rule has been modified to reflect this change.

§350.72. Carcinogenic Risk Levels and Hazard Indices for Human Health Exposure Pathways

Concerning §350.72, Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP does not take a conservative approach. For example, Henry, Lowerre pointed out that a survey by the General Accounting Office shows that the majority of states have set acceptable health risks, such as those for increased risks of cancer at 1 in 1 million people. TNRCC is proposing in §350.72 of the proposed rule to go with the minority of states that allow the increased risk of cancers to be 1 in 100,000. This is not the conservative or even standard approach, especially for the protecting water resources. TNRCC's approach will result in an increase in the number of Texans who will get cancer and other diseases from exposure to contaminants in soils and groundwater.

The 1×10^{-5} risk level is protective as discussed above in the response to EPA Region 6.

Concerning §350.72(a)(1), Chevron commented that RBELs and PCLs for carcinogenic COCs should be limited to class A and B carcinogens. Also, concerning §350.72(a)(1) Chevron commented that in the proposed TRRP a screening risk limit for individual carcinogens of 1×10^{-5} is selected, whereas under the current Risk Reduction Rule a limit of 1×10^{-6} is selected. A limit of 1×10^{-4} is proposed for cumulative risk. Moreover, a hazard quotient of 1 and a hazard index of ten are proposed for non-carcinogens. The current values for HQ and HI are both equal to 1. The selection of the revised risk limits in the TRRP appears to be reasonable. The value of 1×10^{-5} is the midpoint of the target risk range generally accepted by the EPA and Cal-EPA.

The commission disagrees with the comment that the rule should include explicit language limiting the development of RBELs and PCLs for carcinogenic COCs to class A and B carcinogens, especially in light of the fact that the EPA proposed eliminating this classification scheme in favor of adopting a narrative approach. This recommendation by the commentor is also problematic from the standpoint that there are several different classification schemes published by different entities (e.g., EPA, the National Toxicology Program, IARC, ACGIH) and the specific classification for a COC may differ under the various schemes. Further, the classification of a carcinogen as "class A or B" is specific to

the EPA, yet the hierarchy of sources from which persons should obtain toxicity values specified in §350.73(a) is not limited to the EPA. It is the opinion of the commission that if the scientific community determines that a particular study meets the weight-of-evidence requirements such that a cancer slope factor or unit risk factor can be derived and is made available in accordance with the hierarchy sources provided in §350.73(a), then the COC should in fact be evaluated as a carcinogen. By way of example, chlorodibromomethane has been classified by the EPA as a class C carcinogen (a "possible human carcinogen") based on positive carcinogenic evidence in male and female B6C3F1 mice, together with positive mutagenicity data and structural similarity to other trihalomethanes (THMs) which are known animal carcinogens. Based on the scientific weight-of-evidence, it would be difficult to justify ignoring the carcinogenic potential of such a COC. It is worth noting that the development of cleanup levels based on consideration of carcinogenic effects for class C carcinogens is consistent with the approach taken by the EPA in their Soil Screening Guidance (May, 1996), as well as that followed by EPA regional offices and state environmental regulatory agencies.

Concerning §350.72(a)(1), Henry, Lowerre, Johnson & Frederick commented that the risk standard of 1×10^{-5} is different than EPA's standard of 1×10^{-6} as a point of departure.

The cancer risk level deemed acceptable (de minimus) by the EPA actually ranges from 1×10^{-4} to 1×10^{-6} , with evidence in the scientific literature indicating that regulatory actions have not typically been triggered until cancer risks approached a 1×10^{-4} cancer risk level. Further, EPA Region 6 proposed using a screening risk limit of 1×10^{-5} in their recently released Draft *Risk Management Strategy*. In view of the emerging trend for the EPA and other regulatory agencies to consider lifetime cancer risks greater than 1×10^{-6} as acceptable based on cost, feasibility, or the size of the exposed population, the commission determined that a cancer risk level of 1×10^{-5} is an acceptable regulatory benchmark to ensure protection of human health.

Henry, Lowerre, Johnson & Frederick requested to not arbitrarily "Split the Baby" for cancer risks. Henry, Lowerre, Johnson & Frederick stated that the proposed rule bases the cleanup levels of carcinogens on a cancer risk of 1×10^{-5} (or 1 in 100,000 people) instead of the more conservative and commonly followed risk level of 1×10^{-6} (or 1 in 1,000,000). The current rules are also a problem since they allow a range of acceptable cancer risk without also providing guidance for when a higher or lower value can be acceptable. The solution to this problem, however, is not to "split the baby." The solution is to provide guidance on when a lower or higher value should be used. For example, in communities with disproportionate levels of pollutants, added protection is justified. A risk value of 1×10^{-6} is appropriate. Likewise, since it is very difficult to evaluate the cumulative impacts of multiple sources or the additive impacts of exposure over years, the higher safety level should be applied where there are cumulative impacts.

The commentor is correct in stating that allowance of a range of acceptable cancer risks values poses problems for regulatory agencies. What typically occurs when a range of values is used is that the regulated community pushes for the higher (less conservative) end of the range, while citizens and environmental groups push for the lower (more conservative) end of the range. While the commentor's suggested solution to this problem seems reasonable in theory, in practice, it will not alleviate any of the problems experienced in implementing a range of acceptable cancer risk levels. The regulated community will contend that communities are not experiencing disproportionate impacts and push for the higher end of the range, while citizens and environmental groups will contend that they are in fact experiencing such disproportionate impacts and push for the lower end of the range. The end result will be that much time is spent arguing over what the acceptable risk level should be, rather than cleaning up contaminated sites in order to improve environmental quality in communities. The commission remains convinced that use of a clear, single protectiveness benchmark will benefit public health and the environment by avoiding confusion and controversy over the level of protection on which the cleanup levels should be based.

Concerning §350.72(a)(2), Henry, Lowerre, Johnson & Frederick commented that the proposed hazard quotient of 0.2 is different than EPA's standard of a hazard index of 1 as a point of departure.

The comment that the proposed rule specified an acceptable hazard quotient of 0.2 for noncarcinogenic COCs is incorrect. As stated in §350.72(a)(2) of the proposed rule, the RBEL and PCL for each noncarcinogenic COC, including those PCLs based on combined exposure pathways shall be based on a hazard quotient of one except when other standards shall be used as RBELs as discussed in §350.74.

Concerning §350.72(b), Chevron commented that in keeping with EPA guidance and standard risk assessment practice, the requirement to consider cumulative effects from multiple noncarcinogenic COCs should be specifically restricted to COCs that act through a similar mechanism, or affect the same target organ. Also with regard to §350.72(b), KOCH commented that the proposed rules discuss adjusting PCLs to lower concentrations to meet cumulative carcinogenic risk levels and hazard index criteria. KOCH stated that a person should have the option of assessing cumulative risks using the target organ approach. If the cumulative risks exceed criteria at §350.72(c), then a person should be able to re-calculate risks based on which COCs act on a specific target organ. Acceptable cumulative risk criteria would then be estimated for each target organ (e.g., kidney, liver, central nervous system, etc.). KOCH cited the Illinois Environmental Protection Agency as promulgating an applicable system at 35 Ill. Adm. Code 742.720(b) and Appendix A, Table E (Similar-Acting Non-Carcinogenic Chemicals) and at 742.805(d) and Appendix A, Table F (Similar-Acting Carcinogenic Chemicals). A similar system should be incorporated into the TRRP rules. KOCH also commented that it supports the proposed use of cumulative carcinogenic risk level of 10^{-4} and hazard index of ten. The approach should be extended to allow the calculation of risks based on the target organ approach. If the initial calculations show that the target risk levels are exceeded, then a person should have the option of re-calculating the effects of similar acting chemicals on each target organ system (e.g., liver, kidney, central nervous system, etc.). A response action would not be required if these organ-specific calculations do not exceed the target risk levels.

Although not explicitly provided for in §350.72(b) of the proposed rule, the commission has in fact incorporated consideration of a target organ approach in the development of several aspects of the proposed rule. For example, as outlined in Volume 2, of the TRRP Concept Document issued on December 16, 1996, the commission justified use of a target hazard index of ten based in part, on the fact that the proposed rule required persons to add across COCs and exposure pathways regardless of the affected target organ(s). Considering the additive response resulting from exposures to multiple chemicals and pathways also serves, in part, as a means of addressing concerns about potential for synergistic interactions. That is, while it is technically difficult to quantitate potential synergistic responses, requiring that persons consider, at a minimum, the additive response associated with exposures to multiple COCs and pathways regardless of the affected target organ provides a qualitative means of addressing such concerns. Finally, the commission believes that the conservatism inherent in adding across COCs and pathways regardless of the affected target organ serves as a justification for not requiring persons to combine exposure pathways across source media (e.g., soil exposure pathways combined with groundwater exposure pathways) as provided for in §350.71(j).

Concerning §350.72(b)(4), EPA Region 6 commented that this section is an exclusionary provision from consideration of cumulative impacts for ground water-to-surface releases. Not requiring a cumulative check for these releases may underestimate the potential risk. Similarly, concerning §350.72(b)(5), EPA Region 6 commented that this paragraphs allows for the exclusion of COCs for the groundwater ingestion exposure pathway for COCs with designated MCLs; excludes the requirement to do a cumulative estimated risk check for soil-to-groundwater transport; and excludes compounds from the cumulative risk check such as dioxins and PCBs. EPA Region 6 suggested that the exclusion of these from any analysis may underestimate cumulative risk.

The commission disagrees with the comment that exclusion of specific COCs from the evaluation of cumulative cancer risk and hazard in cases where the PCLs have been established based on federal MCLs, based on protection of underlying groundwater, or based on conservative policy levels may underestimate cumulative risk. Such an approach was necessary for the following reasons: 1) federal MCLs are not all set at risk and hazard levels equivalent to those specified in the proposed rule, and many are in fact driven by available treatment technologies; 2) PCLs set based on protection of underlying groundwater (^{GW}Soil) are not risk-based; and 3) the PCLs for dioxins, lead, and PCBs in cases where TSCA is applicable are those that have been determined to be protective on a national basis but do not necessarily reflect the same risk and hazard benchmarks specified in the proposed rule. The commission notes that the rule has been amended to clarify that, as specified in §350.76(d)(4), the person must comply with the requirements of TSCA in order to utilize the TSCA values as the soil PCL and also clarified that this provision was specific to the soil PCL. As should be apparent in the equation provided in 30 TAC Figure 30 TAC §350.72(d), inclusion of the PCLs for such COCs in the calculation of cumulative risk or hazard would imply that they were based on an equivalent level of acceptable risk and hazard. As this is clearly not the case, it would be inappropriate to include such COCs in the calculation of cumulative risk and hazard. Nonetheless, the commission believes that despite the elimination of a limited number of COCs from the cumulative evaluation, the overall approach for calculating RBELs in the proposed rule was in fact sufficiently conservative such that ultimate PCLs will provide adequate protection of human health.

Further, the commission believes that its approach is wholly consistent with what is typically done by the EPA. For example, water utilities are only required to meet federal MCLs, regardless of the number of contaminants present in the drinking water. Arsenic could have been detected above the MCL in the water supply for two municipalities, but municipality Number 1 had four other contaminants present at levels close to the MCL, while the municipality Number 2 had no other contaminants detected. In this case, municipality Number 1 would not have to do anything different from municipality Number 2. Both would just have to meet the federal MCL for arsenic. In addition, conversations with EPA staff indicate that although contaminants with federal MCLs may be included in the initial calculation of risk and hazard in the baseline risk assessment, action is typically not taken to require remediation to levels below the MCL in cases where there are multiple contaminants in the groundwater or to adjust the cleanup levels for other contaminants in cases where the risk associated with the drinking water exposure pathway is unacceptable and is driven by a contaminant meeting the federal MCL (e.g., arsenic). With respect to the exclusion of COCs from the evaluation of cumulative risk and hazard in cases where the PCL is based on protection of underlying groundwater (i.e., ^{GW}Soil), this does not mean that the cumulative risk and hazard is not evaluated for soil or groundwater, just that the ^{GW}Soil value is not the basis for that evaluation (i.e., the ^{GW}Soil value should not be used as the PCL in the denominator of the equation provided in Figure 30 TAC 30 TAC §350.72(d)). In fact, the provisions of §350.72(b) require persons to evaluate cumulative risk and hazard for each individual (e.g., ^{GW}GW_{Ing}) and combined (e.g., ^{Tot}Soil_{Comb}) exposure pathway for which PCLs must be developed in accordance with §350.71(c). Finally, the commission maintains that the exclusion of COCs from the evaluation of cumulative risk and hazard in cases where the PCL is based on a cleanup level that is nationally recognized as acceptable (e.g., dioxins) is consistent with how the EPA typically handles these specific COCs. The EPA routinely uses the policy levels established for dioxins, without regard to the number of COCs present on an affected property. More specifically, the EPA has not been known to remediate dioxins present on residential sites to a level lower than 1 ppb in order to address cumulative concerns associated with other COCs present on the property. For lead, given that the levels deemed protective are based on a biokinetic model, it is clearly not possible to incorporate lead in any calculations of cumulative risk and hazard.

Concerning §350.72(b)(5), KOCH asked whether the polychlorinated biphenyls (PCBs) cleanup levels promulgated in the EPA's "PCB Mega Rule" (40 CFR 761) would be applicable in Texas. KOCH stated

that it strongly believes that these levels (e.g., 40 CFR 761(a)(4)(i)(B)) should be clearly incorporated into the TRRP rules. Further, KOCH stated that a person should have the option (without obtaining a formal exposure factor variance, §350.74(j)) of using these exposure parameters developed by the EPA. For sites meeting the definition of a low occupancy area (40 CFR 761.3), a person should be able to use an exposure frequency of 42 days/year (i.e., 6.7 hours per week for 50 weeks) for PCBs and other COCs.

The commission points out that §350.76(d)(4) states that, in Tiers 2 and 3, soil PCLs may be set based on TSCA 40 CFR Parts 750 and 761 requirements (referred to as the "PCB Mega Rule") for sites where these TSCA requirements are applicable. While recognizing the authority of this Mega Rule for PCBs, the commission does not believe that it is appropriate to broaden the applicability of concepts which are specifically intended for PCB regulation (e.g., designation of low occupancy areas) by using them in evaluating any other COC. Therefore, no change was made in response to these comments.

Concerning §350.72(b) and (c), McCulley Frick & Gilman commented that the target risk value used to develop PCLs for individual carcinogenic chemicals is $1E-05$ and the cumulative risk level is $1E-04$. This standard was adopted because it ensures that on a (carcinogenic) chemical-specific basis each site will be evaluated with a consistent response action criterion. It also ensures that where multiple carcinogens are present (up to ten carcinogenic chemicals) the allowable cumulative risk level ($1E-04$) will not be exceeded in the absence of further corrective action. In the interest of consistency, McCulley Frick & Gilman stated that this is a reasonable, though conservative, approach. The policy adopted by EPA (1991), however, recommends the use of a baseline risk assessment and the upper boundary of acceptable risk ($1E-04$) to make decisions regarding remedy selection. Therefore, cleanup criteria in Texas under the proposed rule may be more stringent than would be necessary to meet EPA requirements, particularly when fewer than ten COCs are present. McCulley Frick & Gilman stated that an inconsistency arises from the requirement to evaluate cumulative risk when multiple chemicals are present in environmental media. Figure 30 TAC 30 TAC §350.72(d) presents the equation that is proposed for use in evaluating cumulative risk. The use of this equation is required to downwardly adjust PCLs when the sum of the ratios of PCL-adj to PCL (per chemical) exceed 10.0 (i.e., the sum of target risk values exceeds $1E-04$ or the sum of hazard indices exceeds ten). Furthermore, the person is allowed to downwardly adjust the PCL-adj value on a chemical-specific basis so that the person may effectively apportion allowable risk toward chemicals that occur in higher concentrations at the affected property. However, the person is not allowed to use the same equation to upwardly adjust PCLs when fewer than ten COCs are present. There is a disparity between the flexibility allowed in downwardly adjusting PCLs based on the consideration of cumulative risk and the restrictions placed on the upward adjustment of PCLs based on the consideration of cumulative risk. Therefore, McCulley Frick & Gilman recommended that the adjustment of PCLs based on cumulative risk level of $1E-04$ be allowed regardless of the number of COCs present at a site.

The commentor is correct in stating that PCLs cannot be upwardly adjusted based on consideration of the cumulative carcinogenic protectiveness benchmark of 1×10^{-4} specified in §350.72(b). The commission has made a fundamental science policy decision in defining the acceptable cancer risk level at 1×10^{-5} for each individual carcinogenic COC regardless of the number of carcinogens present. While this is clearly a departure from the acceptable cancer risk level of 1×10^{-6} specified in the current Risk Reduction Rule, the commission believes that such a departure is appropriate given the emerging trend for the EPA and other regulatory agencies to consider lifetime cancer risks greater than 1×10^{-6} as acceptable based on cost, feasibility, or the size of the exposed population. Like the current Risk Reduction Rule, the proposed rule requires the person to downwardly adjust cleanup levels calculated based on consideration of the protectiveness benchmark for individual carcinogenic COCs in cases where the cumulative risk associated with exposure to multiple carcinogenic COCs exceeds 1×10^{-4} . This ensures that the carcinogenic risk for an individual COC does not exceed 1×10^{-5} , the critical protectiveness benchmark established by the commission. It should be noted that a critical factor considered by the commission in establishing the ultimate

protectiveness benchmark for carcinogens at 1×10^{-5} rather than 1×10^{-4} regardless of the number of carcinogens present was the determination that in cases where PCLs have been established based on a primary or secondary MCL or reflect a policy level as provided for in §350.76, it is not necessary to include such COCs in the cumulative evaluation required in §350.72(b).

Concerning §350.72(c), Henry, Lowerre, Johnson & Frederick commented that besides the differences in policy, the use of these target levels may be a concern from an environmental assessment standpoint. The proposed approach will only allow for ten carcinogens or five non-carcinogens to be present at the RBEL before the maximum target risk level of 1×10^{-4} for carcinogens and hazard index of 1 for non-carcinogens would be exceeded. Henry, Lowerre, Johnson & Frederick asked how TNRCC proposes to protect sites from cumulative effects when more than ten carcinogens or five non-carcinogens are present at the target risk level.

The proposed rule explicitly required persons to consider the impact of exposures to multiple COCs in the development of PCLs. Section 350.72(b) of the proposed rule required persons to evaluate whether the PCLs for a human health exposure pathway need to be adjusted to lower concentrations to meet the cumulative carcinogenic risk level and hazard index criteria in subsection (c) of this section when there are more than ten carcinogens or ten noncarcinogens within a source medium. The specific protectiveness benchmarks for cumulative risk and hazard specified in §350.72(c) include an acceptable cumulative cancer risk level of 1×10^{-4} and a hazard index of ten. The details concerning how to downwardly adjust PCLs when necessary are provided in §350.72(d). It is important to note that, as discussed in the preamble to the proposed rule, PCLs calculated based on consideration of the individual cancer risk and hazard criteria specified in §350.72(a) (i.e., 1×10^{-5} and 1, respectively) cannot be upwardly adjusted based on the cumulative risk and hazard criteria specified in §350.72(c) in cases where there are fewer than ten carcinogens or ten noncarcinogens.

§350.73. Determination and Use of Human Toxicity Factors and Chemical Properties.

Concerning §350.73(a), McCulley Frick & Gilman commented that it appears that some of the toxicity values (e.g., methyl t-butyl ether) are based on provisional or non-verified toxicity values. The source of this information and support documentation is an important part of the risk evaluation and PCL calculation. It is imperative that the rules allow the flexibility to use other scientifically valid sources in the selection of toxicity values used in the development of PCLs.

The commission notes that the sources of all of the toxicity factors used to calculate the Tier 1 PCLs which accompanied the proposed rule were provided in the Toxicity Factors table. Thus, a person may obtain any necessary documentation to determine the basis of any of the provisional toxicity factors. Further, most of the provisional values listed on the Toxicity Factors table were obtained from the EPA's National Center for Environmental Assessment (NCEA) and are indicated as such. The commission maintains that these provisional values are reliable enough to use in the RBEL and PCL calculations, thus allowing risk-based PCLs in lieu of full cleanup (i.e., background) of the COC. This approach is also consistent with EPA policy as indicated by the fact that EPA Regions 3, 6, and 9 use NCEA provisional values as well in establishing cleanups levels provided by their respective screening tables.

Concerning §350.73(a), Weston stated that reopening a project at the time of review of the RACR does not appear to be a workable situation. Once the SIN or RAP has been approved, and the remediation implemented in accordance with the SIN or RAP, reopening the project should not be allowed.

First, there is no formal approval of the SIN. Second, a change in a toxicity factor that is of sufficient magnitude that previously determined PCLs may not be protective of human health and the environment is absolutely sufficient basis to require that PCLs be re-evaluated regardless of the

status of project. This same provision is included in §350.35 which addresses substantial changes in circumstances which could compel closed cases to be re-opened. Additionally, the same toxicity factor changes are considered substantial changes in circumstance under current 30 TAC 334 and 335. The commission is concerned with protection of human health and the environment and not just ensuring cases are closed.

Concerning §350.73(a)(4), EPA Region 6 commented that the proposed rule lists TNRCC's Chronic Remediation-Specific Effects Screening Levels as a reference for toxicity values. The referenced document does not utilize route-to-route extrapolation to evaluate the inhalation pathway when there is no inhalation-based toxicity value. The EPA routinely uses route-to-route extrapolation for assessing the toxicity of organic chemicals that have no inhalation-specific toxicological information and will look at the applicability of using route-to-route extrapolation on a case-by-case basis. EPA Region 6 stated that not utilizing this extrapolation method may lead to an underestimation of the potential risk.

The commission strongly disagrees with the comment that not employing route-to-route extrapolation procedures may underestimate potential risk. Further the commission has determined that the state-of-the-science clearly indicates that such extrapolation procedures are inappropriate. In fact current guidance from both the EPA Office of Research and Development (Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry, EPA, 1994) and the EPA Office of Solid Waste and Emergency Response (Soil Screening Guidance: Technical Background Document, EPA, 1996) strongly discourage "across the board" route-to-route extrapolation as practiced by EPA Region 6 in the derivation of their Medium Specific Screening Levels. Rather, the appropriateness of carrying out route-to-route extrapolation should be considered on a case-by-case basis and should account for the relationship between physicochemical properties, absorption and distribution of toxicants, the significance of portal-of-entry effects, and the potential differences in metabolic pathways associated with the intensity and duration of exposure.

Concerning §350.73(b), IT Corporation requested that the commission clarify whether the TNRCC Chronic Remediation-Specific Effects Screening Level value is to be used as the inhalation URF value as well as the inhalation RfC value.

The commission Chronic Remediation-Specific Effects Screening Level value is to be used as only the inhalation RfC value, and not as the inhalation URF value. As stated in §350.73(b), "(T)he person shall use the Chronic Remediation-Specific Effects Screening Level value as the reference concentration in evaluating the inhalation pathway for both residential and commercial/industrial land use in accordance with §350.75(i)(3),(6) and (8) of this title. . ."

Concerning §350.73(b), Chevron commented that ESL-based values should only be used for residential property or to determine protectiveness at the boundary for commercial/industrial facilities; OSHA PELs and TLVs are more appropriate for commercial/industrial receptors.

Chevron recommended that the commission remove "and commercial/industrial" and insert "and for determining compliance at the facility boundary for commercial/industrial facilities" after "residential land use." McCulley Frick & Gilman commented that §350.73(b) indicates that the TNRCCs Remediation-Specific Effects Screening Level (ESL) is to be used as the reference concentration (RFC) when estimating inhalation RBELs for both residential and commercial/industrial scenarios if no inhalation unit risk or RfC is available from EPA. ESLs are used as part of the air permitting process for facilities in Texas and are generally derived from Occupational Exposure Limits (OELs), such as the Occupational Safety and Health Administrations Permissible Exposure Limits (PELs), and include safety factors to account for residential exposure and to extrapolate from the healthy worker population to the general population, including sensitive subpopulations. This requirement seems overly restrictive when calculating inhalation RBELs for commercial/industrial land use. McCulley Frick & Gilman suggested using the appropriate OEL as the

RfC for calculating inhalation RBELs when an EPA-derived RfC or unit risk factor is not available for commercial/industrial properties.

The commission disagrees with the comment that it is inappropriate to use the commission's Chronic Remediation-Specific Effects Screening Level values (RS-ESLs) in calculating inhalation RBELs for commercial/industrial land use. The RS-ESLs are analogous to EPA's RfCs, both of which are set to be protective for the general population, including sensitive subpopulations considering a lifetime of exposure. EPA's RfCs and other toxicity factors (e.g., RfD_{o,s}, SF_{o,s}, URFs) are routinely used to assess risks/hazards for exposures to both residential and commercial/industrial receptors. Further, the commission notes that the rule as proposed contains a provision in §350.74(b)(1) for using occupational limits as commercial/industrial inhalation RBELs.

Concerning §350.73(c), Chevron, McCulley Frick & Gilman, TCC and TXOGA noted the proposed subsection was incomplete.

The commission agrees with the commentors and has amended the rule to read as follows: Unless prior approval is provided by the executive director in accordance with §350.74(j)(2) of this title (relating to Development of Risk-Based Exposure Limits) to use a subchronic exposure duration (i.e., <seven years) for a commercial/industrial property, the person shall not use subchronic toxicity factors.

Concerning §350.73(e), Brown & Caldwell commented that no provision is made for either SPLP or other site-specific soil leachability tests, and recommended that SPLP or other site specific leachability tests be allowed for development of ^{GW}Soil PCLs under Tier 2 or Tier 3.

The rule allows for the use of appropriate leachate test results under §350.75(i)(7)(C). The intent is that the leachate test results would be used as the site-specific soil-water partition coefficient (K_d). However, to reinforce the point, the rule has been amended at §350.73(e)(1) to allow use of appropriately conducted leachate tests to determine a site-specific K_d or K_{oc} .

Concerning §350.73(e), Chevron commented that there is no reason to specify the use of a particular set of values as part of the rule. This should be presented in guidance. Chevron recommended the deletion this paragraph and its replacement with a general directive to consult guidance. IT Corporation recommended that the TRRP allow calculated estimates of physical/ chemical properties of chemicals not listed in 30 TAC §350.73(a). This recommendation is consistent with the provision to allow submittal of information to the executive director for consideration in the derivation of toxicity factors.

The commission disagrees that there is no basis for specifying the COC chemical/physical properties values to be used in calculating RBELs and PCLs in the rule. In fact, the commission has determined that specifying a single set of consistent values is appropriate in cases where there is not a reason to believe that the chemical/physical properties would vary across sites. For the COC chemical/physical properties that may actually be dependent on site characteristics, the commission has provided the flexibility to make adjustments as provided in paragraphs (1) and (2). To add clarity to the commission's intent in this regard, the rule is amended to state that the COC chemical/physical properties may only be adjusted in accordance with paragraphs (1) and (2) of the subsection to be consistent with Figure 30 TAC §350.75(b)(1) as proposed. The rule is also amended in response to IT Corporation's comment to make it clear that persons may provide chemical/physical property information for COCs not included in the figure to aid the executive director in establishing chemical/physical properties for that COC, when it is warranted that COCs must have a PCL developed.

Concerning §350.73(e), McCulley Frick & Gilman commented that they appreciate the inclusion of the various chemical/physical properties in the various figures; however, they commented that no references are provided for chemical/physical properties. By relying on default values and properties, the regulated community is subjected to their accuracy and validity. The commentor noted that the DF.adj values provided in Figures: 30 TAC §350.74(a) and 1: §350.76(b)(1) are different although they should be the same. Therefore, protective concentration limits (PCLs) calculated based on these figures may be incorrect.

The commission provided the references in the December 1996 Conceptual Document issued for public comment on the then developing TRRP. The commission shall make the references publically available via guidance, but is not amending the table in the rule as it is not the appropriate place to include such information. The commission also points out that the list of COCs provided in 30 TAC §350.73(e) is not an indication of all COCs that may need to be evaluated, but is simply a list of the COCs for which the commission has established chemical/physical properties. Therefore, COCs other than those included in the figure may need to be evaluated, and in those situations the person may recommend chemical/physical properties for use in the establishment of PCLs, subject to final approval by the executive director. The commission agrees that DF.adj values provided in Figures §350.74(a) and §350.76(b)(1) should be the same, and has amended §350.76(b)(1) such that a value of 352 mg-yr/kg-event has been incorporated. This typographical change does not affect the Tier 1 PCL values provided in the draft rule.

Concerning §350.73(e)(1), McCulley Frick & Gilman commented that the last sentence of this subparagraph states “These property-specific values may also be applied in calculating those chemical/physical parameters (e.g., Henry’s Law Constant) which incorporate K_d or K_{oc} in Tiers 2 and 3.” The commentor stated that this sentence is misleading. K_d or K_{oc} values are not used to calculate Henry’s Law Constant.

It is the commission's intent that an option be available under Tiers 2 or 3 for the person to utilize leachate testing or other physical methods in determining a site-specific K_d or K_{oc} and has amended the rule. The commission agrees with the potential for confusion expressed by the commentor, and has stricken that language from the rule. Additionally, Figure 30 TAC §350.75(b)(1) has been amended to change “Special Consideration” to “No” and to replace the rule citation to “NA” for both H and H’ to conform with this change to §350.73(e)(1).

Figure 30 TAC §350.73(e) has been amended to reference 2-chlorotoluene instead of chlorotoluene. The CAS number, H’, Log K_{oc} , Log K_d , D_{air} , D_{wat} , Solubility, Vapor Pressure, and Log K_{ow} have been updated accordingly. Further, chromium has been amended to Chromium III and Total Chromium in response to McCulley Frick & Gilman’s comment on §350.51(m), and the CAS number for Total Chromium has been updated accordingly. The CAS number for p-Xylene has been corrected to the accurate reference. Finally, the C_5 aliphatic fraction has been stricken to conform with the rule change at §350.76(g)(2).

§350.74. Development of Risk-Based Exposure Limits.

Concerning §350.74(a), Chevron and IT Corporation submitted comments on the RBEL-2 Equation noting a typographical error in Figure 30 TAC 30 TAC §350.74(a), Equation RBEL-2 for dermal contact with carcinogens in soil. The commentors recommended replacing " SF_o " in the equation with " SF_d ," noting that this change is consistent with the definition of SF_d given and the use of RfD_d in the equation for noncarcinogens.

The commission agrees with the comment that there is a typographical error in the RBEL-2 equation in Figure 30 TAC §350.74(a) (i.e., SF_o in the denominator of the RBEL-2 equation should be SF_d).

The commission also notes that an additional typographical error was found in the RBEL-2 equation in this figure (i.e., $SA_{(18<33)}$ in the residential figure should be $SA_{(18<30)}$). Figure 30 TAC §350.74(a) of the rule has been amended to reflect this necessary correction. The figure has also been corrected in the list of corresponding default exposure factors for both the resident and commercial/industrial table, the figure reference for $ABS.d$ and ABS_{GI} has been amended to remove the “3” so that the reference now reads Figure 30 TAC §350.74(c).

Concerning §350.74(a), McCulley Frick & Gilman commented that a large percent of the $^{Tot}Soil_{Comb}$ PCLs for roughly 215 of the 350 COCs with oral toxicity criteria are due to the $^{Soil}Soil_{Derm}$ PCLs and for compounds such as beryllium, bis(2-ethylhexyl)phthalate, and endrin, the dermal pathway contributes to greater than 50% of the $^{Tot}Soil_{Comb}$ PCL. By virtue of the conservative assumptions used to evaluate this pathway, the proposed rule will require overly conservative cleanup limits for a highly uncertain pathway. McCulley Frick & Gilman commented that it believes that evaluating dermal exposure for most COCs is an unnecessary and overly burdensome requirement; therefore, they do not support the inclusion of a quantitative evaluation of dermal exposure for all COCs in the $^{Tot}Soil_{Comb}$ PCL calculation. The following comments address the problems which the commentor believes will limit the usefulness and validity of including this pathway for all COCs. There are several pieces of evidence to suggest that the wholesale inclusion of dermal exposure in the proposed rule and calculation of PCLs is inappropriate. In general and by design, the skin is a very effective barrier in preventing the passage of exogenous compounds from the environment into the body. In addition, the rate of dermal absorption of chemicals is inversely related to molecular weight; thus, for larger compounds, such as long-chain aliphatics and PCBs, the likelihood of significant dermal absorption decreases (Rozman and Klaassen, 1996). The soil partitioning coefficient of many chemicals precludes their desorption from soil and makes them less available for dermal absorption. Additionally, there are few, if any, dermal absorption studies that adequately characterize the transfer and absorption of a compound from soil, across the dermis, and into systemic circulation. Thus, risk assessors rely on models to predict dermal uptake from soil and water. Inherent to these models are conservative assumptions that more than likely overestimate exposure by virtue of the lack of information and the assumptions. Given the great differences between actual conditions of dermal exposure to soil, the manner in which absorption studies are conducted (i.e., COC is applied directly to shaved skin, often abraded, shaved skin, and left in contact for up to 24 hours with a plastic, impervious material covering the skin), and the other conservative assumptions made in regard to surface area contacted, event duration of dermal exposure, adherence factors, etc., the commentor believes that including this pathway and the additional steps taken to ensure that dermal exposure is not underestimated (i.e., adjusting the oral toxicity values as presented in Figure 30 TAC §350.74(a)) are unnecessarily conservative. Again, it is difficult to evaluate the appropriateness of the $ABS_{gi.soil}$ and $ABS.d$ values provided in Figure 30 TAC §350.74(c) or the skin surface area assumptions used in Figure 30 TAC §350.74(a) because references or rationale are not provided. Moreover, EPA recognizes the data limitations and difficulties in reliably evaluating dermal exposure for most chemicals in the *Soil Screening Level Guidance* (EPA, 1996a) and has chosen not to evaluate dermal exposure for any chemicals except for pentachlorophenol. Therefore, McCulley Frick & Gilman suggested that this section and related figures be revised to indicate that the dermal pathway should only be considered on a site-specific and chemical-specific basis and not included for all compounds and Tiers as currently required in the proposed rule.

The commentor recommends that the dermal exposure pathway not be considered due to concerns about scientific uncertainties, and notes that the 1996 US EPA Soil Screening Guidance suggests that it is only necessary to evaluate dermal exposure for pentachlorophenol. The commission maintains that there is enough certainty in evaluating the dermal exposure pathway to allow the commission to adopt a risk-based approach, rather than requiring cleanup to a background standard. Further, the commission notes that the rule does not blindly evaluate dermal exposures. Rather, a significant amount of COC-specificity is incorporated, and the rule contains provisions which exclude the evaluation of the dermal exposure pathway for compounds where it is not applicable (i.e., VOCs). Although appropriate default exposure assumptions are specified under Tier 1, many of the

parameters cited by the commentor are allowed to be varied on a site-specific basis under Tiers 2 and 3 (e.g., ABS.gi, ABS.d). In addition, the rule has been amended to allow the person to alter ABS.d based on credible scientific information. With respect to the *1996 US EPA Soil Screening Guidance* approach for the dermal exposure pathway, the commission notes that the abovementioned document reflects guidance issued in 1996, and does not represent either the current EPA position on the dermal exposure pathway or the state-of-the-science in this area. A number of EPA Regional Offices (including Region 6) have incorporated consideration for dermal exposure for numerous compounds in their published risk-based soil screening levels. EPA Region 6 also has recently released a Draft *1998 Risk Management Strategy*, which includes very stringent requirements for evaluating dermal exposure for all relevant compounds. Further, on a national level, the EPA is scheduled to release a finalized *US EPA Risk Assessment Guidance for Superfund (RAGS): Part E, Supplemental Guidance on Dermal Risk Assessment* this summer, which supercedes any discussion on dermal exposures in the *EPA Soil Screening Guidance* document, and clearly supports consideration of the dermal exposure pathway. In addition, the commission disagrees with the commentor's characterization of what the *EPA Soil Screening Guidance* document concludes in regard to dermal exposure. The guidance assumes that dermal absorption would have to be greater than 10% for dermal exposure to be the main pathway of concern at a site (assuming complete absorption via ingestion), and concludes that only pentachlorophenol had available data indicating dermal absorption greater than 10%. First, the rule has a different intent than the EPA guidance, in that the commission determined that it was appropriate to consider combined exposures across all relevant pathways, rather than evaluating each pathway independently. Thus, contributions from dermal exposure are considered in setting a final soil PCL, although it may not be the main pathway of concern for a given COC. Secondly, the *EPA Soil Screening Guidance* assumption regarding complete absorption via ingestion is not representative of actual absorption for many compounds (e.g., metals), which would serve to underestimate the significance of the dermal exposure pathway. Even setting aside the assumptions made by the EPA in offering the 10% absorption cutoff, a significant number of compounds in the rule have current data which indicate dermal absorption of 10% or higher. Therefore, it is clear that the *EPA Soil Screening Guidance* position on dermal exposure has limited applicability to the approach taken in the rule, and does not offer credible support for eliminating the dermal exposure pathway. As noted by the commentor, the dermal pathway is a significant risk contributor for beryllium, endrin, and bis (2-ethylhexyl) phthalate. One reason that the dermal exposure pathway is significant for these compounds is that they have relatively low ABS.gi estimates. While further review of the scientific literature supports the ABS.gi values provided in the rule for beryllium and bis (2-ethylhexyl) phthalate, the commission believes that the 2% ABS.gi value listed for endrin is underestimated. Therefore, the commission has amended the ABS.gi value provided for endrin in Figure 30 TAC §350.74(c) to be consistent with the ABS.gi values provided for its two stereoisomers, aldrin and dieldrin (i.e., 50%).

Concerning §350.74(b)(1), Chevron commented that the requirement discussed in the this section has the potential to conflict with Occupational Health and Safety Administration regulations. Chevron recommended the following language: "The health and safety plan shall be consistent with the applicable requirements of 29 CFR."

The rule language has been modified to remove the specific reference to the required application of OSHA standards, as OSHA criteria were only meant to serve as an example of what could be applied. However, the rule has not been amended to draw applicability to 29 CFR. Such a direct linkage is unnecessarily specific and nothing in the rule would result in a violation of 29 CFR. It should be noted that if any requirements of this rule are more stringent than 29 CFR requirements, then the requirements of this rule must be met. Given that this is an area of flexibility in the rule and allows the use of standards not specifically intended for addressing environmental contamination, the level of requirements are appropriate and should not

necessarily be limited by OSHA requirements. The amendments necessitated conforming rule changes to §350.35(d)(5) and §350.111(b)(14).

Also concerning §350.74(b)(1), Henry, Lowerre, Johnson & Frederick commented that for the air exposure medium, the proposed approach is to rely on air standards established by other agencies, i.e., OSHA. The OSHA requirements, however, are designed to protect on-site workers with limited exposures and are not suitable for RME situations, such as fence line residents. Henry, Lowerre, Johnson & Frederick recommended that any standard proposed for use by TNRCC meet with values consistent with EPA methodologies to protect the long-term resident receptor.

The commission was cognizant of the fact that solely allowing occupational exposure limits requirements to be used for on-site commercial/industrial workers could pose a problem for fence line residents, as such limits are designed to be protective of an occupational scenario. Therefore, the commission included the proposed provision in §350.74(b)(1) that required the person to demonstrate that off-site receptors are protected when occupational exposure limits are used on-site as ^{Air}RBEL_{Inh}.

v•

Concerning §350.74(b)(1), Henry, Lowerre, Johnson & Frederick commented that allowing RBELs to be PELs (OSHA-based Permissible Exposure Limits for commercial/industrial use) at commercial sites results in a cleanup appropriate only for the current industrial use and is tied only to that facility's health and safety plan. Having the control mechanism in the deed record will most likely not be effective over time as the industrial practices change and businesses change hands. In the future, new operators have no incentive to develop, nor will they have the information to develop, the health plans needed to protect employees.

The commission disagrees with the comment that the institutional controls required when OSHA criteria are used as RBELs will not ensure adequate protection of workers who may be present at a site at a later date. In fact, institutional controls are required so ample public notice is provided. If the provisions of the institutional control are not met, then a substantial change in circumstance would be required in §350.35 of this section and would have to be addressed at that time. The commission included the institutional control requirements to protect for future use considerations.

Concerning §350.74(b)(1), Weston and Strasburger & Price suggested deleting the last sentence stating that this appears to require every facility, subject to the TRRP, and that meets the OSHA standards, to file an institutional control in the real property records. This does not appear to be a reasonable requirement for a facility that is in compliance with OSHA. Trying to place every remediation obligation, one-by-one, in the deed records needlessly clutters these important public records.

The commission disagrees with the comment that the requirement for filing an institutional control for affected properties that use occupational inhalation criteria as RBELs be removed. As future conditions at the property may not include the use of an equivalent health and safety plan, the commission maintains that the filing of an institutional control is necessary. The use of the OSHA standards is optional flexibility, and as its protectiveness is highly subject to how the property is used, such limits on property use warrants notice as it effectively is a remedy. However, the person may time the notice with other institutional control filing to avoid the unnecessary clutter as there are no specific timing requirements with regard to the filing of the institutional control, other than that it must be filed before a no further action letter is issued pursuant to §350.34. If a conditional no further action letter is issued, then one of the conditions would be that the health and safety plan are to be followed. Additionally, the commission also notes that §350.31(i) would also need to be complied with until such institutional control was filed. The rule has been amended to conform with the expansion of the definition of institutional control.

Concerning §350.74(b)(1), EPA Region 6 commented that OSHA exposure limits, numerically, in the EPA's opinion may be considered more representative of health standards under an immediate and short term scenario for workers. The EPA's RCRA and other waste programs try to insure human health protection in a long-term industrial exposure. Due to the differing assumptions and toxicity information utilized by OSHA the resulting risk-based values differ sometimes several orders of magnitude from what the EPA would consider protective for the same contaminant. For example, chloroform has an OSHA limit of 240 mg/m³ whereas the EPA utilizes an industrial screening value of 0.08 mg/m³. Due to these numerical differences, the EPA Region 6 stated that it cannot support the use of the OSHA standards for fulfilling the requirements of long-term protection in an industrial worker scenario.

The proposed rule is predicated on the evaluation of chronic exposure and as such, the intent of the commission in §350.74(b)(1) was that only those occupational limits that are protective of long-term exposures could be used. However, the commission understands the commentor's confusion since the rule as proposed did not specify the occupational limits that would be appropriate for use as RBELs for commercial/industrial exposures. The rule has been amended to clarify the intent of the commission in this regard. Specifically, the rule has been amended to clarify that only eight-hour time-weighted average (TWA) OSHA Threshold Limit Values and American Conference of Governmental Industrial Hygienists Permissible Exposure Limits may be considered for use as the inhalation RBEL for commercial/industrial properties. TWA occupational exposure limits (OELs) represent the concentration for a conventional eight-hour workday and a 40-hour work week, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. Thus, by definition, TWA OELs do address exposures of greater than immediate or short-term durations.

Concerning §350.74(c), Brown & Caldwell recommended that RBELs not be set for Volatile Organic Compounds (VOCs) for long term exposure because these COCs do not persist in shallow soils. Specifically, for this paragraph, Brown & Caldwell recommended defining a VOC as chemical with a dimensionless Henry's Law Constant greater than or equal to 0.03.

The commission did, in fact, cite in the proposed rule Figure 30 TAC §350.74(c) that the dermal absorption fraction (ABS.d) for such COCs is 0%. However, in order to further clarify this issue, the commission is adding language to §350.74(c) and Figure 30 TAC §350.74(a) to state that it is not necessary to calculate a soil dermal contact RBEL for COCs with a vapor pressure in mm HG ≥ 1 and has removed such COCs from Figure 30 TAC §350.74(c). Further, the commission has amended Figure 30 TAC §350.74(c) to correct an errant CAS number for Bis (2-chloroisopropyl) ether, amend the reference to chromium to include Total Chromium in response to a McCulley Frick & Gilman comment on §350.51(m) and accordingly add the CAS number.

Concerning §350.74(c), the commission has amended an incorrect rule reference of subsection (j)(1)(C) so that it correctly reads (j)(1)(B).

Concerning §350.74(d), Brown & Caldwell commented that the subsection requires determination of a soil ingestion RBEL. They recommended that RBELs not be set for Volatile Organic Compounds (VOCs) for long term exposure because these COCs do not persist in shallow soils. Specifically, for this paragraph the commentor recommended defining a VOC as chemical with a dimensionless Henry's Law Constant greater than or equal to 0.03.

The commission disagrees that a soil ingestion RBEL should not be calculated for such COCs in surface soils, and no changes were made in response to this comment. The commission points out that more recent surface soil sampling data can be attained in order to address any uncertainty about reductions in COC concentrations since the time the soil sampling data were collected.

Concerning §350.74(e), Fulbright & Jaworski commented that the RBEL equations are flawed in that they do not allow for the inclusion of relative bioavailability of a substance from food. Unity, or 100%, is assumed. Although for many substances such data may not exist, and for some chemicals this difference is incorporated into the toxicity criteria (e.g., cadmium), Fulbright & Jaworski stated that the equation should allow for the incorporation of this information as the science progresses and these data become available for additional chemicals.

The commission notes that §350.73(d) specifies that when reference doses for both food consumption and water ingestion are available, the value for food consumption should be used for all soil exposure pathways. As the soil exposure pathways include above- and below-ground vegetable consumption, the rule already contains the flexibility to address the types of scientific developments cited by the commentor, and no changes are proposed in response to this comment.

Concerning §350.74(e), Fulbright & Jaworski commented that the rule does not present the adult vegetable ingestion rates in the exposure parameters tables. The rule neither provides the essential data, nor references for finding the data used, nor the process employed for deriving the values used. Also concerning §350.74(e), Fulbright & Jaworski commented that it is unclear whether the ingestion rates presented in the rule represent ingestion rates from home gardening scenarios, some fraction of a home gardening scenario, or possibly relate in some way to the total dietary consumption of these types of vegetables. The rule provides no explanation or cited references for the fraction of the total vegetable intake grown on impacted soils. In the 1998 version of the proposed rule, Fulbright & Jaworski noted a factor related to the "fraction of vegetables contaminated" was included in the equations for residential ingestion of above- and below-ground vegetables. In the proposed rule, this factor has been removed, and the ingestion rates decreased substantially. Without providing the references for the revised ingestion rates, or describing the basis for the values presented in the rule (homegrown vegetable rate vs. total diet with some policy-based fraction applied), Fulbright & Jaworski asserted that it is not possible to compare RBEL values per the rule with probabilistic values for this pathway.

In order to limit the size and complexity of the rule, the commission did not provide the references and justification used in deriving the vegetable ingestion rates. It should also be noted that much of the supporting documentation had been provided in the December 16, 1996, Concept Document. Nonetheless, the commission is again providing commentors with the detailed information used to establish the requirements concerning evaluation of the vegetable ingestion pathway. The rule requires evaluation of exposures through typical consumption of above- (both exposed and protected vegetables) and below-ground vegetables (root vegetables) for residential properties. The commission notes that although there are different approaches which could have been taken in deriving above- and below-ground vegetable ingestion rates, the commission chose to base the ingestion rates on average estimates of consumer-only intake, and avoided the uncertainties associated with using higher-end percentiles based on per capita data. The consumer-only ingestion rates were derived by starting with average per capita ingestion rates (grams/kilogram-day) for the following food categories in Tables 9-9, 9-10, and 9-11 from the *1997 US EPA Exposure Factor Handbook*: (1) Above-ground vegetables: Exposed Vegetables, Protected Vegetables; and (2) Below-ground vegetables: Root Vegetables. As discussed on page 9 - 3 of the *1997 EPA Exposure Factors Handbook* (EFH), the average *per capita* intake rates for each of these vegetable groups were converted to *consumer-only* intake rates by dividing by the percentage of people who reported consumption of that vegetable type. This calculation was done for the 0-1, 1-2, 3-5, 6-11, 12-19, and 20-39 age groups reported in the *1997 EFH*, in order to calculate individual ingestion rates for the specific 0-6, 6-18, and 18-30 age groups specified in the rule. For each of the age groups, the intake data (adjusted to a consumer-only basis) are then multiplied by the dry weight fraction to achieve a dry weight intake rate (grams DW/kilogram-day). A dry weight percentage of 12.6% for exposed produce and 22.2% for protected produce (including root vegetables) was utilized, based on data provided in Baes, *et al.*, 1984. The assumed bodyweights for the age group were then applied to this

dry weight intake rate in order to estimate a daily intake in grams/day for each age group. Bodyweights for the 0-1, 1-2, 3-5, 6-11, and 12-18 age group were obtained from Table 7-3 of the 1997 *EFH*. The mean bodyweight for boys and girls was used for all age groups. This intake represents a consumer-only intake of the vegetable groups of interest, but does not account for the fraction of each vegetable type that are produced in home gardens. As cited in Table 13-71 of the 1997 *EFH*, among households who garden, 23.3% of protected vegetables, 17.3% of exposed vegetables, and 10.6% of root vegetables were obtained from home gardens. It should be noted that by including this adjustment to the intake, it is no longer necessary to account for the fraction ingested (FI) (e.g., 25%) in the risk calculation. A weighted consumer-only intake of homegrown vegetables was then calculated for each of the three age groups evaluated in the rule (0-6, 6-18, and 18-30). This was accomplished by weighting each of the relevant age-group specific intakes (calculated based on the data provided in the 1997 *EFH*) in accordance with the percentage of time that the age group represents the three age groups which are specified in the rule. For example, the consumer-only intake for the 0-6 age group specified in the rule is calculated by time-weighting intake data for the 0-1, 1-2, and 3-5 age groups reported in the 1997 *EFH*. The final above- and below-ground ingestion rates for children (IRabg.C.res and IRbg.C.res) were simply the consumer-only intake for the 0-6 age group. In order to establish above and below-ground ingestion rates for an age-adjusted scenario (IRabg.AgeAdj.res and IRbg.AgeAdj.res), the ingestion rate for each age group specified in the rule (0-6, 6-<12, 12-<18) was weighted by the duration of the period and divided by the assumed bodyweight of the age group, similar to the approach used to determine the age-adjusted dermal factor in RBEL-2 of Figure 30 TAC §350.74(a). Finally, it should be noted that the commission is amending Figure 30 TAC §350.76(b)(1) to correct several typographical errors related to the calculation of a residential RBEL for cadmium. The age-adjusted ingestion rates for above and below-ground vegetables listed were in error, and have been changed to be consistent with the values listed in Figure 30 TAC §350.74(a). Similarly, the Fraction of Vegetables Contaminated (Favg.res and Fbg.res) terms should not have been listed and have been removed.

Concerning §350.74(e), Weston commented that development of a vegetable ingestion RBEL should not be required except for residential property used as single-family residences. The option to include a prohibition against raising vegetables on the property should be included for motels, hospitals, apartments and other similar "residential" property use.

The commission does not agree that the vegetable ingestion pathway should be limited to areas where there are currently only single-family residences, and no changes were made in response to this comment. While recognizing that the potential for there to be a vegetable garden within public access areas which are not single family residences (e.g., park, hospital) may be more limited, the commission is aware of instances where community gardens in parks or schools have been established. Further, the commission notes that not considering vegetable ingestion in setting the residential soil PCL would necessitate institutional controls, which the commission does not believe would be an effective or desirable remedy for this exposure pathway. Therefore, the commission is maintaining that the vegetable pathway should be considering in establishing critical soil PCLs for all properties which meet the rule definition of residential land use.

Concerning §350.74(e), the commission clarified the last sentence to indicate that the term "separate" actually referred to the previous sentence. Therefore, the term "separate" was deleted and the phrase "In addition" was added to the beginning of the sentence. Also, in order to clarify the intent of the commission with respect to the calculation of PCL for below-ground vegetables, §350.74(e) has been reworded so that it is apparent that it is only necessary to evaluate: (1) those COCs that are metals; or (2) those COCs that have Henry's Law Constants less than 0.03 and have log K_{ow} values above four.

Concerning §350.74(e)(2), the commission has added “; or” to the end of paragraph (2) for proper formatting.

Concerning §350.74(f), EFSI and ICE commented that under these rules, MTBE appears to have become a regulated COC. The commentors stated that although it still has not been conclusively demonstrated to have carcinogenic effects, this compound can now drive a site into formal assessment and remedy. The commentors recognized that this is a new burden with respect to assessment and cost, and should not be argued to be an unreasonable change in scope or cost.

The commission disagrees with the comment that it is inappropriate for MTBE to be regulated as a COC. Studies in rodents have, in fact, shown MTBE to be carcinogenic, producing lymphomas and leukemia when administered by the oral route and liver and kidney tumors when administered via inhalation. MTBE exposure to rodents also produces kidney, neurological, and reproductive/developmental effects (EPA Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on MTBE, EPA-822-F-97-009, December, 1997). Further, MTBE has been documented to affect the taste and odor of drinking water at much lower concentrations than those determined to result in adverse health effects. Thus, due to the documented carcinogenic and noncarcinogenic effects of MTBE, as well as the low concentrations which would render a drinking water source unfit for use, inclusion of MTBE as a compound of potential concern is warranted.

Concerning §350.74(f)(1), Fulbright & Jaworski commented that the rule is inconsistent regarding the groundwater pathway. In the rule, some groundwater RBEL values are risk based and others are not. Some RBEL values are the MCLs. Pursuant to the Safe Drinking Water Act, MCLs for carcinogenic substances are generally not risk based.

The commentator is correct in stating that some of the RBELs are based on MCLs, while others are risk-based. The commission notes that while MCLs are not necessarily risk-based, MCLs are federal, enforceable standards for drinking water. Thus, the commission has made the policy decision to use MCLs as PCLs. If all COCs had MCLs, then the PCLs for all COCs would have consistently been the MCLs. The rule is as consistent as possible given the policy decision to use MCLs. The commission would not compel a cleanup below MCLs unless a lower PCL was required to protect another exposure pathway. The commission maintains that it is appropriate to use MCLs as the cleanup levels for useable groundwater and to use a risk-based calculation in the absence of an MCL. Due to the fact that MCLs may not be risk-based, the commission does not require the inclusion of COCs with a $^{GW}GW_{Ing}$ PCL based on an MCL in the cumulative risk or hazard check for groundwater as specified in §350.72(b)(1).

Concerning §350.74(f)(1), Henry, Lowerre, Johnson & Frederick commented that the National Research Council and other groups have determined that the MCL for arsenic of 50 ppb is too high and should be lowered.

The commission acknowledges that there is in fact a contentious ongoing debate within the EPA concerning the appropriate MCL for arsenic. However, to date, this issue has not been resolved and water utilities across the nation are still held to the 50 ppb federal standard. The commission has the flexibility to incorporate new MCLs into the PCL calculations as they are promulgated and is keeping abreast of this issue. Should the EPA change the arsenic MCL, the arsenic PCLs will be updated accordingly.

Concerning §350.74(f)(2), Brown Carls & Mitchell commented that dry cleaning facilities use tetrachloroethylene as a cleaning agent. This chemical has been in use for this purpose since at least World War II. It is a "suspected" carcinogen, but the MCL has not been scientifically established - rather the MCL is set at the lowest measurable quantity commonly referred to as the "detection limit" of 5 g/L. The

commentor stated that this sets the bar at an impossibly low level in many cases, especially since the nature of PCE is such that it has three mobile phases: (1) dissolved phase through dispersion and advection; (2) dense non-aqueous phase (DNAPL) transport; and (3) vapor transport in the unsaturated zone.

The commission acknowledges that tetrachloroethylene is not a known human carcinogen and has been determined by the EPA's Science Advisory Board to be ranked on a continuum between a probable and a possible human carcinogen. Tetrachloroethylene, like many other COCs, does not have an adequate scientific database to confirm its classification as a known human carcinogen. However, there is enough carcinogenicity information and certainty to establish toxicity factors for tetrachloroethylene, as well as these other COCs, and to evaluate them from a carcinogenic standpoint. With regard to the MCL issue, the commission has made the policy decision that MCLs, which are federal standards for drinking water, should not be exceeded in groundwater which is a useable source of water. It is fully appropriate in the context of human health and natural resource protection for all class 1 and 2 groundwater which contains COCs in excess of federal drinking water criteria to be properly managed. Persons are also referred to the response to comments provided for §350.71(c)(1) and (2) and §350.74(f).

Concerning §350.74(f)(2), Brown & Caldwell commented that this subsection requires the use of the primary MCL as the RBEL when available for a COC, and stated that this requirement should not apply to class 3 groundwater, as such groundwater is not a credible drinking water source.

The rule as proposed did not require persons to meet MCLs for class 3 groundwater. Instead, as shown in Figure 30: TAC §350.74(a), the RBEL for class 3 groundwater is the groundwater ingestion RBEL multiplied by 100. Thus, for COCs which have MCLs, the class 3 groundwater RBEL would be 100 times the MCL.

Concerning §350.74(f)(2), AFCEE commented that when provisions §350.74(f)(2) and 370.75(i)(1) are combined, there essentially is no Tier 2 or 3 for class 1 or 2 groundwater contaminated with chemicals where there is a prescribed MCL. In effect there are no site-specific considerations if the COC has an MCL. If it can be shown that the groundwater-bearing unit has no beneficial use based on criterion in §350.37(1)(3)(C), AFCEE argued the rule should not require restoration to primary drinking water standards.

The commission disagrees with the commentor that no flexibility is provided under Tier 2 or 3 for COCs which have MCLs. Plume management zones are a potential area of flexibility under Tiers 2 or 3 for class 2 groundwaters. The commission has provided ample flexibility through the plume management zone provisions, acceptance of natural attenuation where it is appropriate for use, and technical impracticability demonstrations. The commission has made the policy decision that MCLs, which are federal standards for drinking water, should not be exceeded in groundwater which is a useable source of water. The commission maintains that it is fully appropriate in the context of human health and natural resource protection for all class 1 and 2 groundwater which contains COCs in excess of federal drinking water criteria to be properly managed. Persons are also referred to the response to comments provided for §350.71(c)(1) and (2) and §350.75(i)(1).

Concerning §350.74(f)(3), McCulley Frick & Gilman commented that §350.74(f)(3) provides conditions when secondary MCLs or advisory levels are to be used as RBELS for groundwater ingestion. Secondary MCLs are established on the basis of taste and odor considerations rather than health effects. Clearly values derived on this basis are not appropriate as risk-based exposure limits. McCulley Frick & Gilman suggested deleting any use of secondary MCLs as RBELS. Likewise, McCulley Frick & Gilman questioned whether provisional or aesthetically-based levels are appropriate as RBELS. For example, 40 g/L is listed in Table 3 as the secondary MCL for methyl-tert-butyl ether (MTBE). The table notes that this is a drinking water advisory level. The risk-based PCL for groundwater for MTBE in this table is 240

g/L for residential areas and 730 g/L for commercial/industrial areas. Use of the aesthetically-based 40 g/L criterion as a Critical PCL would likely require remediation of sites that do not pose unacceptable risk. In light of the large number of hydrocarbon-impacted sites in Texas, McCulley Frick & Gilman asserted that enforcement of this non-risk-based criterion will likely have very significant financial implications.

The commentor is correct in noting that the aesthetic criteria for MTBE are lower than the health-based PCL values for both residential and commercial/industrial properties. However, the commentor is incorrect in stating that the aesthetic criteria for MTBE provided in Table 3 is 40 µg/L. In fact, the aesthetic criteria provided in Table 3 for MTBE was 15 g/L. As aesthetic criteria are not risk-based, the commission's intent is to protect natural resources. As is the case for MTBE, even if a level of a COC is considered to be health-protective, it may render that resource unfit for use. As is also required in §335.559(h) and §335.563(j)(2) of the current Risk Reduction Rule and §334.203(1)(K) and (2)(K) of the current PST rule, the intent of the proposed rule was to preserve the usefulness of the state's natural resources, and aesthetic considerations are a necessary part of this process. The person is also referred to the responses to comments regarding §350.74(i) regarding aesthetics.

Concerning §350.74(f)(3)(A), Fulbright & Jaworski commented that advisory levels and other guidance which have not been promulgated themselves cannot be promulgated as proposed under this rule without violating due process.

The commission agrees and has amended the rule in response to the comment for the reason stated and has stricken “applicable advisory levels” and has replaced it with “other scientifically valid published criteria in cases where COCs are present at concentrations which present objectionable characteristics such as taste and odor... .” The commission addressed the “guidance” issue in the response to general comments section of the preamble.

Concerning §350.74(g), Henry, Lowerre, Johnson & Frederick commented that the risk-based standards for class 3 groundwater that allow contaminants to be 100 times the MCL are unacceptable. TNRCC has made an unjustified decision to sacrifice class 3 groundwater, even though such water may have many valuable uses. Such waters can be used for some industrial and agricultural purposes and to supplement other supplies. Such waters could be extremely important sources of water as growing demands for water cannot be met with other supplies. The recent change in the proposed rules to reduce the extent of investigation for class 3 groundwaters to levels 100 times higher than other ground water investigations simply assures that the groundwater will be eliminated as a future source of water, even in areas where there are no alternative sources. Allowing significant contamination to remain now only transfers cleanup costs to future users. Chevron commented that in many areas of the state, the shallow groundwater that might be impacted by a release is class 2 groundwater. Due to the availability in these areas of high quality municipal (or other) water supplies and/or local restrictions on installation of drinking water wells, no landowner is likely to install a well into these shallow zones, nor would residents ingest that class 2 groundwater. The TNRCC has recognized in §350.37(1)(3)(A) that some class 2 groundwater-bearing units may have no future beneficial use, and provided criteria for determining future beneficial use in §350.37(1)(3)(C). Similar to comments on other sections of the proposed rule, Chevron stated that it believes that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater, and should be held to the same criteria (i.e., PCLs) as class 3 groundwater. Because the PCLs for groundwater ingestion are developed from the groundwater RBELs, this paragraph should be modified to exclude class 2 groundwater with no reasonably anticipated future beneficial use. Chevron suggested revising §350.74(f) and (g) as follows: “The groundwater ingestion RBEL for class 1 and class 2 groundwater is developed as shown below, except that for class 2 groundwater with no reasonably anticipated future beneficial use as defined in §350.37(1)(3)(C) the RBEL is developed in paragraph (g);” and (g) - “The class 3 groundwater RBEL is also used for class 2 groundwater with no

reasonably anticipated future beneficial use as defined in §350.37(1)(3)(C)." McCulley Frick & Gilman commented that Basing the $^{GW}GW_{Class\ 3}$ PCL on the drinking water pathway $^{GW}GW_{Ing}$ PCLs times a factor of 100 seems arbitrary and overly conservative. Class 3 groundwater and soils above a class 3 groundwater unit should be evaluated on a site-specific basis and not held to a drinking water standard multiplied by an arbitrary factor of 100 as required in Tier 1. McCulley Frick & Gilman suggested that these values be removed from the rule to prevent confusion and/or a person being held accountable to these values and recommend that the issue be evaluated for class 3 groundwater units on a site-specific basis.

The commission disagrees that all groundwaters represent equal resource value. To do so, ineffectively uses the limited corrective action dollars that are available to protect human health and the environment. However, the commission does agree that COCs present in class 3 groundwater should be adequately managed when not sufficiently restored and has set forth management requirements for class 3 groundwater, against the apparent recommendations of other commentors. The commission does note that groundwater that would otherwise be considered a class 3 groundwater based on quality and productivity, would be considered a class 1 or 2 groundwater when the conditions of §350.52(1)(a) or (2)(a) are met. The commission also notes that this rulemaking is not any less stringent with regard to setting the RBEL at 100 times the groundwater ingestion level than would be allowable under 30 TAC Chapters 334 and 335. The commission disagrees that class 2 groundwater meeting the conditions of §350.37(1)(3)(C) should be considered class 3 groundwater and treated accordingly. The commission does not concur that groundwater should be classified as class 3 groundwater based on man-induced conditions (e.g., leaking sewer systems, non-point source) as those conditions could change in the future, particularly in instances where the groundwater could be of high quality and productivity . Rather, the commission maintains that designation as a class 3 groundwater resource should generally be based on characteristics that are natural and unlikely to change over time. The commission does agree that there should be site-specific considerations for class 3 groundwater. The 100 times factor provides for a reasonable level above which cross-contamination issues may become of concern, assuming a ten-fold concentration reduction with transport then another ten-fold reduction in a well tapping the cross-contaminated zone. Additionally, the adjustment is consistent with that of the current rules. The commission has chosen not to work site-specificity through the RBEL, not precluding other complete or reasonably anticipated to be completed exposure pathways that may be applicable to the class 3 groundwater. Rather, site-specificity is provided through establishment of plume management zones where site-specific decision making can be applied in a more consistent and straight-forward manner.

Concerning §350.74(h)(1), ARCADIS Geraghty & Miller noted that the proposed rule states that for the purpose of calculating a fresh water aquatic life criteria for hardness-dependent metals, a hardness value of 50 mg/l CaCO₃ must be used. ARCADIS Geraghty & Miller commented that it believes that such data are easily collected or readily available within TNRCC information, and that these site-specific hardness values should be used to derive a more realistic criterion. If no site-specific hardness data are available, then a default value of 50 mg/L may be appropriate for some water bodies.

The commission agrees with the ARCADIS Geraghty & Miller comment, but would add that the rule language does in fact provide the person with the flexibility of determining property-specific hardness values at §350.74(h)(5)(A). In lieu of the 50 mg/L hardness value proposed in the rule for determining hardness-dependent criteria, the rule language will be modified to specify that the segment-specific hardness values specified in the commission's Implementation Procedures, as amended, shall be used unless a hardness value is not available for a particular segment.

Concerning §350.74(h)(1), Brown McCarroll & Oaks Hartline commented that the paragraph requires that a person calculate aquatic life criteria for metals with hardness-dependent criteria at a hardness value of 50 mg/l CaCO₃. Brown McCarroll & Oaks Hartline asserted that more realistic stream-segment specific hardness values already exist in Table 6 of the agency's Implementation Procedures, as amended. These

segment-specific hardness values should be used unless the person determines property-specific hardness values as allowed by §350.74(h)(5)(A).

The commission agrees with the recommendation, and the change is incorporated into the adopted rule. The default hardness value of 50 mg/l CaCO₃ is retained for situations where the *Implementation Procedures* do not provide a segment-specific hardness value. The words “Implementation Procedures” were italicized to indicate the title of a document.

Concerning §350.74(h)(2) and (3), the words “The person shall apply” were added to the beginning of the paragraphs to properly format the lead sentence.

Concerning §350.74(h)(3), the rule was amended to correctly format a reference to a Chapter 321 Subchapter.

Concerning §350.74(i), Brown McCarroll & Oaks Hartline requested that this subsection be deleted, arguing that it is vague, unnecessary and duplicative of other criteria. To the extent the provision is not duplicative of other criteria, Brown McCarroll & Oaks Hartline questioned its legal basis. Specifically with regard to §350.74(i)(2)(3), Brown McCarroll & Oaks Hartline further asserted that the reference to "non-COC specific secondary MCLs" is vague and confusing. McCulley Frick & Gilman commented that it does not believe that these non-risk issues should be considered in the development of risk-based criteria. Rather, it suggested aesthetic considerations should be evaluated on a site-specific basis. Specifically with respect to §350.74(i)(2), McCulley Frick & Gilman commented that many of the ^{Tot}Soil_{Comb} PCLs exceed 10,000 mg/kg. McCulley Frick & Gilman stated that it understands that the purpose of this passage is to maintain aesthetic quality in environmental media, but the reference for this value is unclear. Furthermore, McCulley Frick & Gilman asked why the interval of concern for this criteria is zero to ten feet when the depth intervals for residential and commercial/industrial properties are zero to 15 feet and zero to five feet, respectively. McCulley Frick & Gilman suggested that the TNRCC remove this language from the rule. On the other hand, Henry, Lowerre, Johnson & Frederick commented that criteria to evaluate aesthetic hazards needs to be defined and clarification is needed regarding how protective concentration limits will be adjusted to account for aesthetic hazards. Brown & Caldwell recommended that this subsection be clarified so that physical/institutional controls (such as capping or paving) can prevent concentrations of liquid COCs greater than 10,000 mg/kg from adversely impairing surface use of affected property under Remedy Standard B.

In response to the comments recommending that aesthetics provisions be stricken from the rule, the commission notes that it is charged with protecting human health and the environment, which includes the general aesthetic quality of the environment in which we live. Based on public comments received for other sections of this rule, some commentors take the position that there is no legal basis to leave any environmental contamination in the environment stemming from unauthorized releases. There is legal basis for both requiring aesthetics issues to be addressed and leaving protective concentrations of COCs in place. Specifically, with regard to odors, the Texas Clean Air Act and 30 TAC §101.4 provides specific authority. Additionally, §§26.030, 26.041, 26.121(b), and 26.401 provide clear authority and speak to legislative intent with regard to aesthetics matters/general usability for surface and groundwaters, §26.351(a)(6) provides general authority for storage tanks, and, Texas Surface Water Quality Standards §307.4(b) set forth specific requirements to address potential aesthetics concerns. Aesthetics are clearly a concern of the Texas Legislature, and the commission has rightly included provisions in this rulemaking to address aesthetics concerns.

The commission intends that these rule provisions be applied with discretion and does not intend that the rule provisions routinely trigger a response action for affected properties. Rather, the rule provisions would be triggered on a site-specific basis when it is determined that satisfying the health-based criteria of the rule for an affected property would not render a resource or land surface fit for

use. The commission does have a standard expectation that liquid pools/sludges will not be left at the land surface, particularly for affected properties not owned by the person.

With regard to the comment concerning the vagueness of the non-COC specific secondary MCLs reference included in subparagraph (3), secondary MCLs are available for TDS content and other factors such as color.

With regard to the specific provisions regarding the 10,000 mg/kg and ten feet depth criteria, these are included as factors that should trigger at least a qualitative evaluation of the usability of the land surface. At 1% (10,000 mg/kg) liquid content in soil, the soil could begin to lose structure and integrity. We do not envision rigorous testing, but something more pragmatic. For example, if the area is routinely crossed by automobile traffic, then the person may consider driving an automobile of representative characteristics across the COC-affected area and if the automobile mires in the COC-affected area, then soil integrity has been lost and the land use is impaired and the COCs should be addressed.

When the aesthetics conditions are unacceptable such that further actions are warranted, either PCLs would need to be downwardly adjusted and response actions would then be enacted as appropriate. Or, in situations like those raised by Brown & Caldwell, response actions such as capping may be directly taken based on visual, olfactory, or other physical evidence, provided the landowner consents with the methodology.

The comments submitted for this subsection indirectly express concern over the reasonableness with which these rule provisions will be required to be addressed with a response action. Additionally, extensive general comments were received concerning the excessive or unwarranted use of institutional controls and financial assurance. Therefore, in light of the fact that some aesthetics problems may not be serious, but may be more of an inconvenience, institutional controls and financial assurance may not always be warranted for exposure prevention remedies applied for solely aesthetics purposes. Such requirements should be evaluated on a site-specific basis by the executive director in the context of an evaluation by the person of the severity and nature of the aesthetics hazard, the likelihood that the aesthetics issue would recur should the exposure prevention remedy degrade, and the satisfaction of the landowner. For example, if in the Brown & Caldwell example aesthetics are the sole driver, and the landowner is in agreement with the placement of a concrete or asphalt cap over the area in question because it could serve as a parking lot or other needed use, then the commission sees no need to require an institutional control. The quality of the cap and future maintenance in this instance is an issue of fair and good-faith negotiation and treatment between that person and the landowner. The commission wants the matter resolved to the mutual and long-term satisfaction of both parties. However, in more serious situations such as noxious odors from a recalcitrant COC that would continue to generate noxious odors should the cap be removed, then the commission fully intends that the institutional control and financial assurance provisions would be met to better guard against future reoccurrence of the situation. The rule has been amended to reflect the site-specific evaluation of the need for institutional controls and financial assurance for exposure prevention remedies for aesthetics situations.

Concerning §350.74(j)(1)(C), KOCH commented that a person should have the opportunity to develop a site-specific gastrointestinal absorption factor (ABS_{GI}) applicable to gastrointestinal absorption. This factor would be used to assess gastrointestinal absorption and to adjust toxicity values for dermal exposures. Equation RBEL-3 at §350.74(a) should be revised to allow use of a site-specific ABS_{GI} .

In response to this comment, the commission points out that ABS_{gi} is a dermal adjustment which specifically accounts for reduced oral availability in the critical study which serves as the basis for the oral toxicity factor. Section 350.74(j)(1) allows ABS_{gi} to be altered in Tiers 2 and 3, based on

credible evidence in the scientific literature. However, as it is related to the critical toxicological study, ABS_{gi} is in no way site-specific. While the commission agrees that it is also appropriate to account for site-specific differences in the oral availability of a contaminant in soil, this type of adjustment is accomplished through the use of a relative bioavailability factor (RBAF), rather than through changes to ABS_{gi}.

Concerning §350.74(j)(1)(C), KOCH commented that it is not clear from the proposed rule whether the relative bioavailability factor (RBAF), described at §350.74(j)(C) would incorporate gastrointestinal absorption. It appears that the proposed RBAF would only be based on a mineralogical evaluation of the chemical form of the COC in the soil. Apparently the gastrointestinal absorption of a COC in soil would not be considered by the RBAF in equation REBL-3. Weston commented that this subparagraph should be clarified to state, that data from "credible published authority" can be used to support a RBAF. Weston argued there are widely available, peer-reviewed, scientifically sound soil bioavailability studies already circulating in the general literature that should be considered. Limiting the study to property-specific soils could require animal testing on a case by case basis, which appears overly burdensome and unnecessary.

The commission disagrees that the RBAF should be altered for all compounds in the absence of site-specific studies or mineralogical evaluation, and does not propose any changes in response to these comments. In support of this decision, the commission notes that one of the basic tenets of the science of bioavailability is that contaminant availability in soil may vary significantly in response to site-specific factors (e.g., soil type, aging, particle size). While the commission believes that sufficient data are available to develop conservative default RBAF values for lead and arsenic, the bioavailability of other metals has not been studied as extensively, and the rule requires a site-specific evaluation to set a RBAF for soil.

Concerning §350.74(j)(1)(C), McCulley Frick & Gilman commented that, as described in §350.72(j)(1), the gastrointestinal absorption fraction (ABS_{GI}), dermal absorption fraction (ABS_d), and relative bioavailability factor (RBAF) are the only parameters that may be changed but only if a site-specific study has been conducted to determine the appropriate value. These studies can be very expensive, time consuming, and may provide very little incremental benefit to the person conducting the study given the cost of such an evaluation.

For example, EPA, in the AExposure Factors Handbook@ (EPA, 1996b) provides data for soil adherence factors for numerous body parts, activities, and soil types. A recent study (Holmes et al., 1998) provides additional adherence factors for occupational and recreational activities. Therefore, the proposed rule must be designed to accommodate modifications due to changes in science. We suggest that this type of data, which is recommended by EPA and currently is available in the open literature, be allowed for consideration, on a site-specific basis, when deviating from default values.

The commission explains in other responses to comments for this section why site-specific evaluations are necessary in lieu of the use of alternative literature values. Further, the commission notes that §350.74(j)(1)(A) of the rule as proposed allows the use of alternative scientifically justifiable ABS_{GI} values. In addition, §350.74(j)(1)(B) has been amended to allow the use of alternative scientifically justifiable ABS_d values as well rather than limiting it to studies published after the effective date of the rule. In regard to expenses, the commission notes that embodied in all tiered corrective action processes (e.g., ASTM RBCA, EPA Region 6 Risk Management Strategy, TRRP, etc.) is the fundamental concept that persons must make cost-benefit decisions as they progress through the tiers. That is, each successive tier requires increasing levels of data collection and analysis and there is cost associated with gathering such information. The benefit of incurring additional expense initially in gathering the necessary site-specific information as a person progresses through the tiers is that the incorporation of such information may allow persons to focus investigations and subsequent remediation on the affected property thereby reducing costs associated with these activities. The

cost-benefit decision to be made by the person is whether benefits gained in terms of focusing the investigations and subsequent remediations (and ultimately the associated cost savings) outweigh the costs associated with gathering the necessary site-specific information. The rule as proposed clearly allowed the incorporation of site-specific information in the development of human health-based RBELs and PCLs as specified in §§350.73(e)(1) and (2), §§350.71(j)(1) and (2), and §§350.75(b)(1), (c)(2), and (d)(2). The decision by the commission as to which exposure parameters could in fact be varied on a site-specific basis was based solely on what the commission determined the science would support. The commission acknowledges that good science may not be inexpensive.

Concerning §350.74(j)(1)(C), Henry, Lowerre, Johnson & Frederick commented that for arsenic, a 20% bioavailability is assumed. The RfD and cancer values for arsenic are based on the administered doses, and therefore, the bioavailability of arsenic would have been factored into these values. Therefore, Henry, Lowerre, Johnson & Frederick recommends use of 100% bioavailability for arsenic exposure assessment. Henry, Lowerre, Johnson & Frederick also strongly encouraged TNRCC to remain consistent with IRIS and, not lower the arsenic cancer slope factor. EPA Region 6 commented that it does not generally use relative bioavailability factors (RBAF) for soils except where supported by site-specific information. Currently TNRCC utilizes this factor for arsenic in calculating the PCL. The use of the RBAF makes risk-based numbers less stringent. Although the EPA may consider the use of the RBAF for arsenic as a reasonable approach, however, we do not consider the application of the modifying factor of 0.1 in deriving the Protective Concentration Level (PCL) as reasonable (Figure 30). The EPA has reviewed the technical justification for the use of both the RBAF and the modifying factor (TNRCC's December 16, 1996, Appendices I - IV & VI - IX, pages II - 1 through II -6) and notes the following: a) consideration of site-specific or even average state arsenic concentrations should be considered when dealing arsenic, b) the 1988 EPA Administrator Thomas' memorandum specifically addresses the consideration of uncertainties in dealing with arsenic on a case-specific (emphasis added) basis not as a general rule such as that being considered by the TRRP, c) the 1988 memorandum addresses carcinogenic aspects not non-carcinogenic aspects of arsenic since these considerations may be warranted when applying the EPA cancer slope factor, d) uncertainties in deriving the non-carcinogenic reference dose are already considered since a modifying factor of three rather than the generally used factor of ten is used in generating the current non-carcinogenic toxicity value, and e) because the differing exposure assumptions, generalizing that the derived-PCL (i.e., 200 ppm for soils) for residential exposure should be the same as in an industrial/commercial scenario is not technically sound and most importantly may not be adequately protective to human health or the environment. In summary, the EPA does not support this generalized approach in dealing with arsenic as a chemical of concern.

The commentor is incorrect in stating that the proposed rule incorporated a 20% relative bioavailability adjustment for arsenic. In fact, the RBAF provided in Figure 30 TAC §350.74(a) for arsenic is 78%. This 78% RBAF, which is based on recommendations from EPA Region 10, is necessary to account for the lower oral availability of arsenic in soil as compared to the media of interest in the critical toxicological study (i.e., soluble arsenic in drinking water). Contrary to comments received, this type of adjustment is not already accounted for in deriving the toxicity factor. The commission believes that this default RBAF is conservative, in that the actual relative bioavailability of arsenic in soils at the majority of sites is likely to be less than 78%.

Although several commentors disagreed, the commission maintains that a factor of ten adjustment to the arsenic cancer slope factor is appropriate and consistent with EPA recommendations. The complete rationale for this adjustment is described in detail in the December 16, 1996, TRRP Concept Document. In summary, the adjustment is supported by the scientific weight-of-evidence which indicates that the uncertainties related to the cancer slope factor for arsenic are likely to result in an overestimation of its carcinogenic potency. In the event that the EPA revises the arsenic oral cancer slope factor in the future, the commission will review the applicability and necessity of the proposed modifying factor.

Contrary to EPA Region 6 comments, this adjustment was only made to the arsenic cancer slope factor, and has no impact on soil PCLs based on consideration of non-carcinogenic effects. The commission also clarifies that commercial/industrial and residential properties would not be subject to the same health-based soil PCLs for arsenic, given the inherently different receptors and exposure assumptions in the rule. Also, the commission is not aware of a technical rationale for only applying this arsenic adjustment on a site-specific basis in Texas, as there is nothing site-specific which would make this adjustment more or less valid.

With respect to proposed §350.74(j)(2), the commission received many comments. Brown McCarroll & Oaks Hartline, Campbell, George & Strong, Chevron, Environmental Resources Management, KOCH, McCulley Frick & Gilman, Phillips, Ranger, TCC, TXOGA, AFCEE and Weston commented that the requirements for obtaining a variance to default RBEL exposure factors, particularly the public participation requirements, appear so burdensome. The commentors further noted that the excessive requirements for variance are not warranted and penalize the appropriate use of site-specific information, which should be an integral part of the risk assessment process. The commentors generally recommended deleting the public notice aspects of the variance provisions, and handling these variance requests through the agency staff. Public notice could occur on a case-by-case basis. Brown McCarroll & Oaks Hartline stated that the formality of the process will give the public the impression that the requested "variance" will be less protective than the default assumption when, in fact, the variance is based upon scientifically valid information. Environmental Resources Management commented that developers of Brownfield projects simply do not have the luxury for such time-consuming and open-ended requirements. Investors generally expect a more rapid return on their investments. KOCH commented that unless COCs above the assessment level extend off-site, there is absolutely no need for the extensive public participation described in this proposed section. The public has no clear interest in a PCLE zone completely contained on-site at a large commercial/industrial property, and this PCLE zone would not threaten off-site human health or the environment. Further, KOCH stated this PCLE zone should not decrease adjacent property values, especially if the adjacent land use is also commercial/industrial. McCulley Frick & Gilman stated that it believes the provisions required in §350.35 and §350.111 regarding Substantial Change in Circumstances and the Use of Institutional Controls, respectively, will provide adequate protection in the future in the event that conditions change and exposure may be increased from the exposure parameters assumed in the initial risk evaluation. Weston suggested either modifying the requirements so that they are reasonable, or eliminating the option of obtaining a variance. Chevron and Campbell, George & Strong recommended requiring public notice as part of a request for variance to default exposure factors only at those sites where such input could reasonably affect a decision regarding existing and future surrounding land uses. TCC and TXOGA requested that the agency focus the public input component of the variance to apply only to those affected properties for which the variance would cause a change or reduction in the present use of the property. As a result, industrial areas which will retain their existing use, such as tank farms or process units would be excluded from this elaborate process. Similarly, Chevron and Campbell, George & Strong recommended narrowing the focus of the process governing variances from default exposure factors to those site areas with potential impact on surrounding land uses. Where a variance relates solely to such internal areas, there is little benefit to having unaffected landowners comment on the land use compatibility of such a variance, except perhaps in limited circumstances where the proposed remedy will preclude any useful activity (industrial or otherwise) on the property in question. AFCEE argued that land use compatibility issues are only ripe for public discussion if the area in question is owned by or adjoins property owned by third parties. EPA Region 6 commented that the modification of the exposure duration and exposure frequency in a commercial/industrial scenario should consider the current and future uses of the facility or site. In other words, if needed, an averaging time approach could be used to account for mobility of the receptor across a facility, however, the two parameters should not be minimized without regard to long-term variability of exposure patterns.

Concerning §350.74(j)(2), Chevron, Campbell, George & Strong, Fulbright & Jaworski, and AFCEE commented that the most opportune time for notice to and input by the public is during the selection of the

final remedy (e.g., at the completion of or during the Remedial Investigation/Feasibility Study), not during the development of the RBELs or PCLs (i.e., during the affected property assessment). This is consistent with the federal requirements in the National Contingency Plan (see 40 CFR §300.430) and the State Superfund statute (see Texas Health & Safety Code, §361.1855 where it occurs before the Remedial Investigation/Feasibility Study is completed). TCC and TXOGA stated that they understand that the public participation component can occur at the time the remedy is proposed, which can occur at or just before the submittal of the Response Action Plan (RAP).

Chevron, TCC and TXOGA stated that if the variance changes the PCLs so that there are no exceedences, notification to the public would be provided after the submittal of the Affected Property Assessment Report, and requested that the agency provide this clarification. Fulbright & Jaworski, KOCH, Phillips and AFCEE also recommended relying on those already imposed public notice requirements pursuant to the existing primary environmental laws. Those public notice requirements are sufficient for setting cleanup standards pursuant to a risk-based program. Weston more specifically commented that the public meeting requirements are excessive, appearing to be more stringent than public meeting requirements under other programs and more stringent than those used by TNRCC regarding public meetings. Campbell, George & Strong, Chevron, Weston, and others also suggested having the executive director provide a preliminary approval pending public comment prior to requiring public notification regarding a change to the default exposure factor. This would prevent public notification of a request that TNRCC may not ultimately approve. Also with respect to §350.74(j)(2), Weston requested that variance in worker exposure durations and frequencies (and resulting noncarcinogenic averaging time) should be allowed if a worker biomonitoring program for exposure is in place.

Henry, Lowerre, Johnson & Frederick and the PIC registered concern about any variances to standard default exposure values used to determine appropriate PCLs and opposed variance to these factors. The commentators stated that if parties are allowed to chip away at that standard by changing specific input values, this would appear to counter the purpose of creating a consistent, protective standard. Specifically, they did not support any effort to leave higher contaminant concentrations in place based on a responsible party's representations about reduced exposure levels at a specific site, and expressed concern that there are too many variables beyond the responsible party's future control to have much assurance that a responsible party will truly maintain the ability to strictly enforce restrictions on access to property indefinitely. The consequences of the responsible party being wrong concerning assumptions regarding limited access and corresponding site specific exposure levels do not seem worth the risk. The PIC further commented that allowing such variances is a risk management policy determination. The policy has already been reflected in the development of the default exposure factors. To allow a variance from these factors places too much trust in the representations of a person that they can control exposure factors in such a way to ensure that the commissions risk management policies concerning acceptable levels of risk are still met. With all due respect, more trust should be placed in the default exposure factors than in representations about one person's ability to control the actions of other persons and such variables as who has access to property, how many times they go to the property and how long they stay at the property when they visit. In addition, the PIC illustrated an example of its concerns that occurred approximately two years ago involving Spector Salvage, a facility in Region 10 which had previously been referred to the Pollution Clean Up Division for evaluation, which drives home this point. Because of the status of the facility as a potential Superfund site, the facility should have been adequately secured; however, children or teenagers were able to access the site, take several boxes of tacks from the site, and cause many flat tires for residents on neighboring streets. If such an incident can happen once at a facility which was assumed to be adequately restricted, it could happen again at another site where the consequences of a breach of access restrictions and resulting exposure to those who enter, possibly on repeated occasions, could result in injury to human health -- damage more serious than the flat tires experienced as result of the incident just noted.

Concerning the institutional control requirements of §350.74(j)(2), Henry, Lowerre, Johnson & Frederick commented that the controls on this will most likely break down over time. The proposed TRRP improperly trades long-term protection for short-term cost savings for industry. Strasburger & Price and Fina commented that these requirements should be deleted in their entirety. Strasburger & Price stated that requiring publication of a variance from the "default" therefore appears to be arbitrary. Chevron commented that the requirement for filing an institutional control should only apply if the property is to be sold, or if land use changes. Fina commented that if a variance is approved based upon the number of hours a worker would be exposed, or the amount of skin exposure, it makes no sense to record this fact in the deed records.

Concerning §350.74(j)(2), IT Corporation and SRA commented that the proposed rules require that all current and future users of the site be informed of variations from the default values via an institutional control placed in the real property records for the site. The preamble requests suggestions on how the notification might be accomplished. The following recommendations are offered. If a person wishes to use an alternate exposure factor to calculate a Tier 3 PCL, the person should support the alternate value with the appropriate data and documentation as required elsewhere in the proposed rules. The person would be required to demonstrate the sensitivity of the PCL value to changes in the affected parameter(s). This sensitivity could be demonstrated in a discussion of uncertainties in the Affected Property Assessment Report (APAR). A similar discussion of exposure uncertainty is often prepared under Risk Reduction Standard 3 (30 TAC §335, Subchapter S). The APAR would serve as a notice of exposure assumptions to current and potential users of the site in the same way that it informs users of other assumptions such as COCs, exposure pathways and toxicity values. If the PCL is sensitive to changes in exposure values to the extent that the site should be evaluated for residential exposures rather than commercial/industrial exposures, the executive director might require a residential land use evaluation or use of default values. Similarly, if the executive director determines that an acceptable set of residential PCLs cannot be developed for the COCs evaluated, use of default parameters might be required.

Many of the commentors questioned the controlled process and public notice requirements for the approval of variances to exposure duration and frequency, and averaging time, and recommended that these provisions be removed from the rule as they are considered by the commentors to be burdensome and excessive. Some commentors suggested a modification of the variance process by which the need and timing for public notice is determined on a case-by-case basis following preliminary approval of the variance by the executive director. Other commentors questioned the appropriateness of allowing variances to the default exposure factors at all given that such use conditions are very specific to a particular industrial use which may not be reflective of future use of the property and may thus result in lost tax revenues, perpetuation of Brownfields, and diminished values of surrounding properties if a "no future use" (characterized as "Remedy Standard C") assumption is the basis of approved variances.

The commission acknowledges that the executive director involvement and the public notice departs from how these variances have been handled to date. However, public participation in the remedial process is not a new requirement. These exposure factors represent how often and for how long an individual is assumed to be present at an affected property (i.e., the number of days/year over the number of years a worker is assumed to be present at the affected property) for purposes of calculating protective concentration levels. The more often a property is used, the more an individual can be exposed to COCs at the affected property, the lower the protective concentration levels need to be. Therefore, the commission is in essence deciding whether or not a proposed level of use of an affected property is appropriate for purposes of cleanup. Such land use decisions, which are policy and not technical in nature, can have significant implications for the allowable future use of the affected property as suggested by EPA Region 6, and possibly surrounding properties. Thus, the commission will require the acceptability of all such variance requests to be decided directly by the executive director (i.e., not the executive director's staff).

Because of the potential implications for communities and surrounding neighbors, the commission also maintains the general requirement that the public be notified by the person when the person submits a variance request so that persons are afforded an opportunity to represent their interests. Many commentors advocate that sound risk assessment demands the flexibility to make site-specific demonstrations, and that such site-specific determinations should only involve the public when it may be detrimental to them. The commission conceptually agrees with the site-specificity point of view, but not necessarily at the exclusion of public notice. The general experience of the commission staff is that such variance requests are often not based on site-specific backing, but rather are seemingly site-specific application of arbitrary assumptions for routine use of the affected property. Therefore, the rule provisions should not be viewed as reduced flexibility, but rather application of site-specific decision making in a manner that better ensures the interests of all pertinent parties are appropriately addressed in a manner which strikes an appropriate balance of current and future protectiveness. If such site-specific decisions are not made in an open and controlled environment, thoroughly considering all factors, severe public reactions to a few inappropriate decisions could result in lost flexibility for all involved. The commission also points out that the person is only required to provide public notice. If the matter is truly inconsequential to the public, then the public will likely not voice any significant opposition, if any at all.

However, the commission agrees with the commentors that public notice may be unwarranted in some limited situations. Accordingly, the commission amends §350.74(j)(2)(B) so that the need for public notice will be evaluated on a case-by-case basis when there may be natural conditions at the property which essentially prohibit full commercial/industrial use. Such considerations are based on real limitations on the use of property, independent of any contaminant situation, and as such, may not warrant public notice.

Several commentors requested clarification or affirmative statements for when the variance had to be requested and when the associated public notice had to be conducted. The variance request needs to be submitted when variance-based PCLs are submitted to the executive director for approval. The variance request could be submitted prior to or as part of an affected property assessment report (APAR), or with a response action completion report (RACR) under Remedy Standard A or as a part of a response action plan (RAP) under either Remedy Standard A or B. In response to comments, the commission has amended §350.74(j)(2)(B) to emphasize the flexibility that was already contained in the proposed rule that the person could submit the variance request at their discretion, but prior to or concurrent with the submittal of variance-based PCLs to the executive director for approval.

The commission also received comments that allowances should be made for the public notice to be melded with other public notification/public participation requirements that the person must also comply with for corrective action purposes at the affected property. The commission agrees to the reasonableness of such a request as it lessens repetition and amends §350.74(j)(2)(B) accordingly to allow such coordination with other public notice/public participation provisions provided the conditions of §350.74(j)(2)(D) and (E) are substantially met.

Regarding the comments requesting the executive director to provide some level of approval of the variance request prior to the initiation of the public notice, the executive director is willing to evaluate the technical completeness of an APAR, RAP or RACR prior the completion of the public notice requirements and provide the appropriate response to the person regarding the completeness of the submittal and has amended §350.74(j)(2)(c)(iii) to indicate that the executive director will approve variance requests for purposes of completeness. However, the decision to deny or approve the variance request will be based solely on merit and public input, without consideration of any assessment or remedial costs that have already been incurred by the person due to presumption that the variance request would be approved by the executive director prior to completion of the public

notice. The commission agrees with Weston that worker biomonitoring may add merit to granting the variance, but is not including it as a general requirement. To emphasize these points, the commission amends §350.74(j)(2)(C)(iii) to include a prohibition against including misrepresentations in the public notice that the executive director has granted any sort of approval of the variance request prior to the public notice, and §350.74(j)(2)(I) to preclude consideration of the costs associated with actions taken based on a presumption that the variance request would be approved from the decision regarding the variance request. Such incurred costs are purely at the risk of the person.

With regard to the expressed "no future use concerns," the commission previously sought public comment on a Remedy Standard C concept which allowed PCLs to be established to support a "no future use" scenario. The concept was so criticized by all interests that the commission dropped the concept as a formal remedy standard, did not include the concept in this rulemaking, and established the general intent of the rule to preserve the active and productive use of land considering both current and reasonable future use of the land. The commission acknowledges that suitability with current use is an important factor in determining an appropriate basis for PCLs; however, protection for full future use is also particularly important.

The commission disagrees with the commentor that such variances trade long-term protection for short-term cost savings for industry. Where the person can demonstrate that effective institutional controls can be emplaced and maintained over time, that public notice has been completed, the variance is consistent with actual site use and likely future use and compatible with surrounding land use in consideration of public comment, then the variance is fully warranted, protective, and consistent with the commission goal that the active and productive use of the land be maintained. However, contrary to the assertions of Strasburger & Price, the decision to require the use of institutional controls is not arbitrary. A publically available record which alerts future owners of the limitations of the protectiveness of the cleanup is necessary. The commission disagrees with IT Corporation and SRA that the affected property assessment report should be used as a vehicle to provide future notice of exposure factor variances. Future users of the land may not realize that the full commercial/industrial use of the property is not protected and therefore would not have a strong incentive to review the affected property assessment report. Likewise, the commission disagrees with the IT Corporation and SRA recommendations regarding consideration of PCL sensitivity in decisions to allow residential variance from default exposure factors, as the commission has made a policy decision to consider variances to EF, ED, AT for only commercial/industrial properties so that there is a standard at which sites are protective for full residential use. The commission is requiring restricted access as one of the criteria to allow such a variance at commercial/industrial properties to keep people out so that unacceptable exposure frequency and duration can be avoided. With regard to residential property, restricted access is usually for privacy and safety purposes. It is not a basis to limit how often the person is present within the restricted access area such as would be at a restricted access commercial/industrial facility where workers are usually tracked with regard to their ingress and egress, and are scheduled for egress.

The rule is also amended at §350.74(j)(2), striking the word "that" for grammatical reasons. Also, the rule has been amended at §350.74(j)(2)(A) and (L) to conform to the expanded definition of institutional control. Finally, §350.74(j)(2)(D) and (E) have been amended slightly to enhance readability, but the meaning of the rule has not changed.

Concerning §350.74(j)(3)(E), KOCH commented that the proposed water ingestion rate (IR_{w.w}) for a commercial/industrial worker is 1.4 liters per day (L/day). This rate is higher than the value of 1 L/day used in the existing Risk Reduction Rule (Table 1 of Subchapter S, Chapter 335) and the ASTM RBCA standard. There is no explanation or rationale in the rules or preamble for this change. We recommend that the value of 1 L/day be incorporated into the proposed rules.

Consistent with other contact rates specified in the proposed rule, the commission has selected 1.4 L/day as a conservative estimate of a mean (i.e., intended to approximate a 95 % UCL on the mean) for this exposure factor. The default value of 1.41 L/day is the adult average tapwater intake rate recommended in the current EPA Exposure Factors Handbook (EPA/600/P-95/-002Fa, August, 1997). The recommended value is the population-weighted mean of two national studies (Ershow and Cantor, 1989 and Canadian Ministry of Health and Welfare, 1981).

Concerning §350.74(j)(3)(E), KOCH commented that the proposed soil ingestion rate (IR_{soil.w}) for a commercial/industrial worker is 100 milligrams per day (mg/day). This rate is higher than the value of 50 mg/day used in the existing Risk Reduction Rule (Table 1 of Subchapter S, Chapter 335), the ASTM RBCA standard and the EPA Soil Screening Levels (SSLs). There is no explanation or rationale in the rules or preamble for this change. KOCH recommended that the value of 50 mg/day be incorporated into the proposed rule.

The commission disagrees that the soil ingestion rate for adults should be lowered from 100 mg/day to 50 mg/day. Consistent with other contact rates defined in the proposed rule, the commission has selected 100 mg/day as a conservative estimate of a mean (i.e., intended to approximate a 95% UCL on the mean for this exposure factor). The 1996 EPA *Soil Screening Level Guidance* utilizes a soil ingestion rate of 100 mg/day for adult residents, as does the agency for Toxic Substances and Disease Registry (ATSDR) in calculating their Environmental Media Evaluation Guides (EMEGs). The commission believes it is reasonable to assume that a commercial/industrial worker could have at least as much contact with soil as a typical resident. While the 1997 EPA *Exposure Factors Handbook* references an average adult soil ingestion rate of 50 mg/day, it stresses that this central tendency estimate is highly uncertain and discusses a range between 10⁻⁴ 80 mg/day. Therefore, the commission is selecting a soil ingestion rate of 100 mg/day for both adult residents and commercial/industrial site workers, in order to address uncertainties associated with the very small number of participants studied, and the limited types of activities for which representative data are available in the scientific literature.

Concerning §350.74(j)(3)(G), KOCH commented that the proposed skin surface area (SA_w) for a commercial/industrial worker is 2,500 cm². KOCH commented this skin surface area is apparently intended to represent a worker wearing a short-sleeved shirt resulting in exposed arms, and stated that it is very unlikely that a worker would wear short-sleeves in an area where COCs might be present. Most health and safety plans at industrial facilities would clearly prohibit the wearing of short-sleeved shirts by workers. KOCH recommended revising the skin surface area to a more reasonable value (e.g., about 2,000 cm² for exposed head and hands). Campbell, George & Strong submitted a similar comment stating that facilities with health and safety plans, including the use of gloves or other personal protective equipment, should be able to vary skin surface area. McCulley Frick & Gilman commented that the Age-Specific Adherence Factors (mg/cm²-event) for the residential receptor (AF(6-18) and AF(18-30)) are 0.1 in Figure 30 TAC §350.74(a), while the AF_w for the commercial/industrial receptor is 0.2 mg/cm²-event as shown later in the same figure. If both the AF(18-30) and AF_w are for adult receptors, the commentor requested that the commission clarify why there is a difference. Finally IT Corporation and SRA commented that the proposed rules provide a table of default exposure values which, if not varied, are expected to provide PCL values protective of all human activities under residential or commercial/industrial land use scenarios. For example, the commentors noted the soil-to-skin adherence factors specified for an evaluation of residential dermal exposures to soil (Figure 30 TAC §350.74(a)) are the same for soil at wet sites near the Gulf of Mexico and dry sites in West Texas. Because activities at the site might change from the assumptions used to develop PCL values, the preamble to the proposed rule noted that the PCLs might not be protective over time and future land use policies might be affected. Note that some specified values are more related to human activity than others. For example, the soil-to-skin adherence factor is related more to soil properties and the exposed skin surface area is more related to human activity. Thus, the PCL for dermal exposure at

a given site is expected to be more sensitive to changes in the skin surface area factor than the soil-to-skin adherence factor.

The commission disagrees with the comment that it is unreasonable to assume that a commercial/industrial worker may have 2500 cm² of exposed skin surface area. This surface area is based on consideration of soil contact with workers' hands, forearms and face, which the commission believes to be a realistic exposure scenario. Further, the commission does not believe that worker safety plans or institutional controls (e.g., deed restrictions) would necessarily be effective mechanisms for controlling the amount of skin exposed, considering both current and future site conditions and ownership.

With respect to the comment regarding different adherence factors for adult residents and workers, the commission points out that as the assumed activities and exposure scenarios for these receptors are not the same, the corresponding soil adherence factors will be different. Therefore, no change was necessary as a result of this comment.

Concerning comments from IT Corporation and SRA regarding the potential variability in soil-to-skin adherence factors given different soil properties, the commission recognizes that dermal soil adherence is partially related to soil properties. However, the commission points out that the adherence factor is also significantly influenced by the type of activities likely to be engaged in by a worker. Accordingly, the commission has selected a median adherence factor for workers engaged in a representative high-contact activity. In order to be adequately protective of both current and future site activities, the commission is not allowing variances to the dermal soil adherence factor. In further support of this decision, the commission believes that it is generally not possible to take the current studies used to derive soil adherence factors and confidently evaluate the influence of site-specific soil properties as compared to activity-related factors.

§350.75. Tiered Human Health Protective Concentration Level Evaluation.

Concerning §350.75, Henry, Lowerre, Johnson & Frederick commented that the foundation equations need to be in rule form. As proposed, any changes to the equations would not be subject to public review and comment. Making such changes, however, is required by law to be by rulemaking. Putting the equations in the rule is also justified, even if it creates some delays in changes to the equations. If life-threatening changes are discovered, an emergency ruling by the commission could enforce the necessary changes until the rule could be changed.

The commission responds that the foundation RBEL equations and Tier 1 PCL equations are included in the rule.

Concerning §350.75(a), McCulley Frick & Gilman commented that there is little difference between Tiers 2 and 3, and suggested that these Tiers be combined and Tier 3 be modified to include a site-specific risk assessment to determine the need for response action objectives (similar to current Risk Reduction Standard Number 3).

The commission agrees that from the lack of detailed rule language regarding Tiers 2 and 3, the difference between Tiers 2 and 3 is not apparent or does not appear significant. The key difference is that natural attenuation factor equations will be set for Tier 2, whereas, other models may be applied under Tier 3. However, the commission has not amended the rule to combine proposed Tiers 2 and 3, and to replace Tier 3 with a site-specific risk assessment. The commission is deliberately moving away from the traditional site-specific risk assessment process as it is burdensome to implement. To date, the submitted "site-specific" risk assessments typically do not appear to be based on truly site-specific information, but rather on what appear to be only more favorable literature values which

have no better apparent basis for use than the defaults assumptions. The general lack of adequate technical or scientific justification for adjustments of exposure factors under a site-specific risk assessment applied under current 30 TAC §335.563 has often served little more than to delay corrective action progress as the executive director and regulated community debate the appropriateness and representativeness of alternative literature assumptions. Additionally, the commission points out that the site-specific risk assessments primarily focus on the current exposure scenario and place insufficient emphasis on future conditions and as such, has often been the basis of disagreement between the executive director and the regulated community.

Rather, the commission maintains that a more straight-forward approach is to set up performance objectives administered within a framework that can be consistently applied across all sites, allowing flexibility to be readily available where it can be routinely and adequately supported with truly site-specific information. The commission is committed to forming stakeholder groups to work toward incorporation of probabilistic methods into the process as a future amendment to the rule, but to remain under the environment in which risk assessments are currently conducted is unacceptable.

Concerning §350.75(a)(1), Brown & Caldwell recommended that the section be revised to allow the person to decide whether to use Tier 1,2 or 3 to establish PCLs for each medium for an affected property. For example, the person could elect to use Tier 1 to establish soil PCLs while using Tier 3 to establish groundwater PCLs.

The commission agrees with the comment, but maintains the proposed rule as the "and" included in the rule "...Tier 1, 2, and/or 3... ." indicates that more than a single tier may be applied to an affected property.

Concerning §350.75(b), Chevron, Fulbright & Jaworski, Environmental Resources Management, KOCH, Mobil, TCC and TXOGA suggested modifying the Tier 1 PCLs to avoid a "clean-to-background" standard. The commentors stated that the Tier 1 PCLs do not represent a significant improvement over the existing Risk Reduction Standard Number 1 because the PCLs are so low as to force investigation and cleanup standards to reach background or non-detect. Environmental Resources Management specifically noted that many of the Tier 1 PCLs will result in a cleanup to levels that are less than background in order to protect shallow groundwater that is not use and will not be used in the foreseeable future and poses no significant threat to human health and the environment. Touted by the TNRCC as a major departure from "background" as a cleanup standard, Chevron suggested the TRRP should be reevaluated to ensure that the Tier 1 PCLs live up to that promise. Chevron further commented that a candid examination of the gap between goals and actual standards for Tier 1 is necessary, and Chevron offers its environmental scientists and engineers to assist in that reevaluation. Chevron, TCC and TXOGA compared the Tier 1 PCLs to their site-specific background UTLs as well as to the PQLs for standard EPA analytical methods. According to those commentors, they found that the Tier 1 PCLS have so much conservatism incorporated that in fact these values are below background and PQLs for many COCs. Chevron, TCC, and TXOGA also provided the following results from its analysis: 1) Tier 1PCLs for soil are below soil background for 47% of metals analyzed; 2) Tier 1 PCLs for soil are below EPA SW 846 PQLs for 17% of organics (includes Method 8240 VOCs and 8270 semivolatiles only); and 3) Tier 1 PCLs for groundwater are below EPA SW 846 PQLs for 21% of analytes. Fulbright & Jaworski stated that experience has shown that when a series of default assumptions are multiplied (such as in RBEL and PCL equations), the overestimates are compounded to reach a result that is often more stringent than appropriate for any specific site. In addition to citing the TCC/TXOGA analysis, Fulbright & Jaworski submitted its own analysis.

Given the mandate of the commission to protect human health and the environment, the perspective of the commission in this rule making is that a cleanup is needed until otherwise demonstrated by the person. Further, specific commentors take exception with the rule specifically because it does not

require cleanups to be completed to background concentrations unless it is proven to be technically impracticable to do so on a site-specific basis (i.e. see comments submitted for Subchapter B submitted by Henry, Lowerre, Johnson & Frederick). The commission does not advocate a background basis for cleanups as such cleanups do not provide any necessary additional protection over a health-based cleanup and it is an unwarranted use of finite corrective action resources. Accordingly, the commission has not proposed and is not adopting a background standard in the rule. Such a standard would mandate that all COCs would be cleaned to below the site-specific background concentration for that COC. Despite the concern of some commentors who strongly favor cleanups to background, the commission established Tier 1 PCLs based on conservative risk-based exposure assumptions and not background concentrations. However, because of the high toxicity of certain COCs, some of the Tier 1 PCLs may in fact be below background, but the same outcome could also be realized under the commentor's site-specific Tier 3 and Tier 4 recommendations. In fact, of the Tier 1 PCLs which fall below background, most are a function of the Tier 1 default fate and transport considerations of the COC and not the result of the exposure scenario. To compensate for this situation, §350.78(c) ensures that PCLs are not set below background concentrations, which may actually be anthropogenic background concentrations in some situations.

Further, in the course of developing the Tier 1 PCLs, the commission has conducted exhaustive "reality checks" to ensure the reasonableness of the Tier 1 values published in conjunction with the proposed rule. The commission has compared the critical Tier 1 PCLs for each COC to the median Texas-specific background concentrations provided in Figure 30 TAC §350.51(m), as well as to method quantitation limits (MQLs) for standard analytical methods (i.e., EPA and other nationally recognized analytical methods). In the course of conducting these comparisons, the commission found the following: 1) Groundwater-when the critical PCL was based on a federal MCL, 12.9% of the values were below the corresponding MQL, and when the critical PCL was calculated based on consideration of the groundwater ingestion pathway as required in Figure 30 TAC §350.75(b)(1), 12.3% of the values were below the corresponding MQL; 2) Soil- 22.5% of the critical Tier 1 PCLs were below the corresponding MQL. However, of those critical Tier 1 soil PCLs that were below the corresponding MQL, 86% were based on protection of underlying groundwater (^{GW}Soil), while only 14% were based on protection of human health (^{Tot}Soil_{Comb}). In terms of comparisons to background soil concentrations, the commission found four COCs which had critical Tier 1 soil PCLs below their corresponding Texas median background concentrations. However, of these four, only one was based on protection of human health (^{Tot}Soil_{Comb}), while three were based on protection of underlying groundwater (^{GW}Soil). It should be noted that for the purpose of this comparison, the commission used the 30-acre residential critical Tier 1 PCLs (i.e., the most conservative values) and therefore, the results obtained in terms of the percentage below background concentrations or MQLs reflect the worst-case.

It should also be noted that the MQLs used for the purposes of this comparison do not necessarily reflect the most sensitive standard analytical method and therefore, again, the results of this comparison are likely biased high. The TCC/TXOGA analysis was performed using only two methods (SW-846 8240 and SW-846 8270). Method SW-846 8240 for volatile analysis has been deleted from the SW-846 guidance manual. Method SW-846 8260 is the current equivalent method. Both 8260 and 8270 are good methods for identifying compounds and quantifying compounds. However, these methods are less sensitive than other organic methods included in the SW-846 guidance. For this reason, the TCC/TXOGA analysis is too narrow. For example, the method quantitation limit reported by many laboratories for pentachlorophenol in water using 8270 is 10 up/L. A more sensitive method for this compound would be SW-846 8151 with which the laboratory can achieve a method quantitation limit below the federally mandated MCL.

Further, it should be apparent from this comparison that greater flexibility in selecting the exposure parameters to be incorporated into the human health protective RBEL and PCL equations will not alleviate concerns that the Tier 1 PCLs are below background levels and analytical capabilities given that the vast majority are driven by assumptions concerning fate and transport of COCs from soils to underlying groundwater (i.e., 92% of the residential critical Tier 1 soil PCLs are based on protection of underlying groundwater (^{GW}Soil), while 94% of the commercial/industrial critical Tier 1 soil PCLs are based on protection of underlying groundwater (^{GW}Soil)). Rather, concerns about the conservative nature of the majority of critical Tier 1 PCLs can be alleviated by exercising the flexibility to adjust the Tier 1 ^{GW}Soil PCL based on affected property characteristics, monitoring data, leachate tests, and other factors are described in §350.75(i)(7)(b) of the proposed rule. Finally, the rule includes a specific provision in §350.78(c) to address cases where the critical PCL established in §350.78(a) is less than the MQL as defined in §350.4 or is less than the background concentration as determined in accordance with §350.51(l) or (m). The rule clearly states that in such cases, the greater of the MQL or background concentration is the critical PCL for that COC.

Also, the commission points out that some of the conclusions that many Tier 1 PCLs are below background concentrations results from the inappropriate comparison of Tier 1 PCLs to the PQLs of non-sensitive analytical methods. When the PQL of more sensitive standard analytical methods are compared with the Tier 1 PCLs, this situation is much less common. Many of the PQLs as listed in SW-846 are based on technology in use 15 years ago. For example, routinely laboratories can reach method quantitation limits ten times lower than the PQLs list in 8270 for most COCs.

Finally, the commission disagrees with the comment by Environmental Resources Management that the Tier 1 PCLs will result in cleanup levels below background in order to protect shallow groundwater that is not used and will not be used in the foreseeable future. First, the proposed rule did not drive cleanups to levels that are less than background. As discussed above, §350.78(c) allows persons to establish the critical Tier 1 PCL at the greater of the MQL or background concentration. Second, if it is determined in accordance with §350.52 that a shallow groundwater truly is of such low quality and yield that it is unlikely to be utilized (i.e., is a class 3 groundwater), then a response action is only required in cases where concentrations exceed 100 x the ^{GW}GW_{Ing} value.

Concerning §350.75(b), Environmental Fuel Systems, Inc., and ICE applauded the upward change in the residential soil PCL for benzene and other gasoline-related constituents. Whereas the original benzene default was set at 0.0022 mg/kg, the number proposed now is 0.02 mg/kg. Recognize that this is still lower than current lab thresholds of reporting (often set at 0.10 mg/kg for PST work) and will require more costly analysis and QA/QC approaches for the labs.

Please refer to the commission's response to this comment in response to comments on proposed §350.51(c).

Concerning §350.75(b)(1), Chevron, TCC, and TXOGA commented that parameters LDF and K_{SW} are not defined in either location. Equations for both factors should be provided on page 43 beneath the existing equation. Based on reviews of previous versions of the rules, Chevron stated that it appears that these two variables should be defined as follows: (1) $K_{SW} = pS/B_w$ where: $B_w = qWS + (K_s ps) + (H qas)$; $K_s = K_{oc} f_{oc}$ (organics); and $K_s = K_d$ (inorganics); (2) $LDF = 1 + (U_{gw} S_{gw}) / (I_f W_g)$ where: U_{gw} = Darcy groundwater velocity (cm/yr); S_{gw} = Groundwater mixing zone thickness (cm); I_f = Net infiltration (cm/yr); and W_g = Width of groundwater source (see description on page 40). Based on these new and revised equations, the following terms should be added to the table on pages 44 and 45 (including default Tier 1 values as appropriate): K_s (state that the default Tier 1 values are property-specific); U_{gw} (list the default Tier 1 values for both the 0.5-acre and 30-acre source areas); S_{gw} (list the default Tier 1 value); I_f (list the default Tier 1 value); and W_g (copy the description currently on page 40). IT Corporation commented that an equation for C_{sat} was not located as cited in §350.75(i)(9), and asked if it is intended to

be related to the equation given for $Soil_{Res}$ cited in §350.75(i)(10). Weston commented that the copy it printed off of the internet has a "o" instead of "=" or "x" in all of the equations. It is unclear what the actual equations are supposed to be. There also appear to be errors in the equations. Weston gave an example - the equation for Res_{sat} appears to have density (ρ) raised to the soil porosity power (θ).

The commission amends the unintentional omission and includes the equation for K_{sw} in the Soil-to-Groundwater PCL equation $^{GW}Soil$ in Figure 30 TAC §350.75(b)(1). The commission also amends the Figure 30 TAC §350.75(b)(1) Tier 1 default field for the term K_{sw} to read "COC and affected property-specific parameters." Additionally, the commission amends the K_{ssw} reference in the foc term to K_{sw} . For Tier 1, LDF is a default value and not an equation. LDF will be defined as an equation in the guidance for Tier 2. The "o," "x," "y," and "?" misprints must have been an artifact of the computer download or the printer. These misprints were not contained in *Texas Register* proposal. Additionally, it was intentional that an equation was not provided for C_{sat} since C_{sat} is only considered under Tiers 2 and 3. An equation for C_{sat} will be provided in the Tier 2 guidance, but it is not the residual soil saturation limit equation. Further, the figure has been amended to correctly reference other figures by striking, for example, the "1 and 2" from Figures 1 and 2: 30 TAC §350.74(a) and correcting the plural form of figures to figure. This was done throughout the figure.

Figure 30 TAC §350.75(b)(1) has also been amended at the $^{Air}SOIL_{Inh-v}$ equation to correctly reference subsurface soils and the strike the "p" from $^{Air}SOIL_{Inh-VP}$. The figure has been amended in the Br_{ABG} and Br_{BG} rows to correctly reference §350.73(e)(2) instead of (3). An "x" has been added to complete the equation $K_{oc} \times foc$ for $K_{S_{veg}}$. Finally, the rule citations for changes to K_d and K_{oc} have been amended to correctly reference Figure 30 TAC §350.73(e)(1)(A), (B), and (C).

Concerning §350.75(b)(c), AFCEE commented that details for calculating Tier 2 and Tier 3 PCLs are not provided in the rule. The preamble states that these details "will be included in a guidance document developed for the TRRP". Because these are not included it is difficult for the AFCEE to fully assess the impact of these rules to our program. AFCEE requested that these rules not be adopted until applicable guidance documents are developed and stakeholders have had the opportunity to comment.

Given that Tier 2 is non-binding as Tier 1 or Tier 3 may be used, and Tier 3 can be based on appropriate fate and transport models selected by the person, the fact that the Tier 2 equations were not made available as a part of this rule making should have no bearing on the impact of the evaluation of this rule. Moreover, the Tier 2 equations presented in the *Texas Register* as part of the May 15, 1998, proposed rule were specifically removed from the rule in response to specific comments received from the May 15, 1998, proposal and recommendations of the regulated community and environmental professionals made during meetings held in the fall of 1998.

Concerning §350.75(c)(2)(C), "; and" has been added to the end of the paragraph for grammatical purposes.

Concerning §350.75(c)(2)(D), the rule is changed for grammatical reasons to switch "establish" and "PCLs" at the beginning of the subparagraph.

Concerning §350.75(d), KOCH asked what are "affected property parameters," as they are used in the figures for §350.75(b)(1). However, they are never defined or discussed in the proposed rules.

Affected property parameters describe the natural soil and groundwater properties of the site such as porosity, soil bulk density, organic carbon content, volumetric air and water content, depth to groundwater, etc., and support fate and transport analysis of the COCs in the soils and groundwater at the affected property. These parameters are fixed for Tier 1, but can be modified under Tiers 2

and 3 to match site characteristics. The commission declines to create a new definition as they are specified in Figure 30 TAC §350.75(b)(1).

Concerning §350.75(d)(2)(C), Chevron commented that this subsection severely restricts the opportunity to incorporate site-specific property information in Tier 3. This requirement is extremely limiting and unnecessarily reduces the opportunity to incorporate site-specificity in Tier 3. Chevron recommended deleting this subsection.

The commission disagrees with the assertion that this provision severely restricts the opportunity to incorporate site-specific property information. The only parameters that are not allowed to be modified under Tier 2 or 3 are the particle density and the ambient air mixing zone height. The particle density is only used to establish total porosity and the default value of 2.65 g/cm³ is used routinely in basic geology text books. Porosity can be measured directly. The ambient air mixing zone height is the breathing height of adults and is approximately 2 meters. The 2 meter assumption is consistent with federal risk assessment guidance. The experience of the commission is that these factors are used as defaults and have been rarely debated, if ever. The commission emphasizes that the rule allows 16 out of 23 listed Tier 1 groundwater PCL parameters to be changed under Tier 2/3 and 25 out of 32 listed Tier 1 soil PCL parameters to be changed. Two of the parameters that cannot change are Temperature and the Universal Gas Constant. However, in response to the comment, the Figure 30 TAC §350.75(b)(1) has been amended to allow the use of a site-specific particle density value.

With regard to §350.75(f) and (g), Chevron commented that the intent of paragraph (f) appears to be verify that natural attenuation is occurring at rates predicted by the decay factors. Although the timing of this sampling is not directly stated in paragraph (f), the language of paragraphs (e), (f), and (g) together imply that this sampling would occur after establishment of the PCLs and before response action decisions are made. Verification of decay factors using field measurements can be extremely difficult and provide no conclusive information beyond what can be obtained by monitoring COC concentrations directly. Monitoring should be focused on documenting that COC concentrations remain protective of beneficial uses, rather than for verifying the model used to make the initial predictions. Based on its comments, Chevron recommended deleting subsections (f) and (g). Concerning §350.75(f), Brown & Caldwell commented monitoring of other environmental media should be allowable. For example, monitoring of soil vapor should be allowable to verify the decay of Volatile Organic Compounds (VOCs) in soil.

The intent of the rule is not to determine decay rates, but to place particular emphasis on the evaluation of sufficient field evidence as support for making appropriate response action decisions. As some models are particularly sensitive to the biodecay rate, the commission is concerned that the result of the modeling evaluation may not sufficiently reflect site conditions. Generally, the commission will accept the use of biodecay rates taken from the published literature because the commission will require sufficient monitoring data to be available to verify that conclusions derived from models adequately reflect sufficiently approximate actual site-specific conditions. To clarify this intent, the commission amended the §350.75(f) to restate that the objective of the monitoring is to verify that COCs are degrading. The commission has also clarified subsection (f) to allow full discretion of the type of monitoring that can be used to verify degradation. The commission is not deleting the requirements of subsection (g). It is important that the commission makes it clear that primary weight is placed on field observations and less weight on modeling evaluations. If the modeling evaluation indicates that conditions may worsen over current conditions, then additional monitoring would be required to an appropriate degree to evaluate this possibility and adjust PCLs as necessary to address the situation. However, upon re-evaluation of proposed (g), inadequate flexibility was provided where additional weight may be placed on modeling results. Therefore, the commission amended the rule to state that generally more weight is placed on monitoring data to clarify that the purpose of the monitoring is to verify that PCLs have been established based on an

accurate understanding of site conditions. Further, in response to comment, §350.75(g) has been amended to clarify that the purpose of any required monitoring is to verify PCLs were based on an appropriate understanding of the affected property.

Concerning §350.75(i), Phillips recommended that the agency consider modifying rule language to allow flexibility in the calculation of PCLs for class 2 groundwater. As presently drafted, the only difference in the treatment of class 1 groundwater and class 2 groundwater is that a plume management zone is available for class 2 groundwater. Phillips stated that considering the fact that most groundwater in Texas will fall into either class 1 or 2, this difference provides little comfort when conducting the human health PCL calculations, which require you to assume that MCLs are the PCLs and for other COCs use the same conservative equations and assumptions as class 1. Class 3, on the other hand, sets the PCLs at 100 times the MCL or other class 1 PCL. While the use of a plume management zone has some benefit to certain sites, Phillips was concerned that the rule essentially considers class 2 groundwater to be equivalent to class 1 groundwater even at sites where it might otherwise be considered a class 3 groundwater (e.g., no beneficial use, high TDS, or low yield). Phillips advocated flexibility in computing the PCLs for class 2 groundwater while recognizing the agency's need to set stringent criteria for class 1 groundwater (e.g., PCLs = MCLs) and to set a ceiling on the criteria used for class 3 groundwater (e.g., PCLs = 100 x MCLs). Phillips recommended that the agency modify the rule to allow a person to calculate PCLs within the range of 2 to 99 x MCLs for class 2 groundwater that has no reasonably anticipated beneficial use (based upon actual or future potential use, TDS, yield, and other relevant site-specific conditions). Chevron made a similar comment stating that many of the PCL equations (e.g., those for emissions of volatiles to air from subsurface soil or groundwater) incorporate cross-media transport models to estimate the COC concentration in the receiving medium. A Tier 3 analysis should have the option of using different models (i.e., different PCL equations) provided that adequate documentation and justification of the model is provided, similar to that required for natural attenuation models. Chevron suggested add to (i): "Alternative approaches for calculating PCLs may also be acceptable provided adequate documentation and justification is provided and subject to approval by the executive director."

The commission disagrees with the comment that no flexibility is provided under Tier 2 or 3 for COCs which have MCLs. Plume management zones are a potential area of flexibility under Tiers 2 or 3 for class 2 groundwaters. The commission has provided ample flexibility through the plume management zone provisions, acceptance of natural attenuation where it is appropriate for use, and technical impracticability demonstrations. The commission has made the policy decision that MCLs, which are federal standards for drinking water, should not be exceed in groundwater which is a useable source of water. The commission maintains that it is fully appropriate in the context of human health and natural resource protection for all class 1 and 2 groundwater which contains COCs in excess of federal drinking water criteria to be properly managed. Persons are also referred to the response to comments provided for §350.71(c)(1) and (2) and §350.74(f) (as the issues are the same.

The commission acknowledges that the current PST program is a receptor-based program, but does base standards for major and minor aquifers on human ingestion, albeit the cleanup levels are risk-based and not MCL-based when there are not threatened receptors. However, the commission points out that Standard 3 of the current Risk Reduction Rule at §335.563(h) states "Media cleanup levels for groundwater that is a current or potential source of drinking water . . . shall not exceed Maximum Contaminant Levels (MCLs) . . ." Thus, the current Risk Reduction Rule also mandates that useable groundwater be cleaned to MCLs. This provision is not obviated under the current Risk Reduction Rule by the baseline risk assessment process. Section §335.563(h)(2) does provide some flexibility, but persons should note that the criteria for such judgements are in the context of §335.160(b). The commission notes that those are the same criteria that are included under §350.33(f)(4)(A) of this rule. Given that, the commission makes the point that this rulemaking provides more specific conditions under which the commission may favorably consider approval of the use of the flexibility provided under §335.563(h)(2). Therefore, the commission takes the position

that an equivalent to class 1 groundwater under the current rule would not as readily satisfy the criteria for the flexibility allowed under §335.563(h)(2)(A) and (C). On the other hand, an equivalent to class 2 groundwater under the current rule would more readily satisfy the criteria for the flexibility provided under §335.563(h)(2)(A) and (C), notwithstanding of course the land use considerations (e.g., residential vs. non-residential).

Concerning §350.75(i)(1), Chevron commented that in many areas of the state, the shallow groundwater that might be impacted by a release is class 2 groundwater. Due to the availability in these areas of high quality municipal (or other) water supplies and/or local restrictions on installation of drinking water wells, no landowner is likely to install a well into these shallow zones, nor would residents ingest that class 2 groundwater. The TNRCC has recognized in §350.37(1)(3)(A) that some class 2 groundwater-bearing units may have no future beneficial use, and provides criteria for determining future beneficial use in §350.37(1)(3)(C). We believe that class 2 groundwater that has no reasonably anticipated future beneficial use is essentially the same as class 3 groundwater, and should be held to the same criteria (i.e., PCLs) as class 3 groundwater. Chevron suggested adding the following sentence to this paragraph: "If it has been determined that the class 2 groundwater has no reasonably anticipated future beneficial use, PCLs for class 3 groundwater should be used."

The commission disagrees that class 2 groundwater meeting the conditions of §350.37(1)(3)(C) should be considered class 3 groundwater and treated accordingly. The commission does not concur that groundwater should be classified as class 3 groundwater based on man-induced conditions (e.g., leaking sewer systems, non-point source) as those conditions could change in the future, particularly in instances where the groundwater could be of high quality and productivity. Rather, the commission maintains that designation as a class 3 groundwater resource should generally be based on characteristics that are natural and unlikely to change over time. The commission does agree that there should be site-specific considerations for class 3 groundwater. The 100 x factor provides for a reasonable level above which cross-contamination issues may become of concern, assuming a ten fold concentration reduction with transport then another ten fold reduction in a well tapping the cross-contaminated zone. Additionally the adjustment is consistent with that of the current rules. The commission has chosen not to work site-specificity through the RBEL, not precluding other complete or reasonably anticipated to be completed exposure pathways that may be applicable to the class 3 groundwater. Rather, site-specificity is provided for through establishment of plume management zones where site-specific decision making can be applied in a more consistent and straight forward manner.

The commission did not receive any comment on §350.75(i)(3), however, the commission has amended the wording of the rule to clarify that if persons are establishing a Tier 1 PCL for this exposure pathway, the equation presented in §350.75(b)(1) is used. The proposed rule could be misread to mean persons could only set this PCL with the Tier 1 methodology.

Although there were no related comments, in paragraph §350.75(i)(4), the commission has removed references to "Appendices A - E" and has changed the reference from §§307.10 - 307.6 to correctly reflect where the aquatic life and human health criteria are provided in Chapter 307. Further, a reference to subparagraph (E) was added to §350.75(i)(4) since this reference was inadvertently omitted in the rule language. Additionally, the commission has clarified §350.75(i)(4)(C) to reflect that the dilution factor of 0.15 is to be applied to non-flowing surface waters such as those indicated in general, and was not meant to exclude bodies of water that were not listed such as bays or the Gulf of Mexico. This paragraph was also modified to clarify that the 7Q2 flow reference was intended for flowing bodies of water such as freshwater streams and rivers, and is not conventionally applied to non-flowing bodies of water as it is technically inappropriate. The first sentence of subparagraph §350.75(i)(4)(E) was corrected to reflect that the dilution factor of 0.15 is specified in Subparagraph C rather than B as indicated. Additionally, §350.75(i)(4)(E) was also modified to clarify that the

person may measure as well as estimate surface water dilution and may use receiving water or sediment analyses to measure or estimate surface water dilution.

Concerning §350.75(i)(4), Environmental Fuel Systems, Inc., and ICE commented that it still appears difficult and expensive to try using more liberal surface water dilution factors. When one has a possible surface water exposure, assessment and remedy costs are going to be awfully high using default factors, according to the language in §350.75(i)(4). Concerning §350.75(i)(4)(E), Chevron commented that requiring a receiving water study in cases where PCLs for groundwater are developed using modeling rather than default factors effectively penalizes the facility for using site data and more sophisticated technical approaches. Further, the discussion of the bioaccumulative chemicals implies that the state and federal water quality criteria are not protective for bioaccumulative chemicals. These requirements may allow this rule to "trigger" sampling outside the program areas intended to be covered by the rule. Chevron recommended removing the second and third sentences from this subsection.

The commission recognizes that the appropriate support for situations where a non-default dilution factor is desired can be complicated and difficult, but believes that an evaluation of sufficient technical rigor is justified. Where groundwater is initially released to the surface water, the commission is concerned that the concentrations of some contaminants in the sediments and pore water may be at levels harmful to benthic organisms. Rather than require a receiving water study or more complicated analysis for every site, the commission selected the 15% dilution factor as a modest representation of dilution in the receiving water using the rationale that 15% is generally used as a conservative ratio to preclude acute toxicity, assuming typical acute-to-chronic toxicity ratios. With this in mind, the language at §350.75(i)(4)(E) is appropriate where a less conservative dilution factor (i.e. less than 0.15) is desired. A receiving water study will not necessarily be required in every case, and the complexity of those conducted may vary from water and/or sediment sampling to community and tissue residue studies. It is anticipated that further details of such a study will be discussed in forthcoming guidance. Regarding the comment from Chevron concerning bioaccumulative chemicals, this provision was specified in the rule language to address commission concerns that some groundwater contaminants may have a high capacity to bioaccumulate, and that this capacity may overcome any high dilution factor associated with a particular release to surface water. With the exception of selenium, the state water quality criteria for the protection of aquatic life given at §307.6(c) were generally derived to preclude toxicity to aquatic organisms as a result of direct exposure to constituents as opposed to indirect exposure as a result of food chain transfer. The state water quality criteria for the protection of human health given at §307.6(d) do consider bioaccumulation in fish but the criterion is meant to be protective of human receptors and may not necessarily be protective of ecological receptors that ingest contaminated prey and media.

With respect to §350.75(i)(4) and §350.75(i)(4)(A), Chevron and Groundwater Services, Inc., commented that no dilution is allowed if surface water is not yet affected at the time of assessment, yet is allowed (factor of 0.15) if surface water is impacted. Not allowing consideration of surface water dilution at sites where groundwater discharge to surface water has not yet occurred will result in cleanup actions at many sites with no potential for surface water impact. Groundwater Services, Inc., commented that this provision is apparently intended for resource protection, but, at many sites, no actual resource protection will be achieved. Rather, such actions will entail significant cost with no human health or resource protection benefit. Both commentors asserted that the person should have the option to use site-specific fate and transport modeling to evaluate and/or estimate the extent to which groundwater may impact surface water.

When the concentration of all COCs in groundwater at the zone of discharge to surface water is less than or equal to the ^{SW}RBEL at the time of the affected property assessment, the commission disagrees with the Chevron and Groundwater Services, Inc., comments that the person should be allowed to consider surface water dilution and site-specific fate and transport modeling, and has

retained the language to this effect in §350.75(i)(4)(A). In accordance with §350.51(f) related to the Affected Property Assessment, concentrations of COCs measured in groundwater from wells at or immediately upgradient of the zone of groundwater discharge to surface water shall be used to determine if COCs in groundwater have discharged to surface waters. Depending on the proximity to surface water, the plume may migrate some distance before reaching the surface water, and in this instance, site-specific fate and transport modeling in the groundwater could be used to establish PCLs for the groundwater. However, groundwater modeling will not be allowed as the only demonstration that groundwater is discharging to surface waters in excess of the surface water RBEL. Rather, such demonstrations would need to be made through the measurement of COC concentrations in groundwater at or upgradient of the zone of groundwater discharge to the surface water. In contrast to point source discharges regulated by the commission and the EPA, groundwater-to- surface water releases are not authorized by permit, are not routinely incorporated into waste load models, and may represent a continuing chronic exposure for an indefinite time period, to receptors that utilize the receiving water. For these reasons, the commission maintains that this proposal is consistent with a pollution-prevention approach for purposes of natural resource protection.

Concerning §350.75(i)(4), EPA Region 6 commented that it is concerned about the proposed methodologies for generating PCLs for COCs in ground water discharges to surface water (i.e., ^{SW}GW). These methodologies are used for calculating allowable discharge limits to surface water from permitted discharges not from unauthorized releases as would be considered in waste programs.

The commission agrees with the EPA Region 6 that the groundwater releases to surface water represent unauthorized releases in contrast to those authorized by TPDES or NPDES wastewater permits. As such, the proposed rule specified a dilution factor of 1 (i.e. no dilution) when the concentration of all COCs in groundwater at the zone of discharge to surface water is less than or equal to the ^{SW}RBEL at the time of the affected property assessment. Further, at §350.75(i)(4)(C) and (D) where the 0.15 dilution factor is provided, the verbiage, "clearly less than 15% of the 7Q2" or "clearly greater than 15% of the 7Q2" is intended to mean that some reasoned justification will be required. The commission does not mean to imply that a dilution factor of 0.15 will automatically be allowed for releases to streams and rivers without some discussion of the groundwater release rate compared to the receiving water low flow (7Q2) and the information used to derive these numbers. A similar justification is expected for discharges to non-flowing surface waters such as lakes, estuaries, and tidal rivers. The commission somewhat agrees with the EPA Region 6's comment that the methodologies provided are used for calculating allowable discharge limits to surface water. Contrary to the wastewater permitting programs that have existed at the state and federal levels for many years, the commission is not aware of any easy, routine tools or methodologies for assessing the impact of groundwater releases to surface water. Although the commission has borrowed some terminology used in the wastewater program, it maintains that the rule language provides the flexibility (particularly at §350.75(i)(4)(E)) to allow the use of unforeseen methodologies for assessing the impact of groundwater releases to surface water. It is anticipated that more details regarding the types of possible studies and appropriate justification will be provided in forthcoming guidance. The rule has been amended to complete the reference to §307.6 for formatting purposes by adding "(relating to Toxic Materials).

Concerning §350.75(i)(4)(C), Brown & Caldwell recommended revising this requirement to allow DF values less than 0.15 when demonstrated to the executive director's satisfaction.

The Commission agrees with the comment and responds that the flexibility suggested by this comment is already provided at §350.75(i)(4)(E).

Concerning §350.75(i)(4)(C), Weston asked if it would be the PCL that would be adjusted by the dilution factor. It seems like the RBEL should stay the same.

The commission disagrees with Weston's comment in that the ^{SW}RBEL is adjusted with the dilution factor as provided in figure 30 TAC §350.75(b)(1). Where the dilution factor is one, the groundwater to surface water PCL (^{SWG}) will be equivalent to the surface water RBEL (^{SW}RBEL) determined in accordance with the provisions of §350.74 (h). However, the commission does acknowledge that similar adjustments made for soil and groundwater are characterized as adjustments to the PCLs and not RBELs.

Concerning §350.75(i)(4)(C)(ii), Chevron, TCC and TXOGA commented on the proposed rule language stating that the person shall not apply a dilution factor to the allowable concentrations of petroleum COCs in Subchapter H of Chapter 321 of this title (relating to Discharge to Surface Waters from Treatment of Petroleum Substance Contaminated Waters). The commentors stated that it is unclear why this particular chemical group is treated differently than other COCs; dilution may be applied to other COCs on a site-specific basis, and recommended eliminating the text. Concerning proposed §350.75(i)(4)(D)(ii), McCulley Frick & Gilman commented that the allowable concentrations of petroleum COCs specified in Subchapter H of 30 TAC Chapter 321 are for point source discharges to surface waters. A point source model may be appropriate for a karst aquifer spring; however, the unconditional application of these discharge limits as surface water protective values is overly conservative. McCulley Frick & Gilman requested that the commission provide references to support use of these limits without dilution factors for groundwater discharges to surface waters. Furthermore, McCulley Frick & Gilman requested that the commission provide the flexibility to evaluate the attainment of the requirements specified in Subchapter H of 30 TAC Chapter 321 on a site-specific basis, where these requirements are appropriate.

The Commission agrees with these comments and has removed provisions §350.75(i)(4)(C)(ii) and (D)(ii) from the rule.

Also concerning §350.75(i)(4)(C)(ii), KOCH commented that the evaluation of the groundwater-to-surface water pathway should be risk-based. The proposed TRRP rules state that a dilution factor shall not be applied to the allowable concentrations of petroleum COCs listed in Subchapter H of Chapter 321. The allowable concentrations (termed "maximum effluent limitations") listed at §321.133(c)(2)(A) and 134(c)(2)(A) are not risk-based values. Apparently these maximum effluent limitations were intended to apply to surface discharge from groundwater pump tests, groundwater remediation, tank tests, on-site soil remediation activities, removal of water from a petroleum tank, groundwater wells, excavation and utility vaults (§321.132(f)). None of these applications are similar to the diffuse discharge of groundwater containing petroleum COCs to a surface water body. Further, to evaluate compliance with these maximum effluent limitations, KOCH asked if samples would have to be collected before water is discharged to a splash pad (see §321.133(c)(1)(A)). KOCH also stated that it is also unclear how the rate of groundwater discharge could be controlled to prevent flooding and erosion (see §321.133(c)(1)(B)). KOCH also asked if the point of compliance for this pathway have to be a sample collected from a monitoring well adjacent to the surface water body. The COC concentration in groundwater, before it discharges to surface water, often provides limited information on potential exposure to aquatic life. Therefore, compliance with this pathway should be based on samples collected from the surface water body. KOCH noted the commission has argued that "benzene is benzene" in the preamble and RIA to the proposed rule and that different response objectives in different regulatory programs should be harmonized. However, KOCH stated that the proposed rule will not consider benzene as benzene. The maximum effluent limitation for benzene in 30 TAC Chapter 321 is 50 micrograms per liter (up/L). It must be emphasized that this limit is not risk-based. The benzene aquatic life criteria in Chapter 307 ranges from five to 321 up/L depending on the exposure pathway. The listed aquatic life criteria are based on ecological risk factors. Further, it is appropriate to assess compliance with the Chapter 307 criteria by collecting samples from the surface water body. KOCH asked how can "benzene be benzene" when two different regulations contain two different sets of standards for the same chemical. The risk-based criteria from Chapter 307 should be adopted for benzene. Compliance with these criteria should be measured in the surface water body.

Alternatively, KOCH recommended the appropriate groundwater-to-surface water dilution factors (§350.75(I)(4)(E)) should be applied to samples collected from monitoring wells.

In response to KOCH's comment regarding the dilution factor of one for the allowable concentrations of petroleum COCs listed in 30 TAC 321, Subchapter H, the commission generally agrees with the comments and has removed provisions §350.75(i)(4)(C)(ii) and (D)(ii) from the rule because Subchapter H is intended to address the direct discharges to surface waters, and not groundwater discharges to surface waters.

In response to KOCH's comment regarding the point of compliance for this pathway, that is point of exposure as used in this rule, the commission agrees that the point of exposure for comparing a groundwater concentration to the ^{SW}GW will be COC data collected within the groundwater at or upgradient of the zone of discharge to the surface water body. The commission is amending §350.37(i) to clarify this requirement. Section 350.51(f) further sets out this position.

The person does have the option of collecting surface water (and/or sediment) samples in accordance with §350.75(i)(4)(E) as a means to derive an alternative dilution factor. This sampling data can be used to confirm model projections that estimate surface water concentrations and actual dilution afforded in the receiving water. Language has been added to this paragraph to clarify that receiving water studies may include collection of surface water and sediment samples.

Regarding KOCH's comment that benzene is benzene, the commission acknowledges that the limitations set forth in Chapter 321 and Chapter 307 were based on different performance measures. Chapter 321 limits were developed as an overall technology approach to establish categorical limits for these discharges. Since the Chapter 321 rule was intended to address small, temporary discharges of wastewater containing petroleum hydrocarbons, the discharge levels do not necessarily address possible chronic and cumulative effects that could be demonstrated in surface waters receiving a continuous release of petroleum contaminated groundwater. The Chapter 307 (Texas Surface Water Quality Standards) benzene criteria discussed in KOCH's comment are actually instream criteria that were developed to be protective of human health as a result of drinking water ingestion and/or fish or shellfish ingestion. Chapter 307 also provides criteria for the protection of aquatic life although no specific criterion is currently specified for benzene. As indicated previously, the dilution factor provision for releases regulated by Chapter 321 (§350.75(i)(4)(C)(ii) and (D)(ii)) have been removed from the rule. The reference to Chapter 321 discharge limits has been retained at §350.74(h)(3), however, since that paragraph relates to actual discharge limits that are already promulgated.

Concerning §350.75(i)(4)(E), Groundwater Services, Inc., commented that the requirement to sample sediments to assess possible effects on benthic communities is inconsistent with ecological PCL definition that states that “these concentration levels are not intended to be protective of receptors with limited mobility or range (e.g., plants, soil invertebrates, and small rodents)... .” When surface water criteria are not exceeded, sediment sampling is not necessary to evaluate impacts on “wider-ranging species.” Furthermore, sediment sampling is highly problematic particularly in light of NPDES outfalls, dredging operations, etc. Groundwater Services, Inc., recommended deletion of this provision.

Regarding the protection of benthic communities and the definition of the ecological PCL, see the response-to-comment regarding the ecological PCL definition (§350.4(a)(24)) and the revised definition. The commission also responds that the maintenance of aquatic community composition and structure downstream or downgradient of a release (compared to an upstream or similar reference site) is an appropriate assessment endpoint. In response to the comment regarding compliance with a water quality standard, the commission disagrees with Groundwater Services, Inc. A simple comparison of water column concentrations with surface water criteria may not be

adequately protective of benthic organisms. These organisms may be exposed to high concentrations of COCs at the surface water/groundwater interface before any appreciable dilution in the receiving water has occurred. Further, the surface water criteria are primarily intended to be protective of water column organisms, and may not be protective of benthic organisms that are exposed to COCs in sediment due to direct exposure or sediment ingestion. The commission agrees with the comment that sediment sampling is highly problematic in light of other perturbations. Persons are encouraged to consult with commission staff in the selection of affected area sampling locations and background or reference sample locations. The rule has been amended to change “bioaccumulative chemical” to bioaccumulative COC to make the term consistent with other parts of the rule.

The commission did not receive any comment on §350.75(i)(6), however, the commission has amended the wording of the rule to clarify that if persons are establishing a Tier 1 PCL for this exposure pathway, the equation presented in §350.75(b)(1) is used. The proposed rule could be misread to mean persons could only set this PCL with the Tier 1 methodology.

The commission did not receive any comment on §350.75(i)(7)(B), however, the commission has amended the wording of the rule to clarify that if persons are establishing a Tier 1 PCL for this exposure pathway, the equation presented in §350.75(b)(1) is used. The proposed rule could be misread to mean persons could only set this PCL with the Tier 1 methodology.

Concerning §350.75(i)(7)(C), McCulley Frick & Gilman commented that the subparagraph states that establishing a soil leachate-to-groundwater PCL in accordance with §350.75(i)(A) and (B) may not be required when a demonstration can be made with appropriate soil and groundwater data that the soils will attain the soil response objectives, and based on soil sample data, the concentration trends of groundwater monitoring data decreasing over time when groundwater is impacted, probable time since release occurred, adequate identification of the soil source areas, and other hydrogeologic or property-specific information. McCulley Frick & Gilman agreed with this type of flexible and reasonable approach for determining if a specific pathway is of concern based on site-specific data and conditions, and if a PCL is necessary for the pathway. The commentor suggested that the flexible, reasonable approach shown in §350.75(i)(7)(C), which allows the use of site-specific information to affect PCL calculations, be incorporated throughout the proposed rule.

The rule as a whole provides the flexibility that this subsection offers. The reason a high degree of flexibility is provided for this pathway is two fold. First, this pathway is purely a cross-media issue, and is not a true human health pathway in and of itself. Therefore, it is solely a fate and transport evaluation issue. In all aspects of this rule, persons are provided extensive freedom through the tiered PCL process to use actual field evidence or other technically appropriate estimation techniques to thoroughly and appropriately factor in fate and transport considerations in the development of PCLs. Where this flexibility was not as obviously apparent in the proposed rule, such as in the inhalation exposure pathways as discussed in §§350.71(c) (3) and (6), and subsections (i)(8) of this section, the commission has amended the rule based on comments submitted for those subsections to ensure persons have adequate flexibility to evaluate COC fate and transport matters.

The second reason a high degree of flexibility is provided for this pathway is that a good deal of soil and groundwater data are routinely available which support aggressive risk-based decision making. Not only is the soil source area usually characterized, but the receiving groundwaters are regularly characterized and sampled. The same is not true for vapor pathways. Concentrations of COCs in vapor phase are rarely measured in soils or within the atmosphere at cleanup sites in Texas at all, much less on a time-series basis as is the routine case for groundwater. Rather, vapor pathway decisions are usually forced to be based purely on modeling evaluations which are very rarely field verified with vapor or atmospheric sampling data. Therefore, the commission rightly exercises less aggressive risk-based decision making with regard to vapor pathways. Even more rarely, are

adequate data or bases provided for alternative exposure factors. The degree to which risk-based decisions can be made is a function of the supporting data. Where there is sufficient data, the commission is willing to exercise a great deal of site-specific technical judgement on matters. However, where recommendations are based on generic alternatives which may or may not have any particular relevancy to the affected property, in rule the commission is less willing to make site-specific judgements, and rightly so. The commission whole-heartedly agrees that excessive data collection is not warranted, and data need to be extrapolated to an appropriate extent, but experience has shown that data that are most readily available and easily obtainable are the geologic/hydrogeologic data.

Concerning §350.75(i)(7)(C), Weston suggested deleting the third sentence. From a practical standpoint it is extremely difficult to even get duplicate soil samples to have similar reported concentrations. It is highly unlikely that without an extensive study, changes in soil concentrations could be used to demonstrate the lack of leaching. If this sentence is not removed, the conditions under which the executive director could potentially require this information should be listed. Weston stated that it is concerned that a significant effort could be expended obtaining information that was inconclusive.

The commission notes that the provision stipulates that subsequent soil sampling may be required on a site-specific basis. The intent of the demonstration is to determine if concentration levels appear to be increasing toward the groundwater over time. The commission agrees that it is generally unrealistic to expect concentrations to be exactly duplicated. However, subsequent soil sampling after an appropriate time period should be fully practical to determine if there is evidence of vertical movement of the source mass of the COCs to depth. Further, the commission does not agree that the approach to address inherent uncertainty is to minimize the data upon which decisions are made. When the default endpoint is to clean the soil to background, the commission agrees lesser data may be required. However, given that a "clean to background" is not a default endpoint in this rule, then the inherent uncertainty that surrounds the issue of leaving soil COCs in place that may leach to the underlying groundwater may be appropriately addressed with time-series data collection evaluated in a proper context. The commission is not amending the rule.

The commission amends the fourth sentence to add the missing word "of" to: ". . . a sufficient number of groundwater monitoring wells . . ."

Concerning §350.75(i)(8), Chevron, TCC and TXOGA commented that the person should have the option under Tier 3 of using equations other than those in the figure. For example, Paul Johnson at the University of Arizona at Tempe has developed vapor equilibrium and flux models; EPA has developed a Box Model for these issues; the Thibodeaux-Hwang model published in 1982 may be applicable; and there are other options. Chevron, Mobil, TCC, and TXOGA argued the collection of soil vapor monitoring data should not be the only alternative for this pathway, and requested that the commission add "Other applicable vapor emission model(s) may be used provided adequate documentation and justification of the model is provided and subject to executive director approval." SRA noted that inhalation of subsurface soil vapor indoors, such as in residences or commercial buildings, is not addressed, and requested clarification on whether the indoor air inhalation pathway and the necessary equations will be included in the final TRRP rules. Weston referred to its comment on §350.71(c)(3) where it stated that the air inhalation pathway should be removed from the rule.

The commission has amended §350.71(c)(6) to address these concerns. However, the use of other models does not avoid establishment of PCLs. Modeling directly or indirectly derives PCLs. The commission has also amended the rule to make clear that if a Tier 1 PCL is established, that it is established using the figure in (b)(1). The proposed rule language could be misread to mean the PCL could only be established with the Tier 1 methodology.

Concerning §350.75(i)(9), McCulley Frick & Gilman commented that an inconsistency and a contradiction appear. The use of default soil parameters for Tier 1 PCL calculation while requiring site specific soil parameters for the calculation of Tier 1 soil saturation values

The commission has not amended this rule with respect to this comment. The theoretical soil saturation limit is the soil COC concentration at which soil pore air is saturated with the COC and is a limiting factor for the volatile emissions exposure pathway which is based purely on the characteristics of the property and the COC. The intent of the Tier 1 PCLs is to provide a quick and conservative risk-based screen of the COCs at the affected property. If the COCs are in excess of Tier 1, other evaluations are allowed under Tiers 2 and 3. To ensure that the inhalation pathway is not neglected under a Tier 2 or 3 evaluation and that a Tier 1 theoretical soil saturation limit is not inappropriately used to screen a site-specific Tier 2 or Tier 3 PCL, the commission made the policy decision to not provide generic Tier 1 theoretical soil saturation levels.

The commission did not receive a comment on this matter, however, the proposed rule and the Figure 30 TAC §350.75(b)(1) conflicted with regard to the theoretical soil saturation limit equation. Subsection §350.75(i)(9) indicated that the saturation limit equation is present in the figure. That is not the case, and as such, the commission has modified the rule to delete the reference to the figure for purposes of locating the equation for the saturation limit. The equation will be provided in the guidance for Tiers 2 and 3. The commission elected to not include this equation in the figure to avoid confusion as the figure is a listing of Tier 1 PCL equations. The saturation limit evaluation is not a Tier 1 evaluation.

Concerning §350.75(i)(10), Weston asked what is the basis for the equation provided and documentation that the equation provided can be used to determine if mobile NAPL may be present. Weston stated that if you leave out the TT, the units work out and the default result is 10,000 mg/kg. If the TT was really supposed to be ρT , using the Tier 1 default value the $Soil_{res}$ would be only 3,700 mg/kg. This equation could be simplified if Res.sat was presented in units of gNAPL per cm³soil. The soil concentrations where NAPL may be present would be the Res.sat divided by the soil bulk density and multiplied by 1E6 to get to units of mg/kg. Weston suggested changing "mobile NAPL concentration" to "the soil concentration at which NAPL may become mobile" to clarify. The mobile NAPL concentration should not change. For a pure liquid, the "mobile NAPL concentration" would be 1,000,000 mg/kg. Brown & Caldwell commented that beginning with Figure 30 TAC §350.75(b)(1), and continuing with subsequent Figures, the Greek symbols in the equations and definitions are represented by question marks (?). These should be corrected.

The commission presumes that the commentors downloaded the rule from the internet and the equation was jumbled as an artifact of the PDF format, the download, or the printer. The equation was correctly presented in the Texas Register. The equation was specifically included in response to a comment received from the May 15, 1998, proposal of the rule. The 1998 proposed version of the rule used C_{sat} to set a NAPL limit. The equation is included within the ASTM *Standard Provisional Guide for Risk-Based Corrective Action, PS 104-98*.

§350.76. Approaches for Specific Chemicals of Concern to Determine Human Health Protective Concentration Levels.

Concerning §350.76(c), KOCH commented that under the Toxic Substance Control Act (TSCA) §403, the EPA proposed a 2,000 milligrams per kilogram (mg/kg) hazard standard for lead at residential properties. In December 1998, the EPA stated that this 2,000 mg/kg hazard standard should not be used to address Brownfields, RCRA facilities, or national or state Superfund sites. Rather, the EPA stated that a 400 mg/kg level of public concern for lead should be used. The proposed TRRP rules include a value of 500 mg/kg for residential properties. The commission should provide an explanation for why the 2,000 g/kg or 400 mg/kg criteria are not applicable. In the preamble to the proposed TSCA §403 changes, the EPA

states that the 2,000 mg/kg standard should not be used for two reasons. First, Comprehensive Environmental Response Compensation and Liability Act (CERCLA) response actions and RCRA corrective actions occur with government oversight. A Tier 1 response action under the proposed TRRP rules could proceed without direct commission oversight. Therefore, the TSCA §403 lead standard should be applicable. Second, CERCLA has a preference for permanent treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances. The proposed TRRP rules do not have this preference and interim controls and exposure prevention response actions. Therefore the TSCA §403 lead standard should be applicable. King & Spalding commented that the specific recommendations for soil lead abatement standards at residential sites remains unjustified scientifically, do not use a tiered approach and are more conservative than those of EPA. The level is one tenth of EPA's current recommended level of 5000 ppm under §403 of TSCA. It is also substantially below EPA's recently proposed soil lead abatement level of 2000 ppm for residential sites.

The commission strongly disagrees with the comments that, to be consistent with the recently proposed Toxic Substance Control Act (TSCA) §403 rule, the residential soil PCL ($^{Tot}Soil_{Comb}$) for lead should be 2000 ppm. In addition, the commission disagrees with the comment that the residential soil lead PCL is more conservative than that typically used by the EPA. At a federal level, lead in soil is addressed under several different programs (i.e., TSCA §403, the RCRA Corrective Action program, and CERCLA). While the primary focus of each program is prevention (i.e., the prevention of future exposures from the source(s) being remediated), each differs in purpose and in the authority granted by the statutes under which they were developed. The purpose of the proposed TSCA §403 rule was to identify lead-based paint hazards, which include hazardous lead paint, as well as residential dusts and soils that have levels of lead considered to be hazards (regardless of whether they were contaminated with paint or other lead sources). The EPA makes it clear in the preamble to the proposed TSCA §403 rule that the 2000 ppm soil lead hazard level is one where there is a high degree of certainty of harm to children. That is, when soil lead levels exceed the hazard level of 2000 ppm, the EPA has a strong expectation that, even in the absence of further data on local circumstances, children will be at appreciable risk of elevated blood lead levels. It is important to note that the 2000 ppm soil lead hazard level was developed to serve as a "worst first" level to aid in setting priorities to address the greatest lead risks promptly. As TSCA §403 deals with a potentially huge number of sites, and the resources necessary for the investigation needed to accurately identify their risks are typically very limited, such a "worst first" type of approach was necessary. A soil lead hazard level of 2000 ppm allows persons addressing lead hazards posed by lead-based paint in the nation's housing stock to focus on the worst risks first, that is exposures to lead-based paint itself, which often pose a greater risk of elevated blood lead levels for children living in homes containing lead-based paint than does the soil. The EPA clearly states in the proposed TSCA §403 rule that lead contamination at levels below 2000 ppm in soil may pose a serious health risk based upon site-specific evaluation and may warrant timely response actions. In a recent memorandum addressing the relationship between the proposed TSCA §403 rule and the Office of Solid Waste and Emergency Responses's (OSWER's) Lead-in-Soils Policy (OSWER Directive Number 9200.4-29), the EPA stated that the 2000 ppm soil lead hazard level proposed under TSCA §403 should not be used to modify approaches for addressing lead cleanups at Brownfields, RCRA sites, NPL sites, State Superfund Sites, Federal CERCLA removal sites, or CERCLA non-NPL sites.

With regard to the comment requesting an explanation of why the 400 ppm level of concern established by the EPA is not applicable in the TRRP rule, the commission provides the following response. The commission is aware that the EPA has identified 400 ppm of lead in soil as a level of potential public health concern in the preamble to the proposed TSCA §403 rule. The commission is also aware that OSWER's Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (OSWER Directive Number 9355.4-12, July 14, 1994) identifies 400 ppm as a screening level for lead in residential soils. The 400 ppm screening level was derived based on

application of the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model, using default parameters. However, the EPA makes it clear in this directive that the 400 ppm screening level is not a cleanup goal but rather is a tool to be used to determine which sites or portions of sites do not require further study and to encourage voluntary cleanup. In cases where site data support modification of model default parameters, incorporation of such information should be utilized in the calculation of media cleanup levels. The commission has found that in most cases where site specific data have been available, a cleanup level of 500 ppm has been determined to be protective. This level (i.e., 500 ppm) is also consistent with findings from the CDC which indicate that children exposed to lead in soil in excess of 500-1000 ppm can have elevated blood lead levels. A cleanup level of 500 ppm lead for residential soils is also consistent with the level at which the majority of residential lead cleanups have occurred both in Texas as well as on a national basis.

With regard to the comment concerning the lack of scientific justification for the residential soil lead PCL, the commission acknowledges that in the interest of limiting the size and complexity of the rule, technical justification was not provided in the rule. Justification supporting the residential soil lead PCL of 500 ppm established in the rule is provided below. Lead is of particular concern to the commission because, as stated by the Centers for Disease Control and Prevention (CDC), "The risks of lead exposure are not based on theoretical calculations. They are well known from studies of children themselves and are not extrapolated from data on laboratory animals" (CDC, 1991). Preschool children (i.e., children less than six years of age) have been shown to be the population at greatest risk of experiencing lead-induced health effects. Further, evidence in the scientific literature indicates that exposure of young children to lead may cause health effects that continue throughout a person's life. Therefore, it is critical to remediate areas where children are potentially exposed to elevated levels of lead in soil in as timely a manner as possible to eliminate continuing exposures during critical periods of development. Given the potential adverse impact of lead on young children, the critical need for timely response actions, and the fact that lead is a common COC on residential properties in the state, the commission determined that it was appropriate to set a reasonable non-negotiable PCL for lead in residential soils ($^{Tot}Soil_{Comb}$) of 500 ppm. The commission believes that establishing a clear target level of 500 ppm lead in residential soils will expedite response actions and therefore, children exposed to lead will realize a more immediate reduction in exposure and accompanying reduction in health risks and associated costs.

Concerning §350.76(c), TCC, TXOGA commented that TSCA uses a soil-lead level of 2000 ppm which is more appropriate for industrial facilities, and recommended that the commission allow use of TSCA soil-lead level in industrial facility.

The purpose of the TSCA §403 rule is to identify lead-based paint hazards, which include hazardous lead paint, as well as residential dusts and soils that have levels of lead considered to be hazards (regardless of whether they were contaminated with paint or other lead sources). Further, the 2000 ppm soil lead hazard level specified in the proposed TSCA §403 rule is not even applicable to properties regulated under the proposed TRRP rule. This was made clear in a recent memorandum addressing the relationship between the proposed TSCA §403 rule and the Office of Solid Waste and Emergency Responses's (OSWER's) Lead-in-Soils Policy (OSWER Directive Number 9200.4-29), where the EPA stated that the 2000 ppm soil lead hazard level proposed under TSCA §403 should not be used to modify approaches for addressing lead cleanups at Brownfields, RCRA sites, NPL sites, State Superfund Sites, Federal CERCLA removal sites, or CERCLA non-NPL sites. Therefore, the commission disagrees with the comment that health-based soil PCL ($^{Tot}Soil_{Comb}$) for lead in soils on commercial/industrial properties should be 2000 ppm as proposed in the Toxic Substance Control Act (TSCA) §403 rule. Additional discussion concerning the lack of applicability of the 2000 ppm soil lead hazard level proposed under the TSCA §403 rule is provided in the commission's response to a comment from KOCH Industries concerning this topic.

Concerning §350.76(c), EPA Region 6 commented that the TNRCC sets the residential soil protective concentration level for lead at 500 mg/kg, whereas the EPA uses 400 mg/kg.

The commission is aware that OSWER's Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (OSWER Directive Number 9355.4-12, July 14, 1994) identifies 400 ppm as a screening level for lead in residential soils. The 400 ppm screening level was derived based on application of the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model, using default parameters. However, the EPA makes it clear in this directive that the 400 ppm screening level is not a cleanup goal but rather is a tool to be used to determine which sites or portions of sites do not require further study and to encourage voluntary cleanup. In cases where site data support modification of model default parameters, incorporation of such information should be utilized in the calculation of media cleanup levels. The commission has found that in most cases where site-specific data have been available, a cleanup level of 500 ppm has been determined to be protective. This level (i.e., 500 ppm) is also consistent with findings from the Centers for Disease Control and Prevention (CDC) which indicate that children exposed to lead in soil in excess of 500-1000 ppm can have elevated blood lead levels. A cleanup level of 500 ppm lead for residential soils is also consistent with the level at which the majority of residential lead cleanups have occurred both in Texas as well as on a national basis.

Concerning §350.76(c), Environmental Resources Management commented that a PCL for lead of 500 mg/kg (as illustrated in the Tier 1 PCL Table) is too stringent in light of recent research which shows that residential lead levels greater than 3500 mg/kg are protective. The species of the lead and its bioavailability both before and after corrective action should be taken into account. Under the proposed rules, many residential areas in our cities could not be economically redeveloped.

The technical merits of this comment are difficult to evaluate since the commentor provides no scientific justification supporting their claim that a soil lead level of 3500 ppm has been shown to be protective for residential properties. Nonetheless, the commission believes that establishment of a residential soil lead PCL of 500 ppm is necessary given the unique nature of both the toxicity of and exposure to lead. The commission is aware that the EPA recommends using the Integrated Exposure Uptake Biokinetic (IEUBK) Model for setting site-specific residential cleanup levels for lead in soil. The commission in fact used this model to verify the protectiveness of the 500 ppm value proposed as the residential soil PCL ($^{Tot}Soil_{Comb}$) for all three tiers. However, the commission made a policy decision to establish a single non-negotiable cleanup level for lead in residential soils rather than allowing persons to use the IEUBK model on an individual site basis. This decision was based on the following considerations: 1) lead is a common COC on residential properties in the state; 2) the toxicity data for lead is particularly compelling because, as stated by the Centers for Disease Control and Prevention (CDC), "The risks of lead exposure are not based on theoretical calculations. They are well known from studies of children themselves and are not extrapolated from data on laboratory animals" (CDC, 1991); 3) preschool children (i.e., children less than six years of age) have been shown to be the population at greatest risk of experiencing lead-induced health effects; 4) evidence in the scientific literature indicates that exposure of young children to lead may cause health effects that continue throughout a person's life; 5) several recent studies have shown an association between elevated blood lead levels (10 µg/dl or greater) and exposure to lead in soils at concentrations above 500 ppm (ATSDR, April 1995; ATSDR, 1994; ATSDR, August 1995); and 6) ATSDR has examined many studies which have attempted to correlate environmental lead levels with blood lead levels, and has determined that a rate of increase in blood lead concentration is greater at low exposure levels than at high exposure levels as a result of saturation effects (ATSDR, 1993, p. 108, 129; Reagan and Silbergeld, 1989, pp. 205-209). Based on these findings, the commission determined that it is critical that areas where children are potentially exposed to elevated levels of lead in soil be remediated in as timely a manner as possible to eliminate continuing exposures during critical periods of development. Therefore, the commission determined that it was appropriate to set a reasonable non-negotiable

cleanup level for lead in residential soils ($T^{ot}Soil_{Comb}$) of 500 ppm. The commission believes that establishing a clear target level of 500 ppm lead in residential soils will expedite response actions and therefore, children exposed to lead will realize a more immediate reduction in exposure and accompanying reduction in health risks and associated costs. This level (i.e., 500 ppm) is consistent with findings from the CDC which indicate that children exposed to lead in soil in excess of 500-1000 ppm can have elevated blood lead levels. A cleanup level of 500 ppm lead for residential soils is also consistent with the level at which the majority of residential lead cleanups have occurred both in Texas as well as on a national basis.

Finally, it should be noted that even in the proposed TSCA §403 rule, the EPA clearly states that the proposed 2000 ppm hazard standard for lead in soil is the level at which children's exposures will be associated with a greater certainty of harm. Further, the EPA states in the proposed TSCA §403 rule that lead contamination at levels below 2000 ppm in soil may pose a serious health risk.

Concerning §350.76(c), King & Spalding commented that it supports a number of the changes that TNRCC has adopted in the new proposed rule. In particular, the use of updated National Health and Nutrition Examination Survey (NHANES III) baseline blood lead data in the commercial/industrial soil lead calculations is a significant improvement; however, more recent NHANES III Phase 2 data are now available and should be substituted for Tiers 1, 2, and 3. KOCH commented that the blood lead levels in the U.S. have exhibited a truly remarkable decline in the least few years. Therefore, KOCH also recommended use of the most recent blood lead level data from Phase 2 of NHANES Phase III should be used. The EPA is using the NHANES III Phase 2 data in current rule-making activities. The baseline blood lead levels and geometric standard deviations in the proposed TRRP rules are out of date. The baseline blood lead levels in both the Tier 1 and Tier 2/3 equations should be updated to 1.42 micrograms per deciliter (µg/dL). The individual geometric standard deviation should also be updated to 1.77. These values from the NHANES III Phase 2 are representative of the southern region of the United States.

Based on the comment received from King and Spalding and KOCH, the commission obtained the NHANES III, Phase 2 data from the Centers for Disease Control and Prevention (CDC). The commission utilized this most recent data to calculate updated geometric mean blood lead levels and geometric standard deviations for women of child-bearing age in the southern quadrant of the United States. The commission also segregated the Phase 2 data based on ethnicity and race, looking at geometric mean blood lead concentrations for each of the different ethnic and racial categories identified in the NHANES III, Phase 2 database (i.e., Mexican American women, non-Hispanic black women, non-Hispanic white women, and other). The following results were obtained:

Mexican American women (Geometric Mean Blood Lead (PbB) = 1.64 µg/dL, Geometric Standard Deviation (GSD) = 1.91 µg/dL); Non-Hispanic black women (PbB = 1.50 µg/dL, GSD = 1.90 µg/dL); Non-Hispanic white women (PbB = 1.36 µg/dL, GSD = 1.73 µg/dL); Other (PbB = 1.63 µg/dL, GSD = 1.57 µg/dL); Overall across all ethnic and racial categories (PbB = 1.43 µg/dL, GSD = 1.77 µg/dL).

Given that Mexican American women represent the population at greatest risk, as indicated by the fact that their blood lead concentrations exceeded all other populations, and the fact that Mexican Americans comprise a significant segment of the Texas workforce, the commission determined that it was appropriate to utilize the geometric mean blood concentration and corresponding geometric standard deviation for this population as the default values specified in Figures §350.76(c)(2) and (3). The rule has been revised to reflect incorporation of these updated values for Mexican

American women. It should be noted that the changes made will also precipitate a change in the Tier 1 commercial/industrial soil PCL ($T^{ot}Soil_{Comb}$) for lead.

It should also be noted that flexibility was provided in §350.76(c)(3) of the proposed rule to allow persons to incorporate alternative values in cases where other scientifically defensible values are available (e.g., more recent NHANES data become available in the future).

Concerning §350.76(c), KOCH commented that the exposure frequency value of 250 days/year, used in the proposed lead equations, is higher than the EPA recommended value of 219 days/year. No explanation for this difference is provided in the proposed rules or preamble. The proposed rules should be revised to include a default exposure frequency of 219 days/year or lower (see Comment Number 40) for the lead equations and other RBEL equations.

The commission disagrees with the comment that 219 days should be used as the default value for exposure frequency in calculating soil PCLs for commercial/industrial land uses. In the guidance document entitled "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil (December 1996), the EPA clearly states that the default value of 219 days/year is a central tendency estimate for nonresidential exposures and corresponds to the average time spent at work by both full-time and part-time workers. Given that a goal of the TRRP is to restore affected properties to some reasonable, active and productive use, the commission determined that the appropriate commercial/industrial worker scenario to be evaluated was a full-time worker. Therefore, an exposure frequency of 250 days/year was selected as the default based on the assumption that the commercial/industrial worker is at work five days/week for 50 weeks (assumes a two week vacation each year).

Concerning §350.76(c), KOCH commented that the soil and dust ingestion rates of 25 mg/day (50 mg/day for this combined exposure route), used in the proposed lead equations, are lower than the commercial/industrial rate of 100 mg/day used for the RBELs in Figure 30 TAC §350.74(a). According to this figure, the soil ingestion rate cannot be changed. No explanation for this difference is provided in the proposed rules or preamble. The EPA recommends a value of 50 mg/day. The proposed rules should be revised to include a default soil (and dust) ingestion rate of 50 mg/day for the lead equations and other RBEL equations. McCulley Frick & Gilman commented that there was an inconsistency between the adult soil ingestion rate presented in Figure 30 TAC §350.74(a) for estimating PCLs for all COCs and the adult soil/dust ingestion rate presented in Figures §350.76(c)(2) and (3) for estimating PCLs for lead. The former figure provides an adult soil ingestion rate of 100 mg/day while the latter two figures provide an adult soil/dust ingestion rate of 50 mg/day. These values should be the same since ingestion rate is not COC-specific, but scenario-specific. McCulley Frick & Gilman recommended using an adult soil/dust ingestion rate of 50 mg/day for estimating all industrial/commercial PCLs as well as for calculating the age-adjusted ingestion rate for residents since Table 4 - 22 of current EPA guidance (EPA, 1996b) recommends using an ingestion rate of 50 mg/day for adults. King & Spalding commented that a lower ingestion rate of 20 mg/day should be used rather than the value of 50 mg/day recommended in the proposed rule. The recommended ingestion rate is based on limited, older data and should be revised. The absorption fraction of lead in soil and dust should be modified in keeping with more current analysis.

The commission received several comments concerning the difference in soil ingestion rates specified in Figure 30 TAC §350.74(a) for calculating commercial/industrial soil PCLs for all COCs except lead and those specified in Figure 30 TAC §350.76(c)(2) and (3) for calculating commercial/industrial soil PCLs for lead. Based on review of guidance documents and OSWER Directives concerning the adult lead model, the commission determined that such a difference was in fact warranted. The methodology for assessing risks associated with non-residential adult exposures to lead in soil is different from methodology used for assessing risks of non-cancer health effects for all other COCs. More specifically, the methodology for assessing lead focuses on estimating fetal blood lead concentration in women exposed to lead contaminated soil (i.e., fetal blood levels are derived from the geometric mean blood lead concentrations estimated for the adult population). Given that the fetus is

believed to be more sensitive to the adverse effects of lead than the adult, cleanup levels that are protective of a fetus should also afford protection for adults. In accordance with this methodology, the protectiveness is incorporated in the acceptable level of probability of a fetal blood lead concentration exceeding 10 g/dL. The cleanup levels derived using this methodology are such that a typical individual exposed to lead would have no more than a 5% probability of exceeding the blood lead level of concern (i.e., 10 g/dL). Since this methodology is predicated on evaluating a "typical" individual for the scenario being evaluated (i.e., a full-time worker), the commission determined that it was in fact appropriate to use soil ingestion rate which represented a central tendency value (i.e., 50 mg/day) in order to best estimate geometric mean blood lead levels for adults. In contrast, the risk of non-cancer health effects for all other COCs are assessed using the traditional reference dose (RfD) and reference concentration (RfC) methodologies. In accordance with this traditional methodology, soil cleanup levels are estimated by backcalculating from the level believed to be protective (i.e., the RfD or RfC), assuming reasonable maximum exposures (RMEs). The intent of the RME is to estimate a conservative exposure scenario that is within the range of possible exposures and to avoid estimates that are beyond the true distribution. As such, high-end (RME) estimates are used for the most sensitive one or two exposure parameters in the calculation, while all others are set equal to their mean values. The protectiveness is incorporated in this traditional methodology via the RME assumptions. Given that the contact rate (i.e., soil ingestion rate) was demonstrated to be one of the more sensitive parameters in the equation, the commission determined that it was in fact appropriate to use a soil ingestion rate which represented a high-end value (i.e., 100 mg/day). Further justification for use of a soil ingestion rate of 100 mg/day for commercial/industrial workers for all other COCs is provided in the commission response to comments submitted by KOCH Industries on this topic.

Concerning §350.76(c), Chevron, McCulley Frick & Gilman, TCC and TXOGA commented that Figure 30 TAC §350.76(c)(2), Tier 1 Adult Lead RBEL Equation does not include the parameter K_{sd} (ratio of dust concentration to soil concentration). Chevron, TCC, and TXOGA all stated that this resulted in a soil lead concentration of 987 mg/kg. The Tier 2/3 equation includes the Bowers default value of $K_{sd} = 0.70$, which results in a soil lead concentration of 1162 mg/kg. All commentors requested a justification for the omission of K_{sd} from the Tier 1 equation. King & Spalding commented that revisions are also called for in the default parameters for the ratio of lead concentration in dust to that of soil. There is a need for a lowered value for this parameter, possibly 10% to 45%, and clarification that site-specific data may be substituted for the default value.

The commission received several comments concerning the lack of a soil-to-dust transfer term (K_{sd}) in the equation provided in Figure 30 TAC §350.76(c)(2). Given that evidence in the scientific literature indicates that investigators have been unable to distinguish between the amount of soil ingested vs. the amount of dust ingested with any degree of certainty, the commission determined that in calculating Tier 1 soil PCLs it was reasonable to assume that all soil and dust ingested is at a contaminant concentration equal to that in soil. As such, a single term reflecting the combined ingestion of soil and dust (IR_{sd}) was used in the equation provided in Figure 30 TAC §350.76(c)(2) for calculating Tier 1 PCLs. The intent of the commission in providing an alternative algorithm in Figure 30 TAC §350.76(c)(3), whereby the amount of soil and dust ingested could be looked at separately in conjunction with a soil-to-dust transfer coefficient (K_{sd}), was to allow persons to incorporate site specific data on the levels of lead in outdoor soil and in indoor dust. However, in the course of reviewing comments received on this section, the commission has determined that it was inappropriate to specify default values for the ratio of concentration in dust to that in soil (K_{sd}). In fact, members of the EPA Technical Review Workgroup for Lead have indicated that the default K_{sd} value proposed by the commission was originally developed based on data for residential properties and therefore, the applicability to commercial/industrial properties is questionable (i.e, it is difficult to say with any certainty if the variability observed in contaminant concentrations in dust relative to that in soil on residential properties would be similar to that observed on commercial/industrial

properties). Thus, in using this alternative algorithm, it is critical that the specific contributions from soil and dust be based on direct measurement data for both soil and dust at the affected property. The commission has, therefore, revised the rule to reflect the fact that the alternative algorithm provided in Figure 30 TAC §350.76(c)(3) can only be used in cases where persons have adequate direct measurement data on the concentrations of lead in both soil and dust at the affected property. Note that since K_{sd} shall now be determined based on direct measurement data from the affected property, it is no longer necessary to list K_{sd} as an exposure factor for which alternative values may be used. The rule has been amended accordingly to reflect this.

Further, the commission disagrees with the comment from King & Spalding that a lower K_{sd} value (i.e., 10% to 45% rather than 70%) should be used as the default. The commentors provided a manuscript authored by Bowers and Cohen as justification for the lower K_{sd} value. However, as was the case with the original K_{sd} value of 70% proposed by the commission, the studies which serve as the basis for the lower default K_{sd} value proposed by the commentor reflect consideration of residential properties only. Again, the applicability of such values to commercial/industrial properties is questionable.

Finally in their comments concerning the lack of a K_{sd} term in the Tier 1 equation provided in Figure 30 TAC §350.76(c)(2) of the proposed rule, both Chevron and TCC/TXOGA state that the Tier 1 equation provided in Figure 30 TAC §350.76(c)(2) yielded a soil PCL=987 ppm, whereas the Tier 2/3 equation provided in Figure 30 TAC §350.76(c)(3) yielded a soil PCL=1162 ppm. The commission notes that the soil PCLs cited by the commentors are not the values obtained based on the equations and defaults provided in Figures 30 TAC §350.76(c)(2) and (3) but rather reflect the soil PCLs calculated based on the defaults recommended in the earlier version of the TRRP rule proposed in May 1998. However, based on comments received on this earlier version of the proposed rule, the commission updated the geometric mean blood lead and corresponding geometric standard deviation to incorporate blood lead data specific for the southern region from the more recent NHANES III, Phase 1 study. The updated values were provided in Figure 30 TAC §350.76(c)(2) of the proposed rule. The commission notes that due to a typographical error, the default values provided in Figure 30 TAC §350.76(c)(3) were not updated to reflect the NHANES III, Phase 1 data. This error has been corrected such that the default geometric mean blood lead values and corresponding geometric standard deviations are now identical in both Figures §350.76(c)(2) and (3). The commentors should note also that the geometric mean blood lead values and corresponding geometric standard deviations have been updated even further based on NHANES III, Phase 2 data. Further discussion concerning the specific values incorporated into the final rule is provided in the commission's response to comments from King & Spalding on this topic.

Concerning §350.76(c), McCulley Frick & Gilman commented that it is unclear why when calculating the Soil PCL for lead under Tiers 2 and 3 using the default values listed in Figure §350.76(c)(3), the value is lower than that estimated using the Tier 1 calculation. Using the tiered approach, the value should in fact be higher but given the equations and assumptions proposed in the rule, this is not the case. This emphasizes the need for the TNRCC to provide rationale and support for the proposed assumptions and calculations. King & Spalding commented that the NHANES III Phase 1 data used for baseline blood lead and GSD values in the Tier 1 commercial/industrial calculations are not relied upon in the same types of calculations in tiers 2 and 3. King & Spalding presumed this was an inadvertent error that can be corrected.

The commission notes that, as indicated in comments provided by King & Spalding, the baseline blood lead and GSD values specified in Figures §350.76(c)(2) and §350.76(c)(3) should have been the same. In response to comments received on the earlier version of the TRRP rule proposed in May of 1998, the commission had updated the baseline blood lead and GSD values to reflect data for the southern region from the NHANES III, Phase 1 study. However, due to a typographical error, the

values originally proposed by the commission in Figure 30 TAC §350.76(c)(3) were not updated, while those in Figure 30 TAC §350.76(c)(2) were in fact updated. Further, the commission has received comment from King & Spalding recommending that the baseline blood lead and GSD values be updated again to reflect the more recent data now available from NHANES III, Phase 2. The commission has revised the rule to reflect the new NHANES III, Phase 2 data and has also corrected the typographical error such that the baseline blood lead and GSD values in Figures §350.76(c)(2) and §350.76(c)(3) are now the same. It should be noted that the changes made will also precipitate a change in the Tier 1 commercial/industrial soil PCL ($T^{ot}Soil_{Comb}$) for lead. Further justification for the specific default baseline blood lead and GSD values incorporated into the final rule is provided in the commission's response to comments from King & Spalding on this topic.

Concerning §350.76(c), McCulley Frick & Gilman commented that EPA has developed the Integrated Exposure Uptake Biokinetic Model (IEUBK) for assessing lead exposure and risk in children. This model assesses a child's lead exposure from multiple sources, such as dietary contribution, which can vary drastically between sites, without any influence from site contamination but, yet, greatly affect the estimated cleanup limit. In the guidance manual for EPA's model (EPA, 1994b), EPA indicates that "...no exposure scenario is appropriate for every application of the IEUBK model, and this is particularly true of the default parameters. The responsible use of the IEUBK model requires input data that are appropriate to the site(s) and subject(s)." McCulley Frick & Gilman suggested that site-specific conditions be allowed when estimating a soil lead PCL under Tiers 2 and 3 given the model's flexibility and sensitivity to very site-specific inputs.

The commission is aware that the EPA recommends using the Integrated Exposure Uptake Biokinetic (IEUBK) Model for setting site-specific residential cleanup levels for lead in soil. The commission in fact used this model to verify the protectiveness of the 500 ppm value proposed as the residential soil PCL ($T^{ot}Soil_{Comb}$) for all three tiers. However, the commission made a policy decision to establish a single non-negotiable cleanup level for lead in residential soils rather than allowing persons to use the IEUBK model on an individual site basis. This decision was based on the following considerations: 1) lead is a common COC on residential properties in the state; 2) the toxicity data for lead is particularly compelling because, as stated by the Centers for Disease Control and Prevention (CDC), "The risks of lead exposure are not based on theoretical calculations. They are well known from studies of children themselves and are not extrapolated from data on laboratory animals" (CDC, 1991); 3) preschool children (i.e., children less than 6 years of age) have been shown to be the population at greatest risk of experiencing lead-induced health effects; 4) evidence in the scientific literature indicates that exposure of young children to lead may cause health effects that continue throughout a person's life; 5) several recent studies have shown an association between elevated blood lead levels (10 µg/dl or greater) and exposure to lead in soils at concentrations above 500 ppm (ATSDR, April 1995; ATSDR, 1994; ATSDR, August 1995); and 6) ATSDR has examined many studies which have attempted to correlate environmental lead levels with blood lead levels and has determined that a rate of increase in blood lead concentration is greater at low exposure levels than at high exposure levels as a result of saturation effects (ATSDR, 1993, pp. 108, 129; Reagan and Silbergeld, 1989, pp. 205-209). Based on these findings, the commission determined that it is critical that areas where children are potentially exposed to elevated levels of lead in soil be remediated in as timely a manner as possible to eliminate continuing exposures during critical periods of development. Therefore, the commission determined that it was appropriate to set a reasonable non-negotiable cleanup level for lead in residential soils ($T^{ot}Soil_{Comb}$) of 500 ppm. The commission believes that establishing a clear target level of 500 ppm lead in residential soils will expedite response actions and, therefore, children exposed to lead will realize a more immediate reduction in exposure and accompanying reduction in health risks and associated costs. This level (i.e., 500 ppm) is consistent with findings from the CDC which indicate that children exposed to lead in soil in excess of 500 - 1000 ppm can have elevated blood lead levels. A cleanup level of 500 ppm lead for residential soils is also

consistent with the level at which the majority of residential lead cleanups have occurred both in Texas as well as on a national basis.

Concerning §350.76(c), McCulley Frick & Gilman commented that the adult lead exposure models used are similar to the adult blood lead model developed by EPA Region 6; however, the default values for several of the parameters in the models listed in the proposed rule differ from the default values specified by Region 6. In addition, the allowable ranges of these values specified by Region 6 are not included in the proposed rule. McCulley Frick & Gilman suggested that the proposed rule be revised to allow the use of EPA Region 6 allowable ranges.

In developing the default values specified in Figures §350.76(c)(2) and §350.76(c)(3), the commission selected values which it determined were reasonable for the commercial/industrial worker scenario under consideration (i.e., a full-time worker). Further, §350.76(3) allows persons the flexibility to modify certain default parameters based on site-specific information. The intent of EPA Region 6 in providing a range of plausible values in their guidance concerning use of the adult lead model was not for persons to arbitrarily select values, but rather reflects the plausible range where values selected based on site-specific information are likely to fall. The commission believes that the flexibility provided for in §350.76(c)(3) of the proposed rule accomplishes this goal.

Also with respect to §350.76(c), McCulley Frick & Gilman commented that it supported the flexibility for Tiers 2 and 3 commercial/industrial property, that allows the person to deviate from the default exposure factors provided in Figure 30 TAC §350.76(c)(3) if property-specific or defensible alternative data (e.g., from open literature or privately funded studies) adequately support such an approach.

The commission acknowledges the agreement and support.

Concerning §350.76(c), King & Spalding commented that the rule as proposed failed to provide the technical justification for the absolute absorption fraction of lead in soil and dust of 10%. Further, King & Spalding commented that recent evidence suggests that soil lead absorption may fall within a range of approximately 5 to 7%. KOCH commented that a similar factor is proposed to evaluate risk from the incidental ingestion of lead in soil -- the absolute absorption factor for lead in soil and dust (figures at §350.76(c)(2) and (3)) considered the gastrointestinal absorption of soluble lead. The EPA recommends assuming that 60% of the lead in soil is soluble. The fraction of this soluble lead absorbed into the body's circulatory system among pregnant women is somewhat controversial. KOCH stated that it appears (however no explanation or rationale is provided) that the commission is assuming that 17% of the soluble lead is absorbed. A person should have the option of using this gastrointestinal absorption factor or running a site-specific gastric leaching test.

In an effort to limit the size and complexity of the rule, the commission did not provide the technical justification for all parameters in the proposed rule, and reserved some technical detail for guidance. However, in response to requests that the commission provide the technical justification supporting the absolute absorption fraction for lead of 10% provided in the rule, the commission provides the following information.

The absolute absorption fraction for lead in soil (AFs) is calculated by taking an estimate of the oral availability of soluble lead and modifying it to account for the lower bioavailability of lead in soil (AFs= absolute availability of soluble lead x relative bioavailability of lead in soil). The commission has selected 0.2 (20%) as the best estimate of the percentage of soluble lead that is available for absorption, consistent with the recommendations of the EPA Technical Review Workgroup for Lead (EPA, 1996). As lead in soil has been shown to be somewhat less available than soluble lead, it is appropriate to utilize a relative bioavailability adjustment in calculating an acceptable soil PCL for lead. Several researchers have evaluated the site-specific relative availability of lead in soil (e.g.,

Ruby *et al.*, 1996, Weis *et al.*, 1994, Maddaloni *et al.*, 1998) using a variety of technical approaches, with estimates generally ranging from 0.1-0.8 (10-80%).

For other compounds, the commission would typically select a value from the conservative end of the bioavailability range in identifying an appropriate default estimate. However, unlike other compounds, the protectiveness of the adult lead modeling is addressed through the selection of the 95th percentile of an exposed population as a regulatory level of concern. Therefore, the commission believes it is more appropriate to select a typical estimate of relative bioavailability when modeling lead exposure, rather than identifying a reasonable worst-case value. The commission applied the results of a 1998 study conducted by Maddaloni *et al.*, which demonstrated a relative soil bioavailability of 0.5 (50%). One of the strengths of this study is that it is one of the few experimentally-designed bioavailability studies which involves human volunteers, thus avoiding the uncertainties associated with extrapolations from surrogate species (e.g., rats, swine). Also, the 0.5 (50%) estimate is generally reflective of the midpoint of the range of relative bioavailability estimates reported in the scientific literature. The commission notes that this factor could be altered in Tiers 2 and 3, based on appropriate site-specific bioavailability studies.

An absolute absorption factor (AFs) for lead is therefore calculated as $0.2 \times 0.5 = 0.1$ (10%)

The commission did not agree with the commentor's position that 0.2 (20%) should not be used in Tier 1 as is likely to overestimate the absolute bioavailability of soluble lead. First, the commission does not believe that worker exposure to lead will predominately occur during mealtimes at work, as hand-to-mouth activity is not limited to times of meal consumption, nor does soil ingestion only occur as a result of hand-to-mouth activities (e.g., exposure through dust raised during equipment operation). In developing the 20% absorption recommendation, the EPA Technical Review Workgroup on Lead utilized a weight of evidence approach based on experimental estimates of the absorption of soluble lead in the scientific literature. As this approach also included appropriate considerations for factors which are not always accounted for in experimental studies (e.g., variability in food intake, lead intake, lead speciation, particle size), the commission believes it is an appropriate assumption for the absorption of soluble lead.

While the rule allows changes in the estimated absorption of soluble lead in Tiers 2 and 3, the commission stresses that the 20% estimate is based on a weight of evidence approach (as opposed to being based on the results of a single study). Thus, compelling scientific studies which account for all critical population variability would be necessary to off-set the existing technical body of evidence which supports 20%. The rule has been amended at §350.76(c)(2) to strike "(c)" from "...paragraph (c)(2)... ." for formatting purposes.

Concerning §350.76(d)(3), IT Corporation commented that The equation for derivation of the Inhalation Unit Risk Factor (URF) appears to contain a typo, and asked if the URF units should be (risk per microgram/m³) rather than (risk per gram/m³)?

The commission is amending §350.76(d)(3) in response to the comment that there was an error in the units listed for the inhalation unit risk factor. This section will list the correct units for the inhalation unit risk factor (risk per µg/m³).

Concerning §350.76(d)(4), KOCH referenced it in their comment to §350.72(b)(5).

Please refer to the commission's response to KOCH's comment on §350.72(b)(5).

Concerning §350.76(e)(3), although the commission did not receive specific comments on this subsection, the commission made several minor revisions necessary to enhance the readability of the provision.

Concerning §350.76(g), Henry, Lowerre, Johnson & Frederick stated the rule needs to explain what modifications were made to the TPHCWG recommendations and why.

In response to a request from this commentor, the commission is providing an explanation of the modifications that were made to TPHCWG recommendations and why changes were made. The commission notes that the only difference between the approach proposed in the rule and that of the TPHCWG is in some of the recommended surrogates and corresponding toxicity factors for some of the fractions. The specific surrogates for each fraction are provided in Figure 30 TAC §350.76(g)(2) of the rule, while the corresponding toxicity factors are provided in the Toxicity Factors table which accompanies the rule. As discussed in response to comment from Chevron, the proposed RfDs for C₅ - C₆ and >C₆ - C₈ aliphatic hydrocarbon fractions differed from those recommended by the TPHCWG. The TPHCWG recommends an RfD of 5 mg/kg/day (based on using commercial hexane as the surrogate), while the commission is using a more conservative RfD of 0.06 mg/kg/day (based on using n-hexane as the surrogate). The commission determined that it was appropriate to use the RfD for n-hexane as a result of the lack of oral toxicity data for commercial hexane and the inappropriateness of estimating an RfD from the RfC for commercial hexane. The proposed RfCs for C₅ - C₆ and >C₆ - C₈ aliphatic hydrocarbon fractions differed slightly from the values recommended by the TPHCWG, in that the TPHCWG recommends 18.4 mg/m³ (the RfD is not included rule) based on the toxicity of commercial hexane. The commission recommends an RfC of 18.4 mg/m³ (the RfC is not included rule) for mixtures with less than 53% n-hexane content and an RfC of 0.2 mg/m³ for mixtures with greater than 53% n-hexane content. The commission believes that it is necessary to employ the more conservative RfC based on n-hexane (0.2 mg/m³) in rare cases where a mixture may contain greater than 53% n-hexane. Finally, the commission has dropped C₅ from the aliphatic fraction due to separation problems associated with using n-pentane as the extraction solvent. The rule has been amended at §350.76(g)(2) to reflect this change to C₅. Figures 30 TAC §350.73(e) and 30 TAC §350.76(g)(2) have also been amended.

The commission has also included a separate entry for transformer mineral oil (>C₁₆ - C₂₁ and >C₂₁ - C₃₅ aliphatic hydrocarbon fractions) to be used when evaluating releases of transformer mineral oil. The TPHCWG did not evaluate this specific type of hydrocarbon. The commission has derived an appropriate RfD (1.6 mg/kg/day) (the RfD is not included rule) for this type of release based on the composition of typical transformer mineral oil and evaluation of toxicity data for several representative compounds within the aliphatic hydrocarbon fractions encompassed by transformer mineral oil. Based on analytical data submitted to the commission, the approximate composition of typical transformer mineral oil is 18% >C₁₂ - C₁₆, 60% >C₁₆₋₂₁, and 20% >C₂₁ - C₃₅. Using the RfDs for the various fractions in proposed Figure 30 TAC §350.76(g)(2) and the composition data, the weighted RfD for transformer mineral oil is 1.6 mg/kg/day.

The TPHCWG also established an aromatic fraction for >C₅ -C₆ aromatic hydrocarbons, using benzene as the surrogate. Since benzene is the only hydrocarbon within this range and the fact that benzene is always measured in response to a petroleum hydrocarbon assessment, the benzene is specifically dealt with and does not need to be further evaluated as TPH.

The commission recommends an RfD for the >C₇ - C₈ aromatic hydrocarbon fraction of 0.1 mg/kg/day and an RfC of 1 mg/m³ (neither the RfD nor the RfC are included in the rule). The commission notes a typographical error in Figure 30 TAC §350.76(g)(2) (i.e., the fraction is listed as "C₇ - C₈" when it should list the fraction as >C₇ - C₈). The rule has been amended accordingly. The

TPHCWG recommends an RfD for this fraction of 0.2 mg/kg/day and an RfC of 0.4 mg/m³. The commission elected to use alternate values, as the toxicity factors recommended by the TPHCWG are based on toluene, which contains seven carbons and is outside the range of >C₇ - C₈ aromatic hydrocarbon compounds. The commission chose ethylbenzene as a surrogate, as it is the compound within the >C₇ - C₈ aromatic hydrocarbon range which yields the most conservative PCLs.

Finally, the commission will allow persons to limit evaluations out to C₂₈ when there is no appreciable mass of TPH beyond C₂₈. However, for products such as transformer mineral oil, the evaluation to C₃₅ would be appropriate.

Concerning §350.76(g), Henry, Lowerre, Johnson & Frederick commented that EPA's RCRA and CERCLA remediation program have not utilized TPH analyses as they are not a meaningful risk-based measure. Instead, facilities have been required to analyze for volatile and semi-volatile organic compounds. Henry, Lowerre, Johnson & Frederick believes a wide range of uncertainty lies in utilizing TPH analyses by themselves. For instance, TPH typically has a PQL of 5 ppm, whereas many TPH constituents have much lower health-based levels. Concerning §350.76(g), EPA commented that page 2276. §350.76(g). TNRCC utilizes a procedure for total petroleum hydrocarbons. The EPA will continue to require analysis, reporting, and risk-based evaluation of chemical-specific petroleum hydrocarbons. EPA stated that it will continue to require analysis, reporting, and risk-based evaluation of chemical-specific petroleum hydrocarbons.

The rule as proposed did in fact address the commentor's concern that using TPH analyses alone, could result in potentially missing TPH constituents which have much lower health-based levels. The commission has included TPH as potential COCs as an additional analysis, not to substitute for COC-specific analyses and PCL determination. TPH is included as a "safety net" for hydrocarbon contamination that may not be detected using analytical methods which are designed to detect specific compounds. It is likely that TPH PCLs will almost always be in excess of the method quantitation limit.

Concerning §350.76(g), McCulley Frick & Gilman noted that §350.76(g) states that if the executive director requires PCLs for total petroleum hydrocarbons (TPH) to be established for soil or groundwater at an affected property, the person shall use the approach in this section unless an alternate method is approved by the executive director. McCulley Frick & Gilman commented that it is unclear when a PCL for TPH is required. Likewise, current and definitive guidance on this issue is lacking in the proposed rule. We suggest that this discussion be expanded to include text on whether a TPH PCL is necessary when a person has analytical data for volatile and semi-volatile COCs since many COCs used as toxicity value surrogates (Figure 30 TAC7: §350.76(g)(2)) would be captured in the volatile and semi-volatile analysis. Having to compare soil concentrations to a TPH PCL based on the toxicity value surrogates as well as the specific PCLs for volatile and semi-volatile compounds could result in double counting for the presence of the COCs used as surrogates and is an unreasonable requirement. The usefulness of the approach described in §350.76(g)(2) - (6) is apparent if the only available analytical data is for a non-discrete TPH or if no volatiles or semi-volatiles are measured. McCulley Frick & Gilman recommended revising the proposed rule to indicate that the following options are considered when evaluating the need for a PCLs for non-discrete TPH, stating that they believe that this approach allows for flexibility in analytical and procedural requirements while acknowledging the uncertainty of using surrogate data. The preferred option is Option 1 since it maximizes the amount of data (and minimizes uncertainty) that can be compared to the appropriate and known chemical-specific toxicity values and, thus, chemical-specific PCLs. Option 3 is the least site-specific and most uncertain of the options since surrogate data are used to represent certain hydrocarbon fractions. However, the surrogate compounds and associated toxicity values used in this option may not be indicative of the more toxic species that may be present. Option 1: If data for compound-specific analysis using EPA Method 8260 and 8270 for volatiles and semi-volatiles are available, these data should be compared to COC-specific PCLs and calculation of a TPH PCL is not

necessary. If BTEX, semi-volatiles, and other compounds that generally constitute the composition of the contaminants (if known) are not measured, the person must use either Option 2 or Option 3. Option 2: If the person can determine the bulk TPH composition based on process knowledge and the compound is not significantly weathered (e.g., the release is relatively new), the PCL can be estimated based on a mixture-specific (e.g., gasoline, diesel, mineral oil, or other petroleum products) toxicity value. A bulk TPH analytical method would be acceptable to determine if a PCL is exceeded. Option 3: If the TPH is non-discrete (e.g., petroleum hydrocarbon material that cannot be differentiated into specific organic compounds), the provisions of §350.76(g)(2) - (6) and Figure 30 TAC §350.76(g)(2) would be appropriate for establishing a TPH PCL. Finally, McCulley Frick & Gilman suggested incorporating these concepts into a guidance document and delete the requirements of §350.76(g).

The intent of the TPH analysis is not to replace the evaluation of individual analytes. Rather, the TPH method is to augment the analysis of specific COCs where there may not be sufficient information to evaluate the protectiveness of the TPH mass as a whole. The commission agrees that it is not appropriate to use TPH in lieu of specific analysis of target COCs. The commission agrees with McCully, Frick & Gilman that there is not detailed information or direction as to when TPH analyses may be required. This rule is purposefully not intended to dictate whether or not any COC, including TPH, must be investigated at an affected property. Those decisions are most appropriately made by the program area and are best left to guidance. The suggestions provided by McCully, Frick & Gilman for TPH implementation will be considered should any further guidance be developed on this matter.

Concerning §350.76(g), IT Corporation asked if an analytical method such as TNRCC Method 1005 will be specified for TPH analysis. SRA recommended mention of TNRCC Method 1005/1006 for TPH analysis in §350.76(g).

The commission acknowledges that TNRCC Methods 1005 and 1006 are the intended pre-approved methods to be used for TPH. However, the commission does not agree that it is appropriate to specifically reference those methods in rule and notes that specific methods are not referenced for any other COC.

Concerning §350.76(g), Weston asked whether method TX1006 has been approved by TNRCC and wanted to know if laboratories can perform the new analyses to provide the desired speciation. Weston also asked if TNRCC will accept the TX1006 reporting limits of 50 mg/kg for soil and 5 mg/L in water. Weston registered concern about the need to perform multiple TPH analyses to provide the information (and reporting limits) needed by TNRCC under the proposed TRRP.

Commission Method 1006 is not totally finalized, but is in the process of laboratory testing. Laboratories should be able to run the method to desired specifications, and further improvements will be made overtime. The commission will accept the reporting limits and does not anticipate those limits to be a problem. The person is only required to run a few commission Method 1006 samples and then use that data to establish risk-based cleanup levels for comparison with commission Method 1005 sample results to determine compliance. The commission is sensitive to the level of analysis and works to minimize data collection to that actually needed.

Concerning §350.76(g)(2), Chevron commented that while it applauds TNRCC for their effort to develop risk-based remediation goals for TPH, similar to those developed by the TPH Criteria Working Group, they remain concerned that TNRCC has still proposed an RfD for C5 - C8 aliphatic hydrocarbons that is approximately 80-fold lower than the RfD derived by the TPHCWG. Chevron directed TNRCC to the reasonably comprehensive discussion of the TPHCWG's rationale for selecting an RfD much higher than that for n-hexane (pp.15-21; Volume 4, TPHCWG Series regarding the development of fraction-specific RfDs). Chevron also applauded TNRCC's decision to revise the RfCs for these fractions of aliphatic

hydrocarbons from what was proposed in the previous draft of the TRRP; however, it is unclear why the RfCs were changed, but the RfDs for the same fractions were not similarly changed. Chevron referred the agency to the full text of their comment on this issue submitted in response to the last draft of the TRRP, released for public comment in 1998. Chevron proposed that the RfD for the C₅ - C₈ aliphatic hydrocarbons fraction be changed from 0.06 mg/kg/day, to 5.0 mg/kg/day, except for those rare situations where the analytical fractionation indicates that the mixture contains greater than 53% n-hexane. This revision will also be consistent with the similarly revised RfD.

The commission has reviewed the rationale provided by the TPH Criteria Working Group (TPHCWG) in support of their RfD for the C₅-C₆ and >C₆-C₈ aliphatic fractions and has determined that the route-to-route extrapolation procedure employed by the TPHCWG to derive an RfD for commercial hexane based on inhalation data for commercial hexane is inappropriate. According to EPA's Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry (EPA/600/8-90/066F, October, 1994), route-to-route extrapolation should not be performed in the estimation of toxicity factors when any of six conditions apply. At least two of the conditions cited are applicable to commercial hexane (i.e., when a first-pass effect by the respiratory tract is expected, and a first-pass effect by the liver is expected). The first-pass effect, or metabolism, alters the disposition of the parent compound as well as its metabolites, which modifies the dose to target tissues in various ways depending on the route of administration. Therefore, unless the first-pass effect and dosimetry are fully characterized and utilized in the route-to-route extrapolation process, this extrapolation can result in highly uncertain toxicity factors. Since the first-pass effect and dosimetry for commercial hexane are not well-defined, it is inappropriate to perform a route-to-route extrapolation to estimate an RfD for commercial hexane from the RfC. As oral toxicity data is available for n-hexane and route-to-route extrapolation is not necessary to derive an RfD, the commission has determined that it is appropriate to use n-hexane as the surrogate for the oral RfD for the C₅-C₆ and >C₆-C₈ aliphatic fractions.

In response to Chevron's comment regarding the specific toxicity factor assumptions, the commission has elected to amend Figure 30 TAC §350.76(g)(2) to reference only surrogates, and to list the specific approved toxicity factors in guidance in order that longevity is added to the rule in the event toxicity assumptions warranted modification. This is the same approach generally used for all other COCs.

Concerning §350.76(g)(2), Weston asked why do the TPH approach and the details of Figure 30 TAC §350.76(g)(2) differ from the TPH approach recently updated by the VCP program. Specifically, the TRRP proposes to evaluate inhalation effects of the TPH fractions and employs more conservative (i.e., lower) surrogate reference doses for the fractions (i.e., uses JP-8 with an RfDo of 0.1 mg/kg-d rather than the VCP memo surrogate of n-nonane, with a RfDo of 0.6 mg/kg-d). A more conservative approach does not appear to be justified and does not appear to be consistent with either past TNRCC guidance or approaches to TPH being used for other states (i.e., Massachusetts).

The commentor requests information regarding discrepancies between the toxicity factors listed for >C₈ - C₁₀, >C₁₀ - C₁₂, and >C₁₂ - C₁₆ aliphatic hydrocarbon fractions in Figure 30 TAC §350.76(g)(2) and the less conservative approach for these TPH fractions which are recommended by the commission's VCP program. The commentor states that the approach described in TRRP is also more conservative than TPH approaches being used by other states (e.g., Massachusetts).

The VCP approach described by the commentor is discussed in a November 3, 1995 memo to VCP staff, which is based on the Massachusetts surrogate approach. That November 1995 memo has been updated as of March 2, 1999, to reflect the changes precipitated by the July 23, 1998 "Consistency Memo." The approach discussed in the proposed TRRP, particularly regarding toxicity factors for these aliphatic hydrocarbon fractions, was generally consistent with that proposed by the TPHCWG

in their July, 1997, Total Petroleum Hydrocarbon Criteria Working Group Series. For the proposed TRRP, the commission elected, generally, to employ the more recent (1997) TPHCWG approach instead of the 1995 approach proposed by the State of Massachusetts, with modifications as necessary.

The VCP has used the referenced TPH process since 1995, and recently updated it. The Massachusetts approach does not factor in fate and transport considerations and therefore does not provide the flexibility offered by the recommended method. Persons are free to demonstrate other methods are acceptable as clearly provided for in §350.76(g)(1). The commission is not convinced the recommended method is more conservative than the VCP method. Rather, the converse is likely true.

While the current Risk Reduction Rule does not include TPH on the table of Appendix II Standard Number 2, Medium-Specific Concentrations, various program areas within the commission (e.g., VCP, PST) have been evaluating TPH as a standard COC. The commission has included TPH as a potential COC as an additional analysis, not a substitute for specific COC analysis and PCL determination. TPH was included in the proposed TRRP as a "safety net" for hydrocarbon contamination that may not be detected using analytical methods which are designed to detect specific compounds.

Regarding the assigned toxicity factors, the commission has removed the toxicity factors from the rule (Figure 30 TAC §350.76(g)(2)) as toxicity factors are subject to change as new scientific data become available. However, the commission maintains the fractions and the surrogates for each fraction in Figure 30 TAC §350.76(g)(2) of the rule. Assigned toxicity factors for the surrogates will be maintained in guidance in the Toxicity Factors table along with the toxicity factors for other COCs.

Concerning §350.76(g), Environmental Fuel Systems, Inc., and ICE commented that under these rules, TPH is introduced as a regulated contaminant group, with assigned toxicity factors for particular TPH fractions. This can now drive a site into formal assessment and remedy. We recognize that this is a new burden with respect to assessment and cost, and should not be argued to be an unreasonable change in scope or cost.

The commission acknowledges the commentor's concern regarding the implications of putting forth a method determining cleanup levels for TPH. The commission points out that there is no detailed information or direction in the rule as to when TPH analyses may be required. This rule is purposefully not intended to dictate whether or not any COC, including TPH, must be investigated at an affected property. Those decisions are most appropriately made by the program area and are best left to guidance. The commission has included TPH as a potential COC as an additional analysis, and not a substitute for specific COC analysis and PCL determination. TPH was included in the proposed TRRP as a "safety net" for hydrocarbon contamination that may not be detected using analytical methods which are designed to detect specific compounds. Therefore, where there are specific target COCs upon which to base affected property evaluations and decisions on, then there may be no need for TPH. On the other hand, when there are releases such as transformer mineral oil where there are really not good analytes to target, then the use of TPH is a good tool to evaluate protectiveness. This rule is not mandating the use of TPH and as such does not have any direct impact on scopes and costs as a general matter.

§350.77. Ecological Risk Assessment and Development of Protective Concentration Levels.

Concerning §350.77, Phillips, TCC, and TXOGA supported the use of a tiered framework for ecological risk assessment, which will result in more efficient assessments and a quicker progression to the remedy stage. TCC and TXOGA also commented that they believe that continued multi-stakeholder dialogue on the development and implementation of this guidance is critical to achieving an effective ecological risk

assessment approach under the TRRP, and that the placement of implementation details for the Screening Level Ecological Risk Assessment and Site Specific Ecological Risk Assessment into guidance to be appropriate and consistent with the evolving nature of ecological risk assessment science.

The commission agrees with the comments. No change in the rule is necessary.

Concerning §350.77, Campbell, George and Strong on behalf of Chevron, Conoco, Fina commented that since the focus of the TRRP rule is on the development of protective concentration levels (PCLs), it will likely be difficult to justify reasons why a remedy is not needed after a PCL is determined. Remedies appear mandatory despite other relevant information such as the likelihood and ecological significance of the estimated risks (30 TAC §350.4(a)(18) and §350.77). The decision-making framework established by the proposed rule seems to conflict with that of the draft 1996 ecological guidance document as well as the revised ecological guidance document presently being developed by the Agency/Industry Ecological Work Group (the "Work Group"). Campbell, George & Strong requested that the agency provide assurances that a person will be able to justify why a response action is unwarranted based upon the likelihood and/or ecological significance of the estimated risks, among other reasons. There are many differences in calculating PCLs for human health protection and for ecological receptor protection. The ecological risk assessment takes a "snapshot" of the risks to multiple ecological receptors (birds, mammals, fish, etc.) using often limited literature information regarding toxicity and effects. These limitations result in uncertainties in the risk assessment. Such uncertainties are not always present when calculating human health PCLs. There is only one receptor and there is a multitude of toxicity and effects data sources. Rarely factored into the management of human health risks, but relevant to ecological risk management are issues such as the likelihood of risk, ecological significance, location and extent of COC distribution, half-life of COCs, and other natural and anthropogenic factors affecting the receptors. Campbell, George & Strong went on to state that under a strict interpretation of the proposed rule, once a PCL is determined, the person is required to undertake a remedy if there are any exceedences of that PCL in any media. Therefore, the rule should be modified to allow a person the flexibility to adequately describe and put into context the ecological risks without automatically being required to undertake a potentially costly remedy simply because an exceedence of a PCL has occurred.

The commission agrees with the Campbell, George & Strong comment that the person should have the ability to justify why a response action is unwarranted before having to develop PCLs. The person already has several opportunities to exit the ERA process (e.g., §350.77(c)(1), (6), (7), and (8) without having to develop ecological PCLs. The steps leading up to the development of ecological PCLs provide for the incorporation of any available site-specific data and the ability to adjust the exposure with reasonable assumptions. It was the intent of the commission that the step just prior to PCL development, the uncertainty analysis, be open to wide-ranging discussion on the applicability and appropriateness of the assessment, including why PCLs should not be developed for particular COCs. However, the Campbell, George & Strong comment indicates that the commission's intent is not clear. Therefore, the rule has been amended at §350.77(c)(8) to include, among others, an evaluation of the likelihood of risk and a discussion on the half-life of COCs as examples of justifications for not having to develop PCLs. Further elaboration on what qualifies as an appropriate justification will be provided in the forthcoming ERA guidance document. If, after all these opportunities to exit the process, there are still COCs remaining, the likelihood that these are posing a risk to ecological receptors is considerable and PCLs will need to be developed. However, the commission somewhat disagrees with the Campbell, George & Strong comment that once a PCL is developed the person is required to undertake a remedy. After establishing a Tier 2 ecological PCL, the person may elect to proceed to a Tier 3 evaluation, where the Tier 2 PCL may be adjusted or even eliminated, based on site-specific information. In this case, the Tier 2 PCL is not "final". To clarify this point, the rule has been amended at §350.77(c)(10) to state that the ecological risk management recommendation is based on the final ecological PCL, unless proceeding to Tier 3. The commission also notes that even after the PCLs have been established, this does not mean that the

person will be required to remediate to those levels, although that is an option. The other options the person has at this point are to: 1) compare the ecological PCLs with the human health PCLs to see which may drive the remediation (i.e., the critical PCL), 2) evaluate whether the human health remedy would eliminate the ecological exposure pathway, 3) proceed to Tier 3 to further refine or possibly eliminate the need for ecological PCLs, or 4) where determined appropriate, conduct an ecological services analysis which may justify leaving COCs above ecological PCLs in place (e.g., through compensatory ecological restoration and/or monitored natural attenuation).

Concerning §350.77, Environmental Resources Management commented that the proposed cumulative hazard index criteria for human health is ten, based on the fact that different constituents have different toxic endpoints. However, the proposed cumulative hazard index for ecological receptors is 1.0. Environmental Resources Management suggested this could result in unnecessarily conservative PCLs for COCs in regard to ecological receptors resulting in unnecessary remediation or engineering controls being implemented, recommended increasing the ecological hazard index criteria for compound classes to 10 instead of 1.0.

The commission disagrees with the Environmental Resources Management comment on setting the ecological hazard index to ten. The commission considers that when COCs are present with additive ecological effects, a hazard index is a more appropriate and accurate way to indicate unacceptable ecological risk. Language to this effect has been added to the rule at §350.77(c)(6) - (8) and a definition for the term "ecological hazard index" has been provided in §350.4 Definitions and Acronyms. Regarding the numerical value of the hazard index, a value of one has been used over the last four years by the executive director for ecological risk assessments. However, because the rule was not proposed with a specific ecological hazard index of one, the commission will address this matter in guidance. The commission also disagrees with the comment that unnecessarily conservative ecological PCLs will result. Ample opportunity to adjust the ecological exposure with site-specific and/or less conservative assumptions before ecological PCLs are required is provided. The commission also disagrees with the Environmental Resources Management comment that conducting an ecological risk assessment will increase the cost of the overall assessment. Under the current Risk Reduction Rule, persons are required to protect ecological receptors. The TRRP rule specifies how this protection is to be achieved.

Concerning §350.77, Campbell, George & Strong on behalf of Chevron Conoco, and Fina commented that the proposed rule and its preamble fail to define the roles and responsibilities of the Trustees and the agency in conducting an ecological services analysis (30 TAC §350.33(a)(3)(B) and §350.77(f)(2)). Discussion in the rule or the preamble is needed that describes the roles and responsibilities of the Trustees and the agency in pursuing an ecological services analysis remedy. That rule discussion should address, for example, the following questions. What evaluation criteria will be used to determine whether a site may pursue this option? What is the timing in making that determination? How will the Trustees or agency make decisions - unanimous or majority? Which Trustee will coordinate activities among the other trustees? How will the agency interact with the Trustees so that delays are minimized? What is nature and scope of the analysis? Campbell, George & Strong noted that the Working Group has discussed some of these questions and recognizes that these issues will likely be resolved in a MOA; however, we have yet to see a copy of the MOA and its status is unknown. Thus, the commented stated that it has no real assurances that these questions will be addressed in a manner that is fair and logical. Accordingly, responses to these questions and/or publication of the MOA should be provided in the rule or preamble upon adoption.

The commission disagrees with the Campbell, George & Strong comment regarding the need for the rule or preamble to discuss the role of the Trustees in the ESA process for the following reasons. The purposes of the rule and preamble are to introduce the ESA concept and to facilitate the involvement

of the Trustees. The rule cannot dictate the roles and responsibilities of other agencies. The commission agrees with the commentor's surmise that Trustee roles and responsibilities in the ESA process may be addressed in the planned memorandum of understanding, which will be subject to public comment.

Concerning §350.77, TCC commented regarding the TNRCC statement in preamble: "To facilitate the cooperative natural resource damage assessment process currently practiced in Texas, natural resource trustees will be provided notification from the TNRCC of those sites with COC that remain after the initial Tier 2 screen step." TCC stated that to involve the NRDA trustees in every remediation process which remains after the initial Tier 2 screen step will result in slowing down the remediation process. The NRDA trustees have the regulatory authority and mechanisms in place for becoming involved where the situation warrants. Another concern is that the NRDA trustees will become involved in sites where they have no jurisdiction. TCC recommended allowing the existing NRDA notification mechanisms to work without overburdening the process by including sites for which there may not exist a NRDA concern.

The commission disagrees somewhat with the TCC comment regarding Trustee notification. Just because the Trustees will be notified does not mean they will become involved, although Trustee jurisdiction extends to wherever there is a release of COCs which may threaten natural resources. However, when the Trustees do become involved in the ERA, they will be expected to adhere to the remedial program's schedule. It is anticipated that the planned memorandum of understanding (MOU) will state that the Trustees' involvement will need to be timely. The commission agrees that notification of the Trustees of all sites with COCs remaining after the initial screening step in Tier 2 maybe premature. This is particularly true when considering that this step is a comparison of site concentrations to conservative benchmarks and that COCs without benchmarks, of which there are many, also move forward to the next step. The commission considers that notification prior to PCL development is appropriate, but a final determination will be made in the planned MOU.

Concerning §350.77, TGLO, TPWD, and USFWS cited the proposed preamble discussion of §350.77, noting that there often exists natural resource damage liability beyond that associated with biological injury at a site. The commentors stated that it would be useful and helpful to the regulated community for this rule to cite CERCLA and the rule promulgated by the U.S. Department of the Interior regarding Natural Resource Damage Assessment (43 CFR Part 11). TGLO also stated that injuries to natural resources should be clearly defined. The following is suggested for inclusion in either the preamble or the definition section: Injury can include adverse changes in the chemical or physical quality, or viability of a natural resource (i.e., direct, indirect, delayed, or sublethal effects). Potential categories of injuries include adverse changes in: Survival, growth, and reproduction; health, physiology, and biological condition; behavior; community composition; ecological processes and functions; physical and chemical habitat quality or structure; and-services to the public. TPWD and USFWS requested that an additional statement should explain that resources other than biological resources include land, surface water resources, ground water resources and air resources. TPWD also stated that it supports the commitment of the TNRCC for Trustee notification and the opportunity for the Trustees to participate in the ecological risk assessment process for a site when COCs remain after an initial Tier 2 screening step. The Department agrees that it is critical that a Memorandum of Agreement between the Trustees and TNRCC be developed regarding coordination and interaction with regard to the ecological risk assessment process. Staff remains committed to the development and implementation of this agreement.

The commission agrees with TGLO that wherever the term "injury" is used in the preamble regarding natural resource damages that "injury" be defined according to 43 CFR Part 11. However, the commission disagrees that "injury" should be defined in the rule definitions because the term is never used in the rule in this context. The commission agrees with the TPWD and USFWS comments regarding liability for injury to trust resources beyond just biological as they provide valuable information and clarification.

Concerning §350.77, Henry, Lowerre, Johnson & Frederick appreciated that the TRRP recognizes that the human health protective concentration levels may need to be changed to protect the environment. However, Henry, Lowerre, Johnson & Frederick would like TNRCC to publish and adopt rules focusing on the protection of ecological receptors. Henry, Lowerre, Johnson & Frederick also had several other comments specific to §350.77. They asserted that despite comments and inquiries from the TGLO and the TPWD, TNRCC has not explained why the proposed TRRP will not adversely affect NRDA programs. Both agencies express concern that they would not be notified or allowed to participate in decisions affecting the public resources. Since the proposed TRRP will limit the collection of information on the extent and nature of contamination, the program would appear to have very negative impacts on NRDA. TNRCC, as a state trustee, has a duty to create a TRRP that does not limit, as the proposed rules do, the ability of government agencies to recovery for spills of oil or hazardous substances. Henry, Lowerre, Johnson & Frederick also stated that the TNRCC must recognize that residual contamination highlights that response and clean up efforts at a site do not adequately address, or compensate the public for, injuries to natural resources. As such the natural resource trustees would be pushed to assess those levels of injury and cause the RP to restore the natural resource. It appears that a responsible person's choice of either a "restricted land use" or "no active land use" is acceptance of the need to compensate the public for those injuries cause by the unauthorized release of chemicals of concern. Concerning the work environment, Henry, Lowerre, Johnson & Frederick argued that the use of ecological assessment will not protect the work environment unless there is a ecological baseline for site. The proposed rules need to be amended to define such a baseline and require the use of the baseline for the area. Henry, Lowerre, Johnson & Frederick also commented on the exclusion criteria checklist, stating that the proposed rules do not use a conservative exclusion criteria checklist. Thus, often ecological risk assessments will not be done when they are needed. Inclusion criteria, rather than or in addition to exclusion criteria, are needed. If the rules are not revised significantly, it would appear that the rules will allow for the elimination of most of the ecological assessment now required and many that are needed for a proper risk assessment. Finally with respect to §350.77, Henry, Lowerre, Johnson & Frederick commented that the rules need to provide for consultation with wildlife agencies to assure that proper considerations are made and any endangered or sensitive species such as amphibians are identified.

The commission disagrees with the comments regarding how the rule conflicts with the natural resource damage assessment (NRDA) programs. The Natural Resource Trustees have been extensively consulted during the development of this rule. This rule facilitates the involvement of the Trustees and provides the potential for a more timely resolution of NRDA issues which may include the provision of compensatory ecological restoration. The commission disagrees with the comment regarding the protection of the work environment, as this is not the function of the ecological risk assessment (ERA) process. However, this does not mean that commercial/industrial settings are automatically excluded from protecting ecological receptors, although by their nature they are usually not conducive to wildlife. The ERA process specifies where and when it is necessary to develop ecological PCLs to protect selected ecological receptors. Ecological PCLs may be appropriate at commercial/industrial settings with complete and significant ecological exposure pathways. The commission also disagrees with the comments regarding the exclusion criteria. Exclusion criteria assume that the person will need to conduct an ERA unless they can prove otherwise and are therefore more conservative than inclusion criteria which imply that the person would only need to conduct an ERA under certain conditions. The commission agrees with the comment regarding the need for consultation with wildlife management agencies and had previously indicated key points in Tier 1 where this consultation should be considered. The commission also agrees with the comment regarding the need for regulatory protection of ecological receptors but considers this accomplished through the adoption of this rule.

Concerning §350.77, KOCH commented that the process of conducting an ecological risk assessment has been clarified, and it supports the Tier 1: Exclusion Criteria Checklist. However, a substantial portion of the details for the remainder of the process was removed from the rules. Apparently, this information will

be developed in subsequent guidance documents. The commission must open the development of these guidance documents to all interested stakeholders.

The commission agrees with the KOCH comment that the development of ecological risk assessment (ERA) guidance documents must be open to all stakeholders. A multi-stakeholder ecological workgroup with open membership is currently developing ERA guidance.

Also with regard to §350.77, KOCH commented that a person should be able to factor the background concentration of COCs into these ecological risk assessment calculations. For example, the background concentration could be subtracted from the exposure point concentration. Alternatively, two sets of calculations could be completed; one with and the other without the background concentrations.

The commission agrees that background concentrations should be factored into the ERA. The person may compare the critical PCL to background or the method quantitation limit if the critical PCL is less than the method quantitation limit (§350.78(c)). Section 350.79(2)(B) provides a methodology for comparing COC concentrations to background. Regarding ERA calculations specifically, the forthcoming guidance document for ERAs will specify that COC concentrations will be compared with the higher of the media-specific benchmark concentration or the background concentration when screening constituents to be carried into an ERA in accordance with §350.77(c)(1). The person may desire to discuss or quantify ecological risks due to background concentrations of COCs in the uncertainty analysis at §350.77(c)(8), or in justifying the medium-specific PCL bounded by the NOAEL and the LOAEL at §350.77(c)(9), or as part of the risk management discussion at §350.77(c)(10).

Concerning §350.77, the Port of Houston Authority commented that ecological PCLs have not been defined; therefore, requirements to use eco PCLs as an assessment level could be highly problematic. The commentor also stated it was unclear as to what species are to be protected - individuals or communities.

The commission disagrees with the comment that ecological PCLs were not defined. This definition is found at §350.4(a)(24) and has been amended to provide elaboration on what ecological receptors are to be protected. Although, as discussed in the original preamble to the proposed rule, highly debatable issues like "what to protect" are better addressed in the forthcoming ERA guidance document.

Concerning §350.77, Ranger commented that the proposed rules put a very significant emphasis on Ecological Risk Assessments. Ranger does not believe that this emphasis is warranted. Ranger recommends that the TNRCC simply include a rule provision reserving the right to request this if a site-specific circumstance requires it. Ranger believes that prior to putting this unnecessary burden onto the regulated community, the TNRCC should provide to the public the following information in order to justify the need for these rules. Ranger stated that it sincerely believes that, by and large, and with only rare exceptions, the TNRCC will find that by cleaning up sites to levels protective of human health, the environment and our wildlife will be adequately protected. Also concerning §350.77, Ranger requested that the TNRCC provide a summary to the public of all adverse ecological impacts that have been documented to occur subsequent to the closure of a site to standards protective of human health. This summary should be broken down by program area, and discuss what percentage of the total sites that these sites represent.

The commission disagrees with the comment that human health PCLs will almost always be protective of ecological receptors. This implies that humans and all ecological receptors have the same physiology and are subjected to the same pathways and routes of exposure, which is unrealistic (e.g., humans do not routinely consume rodents, nor do we have gills). However, the rule recognizes the possibility of human health PCLs being protective of ecological receptors at a particular affected

property and states that when human health PCLs can be shown to be ecologically-protective, the ecological evaluation ends. The three-tiered ecological risk assessment process will, with minimal effort, screen-out many sites based on incomplete or insignificant ecological exposure pathways thus focusing the evaluation on those affected properties where ecological risk is likely. The commission does not maintain a database to enable it to provide the requested summary.

Concerning §350.77, Weston commented that the rules are still very complex, especially with regards to establishing groundwater cleanup levels and cleanup values base on ecological risk. It is highly unlikely that a party, without considerable effort and a working knowledge of the rules will be able to apply them appropriately. One of the advantages of the existing Risk Reduction Rule was that the regulated community could, without too much effort, compare sample results from their site to the MSC look up tables and get some idea regarding the need for remediation. This will no longer be possible with the new rules. In the absence of a knowledgeable environmental staff, a user of the rules will likely be required to seek outside assistance to determine if they have a problem or not.

The commission agrees that the development of ecological PCLs can, at times, be a complex process which may require the assistance of an environmental professional. This is a direct result of the complexity associated with the science of Ecological Risk Assessment (ERA). However, the commission remains dedicated to protection of the environment, and so undertook to develop a scientifically-defensible but clearly-stated and reasonable process by which a person could evaluate impacts to ecological receptors and demonstrate an adequate level of protection without having to cleanup to background. The rule outlines a three-tiered approach for conducting an ERA that may be used to determine potential impacts to ecological receptors and to develop ecological PCLs, without creating an overly burdensome process. The tiered approach has been designed to ensure that the incremental increase in complexity and need for expertise with each successive tier is driven by the level of risk/complexity of the problem. The alternatives the commission considered to achieve this goal were: 1) to exclusively use a guidance document based upon a tiered approach to consider protection of ecological receptors; 2) to include specific requirements in the rule to consider protection of ecological receptors; and 3) to develop a combination of guidance and rule. The commission is proposing to develop a combination of guidance and rule. The rule will establish when an ERA is necessary, but because the science of ecological risk assessment is still evolving, the commission is providing the details of a tiered approach in guidance rather than rule. The guidance will provide methods to conduct an ERA which may change over time as the science develops.

Concerning §350.77(a), Chevron commented that this paragraph states that "if at any time during the ecological risk assessment process specified in subsections (c) or (d) of this section, the person can demonstrate to the satisfaction of the executive director that either implementation of a physical control (e.g. cap) planned as part of a response action to address the exceedance of human health-based PCLs will eliminate the ecological exposure pathway, or that human health PCLs will be protective of ecological receptors, then no further ecological risk assessment evaluation will be required." Since the ecological risk assessment will be included in the Affected Property Assessment Report (APAR), Chevron stated there is some confusion as to how this statement will work when remedies have yet to be selected and/or approved by the agency. If a person commits to some remedy in the APAR that will in effect eliminate the exposure pathway or is protective of ecological receptors, then the person should be allowed to terminate the ecological risk assessment by making a statement in the APAR to the effect. Moreover, if the person commits to a remedy that addresses less than 100% of the site, the area to be addressed by the remedy (and all corresponding data) should not be considered in the ecological risk assessment for the remaining area of the property for which a remedy commitment has yet to be made.

The commission agrees, for the reasons stated, with the comment regarding the person's ability to terminate the ecological risk assessment by committing to a remedy in the APAR which will be protective of ecological receptors and the rule has been changed here and at §350.91(b). However,

the commission disagrees with the comment regarding a partial remedy. Remedies that do not address all of the ecological concerns (i.e., additional ecological evaluation will be needed) must be presented and discussed in either the Tier 2 or 3 assessment so that the entire remedy picture may be properly evaluated for effectiveness.

Concerning §350.77(b), Phillips, TCC, and TXOGA supported the recognition by the TNRCC that all sites will not have complete or significant pathways to relevant ecological receptors. Use of the Exclusion Criteria will appropriately eliminate sites that pose no ecological risk at a screening level and will allow ecological assessment resources to be focused on those sites where there is potential for ecological risk.

The commission agrees with the Phillips, TCC, and TXOGA comments that the exclusion criteria should be used to focus the ecological assessment resources in areas where there is a potential for ecological risk. To better emphasize this point, the commission has changed the Tier 1 Exclusion Criteria Checklist to indicate that the person should complete the entire checklist, even if one part of the checklist indicates that the exclusion criteria are not met. The reason for this is that other ecological exposure pathways at the affected property may not be complete. For instance, if the person has a release to surface water or sediment, this will necessitate proceeding to Tier 2 or 3. However, the remainder of the checklist should be completed to see if the soil exposure pathway is complete or significant. If the soil exposure pathway is determined to be incomplete or insignificant, then this information can be stated in the Tier 2 or 3 assessment and there would be no need to further evaluate the soil exposure pathway.

Concerning §350.77(b), Groundwater Services commented that Tier 1 Checklist does not adequately consider the current use or management of the surface water body in the screening decision. For example, an ecological risk assessment and response action for a groundwater discharge to a stream segment classified as a "limited" aquatic life use subcategory (see 30 TAC Chapter 307 Table 4) will provide no measurable ecological benefit. Similarly, "improved drainages" subject to routine maintenance operations to remove accumulated sediment do not provide a viable habitat for benthic species and should not be subject to sediment investigations. Groundwater Services, Inc., recommended revising the checklist to clarify consideration of stream classification and use information.

The commission disagrees with the Groundwater Services, Inc., comment regarding consideration of stream use/management. The situations described by the commentor are best addressed in the identification of communities and feeding guilds supported by habitats at the affected property, and in the development of the conceptual model as required in a Tier 2 ERA. Any habitat limitations should be reflected in the development of a less complex conceptual model that is represented by fewer communities and feeding guilds. For some areas, the aquatic life use may be limited or the water body may be routinely dredged, yet it may support a variety of upper trophic level receptors or a transient aquatic community, as a reflection of habitat availability in the vicinity. Although a water body may be dredged periodically, benthic communities which are fundamental to the food chain dynamics, are capable of rapid colonization and may assimilate bioaccumulative compounds into the food chain and tissues of organisms independent of any dredging activities. However, the commission recognizes that in some cases, dredging activities may influence the decision to evaluate impacts to the benthic community. The potential impacts from both dredging and from the effects of COCs on the benthic community should be considered on a case-by-case basis.

Concerning §350.77(b), EPA Region 6 referenced the exclusion criteria and supportive information. EPA Region 6 cited the first page of the checklist, second paragraph, fifth sentence. The statement reads, "Answers to both PARTS . . . that, at a minimum, human health will always be protected." This statement implies that protection of human health and the environment is an "either or" situation when in fact, the law requires that both be protected. Regarding Subpart A. Surface Water/Sediment Exposure. The phrase "not in contact with surface waters" utilized for the exclusion of conveyances and decorative ponds has

room for misapplication. This phrase can be interpreted as meaning a physical connection and may not address potential surface overflow, runoff, or ground water impacts to surface water. Part I., Subpart A., Item 3, clarifies this issue, however, it appears that the exclusion criteria have been met after answering Subpart A., Part II, Item 1a. It is recommended that Subpart A., Part II., Item 1.a., be clarified (similar to Part I., Subpart A., Item 3.). Regarding Subpart D., De Minimus Land Area. Utilizing a de minimus land area of one acre is a concern for the EPA Region 6 since the area could actually be a source area. Although the qualifying conditions may provide some general guide for considerations, it presents an issue for leaving waste in place. Additionally, there are no specific performance standards required to determine if the COCs will migrate to become greater in size and nullify the qualifying conditions. Furthermore, the area size is proposed to be determined based on the human health protection concentration levels which may at times be greater than concentrations that would be protective of ecological resources. The EPA Region 6 recommends that the TNRCC abandon the de minimus land area concept and determine affected properties for the protection of ecological resources based on ecological protection levels not human health protection levels. The EPA Region 6 stated that it understood the purpose of the exclusion criteria checklist and commends TNRCC on developing such a difficult qualitative tool to assess the level of concern for potential environmental impacts. However, since the checklist allows exiting from further ecological assessment and is a sequential tool, this assessment tool may present some problems under certain scenarios. The related comments to Figure 30 TAC §350.77(b), are offered as a means to clarify some of these situations.

The commission agrees with the EPA Region 6's comment regarding the statement implying that protection of human health and the environment is an "either or" situation and is in violation of the law. The rule has been changed for clarification. The commission also agrees with the comment regarding the potential misapplication of the surface water/sediment exposure exclusion criteria and the rule has been changed accordingly. Regarding the comments on the de minimus exclusion criteria, see responses to §350.4(a)(21) and §350.77(f).

Concerning §350.77(b), Weston suggested adding a list of contacts for wildlife management agencies that may need to be consulted during completion of the checklist.

The commission disagrees with the comment to add the list of contacts for wildlife management agencies to the exclusion criteria checklist. This type of information is often subject to change and if it were a formal part of the rule, as is the checklist, the rule would need to be changed to reflect the update. However, the commission agrees that this list would be valuable to the user of the checklist and will provide this information in the forthcoming ERA guidance document. In addition, the commission has changed or added several of the definitions contained in the Tier 1 Exclusion Criteria Checklist to be consistent with those found in §350.4 Definitions and Acronyms. The footnote in the checklist indicates that the definitions were taken directly from §350.4; however, it became evident that some of the terms did not have the same definitions, or that additional terms from §350.4 needed to be added to the checklist. Also, some definitions were changed in response to particular comments, which are addressed elsewhere.

Concerning §350.77(c), Groundwater Services commented that the rule language provides excessive detail regarding the scope and content of the Tier 2 SLERA, which would be more appropriately addressed in a technical guidance document. For example, Groundwater Services noted that a Tier 2 SLERA could meet the general objectives of the EPA (problem formulation, analysis, and risk characterization), without including each of the ten specified steps; however, such a submittal would constitute a rule violation. Specifically, evaluation of “conservative” and “less conservative” exposure assumptions is not technically necessary for derivation of ecological PCLs; yet, this approach is mandated by rule. Groundwater Services recommended revising this subsection to condense rule text to address only the general scope of the Tier 2 SLERA and relegate specific instructions regarding risk evaluation process (i.e., ten minimum requirements) to guidance. TPWD and USFWS commented that §350.77(c) needs to be clarified to

restrict the ecological risk assessment to an evaluation of chemical stressors only. Staff recommends inserting the word "chemical" before the word "stressor" in the two places the word was used in sentence three of this section.

Regarding the Groundwater Services, comment on the excessive detail of Tier 2, the commission disagrees with the recommendation to place the ten required elements in guidance. Two primary goals of this rule are to provide consistency in the evaluation of risk at corrective action sites and to allow for flexibility. Identifying required elements in the rule promotes consistency, while providing information on how to meet the required elements in guidance allows flexibility. The commission, with the support of a multi-stakeholder ecological workgroup, developed the list of required elements for Tier 2. General consensus has been reached over these elements after lengthy discussions and guidance is currently being developed using these elements as the context. The workgroup believes that the list of requirements represents fundamental and fairly universal elements of a screening-level ecological risk assessment, based on member participation in leading organizations furthering the science of ecological risk assessments (e.g., Society of Environmental Toxicology and Chemistry; American Society for Testing and Materials).

Regarding TPWD and USFWS comments on stressors, the commission agrees that because TRRP only applies to chemical releases from corrective action sites, it must focus on chemical stressors. The rule has been changed here and in the definition of the term "ecological risk assessment" to restrict the ecological evaluation to chemical stressors only. However, the commission acknowledges that at times physical and biological stressors may have more impact than chemical stressors, but that these stressors can always be discussed in the uncertainty analysis portion of the ERA so that their contribution to the impact can be factored into the risk management decision.

Concerning §350.77(c)(1), TGLO, TPWD, and USFWS commented that this paragraph needs to be modified to make it clear that it applies to non-bioaccumulative COCs only. The commentors recommended that the phrase "of non-bioaccumulative COCs" be added after the word "concentrations" so that the phrase reads "use affected property concentrations of non-bioaccumulative COCs to compare to established ecological benchmarks and/or use."

Regarding non-bioaccumulative COCs, the commission agrees with the commentors and the rule language has been changed accordingly. COCs which bioaccumulate in the food chain should not be eliminated from ecological evaluation based upon a comparison to benchmarks which do not take into account food chain transfer of COCs. Also, for clarification purposes, the commission has modified the term "bioaccumulative chemical" to read "bioaccumulative chemical of concern" and has changed the definition at §350.4 to apply to all environmental media.

Concerning §350.77(c)(5), the Port of Houston Authority commented that the development of Ecological Protective Concentration Levels contains a redundant method of performing both "conservative" and "less conservative" analyses, instead of using the site-specific data to save time and expenses. TCC and TXOGA commented that while they understand the desire of the agency to create both a worst case and a more realistic estimate of ecological risk, they believe that the conservative (i.e., worst case) scenario should be based on site knowledge and a realistic upper end bound of exposure potential. Depending on site and receptor specific factors such as type of environmental media, site physical-chemical conditions, the COCs identified, and the size of the site relative to receptor range and mobility, assumptions such as 100% bioavailability or home range no larger than the affected property may be clearly unjustified or even physically impossible. A risk estimate based on such assumptions will be overly conservative and unrelated to actual site risk. It will, therefore, not be useful to the decision making process and may unduly stigmatize sites. TCC and TXOGA suggested a better approach would be to examine a range (from conservative to more representative) of realistic input parameter values based on the particular site and receptors. This would produce both a worst case and more realistic estimate of the risk, both of which

would be likely to be a conservative relative to actual site risk. TCC and TXOGA recommended changing "conservative exposure assumptions" to "realistic conservative exposure assumptions". They also recommended deleting the examples and moving details of development of the conservative scenario to guidance. Also regarding §350.77(c)(5), TGLO, TPWD, and USFWS commented that the word "values" appears out of order and should be after LOAEL, rather than before it, so that the phrase reads "and lowest observed adverse effect level (LOAEL) values,".

The commission disagrees with the Port of Houston Authority regarding conservative assumptions. A worst case scenario provides valuable information to the commission because COCs that screen out of the ERA process based on "conservative exposure assumptions" provide a greater measure of comfort to the commission that these COCs are indeed not posing any significant ecological risk at the affected property. However, the commission agrees with the TCC/TXOGA comment that "conservative" need not imply worst case and recognizes the utility of blending some degree of more reasonable estimates into the conservative analysis. Therefore, the rule has been changed to indicate that the conservative analysis incorporates reasonable assumptions. The determination of what constitutes reasonably conservative assumptions and less conservative assumptions will be described in the forthcoming ERA guidance document and examples of these types of assumptions have been deleted from the rule both here and at §350.77(c)(7).

The commission agrees with the TGLO, TPWD, and USFWS comments regarding the placement of parentheses and the word "values" as these were publication errors and the rule language has been changed as suggested.

Concerning §350.77(c)(6), TGLO, TPWD, and USFWS commented that in §350.77(c)(6), the mathematical symbol utilized should be " " rather than "<" as ecological risk is non-acceptable when the ratio is greater than one. In addition, the term "hazard quotient" should be replaced with "hazard quotient/hazard index". These changes result in the section reading "utilize an ecological hazard quotient/hazard index methodology to compare exposures to the NOAELs and LOAELs in order to eliminate COCs that pose no unacceptable risk (i.e., NOAEL hazard quotient/hazard index one)". The commentors also stated that additional clarification should be added to the section to account for the additive affects of COCs with the same toxic effect mechanism. Staff recommends adding a sentence to the section that reads "COCs that are known to have the same toxic effect mechanism (e.g., PCBs, PAHs), should be treated additively when developing a hazard quotient/hazard index for that group of COCs that is to be compared to a value of 1."

The commission agrees with the TGLO, TPWD, and USFWS comments regarding the symbol as this is a publication error. The rule has been corrected to reflect the use of the " " symbol. Also, the commission agrees with the commentors that, at times, the term "hazard index" is a more appropriate and accurate way to indicate unacceptable ecological risk and that the hazard index be a value of one. In fact, one is the hazard index value that has been used over the last four years by the executive director for ecological risk assessments. Therefore, the commission has amended the rule at §350.77(c)(6) to indicate that, where appropriate, an ecological hazard index should be considered, but because the rule was not proposed with a specific ecological hazard index of one, the commission will address this matter in guidance. In addition, the commission has provided similar clarifying language in §350.77(c)(8) regarding the term "ecological hazard index". The commission agrees with the TGLO comment that a definition of the term "ecological hazard index" be provided and has adopted a definition in §350.4 Definitions and Acronyms.

Concerning §350.77(c)(7), TGLO, TPWD, and USFWS commented that §350.77(c)(7) should be modified with regard to the term "hazard quotient" and the treatment of COCs with the same toxic mechanism. Where the phrase "hazard quotient" is used, it should be reworded to read "hazard quotient/hazard index". Also add the sentence "COCs that are known to have the same toxic effect mechanism (e.g., PCBs, PAHs),

should be treated additively when developing a hazard quotient/hazard index for that group of COCs that is to be compared to a value of 1." Also concerning §350.77(c)(7), EPA Region 6 commented that the EPA can see the technical value of comparing hazard quotients calculated using the No Observed Adverse Effect Level (NOAEL) and comparing them to hazard quotients calculated using the Lowest Observed Adverse Effect Level (LOAEL). However, it cannot support using the LOAEL as the default toxicity value to insure environmental protection. Therefore, all COCs which exceed the hazard quotient based on the NOAEL or LOAEL should be carried through the analyses outlined in (8) and (9).

The commission agrees with the commentors that, at times, the term "hazard index" is a more appropriate and accurate way to indicate unacceptable ecological risk and that the hazard index be a value of one. In fact, one is the hazard index value that has been used over the last four years by the executive director for ecological risk assessments. Therefore, the commission has amended the rule at §350.77(c)(7) to indicate that, where appropriate, an ecological hazard index should be considered, but because the rule was not proposed with a specific ecological hazard index of one, the commission will address this matter in guidance. In addition, the commission has provided similar clarifying language in §350.77(c)(8) regarding the term "ecological hazard index". The commission agrees with the TGLO comment that a definition of the term "ecological hazard index" be provided and has adopted a definition in §350.4 Definitions and Acronyms.

The commission agrees with the EPA Region 6's comment that the LOAEL should not be used as the default toxicity value. The commission acknowledges that this concept might have been inferred from publication errors which appeared in the rule. The intent of the commission is to allow the person to justify not having to develop PCLs for those COCs which are at concentrations which exceed the NOAEL HQ but are below the LOAEL HQ, as the appropriate level of remediation lies somewhere in this range. The publication errors in §§350.77(c)(6) and §350.77(c)(8) have been corrected to reflect the preceding statement.

Concerning §350.77(c)(8), Weston commented that the final parenthetical "(e.g., NOAEL hazard quotient > 1 < LOAEL hazard quotient)" is confusing and potentially not consistent with the latest recommendation provided by TNRCC.

The commission agrees with the comment regarding the symbol as this is a publication error and has corrected the rule.

Concerning §350.77(c)(10), TGLO, TPWD, and USFWS commented that paragraph (c)(10) should be applicable in all cases. Where referenced in §350.77(c)(1), (6) and (7), paragraph "10" should not be included, and those paragraphs should only refer to paragraphs (2) - (9), (7) - (9), and (8) - (9) respectively.

The commission agrees with the commentors that the required element listed in §350.77(c)(10) should be applicable in all cases and should not be eliminated from the ecological risk assessment even if all COCs are eliminated, as it is important that the termination of the ecological risk assessment be recognized. The rule has been changed accordingly at §§350.77(c)(1), (c)(6), and (c)(7). In addition, the commission has provided similar clarifying language in §350.77(c)(8), as this is a possible exit point from Tier 2 as well. Section 350.77(c)(10) requires that a recommendation for managing ecological risk be made. In the case where all COCs are eliminated, the person would simply recommend that the ecological risk assessment should end as there is no apparent ecological risk at the affected property because all concentrations of COCs are below risk levels. Where COCs remain and ecological PCLs are developed, the choices of ecological risk management recommendations are to: 1) compare the ecological PCLs with the human health PCLs to see which may drive the remediation (i.e., the critical PCL) and remediate to those levels, 2) evaluate whether the human health remedy would eliminate the ecological exposure pathway, 3) proceed to Tier 3 to further refine

or possibly eliminate the need for ecological PCLs (assuming the person had developed Tier 2 PCLs), or 4) where determined appropriate, conduct an ecological services analysis which may justify leaving COCs above ecological PCLs in place (e.g., through compensatory ecological restoration and/or monitored natural attenuation).

Concerning §350.77(d), TGLO, TPWD, and USFWS commented that a reference to paragraph (c)(10) should be added to §350.77(d), where it reads "applicable components of a Tier 2 screening-level ecological risk assessment shall be incorporated, including subsections (c)(2), (c)(3), (c)(4), (c)(8)," so that it reads "applicable components of a Tier 2 screening-level ecological risk assessment shall be incorporated, including subsections (c)(2), (c)(3), (c)(4), (c)(8), (c)(10)" Weston suggested rewording the third sentence to avoid the use of the word "truer." Alternately, the purpose of the optional effort could be described as performed to obtain a more site-specific or empirical evaluation of the ecological risk at the affected property.

The commission agrees that the required element in §350.77(c)(10) be added to the list of applicable Tier 2 components at §350.77(d). The rule has been changed accordingly, as it is important that a recommendation for managing ecological risk be made in Tier 3 as well. The commission also agrees with the Weston comment to modify the purpose of Tier 3 as the suggested language is more descriptive of the intent of the rule as has changed the rule accordingly.

Concerning §350.77(f), Henry, Lowerre, Johnson & Frederick suggested that the human health and ecological remedial action plans be developed concurrently, thereby reducing the possibility of prioritizing one level of protection over another

The commission agrees with the comment regarding the need for concurrent development of the human health and ecological evaluations but considers that the rule mostly provides for this concurrent development already. The one exception is that in the Tier 1 Exclusion Criteria Checklist, the affected property is defined according to human health PCLs. The multi-stakeholder ecological workgroup purposefully designed the checklist to identify complete and significant exposure pathways, and not, at this level, to delve into the determination of site-specific concentrations of COCs and their impacts on potential receptors. This type of evaluation would require the assistance of an environmental professional and this is contrary to the decision made by the workgroup to keep the checklist at a level which could be managed by anyone who was familiar with the affected property.

Concerning §350.77(f)(2), Harris County Pollution Control Division requested that the commission clarify under what circumstances a person would be required to conduct an ecological services analysis under §350.33.

The commission agrees that additional clarification is needed regarding the circumstances that would require the need for an ecological services analysis (ESA) to be conducted. The rule language at §350.33(a)(3)(B) has been changed to state that an ESA is required whenever COCs which exceed ecological PCLs are proposed to be left in place.

§350.78. Determination of Critical Protective Concentration Levels.

Concerning §350.78, Henry, Lowerre, Johnson & Frederick commented that if a COC masks another during the investigation and is, therefore, calculated to be the critical PCL, the current rule would not appear to provide for the opportunity for the masked COC to be adequately addressed in the cleanup.

The rule addresses masking in §350.51(n). The potential for masking of COCs is evaluated as part of the site data review and possibly with understanding of the historical operations at the site. If

masking is a critical concern, additional appropriate actions would be required. The reader is directed to the responses to comments submitted on §350.51(n) for further treatment of this issue.

Also with regard to §350.78, Henry, Lowerre, Johnson & Frederick commented that it is not clear how daughter products of natural attenuation are accounted for in the rule. This is especially important where a daughter product may be created that is potentially more harmful than the critical (parent) COC.

Daughter products are evaluated as part of the determination of the COC applicable to the site and are considered during the affected property assessment. Once identified as a COC, they are treated the same as any other COC. The reader is directed to the responses to comments submitted on §350.71(k) for further treatment of this issue.

Concerning §350.78(a), Chevron, TCC, and TXOGA commented that ". in accordance with §350.75(k) of this title."

The cited paragraph is not included in this rule; please provide the proper cross-reference.

The commission amends the rule to correct the citation to §350.75(i). The commission also amends the rule to add the word "Requirement" to make the reference correct for §350.71(k) (relating to General "Requirement") in the first sentence of that subsection. Also, the rule has been amended by removing the words "present in an environmental medium" to avoid conflict with §350.71(k) amendments.

Concerning §350.78(b), Weston suggested deleting this item or at least moving it. The text seems to imply that a calculated PCL that was in excess of the solubility limit for a constituent indicates the presence of NAPL. Weston stated that based on its understanding, a critical PCL for a particular constituent could be significantly above the maximum concentration at the site (indicating there is no risk). If this item is to remain, they suggested adding language such as ".greater than the aqueous solubility limit for that COC and the maximum concentration at the site exceeds the critical PCL then the person.." They also suggested that this item might fit better in §350.79.

The commission agrees that the presence of NAPL seems to be assumed. Therefore, the commission amends the rule to set the PCL at the solubility limit which indicates that the COC will be addressed in the context of NAPL requirements should NAPLs be present. Additionally, the commission added three commas to make the remaining portion of the original rule more clear and grammatically correct. The commission points readers to further discussions with regard to NAPLs in the responses to comments on §350.33(f)(1)(C) and §350.33(f)(4)(E) of this preamble. The amended §350.78(b) should not be viewed to automatically imply that the NAPL will have to be recovered in this situation if it is present. For the reason that it apparently is a low risk COC, the NAPL may not have to be further addressed if there are no particular concerns as explained in the other NAPL discussions.

Concerning §350.78(c), KOCH commented that they agree that if the critical PCL is less than the higher of the detection limit or background, then the greater of the detection limit or background should be used as the critical PCL. A person should not have to use unusual (i.e., non-standard) laboratory methods to achieve critical PCLs. KOCH recommended incorporating the existing text at §335.555(d)(1). This section states that if the PQL and/or background concentration is greater than the cleanup level (e.g., above the PCL), the greater of the PQL or background should be used to determine compliance with the PCL. Other states have established PCLs as the PCL, background or a published acceptable detection limit. Also, any MCLs are based on routinely achievable detection limits which are higher than risk-based levels. KOCH also stated that the SQL should be used instead of the MQL.

The commission does not intend to require non-standard analytical practices as a consequence of this rule. However, the commission is not willing to perpetuate the use of inappropriate analytical strategies, such as using an SQL as a default PCL or using the PQLs (MQLs) from less sensitive methods for default PCLs when more sensitive standard methods are available. The commission intends that standard available analytical methods be used, but the commission also intends that the most sensitive of those methods be used, when necessary, to achieve the performance objectives. Additionally, EPA SW-846 guidance indicates in Chapter 2 (Revision 3) that when the project objectives include sensitivity requirements that exceed those that can be achieved using a less sensitive method (e.g., gas chromatography/mass spectrometry), it may be necessary to employ a more sensitive detection method. The guidance further states that ". . . the choice of analytical technique for organic analytes and metals may be governed by the detection limit requirements and potential interferants." The guidance also indicates in section 2.1 of Chapter 2 that some of the methods can be modified to provide the method performance necessary to meet the intended use of the analytical results as specified in the data quality objectives. Therefore, the commission does not amend the rule. The commission wishes to emphasize that SW-846 also contains procedures for "method-defined parameters," meaning the analytical result is wholly dependent on the process used to make the measurement. When the measurement of such method-defined parameters is required by regulation, those method procedures cannot be modified. Examples of method-defined parameters include, but are not limited to, the toxicity characteristic as determined using the toxicity characteristic leaching procedure (TCLP), the flash point, the presence of free liquids using the paint filter liquids test, and the corrosive characteristic using the pH test and the corrosivity tests.

The commission does not support the use of an SQL as a default PCL. An SQL is laboratory and sample dependent and subject to extreme variability. Therefore, an SQL cannot be used to establish a protective concentration level for a COC. This rule establishes the MQL of the most sensitive standard available method as a default PCL when the critical PCL and background are less than the MQL. In response to the comment regarding published acceptable detection limits, lists of acceptable analytical detection/quantitation requirements are to be included in guidance.

However, the commission amends the rule at §350.79 to account for the situation where the MQL is the PCL and the concentration of a COC in an environmental medium legitimately can not be measured to the MQL. The commission added "...unless the person satisfactorily demonstrates that all reasonably available analytical technology (e.g., select ion monitoring) has been used to show that the COC cannot be measured to the MQL due to sample specific interferences... ." to allow the person to measure attainment with SQLs in such situations.

The commission amends §350.78(d) as a conforming amendment to the amendment of §350.31(c) to drop the "criteria" reference and replace with "provisions" and then replaced "is not exceeded" with "are met."

§350.79. Comparison of Chemical of Concern Concentrations in Protective Concentration Levels.

Concerning §350.79(1), EPA Region 6 commented that the TRRP should specifically state what media concentration (i.e., maximum detected, 95% Upper Confidence Limit) will be used to select COCs and to compare to PCLs. The EPA Region 6 recommended the use of the maximum detected media concentration for selecting COCs and the use of the 95% Upper Confidence Limit to compare to PCLs.

The current rule, while making no explicit reference to the use of the 95% UCL on the mean, clearly allows its use in the applications cited by the commentor. The commission prefers to make explicit reference to specific statistical methods in guidance.

In response to comments to the rule, the commission has amended §350.79(2)(B) to explicitly incorporate performance standards for statistical methods for comparing an affected property to a background area. Consistent with this, the commission has also amended §350.79(2)(A) to incorporate performance standards for statistical methods for comparing an affected property to a PCL. This is done by explicitly stating the hypothesis set to be tested by such a method and the Type I error rate (5%). The specification of these two quantities is sufficiently protective of human health and the environment. Of course, the power and Type II error rates (dependent on the sample size chosen) are an important cost-benefit decision to be made by the person making the comparison, although guidance will discuss ways in which the Type II error rate can be reduced. The amended rule mentions no statistical method explicitly although the commission will recommend that, when appropriate, the UCL on the mean (with a confidence of 95 %) be used in the conventional manner for accomplishing the comparison. The final rule allows for the use of alternative statistical methods if they meet the performance standards.

Concerning §350.79(2)(A), AFCEE commented that §350.79(2)(A) allows the use of statistical or geostatistical methods in "accordance with this section" to compare site data with critical PCLs. However, there are no details in the referenced section. This may be an oversight. AFCEE requested that the agency include guidance on appropriate statistical or geostatistical methods or references to appropriate guidance.

While §350.79(2)(A) does allow the use of statistical or geostatistical methods to compare site data with critical PCLs, no specific statistical or geostatistical methods are herein recommended. The commission notes that because of the site specific factors that determine the appropriateness of any statistical methodologies, the variety of possible applicable methods and the many details associated with their correct implementation that any detailed support of §350.79(2)(A) would best be rendered in guidance.

Concerning §350.79(2)(A), Weston commented that it appears that the referenced subsection for additional information regarding the statistical or geostatistical methods should be Subchapter C §350.51, not subsection (a).

The commission agrees with the commentor that the correct citation was not provided. The rule was amended so substantially in response to comments, that a reference to §350.51(I) is not necessary.

Concerning §350.79(2)(B), AECT, Chevron, Reliant Energy, TCC and TXOGA commented that this null hypothesis is the opposite of the guidance provided in EPA Guidance. By specifying the null hypothesis as above and requiring the type I error rate to be less than or equal to 5%, this rule limits the likelihood for a reasonable conclusion to be reached. The rule requires that site concentrations be significantly below average background concentrations before the person can conclude that no response action is necessary. Chevron also stated that even if concentrations at a potentially affected area are unaffected, one cannot expect site concentrations to be below average background concentrations. In fact, there is only a 5% chance that another set of samples collected from the same background area would be "pass" the background comparison. This is unreasonable and unnecessary. AECT, Reliant Energy, TCC and TXOGA recommended that this provisions should be moved to guidance. All five recommended that the language should be revised as follows: "The null hypothesis (Ho:) shall state that the mean population concentration of the affected property is less than or equal to the mean population concentration of the background area. The type I error rate shall be less than or equal to 20%, and the power of the test to detect a difference of 100% or more should be at least 80%." Also with respect to §350.79(2)(B), EPA Region 6 commented that the null hypothesis is not clear as is stated in this section of the TRRP. If two means (i.e., the affected property mean and the background concentrations mean) are being compared, the null hypothesis should state that there is no difference between the two means. EPA Region 6 stated that the inference of course is that if the affected property mean is greater than the background concentration mean than a response action would be required. Environmental Resources Management commented that

the paragraph specifies a specific statistical test for comparison of site data to background levels with stringent requirements on when and how it can be used, and eliminates the use of upper tolerance tests (UTLs) which are a simple, effective and widely used statistical test, supported by EPA, for background comparisons. Environmental Resources Management recommended adding tolerance limits as an option for background comparisons or do not specify any test(s). Environmental Resources Management asserted that prior guidance from the TNRCC regarding background comparisons under the 1993 Risk Reduction Rule recommended the use of UTLs (TNRCC, 1994; page 196). UTLs are also recommended in numerous other sources, including EPA guidance documents, as an acceptable method for this type of comparison (EPA, 1989b and EPA, 1992a). In addition, many sites have been evaluated and their closure approved under the 1993 Risk Reduction Rule with the use of UTLs. Environmental Resources Management also noted that a good standard set of options for comparison to background would include: 1) comparison of individual site concentrations to the UTL of the background data (as described in the proposed program); 2) analysis of Variance or t-Tests for comparisons of means (if data are normal or lognormal); or 3) nonparametric methods such as the Wilcoxon Rank-Sum Test for comparison of medians (if data are non-normal). Environmental Resources Management suggested this array of options would cover most situations using standard methods which are easily calculated in most spreadsheet programs or statistical software packages and easily interpreted. Finally, with respect to §350.79(2)(B) and comparison to background, Groundwater Services, Inc., commented that the rules retain a "null hypothesis" which is technically flawed and likely to contribute to excessive sampling requirements and erroneous conclusions regarding exceedence of background where none exists. For example, two sets of eight identical sample results can fail the null hypothesis that the populations are different until proven the same. Groundwater Services, Inc., recommended revising the null hypothesis to state that the populations are the same until proven different, as has been the basis for all statistical procedures issued by EPA to date. To address concerns regarding "statistical power," specify a minimum of eight or ten samples for each population.

Section 350.79(2)(B) discusses the statistical methodologies for comparing an affected property to background. Several commentors noted that the null hypothesis stipulated in the rule (that the affected property would be presumed to have concentrations equal to or exceeding background), in conjunction with the implied, but not explicitly stated, alternative hypothesis (that the affected property has a concentration less than background) would "limit the likelihood for a reasonable conclusion." The commission agrees with these comments and has amended the rule to stipulate that the null hypothesis for such a comparison should presume that the affected property has a concentration less than or equal to background and that the alternative hypothesis should be that the affected property has a concentration that, in some sense (depending in the specific statistical model used for testing) exceeds background.

Several commentors also suggested performance standards that such a statistical test might be required to meet. A frequent suggestion was that the statistical test for comparing an affected property to background be performed at a Type I error rate of 20 % and have a power of 80% at a specified alternative hypothesis (or "critical effect size") corresponding to a "difference of 100%". The commission interprets this critical effect size relative to the most common statistical method for testing equality between two populations, the Student's "t" test. In the "t" test, the effect size is expressed as a difference in the actual means of the two populations normalized (divided) by the standard deviation of the populations (assumed equal). Thus, the critical effect size suggested by the commentor's corresponds to an affected property having a mean concentration one standard deviation above the background mean concentration. The commentors, then, are recommending as a performance standard for an appropriate test of the hypotheses test that it be capable of detecting (correctly) such an effect, when actually present, with a probability of 80%. It is noted that some commentors appear to have mistakenly suggested a power of "8%" rather than 80%. A statistical test with a Type I error rate of 20% and a power of 80% does not satisfy the criterion that for a properly designed experiment, the power curve should be a monotonically increasing function of effect size.

In some sense, it is always difficult to choose critical effect sizes and an associated power rate. In many applications the choice is a non-statistical decision. However, examination of the power characteristics of the Student's "t" test for these recommended performance standards do indicate, that for fairly small sample sizes, these standards can be met. For instance, such examination shows that for as few as five samples from each of the populations a power of 80% may be obtained for the critical effect size of 100%. Under the same conditions, an affected property with a mean two standard deviations above the background mean will be deemed in exceedence of background over 90% of the time. Thus, the commission believes such a performance standard, or "experimental design," provides adequate environmental protection. Furthermore, when the affected area actually does have a mean concentration less than or equal to the background concentration the test will yield the same conclusion at least 80% of the time. Thus, such a test provides protection against additional unwarranted, expensive, and time consuming affected property assessments.

Finally, when it is difficult to determine a reasonable critical effect size and associated power, it is considered appropriate to choose a design in which the Type I and II error rates are equal. The commission has been amended the §350.79(1) to require a statistical test to be performed at a Type I error rate of 5% when determining if COC concentrations exceed critical PCLs. Section 350.79(2) has amended to require a statistical test to be performed at a Type I error rate of 20% and a demonstrable power of 80% for an alternative hypothesis equivalent to a 100% difference in populations means in the Student's "t" test when determining if COC concentrations in the affected property exceed background.

It is important to note another feature of the final rule. The rule does not stipulate any particular statistical test, rather it simply requires that whatever test is chosen meet the performance standard for the stated hypothesis test. Thus, for any "experimental design" proposed for comparing an affected property to background it must be demonstrated that it has a Type I error rate and power characteristics which are consistent with the performance standard. Thus, the appropriate number of samples in any particular case, will depend on how many samples the chosen statistical test requires to meet the performance standards.

As alluded to above, five samples from each population, may be sufficient to meet this performance standard, in the case of the Student's "t" test, if the assumptions of the test are reasonably satisfied. However, a common feature of many statistical tests comparing two populations is that for a given total number of samples, the power is maximized when this number is apportioned equally between the two populations. The power of the test deteriorates when the samples sizes from each population are not equal. Thus, five samples from each population, may not be enough to meet the performance standards and furthermore, the commission may have an interest in larger sample sizes in the interest of providing adequate spatial coverage of the sampled areas.

Adoption of the performance standards requires the differentiation between statistical quantities conventionally used for hypothesis testing and statistical quantities conventionally used as estimators of population parameters. Interval estimates (upper confidence limit on the mean, upper tolerance interval) are not conventionally constructed for testing hypotheses, but rather are used as estimators of the true values of population parameters (means, variances). As such, they do not have readily discernable Type I and Type II error rates associated with them. If such statistics are proposed for use in testing an affected area to background the user of the proposed test must clearly state the test statistic, and the critical value of this statistic and must demonstrate that the proposed test, meets the performance standards.

Concerning §350.79(2)(B), Weston asked if the suggested approach of comparing representative concentrations at the affected property to background areas been tested using actual data. If not, Weston

suggested that TNRCC attempt this comparison using examples from several ongoing or completed projects to make sure that it works the way that it is planned.

The commission appreciates the commentors observation that validation of the statistical criteria stipulated in the rule using case studies would be a useful exercise. However, Weston's comments were provided in response to the hypothesis set described in the proposed rule. The final rule incorporates changes relative to the comparing of an affected property to background and should satisfy Weston's concern that the rule not provide for the likelihood of a reasonable conclusion. Still, the commission would like to briefly comment on Weston's recommendation that statistical methods be validated by case studies. It is one thing to test a method on actual data sets and another thing to rigorously verify the conclusions resulting from application of the method. This requires that additional data, beyond that used to "animate" the conclusions developed from the method be collected and that additional statistical analysis be performed. The commission generally does not have the resources for this kind of activity and regulated entities often are not interested in expending resources towards such investigations.

SUBCHAPTER E - REPORTS

Concerning Subchapter E in general, KOCH commented that the proposed reporting and notification requirements are more complex than those used under the existing risk reduction rules. The commission should revise the proposed rules to streamline the reporting and notification requirements. Redundancies like submitting an APAR and completing the Investigation Report Form should be eliminated.

Notwithstanding the amendment made in response to KOCH's comment in regard to §350.94 below, the commission disagrees with the general thrust of the comment that the reporting requirements are not streamlined. The following reports clearly describe the type of information that the agency will require the person to submit over the life of a project: §350.91 - Affected Property Assessment Report; §350.92 - Self-Implementation Notice; §350.93 - Response Action Effectiveness Report; §350.94 - Response Action Plan; §350.95 - Response Action Completion Report; and §350.96 - Post-Response Action Care Reports. The Investigation Report Form will be modified as necessary to be consistent with the Affected Property Assessment Report.

In comparison to the current Risk Reduction rule, really only the Response Action Effectiveness Reports under Remedy Standard A is new. These reports are necessary, however, as the current Risk Reduction rule directs persons to submit an initial notification but then is not specific about reporting on their progress until the action is finished. Without these interim reports, the commission has no information as to whether the person is even actually still conducting the response action or if it will be completed in a timely manner.

The commission clarifies that submitting an APAR and the Investigation Report Form (which is not part of the rule) is not redundant. The Investigation Report Form is currently under development by the commission in concert with an industry stakeholder workgroup for the existing rules. It is anticipated that upon amendment it would become an APAR under this rule. The Investigation Report Form is simply a report format.

Concerning Subchapter E in general, Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP does not provide for adequate notice of or access to significant reports from the process. Reports are not required to be maintained in a public facility in the area, in the TNRCC district office or even in the TNRCC central records. In the past, such reports may eventually be found in TNRCC's central records, but often it will be months or even years after they are submitted and should be available to the public.

The purpose of this rule is to define technical processes for determining protective concentration levels for COCs and for broadly establishing two types of response actions. The agency agrees that reports submitted to it are public information and should as a result be available to the public. The commission, however, does not believe that this rule is the appropriate forum for determining the mechanics of making submitted reports available to the public.

The commission notes that reports submitted to the agency in response to Subchapter E are available at the agency's Central Records Office. The commission notes that the TRRP rule does provide for the notice of the availability of information under §350.55 (relating to Notification Requirements).

§350.91. Affected Property Assessment Report.

Concerning §350.91, Weston commented that this section and the Investigation Report Form currently under development should be consistent.

The commission agrees that the requirements under this section and any subsequent Investigation Report Forms should be consistent. The commission notes that there is an Investigation Report Form currently under development for the current Risk Reduction rule (30 TAC Chapter 335) which should be generally consistent with the TRRP rule but may require some minor modifications for use with the TRRP rule.

Concerning §350.91(a), the word “below” has been replaced with “in paragraphs (1) - (3) of this subsection” to comply with format requirements.

Concerning §350.91(c), Henry, Lowerre, Johnson & Frederick commented that this section indicates that preparation and submittal of a Site Evaluation Report for TNRCC review may be required at the discretion of the TNRCC. All facilities should be required to submit the documentation.

The commission notes that the rule does not discuss a Site Evaluation Report but assumes the commentor is discussing a similar report used in the rule (i.e., Affected Property Assessment Report). Further, the commission notes that the preparation and submittal of an Affected Property Assessment Report is required.

Concerning §350.91(b)(6), KOCH commented that the APAR should not have to document all potential human receptors and exposure pathways. A person should only have to describe the complete or reasonably anticipated to be completed exposure pathways.

The commission agrees with the commentor that the term “all potential” was overly broad and has amended the rule to require that only the complete or reasonably anticipated to be completed exposure pathways to be identified as well as the other exposure pathways evaluated in accordance with §350.71(c)(8) and an explanation as to why they are not complete or reasonably anticipated to be complete. It is appropriate to limit this discussion to these exposure pathways and the associated receptors as the person has already eliminated other exposure pathways and receptors which are not of a concern.

§350.92. Self-Implementation Notice.

Concerning §350.92, Environmental Fuel Systems and ICE commented that responsible persons and consultants are going to want regular (and more frequent than every three years) input, review, and feedback from TNRCC site coordinators and other applicable regulatory staff on every open project. A consultant is contracting with both the responsible person and with the regulatory agencies, in practice if not in legal fact. And the job must get done with all three parties satisfied in the end. This is said simply to

make the point that TNRCC staff will not extricate themselves from being a part of the reporting process. The agency must be sure it has the technically competent staff, in enough numbers, to keep the process moving positively. All three parties - regulators, responsible persons, and consultants - want cases to close, properly, timely and economically.

The commission agrees with the commentor that it is necessary for the agency to be able to provide input, review, and feedback to persons responding to the TRRP rule as necessary. However, the commission is intending that fewer, but more meaningful reports, will be submitted in the future. An example of this is the current effort underway with stakeholders to develop a standard Investigation Report Form (i.e., APAR under TRRP).

Concerning §350.92(a)(4), the word “and” has been removed from the end of the subparagraph as it was an extraneous word.

§350.93. Response Action Effectiveness Report.

The commission did not receive any comments on proposed §350.93. The section is adopted as proposed.

§350.94. Response Action Plan.

Concerning §350.94, KOCH commented that a person should have the option of submitting the APAR, obtaining commission approval, and then submitting the RAP. Figure 6 (TRRP Remedy Standard A) and Figure 7 (TRRP Remedy Standard B) should be revised to allow this option of separate but timely submissions. The APAR, RAP, and other reports should be submitted in accordance with a schedule agreed to by the commission.

The commission has finalized §350.94 as proposed which pertains to the requirements for a response action plan (RAP). The commission sees merit to KOCH's discussion and has always intended that a person could initially submit an APAR for review by itself under either Remedy Standard A or B. Subsection 350.31(e) accurately describes the circumstance in which a response action effectiveness report (RAER) would be accompanied by an APAR, unless an APAR had previously been submitted. For Remedy Standard A, when the person chooses not to self-implement, no change is needed since §350.32(d) appropriately states that the person shall submit a RAP for the review and approval by the executive director. The person is directed to include an APAR with the RAP, unless an APAR has previously been submitted. However, Figure 30 TAC §350.3(4) for Remedy Standard A Reporting has been modified to change the text in the upper right hand box of the flowchart to read “Person submits RAP with APAR for agency approval unless APAR has previously been submitted.” The wording of §350.33(d) for Remedy Standard B did not clearly address this subject and has been revised. The commission has added text regarding APARs to subsection (d) so that it reads: “The person must receive the executive director's written approval of a RAP and an APAR, either submitted at the same time as the RAP or previously, before commencing response actions to attain the standard, but this does not preclude the person from taking interim measures.” And finally, Figure 30 TAC §350.3(4) for Remedy Standard B required modification so that the first line in the second box from the top of the flowchart reads “Person submits RAP with APAR for agency approval unless APAR has previously been submitted.”

Concerning §350.94(f), the words “this sampling discussion shall include:” have been added to the end of the subsection and the words “this shall include a discussion of” have been stricken from paragraph (f)(1) to correctly format the sentence.

§350.95. Response Action Completion Report.

The commission did not receive any comments on proposed §350.95. The section is adopted as proposed, except that (b) and (c)(1) have been amended by moving a subsection (§) symbol.

§350.96. Post-Response Action Care Report.

The commission did not receive any comments on proposed §350.96. The section is adopted as proposed.

SUBCHAPTER F : INSTITUTIONAL CONTROLS

§350.111

Concerning §350.111, Campbell, George & Strong commented that the consent and compensation procedures associated with the filing of deed notices on off-site properties should be refined to require consent only if there is a completed exposure pathway.

Campbell, George & Strong comment that the proposed restrictive covenant procedures should only apply when there is a completed pathway on the innocent owner's property. The TNRCC disagrees. It believes its job is to protect human health and the environment in the future as well as in the present, for example if a future owner were unknowingly to install a drinking water well into a contaminated aquifer. In addition, the takings exposure relates to future possible uses of property, not just present uses.

Concerning §350.111, Region 6 commented that these rules set out a major regulatory inconsistency with CERCLA and NCP: proposed rule relies heavily on the use of institutional controls, which should supplement engineering controls and not substitute for active response measures.

Region 6 commented that the proposed rule is inconsistent with CERCLA and the NCP in allowing reliance on institutional controls in lieu of a regulatory preference for treatment or removal. It is correct that the proposed rule allows for institutional controls, but such allowance is of little consequence since CERCLA does not control state superfund cleanups. To the extent the commission administers or oversees a CERCLA cleanup, it will follow the NCP rather than the proposed rules pursuant to the applicability (§350.2) and Region 6 grant conditions. Private parties wishing to preserve their cost recovery options under CERCLA should conform to the federal requirements as well as these rules, which are Applicable or Relevant and Appropriate Requirements (ARARs), for CERCLA cleanups.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick commented that the TNRCC should create a tracking system before or as part of any TRRP: With or without deed recordation, the new rules leave current and future generations at great risk of being exposed to contamination that is left. Documentation of contamination left in place should be recorded in an easily accessible public record, one that is easy to use by TNRCC, federal, state and local government entities, real estate brokers, and the public. TNRCC staff has admitted that a tracking system for contaminated properties is needed. TNRCC claims it will create the system after the TRRP is put in place. That approach puts the cart before the horse. Moreover, unless the Commission commits to develop a tracking system now, the likelihood of it ever being created is low. TNRCC does not have the resources and has many other priorities. The TRRP should not be put in place without an adequate tracking system

Henry, Lowerre, Johnson, & Frederick recommends a tracking system (registry) in addition to deed recordation and deed restrictions. The commission welcomes the input of Henry, Lowerre, Johnson, & Frederick as it explores the feasibility of a registry. As noted elsewhere, the commission does not believe that its resources or the state of development of this idea allows the use of a registry at this time. With

regard to the “great risk” of being exposed to COCs left on site, two observations should be made. First, if there is direct exposure to COCs, it is to a level of COCs that are acceptable for the affected property’s designated use. Second, with regard to the possibility of indirect exposure to higher levels of COCs, that exposure is avoided by means of the institutional control and the commission’s ability to enforce the control.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick questioned what would be the effect of having a city ordinance which requires all residents to be connected to the city municipal water system. Would this qualify as an "effected institutional control and allow the point of compliance to be established at the city limits?

Henry, Lowerre, Johnson, & Frederick asks the effect of a municipal ordinance as an institutional control. In regard to the point of compliance, the POE must meet §350.37. However, the commission will accept zoning and governmental ordinances as equivalent institutional controls if: 1) The zoning or ordinance is by its terms sufficient to provide the control that is required to be protective of human health and the environment; 2) The zoning or ordinance provides notice of the COCs left in place and that the zoning or ordinance is necessary to prevent exposure to the COCs; 3) The zoning or ordinance applies to both current and future uses for the land covered, and 4) The zoning or ordinance cannot be modified or rescinded without consent of the commission. There may be other methods by which “equivalency” of a zoning or governmental ordinance can be demonstrated, as well. The proposed rule at §350.111 and the definition of “institutional control” have been modified to reflect these possibilities. However, these provisions address only the institutional control issue, but do not circumvent or otherwise supercede the POE criteria set forth in §350.37 for class 1, 2, or 3 groundwater. Therefore, plume management zones may only be established for class 2 or 3 groundwaters, and these provisions do not modify the groundwater classification system established in §350.52. Additionally, ecological impacts or other hazards must be addressed in accordance with this rule.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick commented that the provisions for deed recordation with "implied consent" in §350.4 is not acceptable. There are too many opportunities for miscommunications, including improper delivery, untimely receipt, persons who cannot read well, all of which can result in deed recordation in opposition to the landowner's desires.

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick oppose provisions relating to implied consent for deed recordation.

Henry, Lowerre, Johnson, & Frederick objects to the "implied consent" that was in a previous version of the rule. This provision is not in the proposed rules. However, one condition this provision was intended to address remains, situations where the landowner cannot be found. Chevron, later, also calls attention to “non responsive” landowners and urges flexibility with regard to such landowners. The commission recognizes the difficulty this situation poses and has added flexibility by modifying the rule to provide when a person, after extensive inquiry, cannot find the landowner, the person shall file a deed notice or VCP certificate of completion without the necessity of obtaining landowner consent. While the commission is generally concerned about takings exposure without landowner consent or the use of zoning or governmental ordinance, the exposure in this situation should be minimal because the prospective plaintiff cannot be found.

Concerning §350.111, Port of Houston Authority commented that the use of institutional Controls, such as a restrictive covenant, are deemed unnecessary for innocent landowners since the RP still maintains liability.

The Port of Houston Authority does not believe deed notices and restrictive covenants are necessary because they believe the responsible party retains liability, and the commission could enforce the

controls through responsible parties. The commission disagrees. One function of the deed notice or restrictive covenant is to give notice to an owner and future owners. Even if a responsible party remained liable when an owner did not observe the controls, that liability would not provide notice to those owners. In addition, even though the commission takes the position that the responsible person does have continued liability, some would argue that it is not clear that a responsible party is liable when another person does not observe or alters the controls, for example when a landowner provides contaminated groundwater to his tenants.

Finally, it is most expedient and effective to enforce the controls against the person who is not observing them rather than in a derivative fashion through an earlier responsible party.

Concerning §350.111, AFCEE commented that the proposed institutional control process might make sense for the more typical cleanup scenario where only a few properties will need an institutional control. For large remediation efforts with potential off-site impact over a wide geographic area, however, the time and expense of negotiating/litigating with thousands of landowners could quickly become excessive. For federal facilities that are not currently on the National Priorities List (NPL), the cost impacts of this process could lead to a decision to place the site on the NPL and convert it into a Federal Superfund Site. Adding to the number of Texas sites on the NPL does not seem like a consequence that is justified by the marginal state benefits of restrictive covenants and a "one size fits all" deed notice process.

The AFCEE points out that the requirements of deed notice, restrictive covenants and landowner consent can be expensive to obtain. As noted above, there are some restraints on these costs such as the alternative cost to clean up to residential standards that do not involve controls. Governmental entities such as the AFCEE currently may also have condemnation powers that would act as a restraint on excessive demands. However, the commission does not have expertise to evaluate monetary disputes nor an interest in assisting a person in imposing restricted land use on an unwilling landowner.

AFCEE also comments that this rule may result in more federal facilities being placed on the NPL. While this is a possibility to the extent the federal facilities and the Region 6 control the listing of the sites on the NPL, there are political, practical and procedural restraints on such listing. For example, it is Region 6's practice not to list on the NPL unless the Governor of the state requests such listing. Certainly by such listing, federal facilities will not escape liability for cleanup under commission rules, which are Applicable or Relevant and Appropriate Requirements for NPL sites. Attempts to avoid landowner consent for deed notices, VCP certificates of completion, and landowner consent implicit in restrictive covenants will also expose the federal facilities to takings litigation that the commission is attempting to avoid by these requirements.

Concerning §350.111, Weston commented that the listed requirements do not appear to be consistent with the Certificate of Completions through the VCP. In particular, items (2) and (5) are not always included in the VCP Certificates that are filed to meet the institutional control requirements. We suggest that the filing of a Certificate of Completion through the VCP satisfy the requirements of §350.111.

Weston suggests filing of the Certificate of Completion under the VCP be accepted as equivalent to the deed notice/restrictive covenant requirements. The commission agrees in part. The commission has amended 30 TAC Chapter 333 and §350.111 to acknowledge that with regard to deed notice, the filed VCP certificate is acceptable for the areas covered by the certificate when the content and procedural requirements of this section with regard to deed notices are met. The content requirements of this section are met through the exhibits included in the VCP certificate of completion. However, the VCP certificate is not equivalent to a restrictive covenant when an innocent landowner is involved. To be able to compel an innocent owner to observe the controls, the commission will require a restrictive covenant as proposed, *even if a VCP certificate is filed.* The

commission notes that restrictive covenants are commonly included as an exhibit to the VCP certificate.

Concerning §350.111, Chevron commented that the TNRCC, the public, and the environment will be fully protected by existing enforcement authorities and the deed notice provisions without the imposition of restrictive covenants.

Chevron asserts that the public and the environment will be fully protected by the commission's current enforcement authority with the use of restrictive covenants. The commission disagrees and cites its response to Henry, Lowerre, Johnson, & Frederick elsewhere regarding innocent landowners.

Concerning §350.111, Environmental Fuel Systems and ICE commented that they are of the opinion that deed recordation, written neighbor concurrence and restrictive covenant use are suspect "institutional controls" for PST sites, when one evaluates the costs of obtaining them versus costs of cleanup. TNRCC already has comprehensive databases (whether their information is as complete and accurate as wished, or not) to identify every site currently in the affected programs. These databases are in the public domain, and may be searched by interested parties related to any property transaction, journalistic inquiry, legal or civil search, or other need. ICE feels it is also a matter of further educating the real estate, title, banking, insurance and municipal government communities as to the availability of database information. With every passing day these industries become more aware of the usefulness of risk-based assessment, regulatory database search, etc.

The performance of environmental risk screens, Phase I, or Phase II Environmental Site Assessments (ESAs), under ASTM and other standard practices, is commonplace in the private sector. A Phase I is regularly performed as part of the proper due diligence or discovery processes. When it results in the disclosure of possible subsurface concerns, sampling is performed as part of a Phase II ESA. The protocols ASTM and other organizations have established rely heavily on regulatory database searches and reporting of search results.

Fulbright & Jaworski also suggested that TNRCC provide a registry for sites undergoing remedial actions. This approach is superior to relying solely on deed notification and entry of restrictive covenants. An alternative approach is to provide for use of a computerized database, or site registry," instead of deed recordation. The site registry would be kept by the TNRCC and provide a single point of reference for real property cleanup information. The database would be directly accessible and clearly indexed. It would not retain references to property that had been cleaned up to reasonable risk-based levels. Additionally, the database provisions would be coupled with a provision requiring sellers of real property to notify buyers of the cleanup in appropriate circumstances. This approach would operate more effectively and efficiently than the deed recordation, restrictive covenant and landowner notice requirements.

Environmental Fuel Systems and ICE and many others opposed deed notice and restrictive covenants as institutional controls, suggesting that existing commission databases are adequate to give notice of and control exposure to COCs left on site. The commission disagrees. Although there are numerous commission databases, accessibility is difficult in that they are not cross referenced and do not employ a uniform index. An inquiry with only an address may not discover voluminous data indexed by company name or permit number. Metes and bounds descriptions of property or title recordation references currently cannot be used to locate information in commission databases. Many raw land contaminated areas do not have addresses. Satellite locator coordinates may not adequately identify contaminated areas as opposed to points. Additionally, the data bases are keyed to the on site affected property. A person interested in the condition of off site property would not be able to readily identify or access such information. While it is theoretically possible that a commission registry could be designed and operated to provide adequate notice and oversight of institutional

controls, such a system would require a design that has not yet been sufficiently explored. Until the features of such a system can be developed, the commission believes that deed notice, acceptable VCP certificates of completion and restrictive covenants are the best available tools to give actual notice and provide the commission with the ability to maintain the controls.

Concerning §350.111, Fina commented that the definition of Institutional Control should add the language "or governmental zoning requirements or any other agreement reached with the landowner." We also propose deleting the phrase from the proposed definition of Institutional Control which say "which ensures protection of human health and the environment." If the landowner and the remediating party agree on the action to be taken, the agency cannot, and should not, be inserting itself into judging that agreement.

AFCEE commented that Definition of Institutional Control: Both §350.111 and the definition of "Institutional Control" in §350.4(a)(44) make no reference to municipal zoning ordinances. Municipal zoning ordinances can often be reliable and effective mechanisms to accomplish what deed notices would otherwise be relied upon to do. In fact, the Texas Legislature has already recognized that municipal zoning ordinances may serve as effective institutional controls in some circumstances. See Texas Health & Safety Code, §361.753(g)(1). Yet, the TRRP effectively excludes consideration of municipal zoning ordinances as an institution control without recognizing any executive director discretion where circumstances might warrant an approach other than the deed notice process. AFCEE also suggest the TNRCC revise §350.111 and the definition of "Institutional Control" in §350.4(a)(44) to include "municipal zoning ordinances" as a recognized institutional control that can be relied upon, in the executive director's discretion, in lieu of deed notices where warranted by the circumstances of an individual case, including the size of area and number of properties affected.

Environmental Fuel Systems and ICE commented on §350.111 that what TNRCC should also consider as "institutional controls" are the municipal, water district and other regulating entities' regulations regarding prohibition or restriction of private water well installation, shallow ground-water use and the like. As contaminant exposure scenarios raise these issues, many towns are adding or modifying ordinances to prohibit private citizens and businesses from installing and/or using a private water well in some or all water production zones within the city. This is a most effective control of exposures to shallow, contaminated ground water, in part because enforcement of the restrictions is in local government hands.

Environmental Fuels Systems and ICE and other commentors urge that municipal zoning or other governmental ordinances be recognized as adequate institutional controls in lieu of deed notice and restrictive covenants. The commission agrees, with conditions, and accordingly modifies the proposed rule to allow this possibility. Individual property owners who may be affected by such an ordinance will have an opportunity to provide public input during the adoption of the ordinance. The commission will accept zoning and governmental ordinances as acceptable equivalent institutional controls in lieu of deed notice, VCP certificate of completion or restrictive covenant requirements if:

- 1) The zoning or ordinance is by its terms sufficient to provide the control that is required to be protective of human health and the environment;**
- 2) The zoning or ordinance provides notice of the COCs left in place and that the zoning or ordinance is necessary to prevent exposure to the COCs;**
- 3) The zoning or ordinance applies to both current and future uses for the land covered, and**
- 4) The zoning or ordinance cannot be modified or rescinded without consent of the commission.**

This alternative addresses only the institutional control issue, but does not circumvent or otherwise supercede the POE criteria set forth in §350.37 for class 1, 2, or 3 groundwater. Therefore, plume management zones may only be established for class 2 or 3 groundwaters, and this alternative does not modify the groundwater classification system established in §350.52. Additionally, ecological impacts or other hazards must be addressed in accordance with this rule.

Concerning §350.111, Fulbright & Jaworski commented that although cleanup notices would permanently remain in the chain of title, there is no guarantee that they would be found if a title history were compiled.

The real property records in each of the 254 Texas counties are indexed by the names of the parties to the real estate documents (grantor/grantee; lessor/lessee; assignor/assignee; borrower/lender) and not by property description or property address. A person cannot go to a courthouse with a legal description or an address and determine who owns property or what documents are in the chain of title to that property. Armed with a name, a person must search that name in the real property records to determine if the property owner bought property during the period of time covered by the records being searched. Additionally, a person must search the grantor records to determine if that person sold any property during the period in question. In Harris County, the records are computerized and the name searches can be performed fairly quickly. However, hard copies of the title documents must be obtained from the County Clerk's office because the computerized records do not contain enough information to accurately identify the property in question or the contents of the document in question, such as the creation of restrictions or easements. In many counties, the record searches would need to be performed manually because the records are not computerized.

In some counties, all of the real estate filings are maintained on the same database so that a search of the grantor/grantee index will turn up not only deeds, but leases, mortgages and assignments executed by the person or entity being searched. In some counties separate indices are maintained, requiring a search of all the real estate indices to be sure that all pertinent documents in the chain of title are identified. There is no certainty that the clerk will properly index recorded documents. Moreover, real estate documents are filed and recorded in the order they are received and they are not indexed next to prior documents in the same chain of title. For example, if property were purchased today and the deed indexed today, subsequent documents (such as mortgages, leases, assignments and deeds affecting that property) would not be indexed with the deed. To identify everything in the chain of title from the date of acquisition would require a search of all available indices of the real property records from the date of acquisition to the current date. However, to identify documents that may have been added to the chain of title prior to the date of acquisition, prior records would need to be searched beginning first with the name of the first grantor and then all prior grantors, successively. Given the tedious nature of this task, there is no guarantee that all cleanup notices will be found on pieces of property. Certainly, this process is not efficient and does not give clear notice of cleanup status.

Fulbright & Jaworski, in urging the avoidance of deed notices and restrictive covenants as institutional controls, points out the differences in the way deed records are kept in various counties and that deed searches can be tedious. While this is true, at least purchasers of property, title companies, long term or large lessees and banks are used to and familiar with this system. Until a better system for notice and control is devised and implemented, the deed notices, restrictive covenants, as well as zoning and ordinances are the best forms of institutional controls available.

However, in an attempt to facilitate the filing of notice and restrictive covenants in the deed records, and to avoid improper indexing, the commission will in guidance have example forms for deed notice and restrictive covenants, identify landowners as the existing or current grantee.

Concerning §350.111, Fulbright & Jaworski commented that for the foregoing reasons, Fulbright & Jaworski requests that the TNRCC enter a collaborative effort to draft provisions that would establish a site registry under the proposed rule. The use of a site registry would be especially helpful in certain situations. For example, publication on the registry would provide institutional control and public notice of a remedial action where cleanup activities were stalled due to negotiations with nearby landowners over deed recordation or entry of restrictive covenants. For some sites, publication on the registry would provide sufficient institutional control in lieu of such additional controls. Thus, the use of a registry would be expected to expedite completion of remedial actions.

Fulbright & Jaworski proposes to enter into a collaborative effort with the commission to establish a registry system under the proposed rule. As noted above, the registry idea has merit, but is

undeveloped and not yet ripe for implementation. It may also require resources that the commission does not have currently. For these reasons, a registry system is not feasible under this rule making. However, commission welcomes the input of Fulbright & Jaworski and others to explore this idea for future rule making.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick commented that it appears that the concession to allow written concurrence from a landowner of privately-owned property to change the land use from residential to commercial/industrial or no active land use without accompanying deed restrictions may create situations open to misuse. The lack of institutional controls on such off-site property may create situations where future landowners will purchase properties without adequate disclosure. The agency should consider requiring deed restrictions to a landowner's property deed when such written concurrences are granted. Also, written concurrence from a landowner that privately-owned property of the landowner can be considered commercial/industrial or no active land use for the purpose of establishing risk-based concentration levels should require deed restrictions to the landowner's property.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick commented that the proposed use of deed notices instead of deed restrictions in some cases would require the state to take enforcement action in the future should inappropriate land use occur at a site. Deed restrictions should be used instead of deed notices. Henry, Lowerre, Johnson & Frederick does not believe that institutional controls as the sole remedial action will, in and of themselves, be able to provide long term protection to human health and the environment. This is because deed notices are designed to provide information to the public and are not enforceable, whereas deed restrictions actually provide a legal basis for prohibiting certain actions.

Henry, Lowerre, Johnson, & Frederick comments that restrictive covenants should be the control required in all cases in order to alert future landowners and allow the commission to enforce the control. The commission disagrees. A deed notice combined with the rule regarding substantial change in circumstance as described in §350.35 is adequate to give notice to future owners of the conditions on the property as well as the future owner's obligation to maintain or not undo the control. In addition, through its rule regarding substantial change in circumstance (§350.35), the commission will be able to enforce the controls against many owners. In the case of innocent owner/operators under §361.752(a) of the Texas Health and Safety Code, who arguably do not have response obligations or other liability for the conditions, the commission is requiring restrictive covenants in favor of the state in such cases in order to be able to enforce the controls.

Concerning §350.111, Fina commented that the Institutional Controls requirements for both Remedy Standard A and Remedy Standard B present a framework for class 1 and class 2 Offsite Groundwater of deed recordation or cleanup to MCLs. This framework is unworkable, having severe negative consequences. Under this framework, a landowner can demand exorbitant monetary amounts for the deed recordation. These proposed rules thrust the TNRCC into the middle of land disputes. The TNRCC should remove the deed recordation requirements. An alternative approach is to expand the definition of Institutional Control. Zoning should be included in the definition. There is no technical or legal reason why zoning cannot be the basis for Institutional Control.

Fina and others comment that the proposed rule requirements for deed notice, VCP certificate of completion or restrictive covenant, and landowner consent allow landowners to demand exorbitant payments or "greenmail" from persons desiring to remediate such property utilizing these institutional controls. The commission disagrees. One restraint on this predicted result is the alternative that persons may avoid deed notices, VCP certificates of completion and restrictive covenants by cleaning up to residential levels without controls. Also, persons who think that a demand for compensation by a landowner is exorbitant may utilize Alternative Dispute Resolution (ADR) or seek a court decision on the matter through declaratory judgement by asking a court to set damages in connection with an action to allow filing a deed notice without the landowner's consent or

in response to a landowner's lawsuit for filing a deed notice without his consent. A court determination of appropriate compensation for deed notice, VCP certificates of completion or restrictive covenants may also be obtained in an action for trespass, property damage, nuisance, or personal injury brought by the landowner in response to the contamination, or in connection with an appeal in response to a commission enforcement action.

While a determination of damages by a court does not automatically compel the consent to deed notice by the landowner or the execution of a restrictive covenant by an innocent landowner, it is persuasive and may facilitate that consent or execution. Still, a landowner may refuse and a court may refuse to compel it, forcing a person to clean up to residential standards without controls. If this result becomes too offensive, as experience in the application of this rule is gained, legislation may be sought by the commission or persons wishing to impose a cleanup on unconsenting landowners allowing the commission to condemn the property in such cases. Until the commission receives legislative direction in this regard, landowner consent or cleanup to residential standards without consent is required unless technically impracticable, the landowner cannot be found or an equivalent zoning or governmental ordinance exists.

Concerning §350.111, Fina commented that other forms of agreement with the landowner should be allowed. We have agreements whereby we connected landowner to city water supply and closed down the drinking water wells. Also, we provided an indemnity to the offsite landowner.

Fina comments that the commission should not require deed notices, VCP certificates of completion or restrictive covenants if the landowner will agree to less, such as hooking up the owner to a municipal water supply when groundwater use is restricted as part of a remedial action. The commission disagrees. The purpose of institutional controls is to give notice of and prevent exposure to COCs both in the present and in the future. An agreement with a current landowner that is not enforceable by the commission, or that is not binding on future owners and others such as lessees is not adequately protective of human health and the environment.

However, providing an alternative water source could be an acceptable portion of a response action, when combined with institutional controls.

Concerning §350.111, Henry, Lowerre, Johnson & Frederick commented that the use of deed notices will not meet federal requirements under RCRA for the post-closure notices and land restrictions contained at 40 CFR §264.119 and 40 CFR §265.119.

Henry, Lowerre, Johnson, & Frederick comments that deed notices will not meet the various RCRA requirements for institutional controls. While not conceding that this assertion is correct, the commission notes that if RCRA requirements are more stringent than the proposed rule in this regard, §350.2 states that the persons subject to these more stringent requirements must comply with such requirements as well as the rule. Restrictive covenant requirements when innocent landowners are involved should meet RCRA requirements.

Concerning §350.111(a)(5), KOCH commented that it would be helpful if the commission provided examples or model documents covering the various requirements for institutional controls (e.g., §335.569, Appendix III).

KOCH commented that it would be helpful if commission provided model documents for deed notice and restrictive covenants. The commission had such documents and in its previous proposal, included them as part of the rule. However, many previous commentors complained about the length of the rule and requested that much of the rule be set out in guidance instead.

That is the course the commission has taken in this proposal. Model deed notices and restrictive covenants will be provided in future guidance.

Concerning §350.111(a)(5), KOCH commented that the proposed TRRP rules state that information on environmental media containing COCs must be included in an institutional control. This requirement should be revised to state that only COCs above PCLs should be listed.

KOCH comments that the institutional controls should only require the listing of COCs above PCLs. The commission agrees and is modifying the proposed rule to reflect this. COCs below PCLs absent institutional controls are protective of human health and the environment. Therefore deed notice, VCP certificates of completion, and restrictive covenants regarding COCs below PCLs is not required in such case, although they may still be required based on limited land use such as commercial/industrial.

Concerning §350.111(b), Chevron and Campbell, George & Strong commented that mandating restrictive covenants as a condition of closure where commercial/industrial standards are relied upon for properties held by so-called innocent landowners will bring only marginal benefits to the TNRCC and the environment. At the same time, a significant financial toll will be exacted from the regulated community. Presently, a Texas Senate Bill has been introduced in the on-going legislative session that will modify the existing statutory immunity provision so that landowners that violate deed notices or other institutional controls will lose their immunity status (SB 509). Assuming the bill passes, the agency's purported need for restrictive covenants vanishes and they should be removed from the rule. Regardless of the passage of this bill, restrictive covenants should be removed from the rule given their marginal benefits, their logistical and legal problems, and the adequacy of existing agency enforcement authority, as well as analogous CERCLA case law defining the limits of the innocent owner defense. The language pertaining to restrictive covenants should be replaced with language that acknowledges the use of other institutional controls, whether they be deed notices or local ordinances when the circumstances warrant reliance upon such ordinances.

Chevron and Campbell, George & Strong comment that SB 509 would eliminate the purported need for restrictive covenants. SB 509 indeed would have allowed the commission to avoid this requirement; however, it did not pass. Restrictive covenants are needed to insure that innocent landowners observe controls. As noted elsewhere, the CERCLA innocent owner limits do not speak to the immunities found at §361.752(a) of the Texas Health and Safety Code.

Concerning §350.111(b), Environmental Fuel Systems and ICE commented concerning the value of regulatory database searches and reporting, in order to avoid the use of deed notices and restrictive covenants. The agency did a much more thorough impact analysis with this rule package. But how will it assess potential costs of restrictive covenants, and how do they compare with costs of cleanups on example sites?

Environmental Fuel Systems and ICE commented that the commission cost analysis should reflect the costs to secure institutional controls. The commission agrees and has responded in the RIA to this adoption.

Concerning §350.111(b), Fulbright & Jaworski commented that the proposed rule would unnecessarily regulate land use and interests in real property by requiring recording of deed notices or entry of restrictive covenants on affected properties. Once a cleanup notice is filed in the real property records, it will be a part of the chain of title forever. It will be inexorably bound to the land. The chain of title would contain all notices of any kind, regardless whether they remained relevant. For example, when a mortgage is filed it becomes a part of a chain of title and remains so even after the mortgage is released.

Fulbright & Jaworski, arguing against deed notices and restrictive covenants, complains of the permanence of such records. The commission responds that it is relying on that permanence when it is necessary to give notice of and maintain the controls. However, the commission has modified the rule to accommodate changed conditions. Should it come to pass that such controls are no longer necessary, due, for example, to natural attenuation, the commission will allow a superceding deed notice or release of restrictive covenant to be filed without landowner consent. The combination of the previous deed notice and the superceding deed notice or release should be no more onerous on real property than liens and lien releases, and mortgages and subsequent releases.

Concerning §350.111(b), Henry, Lowerre, Johnson & Frederick commented that the rules provide for the elimination of most requirements for deed recordation: The rules also eliminate most requirements for notifications in deeds for much of the contamination, even if the existence and extent of the contamination is well documented by the responsible party.

Henry, Lowerre, Johnson, & Frederick comments that the rule will eliminate the requirement for deed notice compared to the current risk rules. The commission agrees that the rule changes the requirement for institutional controls relative to the current risk rule (30 TAC Chapter 335). The current risk rules require deed notice of any contamination above background. On the other hand, this rule requires deed notice, VCP certificate of completion or restrictive covenants when COCs are present above residential levels instead of background. However, this level of notice and control protects human health and the environment since such levels of COCs are within acceptable risk limits should people or environmental receptors be exposed.

Concerning §350.111(b), Henry, Lowerre, Johnson & Frederick commented that deed restrictions limiting redevelopment of contaminated properties would inhibit the City of Austin's ability to meet the desires of the East Austin community to reduce the amount of dirty industry and contaminated property in close proximity to residential areas.

Henry, Lowerre, Johnson, & Frederick comments that the use of restrictive covenants as a control may inhibit cities such as Austin from altering land use in response to citizens' desires. The commission disagrees that a city's ability to change zoning is impacted. Cities may change zoning currently and in the future without regard to actions taken on individual properties to ensure protection of human health and the environment in accordance with the TRRP rule. Also, cities have condemnation powers that may be utilized in such situations. After condemnation, the city may choose to perform additional cleanup and impose zoning on the property such that different uses of the property are mandated in the future.

Concerning §350.111(b), Ranger commented that the TNRCC has proposed 13 different deed notices/restrictive covenants in §350.111. To date, there have been thousands of PST sites, for example, which have been closed without any of these requirements. Ranger is unaware of any adverse impacts to human health and the environment that have been caused as a result of the PST program's current or former closure rules/guidelines. If there have not been any adverse threats to human health and the environment as a result of the current and historic PST closures, why does the TNRCC now propose to put this tremendous burden upon PST owners? Where is the cost benefit? The TNRCC through these proposed rule provisions will cause innumerable unnecessary litigation cases and will require that responsible parties hire an attorney for virtually every site which they are trying to close. The TNRCC should note that the existing deed certification and recordation requirements contained in the Risk Reduction Rule, which are far less onerous than the proposed deed notices/restrictive covenants contained in the TRRP rules, are already considered by the regulated community to be overly-burdensome, to create unnecessary litigation, and to be counter-productive to site cleanup efforts.

Ranger believes that the deed notice/restrictive covenant requirements of the rule are more onerous than the current 30 TAC Chapter 335 rules and unnecessary. The commission disagrees in part. The rule accomplishes the goals of notice and control set out earlier. It is less stringent than current 30 TAC Chapter 335 in that deed notice under the rule is triggered when COCs will remain after the response action in excess of residential PCLs rather than when background levels are exceeded as under the current Risk Reduction Rule. It is more stringent than the existing rule in regard to the requirement for restrictive covenants in some cases. This is necessary due to the passage of the innocent owner/operator statute that occurred after 30 TAC Chapter 335 was adopted. That law arguably changed the ability of the commission to enforce the controls set out in deed notices against innocent landowners.

Ranger is also concerned about the additional burden of deed notices/restrictive covenants on PST owners. The additional burden is due to the desire of the commission to treat contamination from *any* source in the same fashion, and not make artificial distinctions, for example, between benzene from a PST and benzene from a chemical plant. The commission has previously explained its rationale for the need for deed notices, VCP certificates of completion and restrictive covenants. This rationale applies equally to COCs from PSTs.

Concerning §350.111(b), Ranger commented that they believe that the proposed TRRP rule deed notices/restrictive covenants requirements overstep reasonable and responsible bounds of regulatory authority, and unduly interfere with private property. There are existing real estate notification and disclosure requirements that citizens of the state must comply with, and that provide for adequate protection of human health and safety. Ranger recommends that the TNRCC focus the rules on site investigations and cleanups, and allow the citizens of the state to responsibly comply with existing real estate disclosure laws.

Ranger contends that the commission does not have the legal authority to require deed notices/restrictive covenants, and that in any event, current real estate disclosure laws provide adequate protection of human health and the environment. The commission disagrees. Under §5.102 and §26.011 of the Texas Water Code, the commission has the statutory authority to do those things necessary and convenient to accomplish the goals of protecting human health and the environment. The commission also has other statutory rule making authority. For the reasons noted above, the proposed rules are necessary and convenient. It also notes that deed notice requirements have been a part of 30 TAC Chapter 335 since 1993 and that deed notice as an appropriate regulatory tool has been a part of the Texas Health and Safety Code for many years. To date no one has legally challenged the 30 TAC Chapter 335 Risk Reduction Rule provisions as beyond the commission's authority. Real estate disclosure laws are not an adequate substitute since they depend on private actions to enforce necessary controls. Additionally, the commission needs the ability to enforce controls if it is to perform its duty to the public.

Concerning §350.111(b), TCC and TXOGA commented that restrictive covenants may not be enforceable and could subject the State of Texas to liability. A survey of the laws in other states generally reflects legislative authorization for restrictive covenant in favor of the state for correction action or similar purposes. Texas law does not expressly include such authorization. Authorizing legislation typically provides that an agency may hold and enforce such restrictive covenant, and negates certain defenses to enforceability. The absence of Texas authorizing legislation could make restrictive covenant under the proposed rule unenforceable.

TCC and TXOGA comment that the lack of specific legislation authorizing restrictive covenants may render the restrictive covenant in the rule unenforceable by the state. As noted above, the commission is relying on its "necessary and convenient" powers as well as its other rule making authority to support its ability to adopt restrictive covenant provisions. If a court determines this

portion of the rule is unenforceable, then the commission will seek specific legislative authority in the future, or at a minimum, re-evaluate the remedial response objectives for affected properties with innocent owner/operators, possibly leading to mandatory cleanups to residential levels.

Concerning §350.111(b), TCC and TXOGA commented that a potential problem with restrictive covenants in the absence of authorizing legislation is the possible legal exposure that may result to the State of Texas. As grantee under a restrictive covenant, the state may be found to have acquired an interest in the affected property and thus to have become liable as a potentially responsible party under federal law. The problem could become particularly acute if the state was lax in enforcing restrictive covenant (assuming they are enforceable). Strike all restrictive covenant language from the rule, leaving only the requirement for a deed notice.

TCC and TXGOA believe that the state may become a potentially responsible party by a restrictive covenant that allows the state to enforce an institutional control. This, they assert, may result in the state acquiring a property interest that amounts to ownership. The commission disagrees. A restrictive covenant with the state as a beneficiary does not convey an ownership interest in the property to the state any more than a neighbor becomes an owner of all property in a homeowners' association to which restrictive covenants apply. The neighbor can enforce the restrictive covenants without a property interest that amounts to ownership. In addition, §361.196 of the Texas Health and Safety Code restricts liability of persons, including the state, who render assistance in performing a remedial action, to gross negligence or wilful misconduct, rather than the strict liability of owners, operators, transporters and generators. The Commission will not be legally exposed under these provisions by requiring restrictive covenants in favor of the state. There is a similar federal provision in CERCLA at 42 USC §9607 (d) which also sets a negligence standard rather than strict liability applicable to owners. This negligence standard exposure exists on any federal superfund site that the state cleans up pursuant to a grant from Region 6 or in a defense to a cost recovery action against the state under CERCLA.

Moreover, recent Supreme Court cases would suggest the state has sovereign immunity from private lawsuits under federal law such as CERCLA.

Finally, it should be recognized that these instruments are filed after remediation has been substantially completed. Liability for the state, given the worst case asserted by TCC and TXOGA would be for risk of additional cleanup after the commission has approved the previous cleanup.

Concerning §350.111(b), Chevron and Campbell, George & Strong commented that the incremental benefit to the public or to agency from the restrictive covenant is hard to discern. Failure to abide by restrictions outlined in a deed notice or other institutional control already places him/her at significant risk to regulatory enforcement under the broad enforcement authority of the agency as well as potential tort-based claims where affecting human health. Thus, the application of the immunity defense based on an innocent owner or operator status is unlikely to succeed in cases where a person; a) knew or should have known about the deed notice provisions, b) ignored the notice all the same, and c) proceeded with a change in the land use.

The proposed use of restrictive covenants presents many practical and logistical problems, is possibly legally flawed, and is no more effective than a simple deed notice (30 TAC §350.111(b) and (c)). The rule proposes the use of restrictive covenants as an institutional control for on-site or off-site properties held by an alleged innocent landowners (as defined in Texas Health & Safety Code, §361, Subchapter V). These properties include those involving cleanups to commercial/industrial standards, variances in exposure factors, or increases in the size of the soil exposure area. Restrictive covenants pose both logistical and legal problems. We have identified several of these problems in Exhibit II to this comment. Under the proposed rule, a landowner must be convinced to execute a covenant allowing the agency to take action directly against him for changes in use. This control measure would go far beyond the more customary

tool, recording a notice in the deed records for the county in question. But the incremental benefit to the public or to agency from the restrictive covenant is hard to discern. Failure to abide by restrictions outlined in a deed notice or other institutional control already places him/her at significant risk to regulatory enforcement under the broad enforcement authority of the agency as well as potential tort-based claims where affecting human health. Thus, the application of the immunity defense based on an innocent owner or operator status is unlikely to succeed in cases where a person; a) knew or should have known about the deed notice provisions; b) ignored the notice all the same; and c) proceeded with a change in the land use. In Texas, a landowner of commercial land is presumed to have knowledge of any recorded instrument pertaining to real property. These legal precedents in conjunction with the decisional law of CERCLA provide ample authority for Texas courts to deny immunity to those landowners that willfully ignore restrictions in a deed notice. Additionally, the benefits of this additional requirement are marginal, particularly compared to the transactional cost and difficulties involved in procuring restrictive covenant from reluctant or non-responsive "innocent" landowner. Moreover, the landowner is likely to exact greater compensation from parties that are requesting that he/she execute the covenant than for the filing of a deed notice.

Chevron and Campbell, George & Strong also commented the use of a restrictive covenant may violate certain provisions in the Texas Property Code and Human Resources Code. The Texas Property Code states that a "dedicatory instrument or restrictive covenant may not be construed to prevent the use of a property as a family home." A family home is a "residential home that meets the definition of and requirements applicable to a family home under the Community Homes for Disabled Persons Location Act." That act is codified in the Texas Human Resources Code Annotated, §123.001 (West. 1998), and generally relates to the establishment of a community home for disabled persons. Additionally, the Texas Human Resources Code, §123.003(b), states that "(a) restriction, reservation, exception, or other provision in an instrument created or amended on or after September 1, 1985, that relates to the transfer, sale, lease, or use of property may not prohibit the use of the property as a community home." In reviewing these statutory requirements in context with the use of restrictive covenants proposed by the agency, the commentators stated that it is conceivable that the issuance of these covenants, which are intended for restricting land use to commercial/industrial, could be construed as violating these requirements. This is because the restrictive covenant would prohibit the use of the land for residential purposes which includes family and community homes. Chevron and Campbell, George & Strong also stated that the enforcement of a restrictive covenant is subject to many common law defenses. To be successful in enforcing restrictive covenants, the agency must prevail in a civil court setting. Several common law defenses that historically been used to declare such restrictive covenants unenforceable include, but are not limited to, waiver, estoppel, abandonment, acquiescence in a violation, laches, release, and change in condition. There is little doubt that these defenses would likewise be used to defend against enforcement of the restrictions by the agency. The commentators asked if the agency intends to pursue enforcement of restrictive covenants, subject to these common law defenses and others, in civil court using taxpayers' dollars, and stated that they hoped not.

TCC and TXOGA commented that restrictive covenants pose both logistical and legal problems. Under the proposed rule, a landowner must execute a covenant allowing the agency to take action directly against him/her for changes in use. This control measure would go far beyond the more customary tool, recording a notice in the deed records for the county in question. But the incremental benefit to the public or to TNRCC from the restrictive covenant is hard to discern. Failure to abide by restrictions outlined in a deed notice or other institutional control already places him/her at significant risk of regulatory enforcement by the agency as well as open to potential tort-based claims alleging adverse impacts on human health. Requiring a restrictive covenant simply provides TNRCC with a contractual claim against the landowner.

AFCEE commented that it appears that the TNRCC is proposing the use of restrictive covenants because it believes that it will be unable to effectively enforce deed notice restrictions on so-called "innocent landowners" that qualify for statutory immunity under the "Innocent Owner/Operator Program (IOP)" set

out in the Texas Health & Safety Code. While The AF understands the commission's concerns, we do not believe the contractual action the state will inherit (to enforce the restrictive covenant) will be more effective than an action brought by the TNRCC under its broad enforcement authority in the Texas Water Code and Texas Health & Safety Code. It seems unlikely that a court of competent jurisdiction will hold a landowner immune from liability to the state if that landowner has caused or exacerbated contamination because it has failed to abide by restrictions set out in an institutional control such as a deed notice or a municipal zoning ordinance. The restrictive covenant requirement should be removed and the rule should instead re-state the TNRCC's broad statutory enforcement authority to enforce against all landowners that endanger human health and the environment by violating institutional controls such as deed notices and municipal zoning ordinances.

TCC, TXGOA, and others comment that a restrictive covenant is a contractual claim that goes beyond normal regulatory enforcement powers, is of uncertain benefit to the agency and is unnecessary since private tort based claims will ensure that controls are maintained. The commission disagrees that the rule is unnecessary or of no benefit. As noted above, the restrictive covenant requirements apply to the innocent owner situations where, arguably, by statute, the innocent owner would otherwise have no response action or other liability regarding the contamination. The commission believes that the quasi-contractual restrictive covenant that runs with the land is likely necessary to fill the gap and allow the commission to enforce the control against the innocent owner since the restrictive covenant itself, standing alone, imposes a legal duty on the landowner. The commission attempted to secure statutory authority allowing more direct enforcement under SB 509. Unfortunately, this effort was unsuccessful, necessitating continued reliance on restrictive covenants as proposed.

The commission should not rely on private parties' tort based claims to enforce necessary controls. Private parties may decline to pursue rights they have for many reasons such as lack of financial resources, lack of interest, lack of knowledge of rights, or other factors. The commission must have the ability to enforce the controls when private parties, for whatever reasons, do not.

Chevron comments that restrictive covenants pose logistical and legal problems including susceptibility to various legal defenses such as lack of privity of estate, violation of the Property Code and Human Resources Code in regard to Community Homes, and waiver, estoppel, abandonment, acquiescence in a violation, laches, release, and change in condition.

The commission agrees that restrictive covenants in favor of the state are somewhat novel. But they are not unprecedented. Other states use them. See TCC Comment, p. 5. While it would be preferable to have explicit legislation solving the potential issues noted in the comments, the commission is prepared to accept these legal risks to avoid adverse effects on human health and the environment resulting from the failure of the current innocent landowner to maintain controls he has agreed to or failure of a subsequent innocent landowner to maintain controls. The commission notes that SB 0154 passed in the 76th Legislative Session which concluded May 31, 1999, contemplates restrictive covenants where the state is a beneficiary. The commission believes this indicates the concept has been legislatively recognized in Texas.

To the extent that defenses such as laches, waiver, acquiescence, etc., apply to these types of restrictive covenants in favor of the state, such defenses are not fatal to the concept, but rather function as admonitions to the state to be vigilant and take immediate action when a covenant is violated. In the case of a change in condition such as natural attenuation that obviates the need for the restrictive covenant, there is no need for its continued enforcement by the state. Under these circumstances the state would agree to release the covenant and has so provided by amendment of this rule.

With regard to the Community Home issue, the restrictive covenants would be released by the state if the property conditions (COCs) were further remediated such that residential use was safe. Thus, there is no violation of the Property Code or Human Resources Code as contemplated by those statutes, which contemplate permanent restrictions from otherwise safe property being used as a community home.

Campbell, George & Strong comment that Federal Court decisions show that the state can enforce against innocent landowners without the use of restrictive covenants and that therefore restrictive covenants are unnecessary. In the commission's opinion, this reliance on federal decisions under CERCLA is misplaced. The innocent landowner defense under CERCLA is much more narrow than the innocent landowner defense under §361.752(a) of the Texas Health and Safety Code. The federal defenses are analogous to §361.275 defenses in the Health and Safety Code rather than the possibly unrestricted defense under §361.752(a).

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick commented that with respect to the request for consent, there appears to be no prescribed format at this point in the process for requesting the consent or providing information to the affected landowner as to their rights and options for responding to the request. Henry, Lowerre, Johnson, & Frederick is concerned that the rule as presented may not require the responsible party to provide sufficient information to unsophisticated landowners as to how they may respond to the request to preserve their rights.

Henry, Lowerre, Johnson, & Frederick comment that the commission should promulgate landowner consent forms so that unsophisticated landowners are not duped by persons seeking their consent. The commission does not agree at this time. It will, however, examine the consent documents provided by a person to determine if they are clear as to intent. If the commission becomes aware of significant misrepresentations by persons who secure landowner consent, it will become more prescriptive in this regard in the future. The commission has also modified the rule to require inclusion of the telephone number of the Public Interest Counsel in requests made to landowners concerning deed notice, VCP certificate of completion and restrictive covenant.

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick commented that if TNRCC wishes to limit the use of groundwater beneath a city street, that limitation should be imposed on the adjacent property owners because they, and not the right-of-way holder, have the right to use the groundwater.

Henry, Lowerre, Johnson, & Frederick comments that the commission should impose institutional controls on property owners that are adjacent to a city street if water under the streets is to be restricted. The commission disagrees. The property owner should be the person to whom the institutional control applies because that person may prevent access to the water most directly. What the commentor may be referring to is the common situation where the city does not own the property beneath its streets, but merely holds an easement. The property to the middle of the street is commonly owned by the adjacent property owners. The application of this rule to the property owners is protective in this case and is the result the commentor desires. However, if the city in fact owns the property beneath the street, the institutional control will be applied to the city, since as property owner it can prevent access to its property for these activities.

Concerning §350.111(c), Strasburger & Price commented that to be consistent with §350.111(b)(5)(6)(10)(11)(13), "landowner" in §350.11(c) should be replaced with "landowner who is an innocent owner or operator." For the same reason, the fifth sentence of this provision should be clarified to provide: "A restrictive covenant will be the required institutional control for the landowner who is an innocent owner or operator with the exception of institutional controls required under §350.31(h) and §350.74(b)(1) of this title (relating to General Requirements for Remedy Standards and Development of Risk-Based Exposure Limits, respectively)." In addition, there appears to be a typographical error in this

sentence when it refers to §350.74(a)(1). Section 350.74(a)(1) does not exist. The TNRCC is probably referring to §350.74(b)(1).

Strasburger & Price points out several areas needing clarification. The commission agrees and makes changes to make its intent clear.

Section 350.74 (a)(1) reference is changed to §350.74(b)(1).

In addition, the commission has clarified §350.111(c) so that restrictive covenants are more clearly related to innocent landowners.

Concerning §350.111(c), Amoco commented that to require further consent as to an on-site property does not provide notice to the landowner as much as it does provide an opportunity for the landowner to nullify or renegotiate existing contractual rights of the operator. The agency should not require landowner concurrence when the landowner has, in effect, already concurred. The concurrence of the landowner should only be required when the operator does not otherwise have contractual authority from the landowner. And in no case should the landowner have to actually sign a deed notice or other instrument of institutional control. From the operator's standpoint, the requirement of landowner concurrence for a deed notice provides the opportunity for the landowner to "hold up" the operator and frustrate remediation efforts. Usually, if an operator does not own the property, the operator holds a lease or grant from the landowner to occupy and possess the land. Express or implied in such lease or grant would be the right to conduct operations on the land and to file of record any required regulatory notice related to its operations. Indeed, the lease or grant itself may be recorded and thus serve as notice of operations on the property. If the landowner desires to restrict the operator from recording the lease or grant or any related regulatory notice, then the landowner should include such restriction in the lease or grant.

Amoco suggests that existing leases or grants, "in effect," already provide landowner consent to an operator who wishes to utilize institutional controls. The commission disagrees. Unless explicitly stated in the lease or grant, the owner has not consented to a cleanup that limits the future use of his land after the lease or grant expires. If the lease or grant does explicitly give the consent of the landowner to the institutional control, the operator may enforce that agreement and ask a court to compel the landowner to evidence that consent to the commission.

Concerning §350.111(c), Amoco commented that a deed notice should not require the consent of the landowner. The explanation to the proposed rule seems to contradict itself when it states that landowner concurrence is only necessary for a restrictive covenant: "Under the proposed rule, a restrictive covenant must be enforceable by the state and must be filed by the landowner, unlike deed notices which may be filed by others without the landowner's consent." Perhaps unintentionally, the agency's explanation states the preferred position - landowner concurrence should not be required for deed notices.

Amoco comments that the commission should not require landowner consent to a deed notice since the commission admits deed notices can be filed without landowner consent. The commission disagrees. While it is true that deed notices may be filed without landowner consent, the commission, having required deed notice to be filed for certain cleanups, may nonetheless be exposed to a takings claim without that consent. Therefore, the commission is requiring landowner consent in most cases for a deed notice to satisfy the rule's institutional control provisions. In addition, the landowner's consent will assist in maintaining the long term effectiveness of the institutional control on the land owned by the consenting landowner.

Concerning §350.111(c), Amoco commented that if the commission retains the requirement of landowner concurrence as set forth in the proposed rule, the practical effect will be that the operator must purchase the property from the landowner and/or pay an unreasonable amount of compensation. The commission cites

concerns over "takings" claims by landowners. But the commission will in effect require that the operator take the property through purchase, without benefit of the right of eminent domain. The agency is in a better position than the operator to require landowner concurrence, particularly if the agency is supported by legislative authorization.

Amoco comments that the effect of the rule will be additional expense for persons wishing to place institutional controls on other's property. However, it may or may not be correct that the total cost associated with cleanups will rise compared to current situations due to the cost for consent to institutional controls. The expenses necessary to secure landowner consent are related to the environmental contamination event that precipitates the need for institutional controls. Property owners already have the right to sue for various damages resulting from COCs on their property. Those damage costs must be part of any comparison of total cost with and without consent requirements. They are likely reduced when the landowner has consented to the institutional control, off-setting any purported avoided costs if consent is not required. Additionally, the use of institutional controls may reduce cleanup costs that would otherwise be required for a cleanup that does not utilize controls, resulting in reduced total cost even if there are additional costs to secure consent.

Institutional controls are necessary to give notice and give the commission the ability to enforce the controls. At the same time it is the requirement for institutional controls in certain situations that may expose the commission to a takings claim. Even if there is additional total cost involved to obtain landowner's consent, landowner consent is necessary to avoid a takings risk to the commission, and the commission is not willing to accept that risk and inadvertently share in the cost associated with remediating COCs for which others are responsible.

Amoco also comments that the requirement for landowner consent will compel the person wishing to utilize institutional controls to purchase the land or pay an unreasonable amount of compensation. The commission disagrees. While a land purchase may be a cost-effective choice considering all costs associated with the COCs, settlements for reasonable compensation frequently can be reached through compromise.

If landowners are also responsible parties, that is if they do not have defenses to responsibility, the person seeking landowner consent will have leverage to obtain it with a reasonable settlement.

Finally, it does not follow that the cost of purchase of the land or to secure the landowner's consent, if necessary, is an unreasonable cost. What is an "unreasonable" amount depends on whose point of view is being consulted. The landowner may have a different view from the person responsible for the COCs.

Concerning §350.111(c), Amoco commented from the landowner's standpoint, consenting to a deed notice could subject the landowner to liability and prevent the assertion of certain defenses, such as the innocent landowner defense under federal law. By consenting to a deed notice, the landowner arguably may be adopting and ratifying the actions of the person who placed the COC on the property. The explanation to the proposed rule seems to recognize this point: "Landowner consent to the placement of physical and institutional controls is effectively an acknowledgment, and agreement by that landowner of the conditions necessary for the control." In effect, the landowner could become a potentially responsible party under both present laws and possibly more restrictive future laws. No landowner will ever consent to a deed notice if that is a possible result.

Amoco believes that landowner consent will subject the owner to liability he would not otherwise have. The commission agrees with respect to restrictive covenants and innocent landowners. Indeed, that is the commission's rationale for the necessity of restrictive covenants when an innocent

landowner is involved. However, the commission disagrees that the consent and accompanying landowner obligations imply liability beyond the explicit controls to which the landowner has consented. In other words, by consenting to an obligation to maintain or not remove controls, a landowner does not consent to all forms of liability for the underlying contamination.

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick commented that TNRCC should clarify whether an "interest holder" is synonymous with "landowner."

Henry, Lowerre, Johnson, & Frederick wants the commission to clarify whether an interest holder is a landowner. The commission responds that not all interest holders are landowners.

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick commented that in the event the landowner and responsible person do not agree on a remedy standard, who makes the final decision?

Henry, Lowerre, Johnson, & Frederick asks, "If a landowner and responsible party do not agree on a remedy standard, who decides?" Any remedy requiring institutional controls must be consented to by the landowner except for technical impracticability situations where the court process applies or where equivalent zoning or government ordinances exist or where the landowner cannot be found. In most cases, however, the landowner has final decision making authority on the remedy standard applied to his land.

Concerning §350.111(c), AFCEE commented that it is unclear whether written consent from the landowner is required for filing of a deed notice. Second, the last sentence in the main body of §350.111(c) is completely unclear. The first clause of the last sentence of paragraph (c) is inconsistent with the first sentence of paragraph (c). The rule as proposed states no restrictive covenant has to be filed with the landowner is not an "innocent owner" as that term is defined at Texas Health & Safety Code §361.751(2). The rule does not go on to state that a deed notice is required instead, so it could lead one to conclude that no institutional control has to be filed when the landowner is not a "innocent owner." The landowners are "responsible parties," and jointly liable. No flexibility is available in the case of dry cleaning facility operators.

AFCEE comments and asks if landowner consent is required by the rule for deed notices and restrictive covenants. The answer is "yes". Explicit consent is required for deed notices. Since restrictive covenants may only be executed by a landowner, landowner consent is effectively given when the landowner signs the restrictive covenant, although consent is not specifically required.

Additionally, deed notices are required for institutional controls when the property is not owned by an innocent landowner. The rule has been modified to make this more clear.

AFCEE also comments that no special relief from the rule is available to dry cleaners. This is correct. The commission is seeking consistency and to that end it is the existence of the contamination and the fact that it is on other's property that are the relevant factors in the applicability of the rule. The necessity for notice and ability to enforce controls do not disappear when dry cleaners or other tenant businesses are involved.

Concerning §350.111(c), Phillips commented that the rule requiring the remediator to obtain a restrictive covenant from a landowner is bad public policy that will be likely to cause unnecessary litigation between private parties. There is no reason why this issue should be handled any differently than it is currently handled under the Underground Storage Tank cleanup laws. Affirmatively requiring the person performing the remediation to obtain a restrictive covenant places the TNRCC in the middle between private parties, and it will cause more money to be spent on litigation instead of remediation.

The government should allow the private parties to settle any differences in a neutral context. If the government forces one party to obtain a covenant from the other, the party can withhold the covenant and try to obtain the difference in the cleanup costs as private settlement damages by withholding the covenant. This tilting the balance between the landowner and the remediator is not good public policy.

Any damages paid to the landowner should be based on any lost value of the land, not the difference between the cleanup costs associated with obtaining or not obtaining the covenant from the landowner.

Further, it does not address the situation in which the landowner may be partly at fault for the pollution or its extent.

In effect, this proposed rule would allow the landowner to obtain a large share of the cleanup costs and stick it in his pocket, rather than devoting it to cleanup. This changes existing Texas law, which in most cases bases the damage to property from pollution on the decreased value of the land, and limits it to the market value of the land before and after the incident. Any change, which has this dramatic effect on the relationship of private parties, should be subject to the legislative process, not rulemaking.

The commission has responded to many of these comments earlier. With regard to current PST practices, the commission notes that the Innocent Owner/Operator statute was passed in 1997 while the PST program in large part began in 1989. The commission, as explained elsewhere, believes restrictive covenants are necessary to address the 1997 change in the law.

Concerning §350.111(c), PIC commented that it fully supports the concept of requiring written landowner concurrence prior to the filing of an institutional control in the real property records. The PIC agrees that the TNRCC must be assured that the affected property owner consents in order for TNRCC to avoid potential "takings" claims. The PIC encourages the Commission to not be swayed by any arguments that such a policy allows landowners to engage in "greenmail." To the extent that affected landowners may require compensation for such a burden being placed on their property, the PIC believes such parties have a right seek compensation for any use, burden, restriction, impairment or encroachment on their property. This should be considered a cost of business for the responsible party and a foreseeable result of their actions which have caused or contributed to the contamination of someone else's property. The amount of compensation due to an affected landowner in an individual case should be determined by the market and by the individual parties affected by the negotiations. Moreover, the PIC believes that the Commission should not be placed in the untenable position of being an arbiter of reasonableness in such situations. Placing the TNRCC as an intermediary in such a case would encourage unnecessary government intervention in matters of individual property rights and private business. The rule requires a person to submit a written request to the landowner to obtain permission to file the deed notice or to have the landowner file a restrictive covenant. However, there is no prescribed form for requesting the consent or providing information to the affected landowner as to their rights and options for responding. The PIC is concerned that the rule as presented may not require the responsible party to provide sufficient information to landowners. The rule simply requires that the request must contain a copy of the proposed institutional control and a "clear explanation of the content and purpose of the institutional control." The preamble states the following:

The commission emphasizes that it is the innocent landowner's decision to allow an institutional control to be placed on the landowner's property. The innocent landowner can refuse to consent to the placement of an institutional control which effectively forces a residential-based Remedy Standard A response action. 24 TexReg 2233 (March 26, 1999)

Emphasis of this point should be made not only in the preamble, which is unlikely to be seen at this point by the majority of landowners who will be affected by this rule in the future, but also in the individual requests for written landowner concurrence which will be sent to and read by these innocent landowners.

Without a prescribed form, persons may manipulate the request for consent in such a way as to give the impression that the recipient of the request has no choice in the matter. The public could be seriously misled about their rights without a prescribed form of notice providing more information about their rights to have input regarding the remediation of their own property. It should be made clear in a prescribed, uniform notice that the recipient of the request has the option of granting -- or not granting - permission for the filing of an institutional control and the consequences of both of those options. Additionally, the rule should require that along with the copy of the proposed institutional control, the landowner be provided with a copy of rule §350.111 (with emphasis on subsections (c) and (d)) and the name, address and phone number of an independent contact at the TNRCC -- from the executive director's staff, the Office of Public Assistance, or the Public Interest Counsel -- in the event the landowner has questions about their rights upon receiving the request for their permission. The notice should also suggest that the landowners return their response by certified mail.

Concerning §350.111(c), Henry, Lowerre, Johnson & Frederick commented that they fully support the concept of requiring written landowner concurrence for a deed notice/deed restriction on such person's property. Henry, Lowerre, Johnson, & Frederick agrees that the TNRCC must be assured that the affected property owner consents in order for TNRCC to avoid potential "takings" claims. Henry, Lowerre, Johnson, & Frederick encourages the Commission to not be swayed by any arguments that such a policy allows landowners to engage in "greenmail". To the extent that affected landowners may require compensation for such a burden being placed on their property, Henry, Lowerre, Johnson, & Frederick believes such parties have a right seek compensation for any use, burden, restriction, impairment or encroachment on their property.

The PIC comments that the rule should require the person seeking the landowner's consent to provide a copy of the relevant part of the rule and the name, address and phone number of an independent contact at the commission with whom the landowner can consult. The commission agrees to amend the rule to require the person to provide the contact information for the Commission Public Interest Counsel, but disagrees that a copy of the rule must be provided as the landowner can contact the agency to obtain relevant copies of the rule. The commission has previously responded to the comment concerning misleading documents used to obtain consent. The commission does not believe it is necessary that landowners responses be returned by certified mail. The person must secure consent to satisfy cleanup requirements. This provides incentive. Penalties for false filings are adequate to prevent fraud.

Concerning §350.111(c)(d), Strasburger & Price commented that the combination of these provisions seem to imply that the regulated entity is to place a notice in the deed records without the landowner's consent. In this situation, the relationship between the regulated entity and the land owner is probably adverse. The TNRCC should not require the regulated entity to perform actions that may subject the regulated entity to further liability. The TNRCC should have the authority to require the landowner to file the required document. Takings should not be an issue since the compensation due the landowner has been registered with a court. See 24 TexReg 2451. The following should be added to this section: "When the provisions of this subsection (d) are met, the landowner shall record the institutional control required under this chapter in the real property records."

Strasburger & Price comments that takings should not be a concern of the commission since the landowner will have been compensated. This is true in the case of technical impracticability situations where the court has determined the damages and those damages have been paid into the court registry.

Accordingly, in the case of technical impracticability and innocent landowners under §361.752(a) after the court proceeding and if the innocent landowner still refuses consent, the person shall file a deed notice on the affected property. The commission has modified the rule to make this clear. This

notice is an acceptable institutional control without the necessity of consent by the innocent landowner. Due to §361.752(a) of the Texas Health and Safety Code, the commission has concerns about its ability by rule to compel the innocent landowner to file a restrictive covenant or deed notice as Strasburger & Price suggests.

In situations that do not involve technical impracticability, landowner consent is required before the commission will accept a deed notice or VCP certificate of completion as an adequate institutional control under the rule, whether or not a person has already filed a deed notice or VCP certificate of completion on the affected property.

Concerning §350.111(c),(d), AFCEE commented that even if the restrictive covenant requirement is removed or technical impracticability can be proven, the consent and compensation procedures associated with deed notices will be extremely disruptive of the cleanup process for facilities with potential off-site impacts over a wide geographic area. Put simply, such sites will potentially, even likely, be required under the TRRP to obtain consent from or declaratory judgments against hundreds, if not thousands of landowners. The consent and compensation process mandates consent or compensation by rule that would otherwise be the subject of private negotiations. The draft rule also appears to pre-suppose that the landowner would receive compensation from the court.

AFCEE comments that the consent and compensation procedures will be extremely disruptive of the cleanup process. Under these rules, there should be minimal additional disruptions beyond the current situation. The commission currently requires landowner consent. Persons filing deed notice without consent (as the AFCEE would apparently advocate) would face disruptive court actions such as slander of title as well as other court actions related to the contamination such as trespass and damages. With the current consent requirement, settlements have been and are reached, and this rule does not prevent such alternative procedures or negotiations to secure consent. In addition, the Innocent Owner/Operator statute provides that such persons lose their immunity if they do not grant access for cleanup. The commission assists in the process of gaining access with its alternative dispute resolution office and the threat of enforcement against landowners who refuse to grant access pursuant to Texas Health and safety Code §361.751. The commission will continue to utilize these procedures under this rule.

AFCEE comments that the proposed rule presupposes that a court will award damages to a landowner in all technical impracticability situations. The commission agrees with the comment and modifies the rule to state, "if any" to avoid this presupposition.

Concerning §350.111(c),(d), AFCEE commented that the TNRCC should adopt a modified deed notice consent and compensation process for landowners which, after full notice to the landowners, stays the consent and compensation requirements until the off-site property is to be conveyed.

AFCEE and others comment that the court process related to technical impracticability should be delayed until the property is to be conveyed by the landowner. The commission disagrees. Such a delay would not allow the commission to enforce the controls against the current innocent landowner, which is one of the goals of the process. The deed notice and substantial change rules allow the commission to maintain controls when the current owner is not an innocent landowner under Texas Health & Safety Code §361.752(a). A deed notice also functions as overt and clear notice of conditions that must be observed by a non-innocent landowner or that should be observed by an innocent landowner. This will assist the commission in maintaining the controls. The restrictive covenant rules allow the commission to maintain the controls when the current owner is an innocent landowner.

Concerning §350.111(d), Henry, Lowerre, Johnson & Frederick commented that the commission should eliminate the Private Condemnation Authority. The new authority given to the responsible parties is very bad public policy and not authorized by TNRCC's enabling legislation. Even limited use of the rule allowing the responsible party to go to court to "condemn" the reduced value of a contaminated property would be extremely unfair to the innocent property owners. Those property owners would be forced to accept the value set by the responsible party or hire an attorney and expert to fight that evaluation in court. In addition, since this apparently would be the first use of such a private right of condemnation in Texas, it would set a very bad precedent. The existing private dispute resolution mechanisms must be allowed to resolve private disputes. The proposed TRRP would shift the balance in favor of the responsible parties.

In addition, the landowner is not provided an opportunity to participate effectively in TNRCC's decisions that are a prerequisite to this private condemnation. In particular, TNRCC's decision on the feasibility of the clean-up on a third party's land is not one that should be made solely by TNRCC and the person responsible for the contamination. The affected landowners must be allowed to challenge any claim of a lack of feasible remediation that is used as a basis for the private condemnation action.

Henry, Lowerre, Johnson, & Frederick comments that the court procedure in technically impracticability situations amounts to allowing private parties condemnation powers. The commission disagrees. It should be observed that the commission is not giving permission to contaminate land beforehand against a landowner's consent. The land is already contaminated, and it is technically impracticable to clean it up to the point where institutional controls are not needed. Since the need for an institutional control cannot be reasonably avoided, the only issue left is damages, if any. Unlike condemnation, the use of the landowner's property is not a matter of convenience, but of necessity to assure protection of human health and the environment from unacceptable risk. Landowners may also participate in the technical impracticability decision by examining open records submitted by the person to the commission and commenting to the project coordinator.

Concerning §350.111(d), Brown McCarroll & Oaks Hartline commented that the section sets out a procedure to demonstrate compliance with "landowner consent" requirements when such consent cannot be obtained. Brown McCarroll & Oaks Hartline supports TNRCC's inclusion of a mechanism to bypass landowner consent to record institutional controls in certain circumstances. Without §350.111(d), as TNRCC is aware, it would be possible for a landowner to hold an entire project hostage for excess monetary gain. Brown McCarroll & Oaks Hartline requests, however, that the provision also allow compensation to be determined through arbitration or mediation because of the time that can be involved in judicial resolution of appropriate compensation.

Brown McCarroll & Oaks Hartline supports the bypass mechanism provided in the rule to avoid the necessity of landowner consent in the case of technical impracticability. Brown, McCarroll comments that the rule should provide for additional mechanisms such as arbitration or mediation. The commission agrees that such mechanisms are appropriate tools for resolution and are already available to the parties if they agree. The commission is seeking landowner consent, whether it is arrived at through negotiation, mediation, arbitration, or settlement. However, if these methods fail, the court is the authority to finally settle disputes on damages, if any, due to necessary institutional controls.

Concerning §350.111(d), Chevron and Campbell, George & Strong commented that the consent and compensation procedures associated with the filing of deed notices on off-site properties should be refined to require consent only if the notice permits or requires a physical intrusion of the property or requires the maintenance of a physical control. There are two apparent purposes behind the consent and compensation process currently proposed in §350.111(d). First, the agency is interested in the long-term effectiveness and reliability of response actions. Second, the agency fears "takings" litigation would ensue if the TRRP

allows deed notices to be executed without either landowner consent or a declaration by a court of competent jurisdiction that an amount has been paid into the court's registry sufficient to compensate the landowner for any devaluation attributable to the recording of the deed notice.

The agency's first goal of ensuring long-term effectiveness for response actions can be accomplished without the need for the currently proposed consent and compensation procedures. By requiring deed notices or some other functionally equivalent institutional control (e.g., a reliable municipal ordinance), future landowners will be fully informed of the response and the consent or compensation of the current landowner will do nothing to help in that regard.

To address the agency's takings concerns, a number of refinements could be made to the rule that will alleviate many of the burdens of the current proposal and still substantially diminish the agency's risk of takings liability. Because the bulk of takings litigation revolves around actual physical intrusion of property, we suggest that the proposed rule be tailored to reduce the risk of that type of takings claim. As for the agency's apparent concern that a "regulatory taking" could be claimed based solely on the impact of the deed notice, we believe that concern is not warranted. The agency need not look any further than its own proposed Takings Impact Analysis ("TIA") to understand why the mere filing of a deed notice cannot constitute a taking. On page 4 of the TIA, the agency concludes that the proposed TRRP "is not a producing cause of any diminution of property" because "levels of COC are already present at the affected property; and it is the presence of these chemicals that may have caused any property devaluation. . . . Therefore, the proposed rule does not and cannot constitute a taking as defined by statute."

Chevron comments that if the commission has concerns about takings exposure, the requirement for landowner consent should be limited to physical intrusions on property. The commission disagrees. While physical intrusions are the most apparent types of takings, diminution of value without physical intrusion has similar status in the law. Indeed, the damages due to a property owner when there has been no physical intrusion may exceed those involved with a physical intrusion. The essence of the commission's takings concerns has to do with a possible judicial perception that the commission has aided, approved or compelled the damages due to the imposition of an institutional control. By requiring landowner consent in all cases of deed notice or VCP certificates of completion except in cases of inability to locate a landowner or technical impracticability, a court determination of damages in cases of technical impracticability, and payment of those damages, the commission avoids that perception.

Although Campbell, George & Strong recognize that the commission is also concerned with regulatory takings exposure, they comment that the commission has admitted in its TIA that the mere filing of a deed notice is not a taking. While that is the position of the commission, the commission also recognized the legal risks involved. See also the comments of Henry, Lowerre, Johnson, & Frederick and the PIC concerning "takings" exposure. Campbell, George & Strong have focused on only one statement by the commission. Elsewhere, the commission notes that some real estate experts say that the filing of a deed notice alone reduces property value by 20% - 30%. The commission also expresses its difficulty in assigning the devaluation to the contamination or the deed recordation exclusively. As stated in the Preamble for the proposed rule, "Institutional controls may be a primary factor in devaluation of property according to real estate professionals. . . . It is difficult for the commission to distinguish between the reductions in property values due to the presence of remaining contamination and reductions due to the implementation of institutional controls, which inform others of the presence of contamination."

If the commission is challenged that its rule constitutes a regulatory taking, it reserves the right to argue as Campbell, George & Strong suggest. However, the commission recognized the risk of relying on such a defense in the TIA and performed further analysis in the TIA as if a prima facie takings were implicated.

The commission has responded to the municipal ordinance point elsewhere.

Concerning §350.111(d), Chevron commented that they have two concerns regarding the consent and compensation requirement. First, provided that a remedy is technically impracticable, is the agency still going to require a person to conduct the cleanup despite this fact if a landowner refuses to allow the filing of an institutional control, but no court has heard the matter? This seems somewhat inappropriate. The rule should recognize this potential scenario and provide the person with some form of relief other than ordering a cleanup that will serve little to no purpose. For example, the rule should allow the person at least two years to reach some form of agreement with the landowner regarding the use of an institutional control.

Second, having this requirement so narrowly defined so as to require that a court of competent jurisdiction must render final judgment with all costs to be paid into the court registry is virtually impossible in today's society. Surely other mechanisms suffice to demonstrate satisfactory resolution, such as: a) competent evidence that the matter was mediated and payment was made to the landowner or b) an out-of-court settlement compensating that landowner for the diminution in value of his/her property and that payment had been made.

To address these additional concerns about consent/compensation, where required, the rule language should be modified to allow for more flexibility in dealing with non-responsive landowners regarding deed notices, especially where an access agreement is also at issue. In the attached table (Exhibit 1), we include revisions to proposed §350.111(d) that allow sufficient flexibility in dealing with non-responsive landowners, including a provision that gives the person at least two years to resolve the matter before being required to pursue an alternative response action. The agency should also confirm in the preamble to the final rule that it will continue to follow its current practice of writing the landowner to encourage access cooperation and to inform the landowner of the risk of enforcement under the Texas Water Code if access is denied.

Chevron asks if the commission will still require cleanup if the landowner will not consent to deed notice, VCP certificate of completion or a restrictive covenant in technical impracticability situations prior to a court ruling. The commission responds, "Yes". The TNRCC will have agreed that a cleanup without controls is technically impracticable. The contamination needs to be addressed. The only question is the damages due to the necessary controls. The responsible person must proceed with cleanup and file a deed notice without the landowners consent, and thereby meet the requirements of this rule.

Chevron comments that the rule should allow settlements leading to landowner consent between persons in lieu of court proceedings. The commission agrees. If a settlement prior to a court action results in a landowner agreeing to a deed notice or restrictive covenant, that is satisfactory. The court procedure set out in the rule is a procedure by which the consent issue may be resolved in cases of technical impracticability when the parties cannot agree. Therefore, the commission did not intend to preclude settlements or other resolutions. Settlements and other resolution methods amount to consent and thus the provisions of subsection §350.111(d) are avoided.

Chevron is concerned that the process in the rule regarding innocent landowners and restrictive covenants will result in the exposure of persons to enforcement by the commission when a landowner is uncooperative and a court has not yet ruled on the damages. Due to this concern, Chevron requested a two year period to pursue court actions to resolution. The commission responds that it has enforcement discretion. If the person proceeds expeditiously to secure a court decision, the commission will not initiate enforcement. However, if the person is dilatory in pursuing a court decision on damages, the commission will initiate enforcement against the person. Therefore, the

commission is not specifying any particular time period in the rule to pursue court action to resolution.

Concerning §350.111(d), Chevron commented that the deed notice consent and compensation procedures in the proposed rule should be refined to allow parties to resolve consent issues themselves without the interference of mandatory consent and compensation requirements in the TRRP, except perhaps where the deed notice requires an actual physical intrusion of the off-site property or the maintenance of a physical control on that property. In the limited circumstances where the consent and compensation procedures apply, the TNRCC should continue its current practice of writing the landowner to encourage cooperation and to inform the landowner of the risk of enforcement under the Texas Water Code if access is denied.

Chevron commented that the commission should confirm its current practice of writing the landowner when the person can demonstrate that access has been requested, but is denied unreasonably. The commission agrees that it will continue this practice. It notes that the innocent landowner statute conditions the immunity from liability on providing access. The commission will use its alternative dispute resolution capabilities and enforcement authority if access is denied unreasonably.

Concerning §350.111(d), AFCEE commented that subsection (d) can be read one of two ways: First, it could be read as an exception to the general requirement in the first sentence of subsection (c) to obtain landowner consent before filing any type of institutional control. Or, it could only apply under the circumstance described in subsection (c)(2) - when a person can show that it is technically impracticable to meet remedy Standard A for residential use. Second, language in subsection (d)(2) contains implicit presumptions that; 1) landowners are not responsible parties under Texas Health & Safety Code as "owners" of contaminated property, and are not strictly, liable for cleaning up the property; and 2) monetary damages are due to the owners. These two implicit presumptions are astounding in their implications.

AFCEE comments and asks if landowner consent is required by the rule for deed notices and restrictive covenants. The answer is yes. Explicit consent is required for deed notices except when the landowner cannot be found or §350.111(c)(3) or (d) has been satisfied. Since restrictive covenants may only be executed by a landowner, landowner consent is effectively given when the landowner signs the restrictive covenant, although consent is not specifically required. However, in technical impracticability situations where the court procedure has been followed and the landowner refuses to consent or execute a restrictive covenant, the person shall file a deed notice without the landowners consent. The commission has revised the language in the rule to make it clearer in regard to these intentions. If landowners are also responsible parties, that is if they do not have defenses to responsibility, the person seeking landowner's consent will have leverage to obtain it with a reasonable settlement. AFCEE expresses doubt that some landowners are not liable for contamination on their property. This is the effect of the Innocent Owner/Operator statute for off site owners of impacted property. In regard to landowner liability for monetary damages, the commission has modified the rule to state, "if any."

Concerning §350.111(d), Amoco commented that one possible improvement to the rule would be to have the "technical impracticable" exception apply to all landowners, that refuse to consent to deed notice. A better approach to the problem of the recalcitrant landowner would be to fashion a broader exception that does not depend upon any standard of technical impracticability, but is simply based on the landowner receiving fair compensation, not to exceed the value of the affected property.

Amoco comments that the rule could be improved by making it apply to all landowners, innocent or not, when it is technically impracticable to avoid the use of institutional controls. The commission agrees and has modified the rule to clearly address this situation. The intent of the rule is that the

court be used as the avenue of final recourse to address the situation (assuming no equivalent zoning or governmental ordinance and that the landowner can be found) where the landowner (innocent or not) refuses to grant consent for an institutional control and it is technically impracticable to clean up the affected property such that institutional controls would not be required.

Concerning §350.111(d), Groundwater Services commented that uncooperative landowner option for payment to court registry is impractical. Court resolution requires participation of both parties.
Recommended Revision: Delete this provision.

Groundwater Services comments that the court procedure for technically impracticable situations is unworkable since one party (the landowner) may not participate. The commission disagrees. The moving party may serve the landowner with notice of an action involving a determination of damages to the landowner's interests. If the landowner does not participate, it is likely that the moving party's evaluation of the damages will prevail. Once that amount has been paid into the court registry, the modified rule requires the person to file a deed notice, without the need to obtain consent. In court actions brought by the landowner, the landowner will already be in court.

Concerning §350.111(d), Harris County Pollution Control Division asks if the requirement for court-ordered compensation to innocent landowners that refuse to consent to the placement of an institutional control is really a viable option? Has it been used and/or been successful in any other environmental program.

Harris County Pollution Control Division asks if the court procedure described in the rule is viable or tested. The commission believes it is viable, though untested. The commission will defend the rule vigorously if challenged.

Concerning §350.111(d), Michelle A. McFaddin commented that a facility can essentially have our property "condemned" as contaminated under proposed rule §350.111(d), paying only for the amount of the devaluation. Such devaluation would not only affect the surface property value of this land and our ability to develop it, but also our ability to explore for oil and gas in the future since operators will not want to drill wells on property with known groundwater contamination in this area.

Michelle A. McFaddin comments that the court procedure in technical impracticability situations may not compensate landowners for other land use values such as oil and gas exploration. The commission disagrees. The landowner who participates in such a court action may direct the court's attention to all effects that the institutional control will have on the use of the property which will affect the amount of damages.

Concerning §350.111(d), Fina commented that the subsection provides only one alternative for an uncooperating landowner. This requirement that there be a court decision and money be paid is impractical and unworkable. Neither the remediating party nor the landowner can go seek a declaratory judgement from a court on the amount of damage incurred from the soil or groundwater contamination. The proposed alternative does not even allow for a settlement of the claim. Nor does it allow an out should the remediation part win the lawsuit because there is no damage to the landowner. Even if the remediating party wins the lawsuit, it must still clean up the groundwater to MCLs. This again shows that negative consequences flow from having the deed recordation requirement.

The commission believes the rule to be workable. Fina cites no authority or argument that declaratory judgements cannot be utilized to determine damages due to the imposition of institutional controls. This proposition is not self evident. The controversy over the appropriate amount of damages is ripe and real, not remote and speculative and resolution is necessary for the responsible party or person to avoid enforcement by the commission. Early resolution of the controversy will

also promote expedited cleanups and judicial economy by settling a major and fundamental issue (damages for imposition of institutional controls). That in turn resonates in related issues such as damages for trespass. Declaratory judgement and other legal mechanisms are available to persons. The commission has also spoken to the issue of settlements above.

Finna comments that if a remediating party "wins" the court procedure by a court determining that no damages are due the landowner, the remediating party must still clean up to residential standards without controls. The commission disagrees. First, it should be noted that these court procedures only apply to technical impracticability situations, for example where it is not technically practicable to clean up to MCLs. By this rule a party is not required to do what is technically impracticable. On the contrary, as modified, the rule will require the person to perform a technically practicable cleanup, file the necessary deed notice and not require landowner consent in such case. This will allow the remediating party to fulfill its obligations under the rule.

Concerning §350.111(d)(2), Amoco commented that the rule should be clarified to provide that the amount of compensation due a landowner should never exceed the value of the affected property.

Amoco comments that the rule should provide that the amount of the damages due to the landowner in the court procedure never exceed the value of the land. The commission declines to make this modification to the rule. The court rather than the commission is best equipped to evaluate damages attributable to the placement of institutional controls on a non-consenting landowner's property.

SUBCHAPTER G - ESTABLISHING A FACILITY OPERATIONS AREA

§350.131. Purpose.

Concerning §350.131, ARCADIS Geraghty & Miller, Dow, Eastman, EPA Region 6, KOCH, McCulley, Frick, & Gilman, Phillips, TCC, TXOGA, and Weston commented that they support the inclusion of a FOA in the proposed rules. However, EPA Region 6 qualified their endorsement with some concerns which are noted in the comments to other sections of Subchapter G. The other commentors stated that the FOA concept provides appropriate flexibility to the regulated community and the agency. The commentors also believe this concept will streamline and accelerate the corrective action process by providing a plan for managing risk and receptors for the entire operations area of a facility. The Port of Houston Authority commented that the re-proposed rules do not adequately address historical contamination in affected FOAs, and asked whether management and discovery of historical contamination would be treated as a "future release."

The commission agrees with the commentors and appreciates their support of the Facility Operations Area. With regard to the comment from the Port of Houston Authority, the commission points out that this concern is addressed in response to comments on §350.132.

Also, concerning §350.131, EPA Region 6 commented that the subchapter should more specifically include remedial action or performance standard requirements to be followed in obtaining or maintaining a FOA at a facility. Additional guidance is needed to describe what actions are necessary in the event that a facility has a release beyond a FOA boundary with contaminant concentrations not protective of human health and the environment. EPA Region 6 stated that because there are no technical standards specified in the TRRP for establishing and maintaining a FOA, it will be difficult to revoke a FOA designation in an instance of non-compliance.

The commentor recommended that the subchapter should include more specific remedial action or performance standard requirements to be followed in obtaining or maintaining a FOA at a facility, otherwise it will be difficult to revoke a FOA designation in an instance of non-compliance. First, the

commission disagrees with the commentor regarding performance standards. The commission did specify an overarching performance standard in §350.132 by requiring that an interim response action be protective of human health and the environment within and at the boundary of the FOA. This is essentially the same performance standard required by federal regulations that govern corrective action for releases from solid waste management units (40 CFR §264.101). Beyond the FOA boundary the person must respond to releases by complying fully with all requirements of this chapter. Secondly, the commission intends to include specific requirements for demonstrating compliance with FOA performance standards in the facility's hazardous waste permit or corrective action order. Routine inspections will be performed to determine the facility's compliance with its permit provisions. Non-compliance with FOA provisions can be addressed through the commission's enforcement process. The typical result of the process is a return to a compliant status, although revocation of a permit provision is a possible outcome.

The commentor further stated that additional guidance is needed to describe what actions are necessary in the event that a facility has a release beyond a FOA boundary with COC concentrations exceeding protective levels. The commission points out that this situation is addressed by the rule in §350.132(b) which states that all requirements of this chapter apply to affected property outside the FOA boundary.

Concerning §350.131, EPA Region 6 commented that 40 CFR 264.100(c) requires that corrective action begin within a reasonable time after the groundwater protection standard is exceeded. In light of the FOA concept of delaying corrective action until facility closure, EPA Region 6 asked how Texas facilities would meet this requirement for regulated units.

The commission points out that §350.2(h)(2) of the rule requires that hazardous waste facilities are also subject to the requirements of Chapter 335, Subchapters E and F, which contain this specific federal requirement. Any regulated units located within the FOA would have to comply with this more stringent federal requirement. This approach is also reinforced by §350.2(a). Regarding the subject of reasonable time frames, the commission is formalizing its recommendation put forth in the preamble to the March 26, 1999 proposal for §350.133 (24 TexReg 2235) for initiating interim and final response actions: "Finally, the commission expects that a prudent owner or operator of a facility will utilize a Facility Operations Area to pace out its corrective action obligations over time such that meeting its final remediation objectives would not be as burdensome as waiting to complete all actions." The commission recognizes that some production areas will likely remain active to the end of the FOA authorization whereas other areas will not. Final response actions, if needed, can be effectively applied in the deactivated production areas, or other areas of the FOA where application of a remedy is not hindered by operations infrastructure, before the FOA is terminated. The commission revised §350.132(a) to include a statement that the facility can prioritize final response actions to be completed to the extent practical during the FOA authorization. A conforming provision was added to §350.135(a)(8) as part of the application requirements.

Concerning §350.131, Chevron commented on the proposed language stating that "the facility must be subject to a hazardous waste permit or commission corrective action order." Chevron commented that the obligations set out in a voluntary cleanup agreement or conditional certificate of completion are no less enforceable than conditions set out in permits and orders. Therefore, Chevron recommended that the TNRCC should allow sites under the VCP to benefit from the FOA approach where the site otherwise qualifies for the eligibility requirements. Where permits and orders are referenced in the above-noted subsections, make appropriate reference to conditional certificates of completion and voluntary cleanup agreements.

The commission disagrees with the commentor's suggestion about expanding the means of FOA authorization to include being entered into the VCP. Certain aspects of the FOA concept, specifically

use of interim remedies and potential long-term deferral of final remedies and continued liability, are contrary to the objectives of the VCP. The VCP is barred by statute from accepting facilities subject to permit or order. This program is intended to provide incentives to third parties to remediate property by removing environmental liability from lenders and future owners. The commission has added the words "hazardous waste" or "corrective action" as modifiers to the word "permit" or "order," respectively, where needed to make the usage of the terms "hazardous waste permit" and "corrective action order" consistent throughout this subchapter.

§350.132. Effect.

Concerning §350.132, Groundwater Services commented that applicability of FOA provisions to historical contamination discovered after the effective date of the FOA is unclear, and asked whether this would be treated as a "future release." Also, Groundwater Services requested clarification regarding effect of the FOA on on-going RFI investigations or other Compliance Plan corrective actions already underway in FOA area. Groundwater Services recommended revising the text to clarify the applicability of FOA provisions to newly discovered historical contamination and on-going corrective action programs.

The commission has drawn a distinction in this section between releases based on time of occurrence. Those that occur after the establishment of a Facility Operations Area (FOA) are to be addressed in accordance with Chapter 327 rules, and as required by §350.135 (a)(7). The objective of immediate response actions for these releases is a restoration to pre-release conditions, such that COC concentrations within the FOA do not increase over time as a result of additional releases. The other category includes all other releases being addressed by the response actions of the FOA. Newly discovered "historical" contamination (i.e., has not been previously identified as a release within the FOA but by its nature can be shown to have pre-dated the FOA effective date) should be reported in accordance with terms of the hazardous waste permit for newly discovered solid waste management units (SWMUs), or an alternate notification plan of §327.3(j). Regardless of the time of discovery relative to the FOA effective date, the commission emphasizes the importance of cataloging release sites for compliance with the full provisions of this chapter at the termination of the FOA.

With regard to ongoing RFI investigations within a FOA, the facility will be able to adjust the scope of investigations to determine what response actions will be necessary to attain objectives at the FOA boundary. Similarly, ongoing corrective actions could be adjusted to take into account a point of exposure at the FOA boundary. However, in the case of RCRA regulated units subject to groundwater corrective action regulations of 40 CFR §264.100, the commission notes that the most likely alteration to response actions will be utilization of alternate concentration limits (40 CFR §264.94(b)). Corrective actions in response to these federal regulations will not realize much change from existing requirements as specified in the compliance plan of the permit. On the other hand, facilities can design response actions for SWMUs to more fully utilize the flexibility of the FOA concept.

§350.133. Duration and Termination

Concerning §350.133(b), EPA Region 6 commented that the rule proposes that the FOA is subject for review at the time of the permit renewal. The rule should instead state that the FOA can be reviewed at any time to determine if corrective action is needed.

The commission notes that this subsection already contains a provision to subject the FOA authorization to review at any other time (meaning in addition to the time of hazardous waste permit or corrective action order renewal) for failing to maintain compliance with the qualifying criteria specified in this subchapter. Also, as noted in the response to comments on §350.131, routine inspections will be performed to determine the facility's compliance with its hazardous waste permit

or corrective action order provisions. Non-compliance with FOA provisions can be addressed through the commission's enforcement process. The typical result of the process is a return to a compliant status, although revocation of a FOA authorization is a possible outcome. No change to the rule is necessary to incorporate the recommendation of the commentor. The commission has added the words "hazardous waste" or "corrective action" as modifiers to the word "permit" or "order," respectively, where needed to make the usage of the terms "hazardous waste permit" and "corrective action order" consistent throughout this subchapter.

Also, concerning §350.133(c), EPA Region 6 commented that default to class 2 cleanup criteria for class 1 and 2 groundwater at the termination of the FOA should not be automatic. EPA Region 6 stated that only if criteria for cleaning to class 1 standards can no longer be met, and criteria for making a technical impracticability determination exist, should facilities be allowed to limit cleanups to class 2 standards. These determinations should be made on a case-by-case basis not as a default determination up-front.

The commission points out that the classification of the groundwater is not being changed as a result of this provision, only the response requirements are being changed, and even then it is not a certainty for the person that a class 2 response action will be approved for a class 1 groundwater situation. At the end of the FOA authorization, the person must respond fully to the requirements of this chapter. This means the person must propose in a response action plan subject to commission review and approval any proposed use of controls or other options available for class 2 groundwater under Remedy Standard B. The commission can thus determine the appropriateness of class 2 response objectives in class 1 groundwater on a case-by-case basis as recommended by the commentor. No change to the rule is necessary to implement the commentor's recommendation.

§350.134. Qualifying Criteria.

Concerning §350.134, EPA Region 6 commented that the FOA concept appears to be more applicable for permitted facilities with good compliance histories with the ability and resources to conduct the hydrogeological investigations necessary to determine contaminant migration, and the ability to properly monitor performance of this interim action.

The commission concurs with the commentor's interpretation of the applicability of the FOA concept to certain facilities.

Concerning §350.134(a)(1), ARCADIS Geraghty & Miller, McCulley, Frick, & Gilman, AFCEE, and Weston commented that a large number of manufacturing facilities that are not refineries or chemical plants meet all of the other qualifying criteria to be eligible to use a FOA, and suggested that the FOA concept be applied to other operational facilities and not be limited to chemical and petroleum manufacturing facilities. The commentors stated that there is no scientific or policy justification for the exclusion of other facilities, and requested the rationale for doing so. The commentors went on to state that such an arbitrary exclusion could cause the entire FOA Subchapter to be nullified if challenged. Therefore, they suggest that only this criterion be omitted from this Subchapter.

The commission has retained this provision as proposed. The basis for limiting applicability of this subchapter to the chemical manufacturing and petroleum refining facilities, as determined by North American Industrial Classification System Code Numbers 325 and 324, respectively, is a policy decision founded on several premises.

These two major classes of industries account for a significant percentage of facilities with hazardous waste permits that are required to conduct corrective action for releases from SWMUs. In general, these facilities tend to occupy large tracts of land with extensive infrastructure for product manufacturing, storing and transport, as well as waste treatment and disposal. Historical product

management and waste disposal practices have contributed to extensive contamination and a large number of SWMUs at such facilities. Commingled releases from multiple sources can be more efficiently addressed on an area-wide basis than on a SWMU-by-SWMU basis. In dealing with large volumes of liquids, the potential is great that additional releases could occur by the very nature of these businesses, thus potentially retarding progress or negating effects of cleanup efforts. These types of properties tend to remain in industrial use and are not likely to be quickly transformed to some other land use. Internal brownfields, tracts of land once used for process areas but which are now dormant, could be returned to active use for new or expanded processes, rather than encroaching on greenfields. The long-term nature of the manufacturing activities and the associated durations of permits for active waste management, corrective action and post-closure care make these industries more suitable than others for the final remedy deferral and exposure prevention aspects of the FOA concept.

The commission notes that other options are available in this rule and program guidance for facilities to utilize to address multiple releases in ways that are similar to some aspects of the FOA concept (e.g., commingled plumes, area of contamination concept) but without the additional obligations of this subchapter. For example, persons can utilize options identified in EPA's recent compilation of guidance entitled "Management of Remediation Waste Under RCRA" (EPA 530-F-98-026, October 1998) for this purpose.

Concerning §350.134(a)(2), Groundwater Services stated that for a site with no historical compliance issues or permit, it is unclear how FOA could be implemented in the absence of an existing order or permit. The commentor further asked if the commission will issue an order to accommodate a FOA.

The commentor questioned whether the commission can issue an order for a facility that can satisfy the qualifying criteria for a FOA but does not have an existing order or permit. The commission notes that §350.135(a) allows a person to submit an application for a FOA during the preparation of a corrective action order. The commission has revised §350.134(a)(2) to more clearly indicate that a person without an existing order can satisfy this qualifying criterion for a FOA by requesting a corrective action order. This change will also conform more closely with the commission's intent as stated in revised §350.135(a). The commission has also revised this paragraph to clarify its intent for restricting the FOA option to a specific group of facilities that are subject to a hazardous waste permit or corrective action order as of the effective date of this rule. Such documents have not been issued yet to all possible candidate facilities. The facilities with issued permits have generally been implementing the corrective action requirements for a decade and are more likely to have the types of conditions and information needed to carry out a FOA. Facilities that otherwise meet the qualifying criteria of this subchapter save for having a permit are now directed to request a corrective action order.

Also with regard to §350.134(a)(2), Weston recommended adding "or be entered into the Voluntary Cleanup Program."

Chevron made a similar comment in reference to §350.131. Please refer to the commission's response to that comment.

Concerning §350.134(a)(4), Chevron, TCC, and TXOGA noted that OSHA does not certify or audit facility health and safety programs, and suggested replacing the requirement for OSHA certification with language about OSHA compliance history and inspection frequency.

The commission has verified with the Occupational Safety and Health Administration (OSHA) that it does not certify such documents. OSHA does perform audits but not on a regular frequency. An extensive on-site evaluation is performed as part of the review of a facility's application for

recognition in the Voluntary Protection Program. Upon acceptance into this program at one of its different levels, the highest of which is the OSHA Star rating, the facility can receive an audit on a three year cycle to verify that the program is still in place. The commission will view acceptance into the Voluntary Protection Program as a way to satisfy this qualifying criterion for FOA authorization. Consequently, the commission agrees with the commentors' recommendation to revise the rule and has done so by requiring facilities to be able to document that their health and safety plans meet or exceed OSHA requirements. This can be accomplished by either providing the results of its OSHA compliance and inspection history or results of an evaluation by a third party certified industrial hygienist and safety specialist.

Concerning §350.134(a)(5), KOCH and McCulley, Frick, & Gilman commented that there is no direct relationship between lost workday injury case rates or injury incidence rates and a successful FOA. McCulley, Frick, & Gilman suggested that this qualifying criterion seems irrelevant to protecting workers from environmental media and would potentially rule out FOAs at many otherwise qualified facilities. Both commentors recommended removing the qualifying criterion from the rules.

The commission disagrees with the commentors' recommendation and retains these items as relevant criteria for evaluating a facility's qualifications for FOA authorization. As stated in the preamble for the March 26, 1999 proposal, the commission has specified qualifying criteria to define the universe of facilities for which the FOA option is available and to demonstrate their performance in the area of health and safety protection for workers. This type of information is relevant to the commission's evaluation of a facility's diligence towards protection of human health and the environment. A facility can explain, as part of its application, any short-term deviation from its long-term trend in these criteria.

Concerning §350.134(a)(6), TCC, TXOGA, and Chevron commented that OSHA does not certify or audit facility health and safety programs, and recommended replacing the certification requirement with language about OSHA compliance history and inspection frequency.

The commentors made the same recommendation for this provision as they did for §350.134(a)(4), namely that the OSHA does not certify or audit facility health and safety programs. Although the commission partly agrees with this observation, as described above, the commission does not agree with the recommendation to change the rule because an OSHA certification is not being required and two options are provided for the performance of audits, either by OSHA or by a third party certified industrial hygienist and safety specialist.

§350.135. Application Requirements.

Concerning §350.135(a)(1), EPA Region 6 commented that the FOA be restricted to a contiguous footprint within operational boundaries within a single facility boundary not inclusive of waterways, highways, or undeveloped property. EPA Region 6 also commented that the TRRP and Subchapter G should insure that a receptor at the edge of the FOA is protected.

The commission agrees in part with the commentor's recommendation. The FOA definition, found in §350.4(a)(34), does restrict the FOA within a single facility property boundary. Undeveloped property, particularly large tracts, would be excluded if such land is not a part of the manufacturing infrastructure. Relatively smaller tracts within the process areas need not be excluded if the FOA interim or final remedies would be less effective or less practical as a result of exclusion. The requirement in §350.132(a) to respond to new releases is intended to protect these interior tracts from additional degradation. Similarly, highways (particularly if overlying subsurface releases) and waterways will require a case-specific evaluation regarding exclusion from the FOA. The commission agrees with the commentor that the rule should insure protection of a receptor at the edge of a FOA.

The commission notes that three provisions of this subchapter accomplish this and that no change to the rule is necessary. First, §350.132(a) sets the performance standard for the FOA to be protective of human health and the environment within and at the boundary of the FOA. Second, §350.132(b) requires full compliance with this chapter for response to affected property outside the FOA. In the event the FOA boundary coincides with the facility property boundary, the point of exposure at the FOA boundary, which is coincident to the nearest off-site property boundary, must be protective for the land use of the neighboring off-site property in accordance with §350.37 regarding human health points of exposure. Third, provision is made for protection of ecological receptors in §350.135(a)(6).

Concerning §350.135(a)(2), Groundwater Services commented that the basis for requiring investigation of the entire FOA is unclear, and noted that the extent of releases from SWMUs and permitted hazardous waste management units must be investigated as required by permit. Hazardous substance releases are also reported and addressed. Therefore, Groundwater Services argued that the benefit of additional investigation and the TNRCC authority to request such an investigation is unclear, and requested that the commission clarify the scope of FOA investigation.

The commission points out that participation in the FOA is a voluntary option, and as such the commission has broad discretion in setting reasonable criteria for its utilization. Given that the FOA is focused on the management of the released COCs on a site-wide scale, the commission is within its jurisdiction to require data of site-wide scale upon which to base site-wide decisions. The commission utilizes the same authority to require investigations within the FOA as it does for releases at individual SWMUs, specifically §3004(u) and §3004(v) of the RCRA. The area affected by any release at facilities subject to these provisions can be designated as a SWMU and hence be entered into the corrective action process. The commission expects that facilities will have to gather additional information to adequately characterize the FOA in the manner specified in this paragraph. The objective of the investigation is to bring together sufficient and appropriate information to reliably predict and hence control, if needed, the long-term movement of COCs, both horizontally and vertically, toward the FOA boundaries. Facilities that have already conducted investigations at individual release sites can and should utilize the results in fulfilling this requirement. Such information would have to be integrated into a FOA-wide hydrogeologic setting. Additional investigation would be needed in areas of the FOA lacking sufficient data to design and monitor a FOA-wide interim or final response action.

Also, with regard to §350.135(a)(2), EPA Region 6 commented that the operations area should be adequately investigated and evaluated in regard to the location and extent of primary source areas prior to the application of the FOA concept since determination of future transport requires knowledge of the nature of the contaminants and their location.

The commission agrees in part with this recommendation. The commission anticipates that for the types of facilities likely to receive a FOA authorization, many primary source areas such as SWMUs will have been identified and investigated to some extent via the RCRA corrective action process of the hazardous waste permit. Approval of the FOA does not relieve any requirements under RCRA to identify SWMUs. Consistent with §350.2(a), this rule sets up response action objectives and management options for releases identified through program areas. The proper vehicle for requiring the identification of SWMUs is under the RCRA regulations. In addition, the performance language of this provision is sufficient to meet the objectives of an investigation of a FOA and does not need revision.

Concerning §350.135(a)(3), Dow, TCC, and TXOGA commented that this section states that "there are no required points of exposure for groundwater ingestion within the FOA boundary unless water wells with potential for use are located within the FOA." In the preamble, the commentors noted that TNRCC also states "there will not be any points of exposure for groundwater within the Facility Operations Area, unless

there are actual water wells with the potential for use (e.g., have not been plugged and abandoned or securely taken out of service)." The commentors requested that TNRCC clarify this explanation to ensure water wells that are cased in the FOA boundary but are producing water from formations below the vertical FOA boundary are not considered required points of exposure.

The commission agrees with the commentors in that water wells with potential for use within the FOA lateral boundaries but that extract groundwater from zones beneath the vertical FOA boundary are not "within" the FOA. However, because these wells pass through the FOA, the potential exists for them to function as a migration pathway for COCs if not appropriately constructed. The commission will initially consider such wells to be points of exposure unless the facility demonstrates that methods of well construction are adequate to preclude migration of COCs into the well intake. Factors the commission may consider in designating such wells as points of exposure include a well bore that is in contact with groundwater bearing units within the FOA vertical boundary, such that COCs could migrate into the well intake via an uncased interval, a leaking casing, or an incompletely sealed casing-borehole annulus. Another demonstration of well construction integrity is an analysis for COCs in water from the producing well. This test is especially appropriate for wells in actual use.

Additionally, with regard to §350.135(a)(3), EPA Region 6 commented that the statement that there are no required points of exposure for groundwater ingestion within a FOA boundary should include an exception for cases where a facility may have a public water supply well on-site which can be used by employees or cafeteria facilities.

The commission agrees with the commentor that water wells within the FOA that can be used by employees or cafeteria workers should be designated as points of exposure. The commission believes this rule provision is sufficiently broad to encompass this recommendation and does not need an exception added to cover these examples of use.

Concerning §350.135(a)(4), EPA Region 6 recommended that the FOA concept not rely on OSHA requirements for the protection of long-term industrial worker exposures since they generally represent acute measures. EPA Region 6 further commented that OSHA or equivalent compliance also does not consider ecological protection. OSHA status should not be a main consideration for designating a FOA other than to help gauge the compliance record of a facility.

The commission disagrees that OSHA requirements are limited to acute measures. In fact, OSHA requirements address both acute and chronic exposures. In addition, the commission disagrees with the comment that OSHA status should not be a main consideration for designating a FOA. One basis for developing COC concentrations protective for chronic exposure is the assumption of random access across the affected property without knowledge of the conditions and without reliance on barriers or behavior modification to prevent exposure. These assumptions will not apply within the FOA because workers' knowledge of the conditions, via procedures of the health and safety plan or other policies and practices, can be used to prevent random access to elevated COCs within the FOA. When used in conjunction with access restrictions, not just at the facility entrance but also within the FOA, the health and safety plan will adequately protect workers from exposure. The commentor also stated that OSHA or equivalent compliance does not consider ecological protection. The commission has addressed requirements for ecological protection in §350.135(a)(6).

Concerning §350.135(a)(4), PIC opposed any attempt to modify applicable protective concentration levels within a FOA based merely on the fact that the facility has a worker health and safety program. The safety of workers at these facilities should be given as much consideration as the safety of other members of the public when protective concentration levels are determined for "non-FOA" properties throughout Texas. Workers should not be subjected to additional risk simply because of their employment at a facility which opts to pursue an interim response action under Subchapter G. The existence of a worker health and safety

program is a not a satisfactory substitute for the assurance provided by the more precise science which supports the concentration level determination methodologies otherwise applicable under the TRRP. As with possible variances to default exposure factors discussed in comments above, the PIC commented that there are too many variables concerning human activity to have confidence that: 1) restricting access to trained workers will actually be effective in keeping untrained persons out of the FOA; or 2) workers who have completed a safety training course have actually mastered additional skills in risk avoidance to such a degree that it is acceptable to expose them to a higher level of risk than the rest of the public.

The commission disagrees with the commentor's summation that PCLs can be modified within a FOA merely because a facility has a worker health and safety program. The qualifying criteria and application criteria should be viewed in the total context of this subchapter. As stated in §350.132(c), the person must comply with all other applicable requirements of this chapter unless explicitly exempted from doing so under Subchapter G. The person must request to modify PCLs, and any other aspect of this chapter, and make a convincing demonstration in the application that the proposed modifications will satisfy requirements. To address the commentor's concerns that workers within a FOA should be given as much consideration as the safety of others in non-FOA areas, and that they should not be subjected to additional risk, the commission has revised this provision to limit the levels derived from the health and safety plan. Regarding soil PCLs specifically, this paragraph calls for action levels developed for the worker health and safety program and a description of facility access restrictions to control exposure. This information is used in conjunction with §350.135(a)(5) to develop procedures for response actions for soil that will achieve protection of human health when COCs in excess of levels acceptable under the worker health and safety program are encountered. The facility may use PCLs developed in conformance with Subchapter D or other values proposed as a modification. It is important to note that PCLs for non-FOA areas presume random exposure and uncontrolled access. Levels developed for the FOA can take controlled access and non-random exposure into account; therefore, higher concentrations can still be acceptable, as discussed above. However, to put a ceiling on these action levels, the commission will limit these levels such that personal protection equipment will not be necessary for workers to gain routine access to perform their normal job functions.

Also, with regard to §350.135(a)(5), the PIC commented that it believes that as part of the required institutional controls necessary to ensure the protection of human health and minimize exposure to contaminants, no excavation or construction should be allowed in any area designated as a FOA.

The commission disagrees with the commentor's recommendation to prohibit excavation or construction in any area designated as a FOA. Such a rule change would impede commerce in the state and could render FOAs into brownfields. The commission believes that the change made to §350.135(a)(4) will also serve to address the commentor's concerns for worker health and safety within the FOA.

Concerning §350.135(a)(7), Groundwater Services commented that the requirement to restore the site to pre-release conditions for spills occurring after the effective date of FOA is overly burdensome. Groundwater Services noted that the preamble to the proposed rule states that new releases are to be managed per 30 TAC Chapter 327, which requires TRRP management if not remediated in 180 days; however, rule language in §350.135(a)(7) specifies total removal. Groundwater Services stated that this requirement is comparable to the current Risk Reduction Standard 1, which was to be abolished under this new rule, and asserted that cleaning to background in a defined area of intense industrial use provides no risk management benefit. Groundwater Services recommended revising the provision to require remediation of new releases per requirements of 30 TAC Chapter 327.

The commission disagrees with the commentor's recommendation of revising the rule to require remediation of new releases per the requirements of 30 TAC Chapter 327. The commentor equated

this provision (to restore the impacted environmental media to pre-release conditions) to a cleanup to background under the TRRP Rule of 30 TAC Chapter 335. Risk Reduction Standard 1 of those rules does not allow COCs released from waste management or industrial activities to be factored into background. The commentor's interpretation is not correct in situations when a new release occurs in an area within the FOA that already contains COCs from previous releases. The objective of this provision is to prevent an increase of COC concentrations within the area of the new release above those that already exist, and to require facilities to maintain diligence in preventing releases and responding quickly should they occur. This approach is consistent with the intent of the statutes governing emergency response actions. The commentor is also incorrect in their interpretation of the preamble to the March 26, 1999 proposal (24 TexReg 2237) by misstating the manner in which Chapter 327 would apply to all new releases in the FOA. The commission clarifies that new releases occurring in unimpacted areas (i.e., no previous release or "historical" concentrations of COCs) of the FOA must be remediated to background, which is the pre-release condition, or failing that, to Remedy Standard A or B, as the rules in Chapter 327 would normally allow.

Concerning §350.135(a)(8), EPA Region 6 commented that the FOA concept should be coupled with active contaminant plume management, including potential source area investigation and source removal, in order to prevent future plume growth outside the FOA and aid in adequate plume management. Contingencies for the event that controls are unable to effectively protect human health and the environment should also be required.

The commission agrees in part with the commentor's recommendation regarding active COC plume management. It is appropriate and required by this provision for the facility to do this to attain or maintain performance objectives at the points of exposure. This provision, however, does not require active plume management in all cases. The commission agrees that it is prudent for facilities to perform active plume management to achieve full and timely compliance with this chapter upon the termination of the FOA. The commission agrees with the recommendation for contingency plans in the event the FOA controls fail to protect human health and the environment and has revised the rule accordingly. Also, the commission has revised this paragraph to conform with changes made to §350.132(a). To ensure that initiation of all corrective action is not deferred until the termination of the FOA, the commission is requiring a prioritization plan for phased corrective action. The facility will detail its intentions for prioritization and time frames for initiating corrective action within the FOA so as to minimize the deferral of all final response actions to the end of the FOA.

Concerning §350.135(a)(9), EPA Region 6 recommended requiring treatment for areas where principal threat wastes are present (i.e., hot spots), unless treatment is found to be technically impracticable. EPA Region 6 also commented that, generally, most NAPLs would be considered principal threat wastes.

The commission disagrees with the commentor's blanket assertion that treatment should be required for any areas where principal threat wastes are present (i.e., hot spots), unless treatment is found to be technically impracticable. Removal of principal threat wastes does not have as much immediacy within a FOA as it might elsewhere because of the exposure prevention, deferral of final remedy or phased corrective action, and point of exposure at the boundary aspects of the FOA concept. The commission described its expectations for non-aqueous phase liquids (NAPLs) in the preamble to the March 26, 1999 proposal and reiterates here that some amount of source removal may be necessary before control measures alone will be considered sufficient for a FOA interim response action. At the termination of the FOA, the EPA policy will become more relevant when the facility must achieve full compliance with this chapter. The commission also interprets the commentor's use of the term "treatment" to allow for both removal and decontamination techniques. The commission recognizes the commentor's concerns about addressing NAPLs and has revised the rule to indicate under what conditions NAPL should be addressed within a FOA.

Concerning §350.135(a)(10)(B), ARCADIS Geraghty & Miller commented that it understands the desire of the TNRCC to set a high bar for entry into a FOA. However, financial assurance for the closure of the entire facility after operations cease would exclude all but a handful of facilities and perhaps cause the rest to accrue unreasonable economic liabilities due to required accounting procedures. ARCADIS Geraghty & Miller suggested that a comparable financial assurance mechanism can be created for post-closure care of the FOA based on a summation of the cost for post-closure care for each SWMU.

While recognizing the inherent financial risk to facilities that choose to defer their final response actions to the end of the FOA authorization, the commentor has suggested that a comparable financial assurance mechanism can be created for post-closure care of the FOA based on a summation of the cost for post-closure care for each SWMU. The commission does not find it necessary to revise the rule, particularly in Subchapter G, because "post-closure care" would commence after termination of the FOA and completion of any final remedies under Subchapter B. At that point, any post-response action care would not be regulated by Subchapter G but rather by the other subchapters of this chapter. Financial assurance would be required for any post-response action care for physical controls as part of a Remedy Standard B approach in accordance with §350.33(l), (m) or (n), as applicable. Although it is possible that the amount of financial assurance for physical controls of a former FOA could be less than the amount calculated as proposed by the commentor, a facility may have to assure for that amount if any federal requirements for financial assurance still apply at that time, such as for post-closure care of regulated units, groundwater compliance plan requirements, or SWMU corrective action.

Concerning §350.135(a)(11), the rule has been amended to conform with the expanded definition of institutional control.

Concerning §350.135(a)(12), the commission has amended this paragraph to clarify its intent for schedules of compliance for items not completed at the time of FOA authorization to be included in a modification to a hazardous waste permit or a corrective action order. Either of these documents will provide the initial authorization of the FOA. Since the FOA is limited to facilities with an existing hazardous waste permit, that permit must be modified as directed by §350.135(b). The word "amendment" was struck from this provision to conform with the usage of "modification" in §350.135(b).

Concerning §350.135(b), PIC requested clarification regarding the requirements of this subsection. The preamble states that applications for FOA authorization will be considered a "class 3 permit amendment." The Chapter 305 rules provide for major and minor amendments and for class 1, 2 and 3 modifications. The PIC assumes that the commission intends for FOA applications to be processed as class 3 modifications. This is the classification favored by the PIC because it provides for the greatest level of public participation. While the preamble addresses that the application should be processed as a permit modification, the PIC recommends revising the text of the rule to state that such an application will be processed as class 3 modification. A corresponding revision to Appendix I to 30 TAC, Chapter 305, Subchapter D would also be necessary to reflect that requests for these authorizations should be classified and processed as a class 3 modification under 30 TAC §305.69.

The commentor correctly pointed out that the rule was not as specific as the preamble regarding the method of authorization of an application for a FOA. The commission has revised the rule in this subsection and subsection (a) of this section for consistency to require processing of the application as a class 3 modification under 30 TAC §305.69. The commission has deleted the option of submission of a FOA proposal as a permit application, meaning a first-time hazardous waste permit application, to conform to the approach taken in §350.134(a)(2). Regarding the recommendation to make a conforming change to Appendix I to Subchapter D of Chapter 305, the commission will have to perform this change if needed as a part of a separate rule making. The commission has added the

words "hazardous waste" or "corrective action" as modifiers to the word "permit" or "order," respectively, where needed to make the usage of the terms "hazardous waste permit" and "corrective action order" consistent in these subsections.

Concerning §350.135(c), the commission has added the words "hazardous waste" or "corrective action" as modifiers to the word "permit" or "order," respectively, where needed to make the usage of the terms "hazardous waste permit" and "corrective action order" consistent in these subsections. The word "modification" was added to this subsection to conform with the usage of "modification" in §350.135(b).

GENERAL

EPA Region 6 commented that the TRRP proposed rule and Subchapter G can be characterized to be a risk-based approach with major emphasis on exposure prevention. Although exposure prevention can be utilized as an initial step in a phased approach in order to contain contamination plumes, it should not be considered the sole remedy to address impacted environmental media. The TRRP should require an integrated long-term contaminant monitoring strategy for soil and ground water that includes exposure prevention together with: investigation of suspected releases; removal of sources of contamination; principal threat wastes especially nonaqueous phased liquids; and removal/remediation of high concentrations of dissolved phase contaminants. The Point of Compliance for the purposes of contaminant plume containment and remediation should be addressed at the facility boundary or at the edge of the current plume, whichever is less, unless it proves to be technically impracticable through a Technically Impracticable decision. Furthermore, remedies relying solely on institutional or physical controls should only be utilized when it has been determined to be technically impracticable to accomplish removal or remediation of sources and wastes. As stated in EPA's April 21, 1999, Office of Solid Waste Directive Number 9200.4-17P, titled: Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, "EPA remains fully committed to its goals of protecting human health and the environment by remediating contaminated soils, restoring contaminated groundwaters to their beneficial uses, preventing migration of contaminant plumes, and protecting groundwaters and other environmental resources."

Concerning general accountability, Henry, Lowerre, Johnson & Frederick commented that with the complexity and the enforceability problems of the proposed TRRP, Texas will lose accountability. The ability of the public, local governments, other state and federal agencies and the legislature to monitor and evaluate the effectiveness and adequacy of the program will be reduced significantly under the proposed TRRP. Complaints by the public that the person doing the cleanup is not protecting the community will go unresolved, since even TNRCC will not be able to evaluate the cleanup in terms of clear standards of practice. There will be no way to hold those using the self implementing steps accountable for their actions. TNRCC has not even explained how it would enforce these rules with its limited resources.

The commission has just spent a four year process which involved two conceptual documents and significant interaction with stakeholders in developing and promulgating the TRRP rule. The commission has used its best professional, scientific, and societal judgments in adopting this rule. This rule is protective of human health and the environment. One of the most difficult and troublesome tasks faced was trying to strike an appropriate balance between requiring pollution cleanup response actions and allowing engineering controls, institutional controls and financial assurance to prevent the exposure of humans and ecological receptors to unprotective levels of COCs. This is discussed in greater detail in the preamble section on §350.33(a) and (b). Further insights into the rule's balance between a "pollution cleanup" and an "exposure prevention" approach is presented in the discussion of soil source area response objectives also contained in the section on §350.33(a),(b). This section also explains in detail plume management zones, particularly with regard to class 2 groundwater. With regard to Region 6's initial comment, they are mistaken. TRRP cannot

be fairly characterized as placing a "major emphasis on exposure prevention." Exposure prevention is one aspect of this balanced rule we are adopting today, but it does not have the "major emphasis."

In response to the accountability concerns, the rule contains substantial accountability provisions and actually increases accountability over the existing regulations. The commission acknowledges that the rule increases reliance on exposure prevention remedies. However, the rule also implements new up-front notification provisions intended to inform all parties who may be potentially affected by releases. Such provisions will allow such potentially affected parties to be vigilant in protecting their interests. Additionally, the rule contains provisions that compel the person to notify parties who are potentially exposed to the released COCs in excess of Tier 1 human health PCLs, and to also notify the executive director of the exposure situation. The rule contains routine reporting of response action effectiveness and post-response action care. The rule compels timely filing of institutional controls where such controls are part of the remedy, and also compels financial assurance for physical controls so that provisions are in place to maintain the effectiveness of physical controls. The rule is constructed in terms of protective concentration levels instead of risk levels. Protective concentration levels are measurable and can be directly applied to affected properties in a straight forward manner to determine the protectiveness of a site. Finally, the remedy standards set forth clear and comprehensive criteria that must be met to demonstrate an affected property is protective of human health and the environment. For all of these reasons, the rule has sufficient accountability factored in.

With regards to general baseline risk assessment, EPA Region 6 commented that the lack of an explicit requirement to conduct a baseline risk assessment is regulatorially inconsistent with EPA approaches.

The commission acknowledges that the lack of a requirement for a baseline risk assessment is different from the traditional EPA approach. However, the baseline risk assessment is an unnecessary step in the risk assessment process, as the calculation of the RBELs and PCLs, and subsequent comparison of site data to these concentrations, accomplish this same goal. The process described in the proposed rule includes the four steps in a baseline risk assessment procedure (i.e., data collection and analysis, exposure assessment, toxicity assessment, and risk characterization), although the additional time and cost of producing a baseline risk assessment report has been obviated.

Concerning Brownfields, Henry, Lowerre, Johnson & Frederick commented that the TRRP, which allows polluters to basically fence and walk away from contaminated sites if no further land use is proposed will create, not prevent, additional Brownfields sites.

Contrary to the concerns of the commentor, the rule is designed to restore land to active and productive use. In fact, the rule includes a tightly controlled variance approval process to better ensure that such remedies are accepted only in a very deliberate manner after factoring in public input and implications for other properties and general protectiveness. During the development of this rule, a Remedy Standard C "no future land use" remedy which was a certain "fence it and walk away" type remedy was issued for public comment in 1996. The Remedy Standard C concept received such criticism by all sides of the issue that the commission dropped it. The rule does not embrace or otherwise readily approve of such remedies.

With regards to general complexity, McCulley Frick & Gilman commented that the proposed rule may be nearly impossible to effectively and efficiently implement at many sites. In addition, they are disturbed by the lack of rationale and documentation for policy decisions. The impact of such decisions can be immense, but without rationale, they cannot support the decisions made as part of the rule. It is their opinion that the December 1996 version of the Concept Document was much better documented, policy

decisions were justified and explained better, and the requirements and technical approach were much easier to read and follow than the proposed rule.

To limit the size and complexity of the rule, the commission did not provide the references and justification used in deriving the exposure factor assumptions. It should also be noted that much of the supporting documentation had been provided in the December 16, 1996, Concept Document. The commission will consider issuing a new technical background document at a later date.

Concerning general complexity, Environmental Resources Management commented that the proposed rule will require excessive time to understand and implement due to the prescriptive details involved. Additional time and budget will be required for meetings, calls, correspondence with TNRCC, response to NODs brought about by misinterpretations of the prescriptive requirements of the rule. Environmental Resources Management also suggested that the rule needs a good index to search for particular topics, simplify terminology and improve consistency throughout, and to leave out the prescriptive details.

Groundwater Services, Inc., commented that the re-proposed TRRP rules are shorter in length and less prescriptive than the draft rules previously proposed on May 15, 1998. Details have been removed for incorporation into guidance.

Henry, Lowerre, Johnson & Frederick commented that the TRRP conflicts with the goal of simplifying the rules. Simplifying and clarifying the commission's current environmental assessment and remediation programs is one of the primary justifications given in the preamble of the commission's recently proposed risk reduction rules for pursuing this comprehensive revision to the State of Texas' environmental cleanup regulations. As the public benefit portion of the preamble states, "a more general savings... is anticipated to result from the overall clarification and simplification of the regulations governing cleanup standards." Assuming that no irony is intended, it is difficult to understand how this convoluted and complex proposal either simplifies the implementation of or clarifies the relationship among the commission's current environmental cleanup (remediation) programs. As a result, the proposed TRRP cannot and will not be easily or consistently interpreted. At a minimum, the rules need to be revised to be written in plain English.

The TNRCC should revise the TRRP to assure similar or more consistent cleanups. A stated goal of the draft rule is to provide a simpler, more open process that will allow faster and more consistent cleanups. It is readily evident that the draft rule is instead much more complex than the existing rule and just as susceptible to delays and negotiation. One obvious example is applicability of the Texas regulatory flexibility law. The TRRP should provide that anyone who takes advantage of the TRRP may not also seek to use that law. If that is not done, even the 1 in 100,000 (1×10^{-5}) standard for cancer risks will be negotiable. Since it will only be the industry negotiating, all changes will be for a lowering of the standard.

Henry, Lowerre, Johnson & Frederick also commented that the TRRP should not apply to any sites on the federal or state superfund lists for which a RI/FS is in progress or remediation has begun.

Henry, Lowerre, Johnson & Frederick stated that by setting the risk at 1 death from cancer in 100,000 and defining other standards, the negotiations between TNRCC and responsible parties over clean-ups will not necessarily move more quickly, and the resulting remediation will not occur more quickly and be more consistent. With everything still subject to negotiations, without incentives to move quickly, TRRP will not improve the process. The proposed TRRP still has many areas for extended negotiations. Most TNRCC negotiations take a long time, not because of the issues but because the responsible party will want to drag out the negotiations and clean-up to delay or extend the time over which the clean-up costs are spread. There is no incentive in the TRRP to encourage responsible parties to move more quickly. If TNRCC truly wants faster responses to contamination, it needs to put deadlines on negotiations and on remediations. Speed should not, however, be the goal, except where there is an imminent risk. Instead, quality of clean-up, more than the quantity of clean-ups, should be the true test of TNRCC's programs. Adopting the

proposed TRRP would also delay current plans for remediations as responsible parties go back to see if they can get a better deal. Ranger commented that the proposed rules are too complex and confusing. They will add significant and unnecessary economic burdens upon the State of Texas for which there is no cost benefit. Weston commented that the rules are still very complex.

The commission appreciates the recognition by Groundwater Services, Inc., that the complexity of the rule has been reduced from the May 15, 1998 proposal. The commission recognizes that the rule is somewhat complex and lengthy. The rule regulates complex science, engineering, and public policy matters. Ensuring that leaving levels of COCs in the environment in a manner which protects human health and the environment is a complex matter and a serious matter. It is not illogical that a complex rule results from a complex matter. However, the commission has worked extensively to simplify the rule as the commission recognizes the inefficiency of needless complexity. The commission also points out that much of the complexity results from the flexibility included in the rule as well as included detail where such detail is necessary to reinforce certain provisions that are necessary to protect human health and the environment.

The rule will need to be supported with training and guidance to be effectively implemented. The commission is committed to addressing these needs as warranted to support full implementation of the rule.

The comments also question whether the rule will accelerate corrective action as anticipated by the commission. The commission acknowledges that there will be a learning curve, as with any new rule or process. However, past the learning curve, the commission anticipates that corrective action will be accelerated because many critical policy issues have now been comprehensively addressed which adds greater clarity of commission expectations and areas of flexibility. By addressing critical policy issues directly in the rule, even if it results in complexity and length, the rule will be more effectively implemented because many of the hard decisions have been made which are often avoided, indefinitely negotiated or inconsistently applied. Persons will have a clearer understanding of the intended flexibility in the rule and individual site decisions are limited primarily to technical matters which the executive director's staff is most capable of addressing.

The commission acknowledges that areas of negotiation still exist within the rule. The commission also acknowledges that as is the case with any environmental regulation, including the current rules, persons may stall. However, the commission maintains that the rule contains incentives for parties to address environmental contamination in a timely manner. Persons are provided with certain flexibilities and do not have to argue their way to use them. Other areas of the rule are non-negotiable (e.g., risk levels), and therefore negotiations will not be allowed to occur regarding those matters. A greater level of corrective action across the state is what will provide the greatest protection, not an overly thorough treatment of only a few sites. With regard to the Texas regulatory flexibility law, the commission acknowledges that it could be applied across this rule, but the same is true for the existing rule. Therefore, the commission does not see any validity of that issue as a criticism of this rulemaking, as it does not nullify the commission's point that less critical policy issues are up for negotiation when one stays within the rule, relative to the existing 30 TAC Chapter 334 and Chapter 335. The commission does not see that prohibiting use of the Texas regulatory flexibility law when progressing under this rule as a viable option, as persons could still proceed outside of the rule under the law in an attempt to delay progress.

The commission also notes that the rule can be effectively used to address the simplest sites under Tier 1 and Remedy Standard A as well as complex sites under Tiers 2 and 3 and Remedy Standard B. The commission is particularly perplexed by Weston's assertion that persons will no longer be able to readily compare site concentrations to look up tables to quickly determine potential remedial needs. Tier 1 PCLs have been calculated for over 300 COCs. If the site concentrations (considering

cumulative effects) are less than Tier 1, chances are good that no remediation is needed. If Tier 1 is exceeded, then additional evaluation is warranted. The PCL calculation procedures are generally no more complex than those already used by the existing PST program, which regulates some of the smallest businesses and sites in the state. The commission also finds such comments regarding complexity as inconsistent as the commission notes that these same commentors are some of the chief critics of the level of flexibility under Tier 3 and advocate increased flexibility to factor in additional site specificity, including the use of probabilistic methods, which in turn adds greater complexity to the PCL calculation process. However, the commission does accept the fact that the greatest success in use of the rule will result when using the services of well qualified environmental professionals.

The commission also notes that provisions are contained under §350.2(m) which provide persons the clear opportunity to remain under 30 TAC Chapter 335 when certain conditions are met. Based on comments received (see comments related to §350.2(m)) many sites will likely remain under the existing rules because of progress made to comply with those rules, and therefore, the adoption of this rule should not significantly delay corrective action. However, if people do voluntarily choose to come under this rule, it would be because they perceive corrective actions could be conducted in a more expeditious, and therefore, less costly manner. Again, no significant down time should result. Finally, the rule will apply only to PST sites reported on or after September 1, 2003, and therefore should not result in any delay of corrective action at PST contamination sites reported to the agency prior to that date.

Ranger commented that prior to discussing more specific items, Ranger would like to state that these proposed rules should not be adopted. The net result of these rules will be to bankrupt small businesses, increase agency enforcement actions, increase the number of State-Lead and Superfund cleanups, create unnecessary legal complications, costs and lawsuits, and diminish the ability of the regulated community to address and close sites.

The commission is adopting this rule to resolve inequities between current program areas, to increase the focus on long term natural resource management and protection, increase the assurance of future notice, and respond to the legal change resulting from the innocent owner/operator statute. The commission has seriously considered the implications of the adoption of this rule and does not agree with the prophecy of the commentor. The rule provides flexibility that can be used to contain costs. Also, the commission notes that the implementation date of the rule for PST cases has been changed to September 1, 2003. Thus, persons who agree with the commentor's assertion have four years to discover and report releases and take action under the existing PST rule. If the specter of the TRRP rule increases immediate compliance with the existing PST rule, then that is an unanticipated but additional benefit of the rule.

Henry, Lowerre, Johnson & Frederick commented that one major concern with the current version of the proposed rules is the backsliding that has occurred since the version that was published in 1998. Changes since the last version have seriously undercut the efforts by TNRCC staff to protect the public interest and property rights. In fact, if the staff had been given the ability to prepare rules that are balanced, TNRCC's staff would have prepared an appropriate set of rules. Pressure from managers in TNRCC to solve the problems raised by the regulated industries forced the staff to draft rules that are extremely favorable to industry. In fact, it was that favorable response to many of industry's unjustified complaints that has encouraged the industry to push for more changes. Yet, the current rules clearly favor the responsible parties over the innocent property owners whose land is contaminated.

The proposed rules shift the burden of the contamination to innocent property owners and future generations, in order to save money for the parties responsible for the contamination in the first place. TNRCC has abandoned its responsibilities to protect the public health and the environment in favor of protecting the interests of those who have caused the contamination.

The commission and the staff that prepared the rule are confident in the integrity of the rule. Even though some details were removed from the rule, the rule maintained critical performance-based provisions to ensure corrective actions are conducted in an appropriate manner. The areas of detail removed from the rule will ultimately be addressed in guidance in an appropriate manner. The commission maintains that the rule does not compromise protection, but provides certain flexibilities that are intended to provide opportunities for persons to contain costs. Making corrective actions more cost-effective will encourage more cleanups and ultimately provide greater protection to future generations, not less.

Henry, Lowerre, Johnson & Frederick commented that the scientific understanding necessary to assess accurately the human health and ecological risks posed by environmental contaminants is currently and will be for the foreseeable future insufficient for safe use of the assessments proposed under the TRRP. The proposed TRRP incorrectly assumes a much greater state of understanding of these complex issues. Assessments can be done based on the current understanding; however, a conservative approach must be used to compensate for the likely changes in the scientific knowledge regarding risks. The commentor further states that it is true that there have been some advances in risk assessment and contaminant exposure modeling the last few years. Nevertheless, substantial uncertainties remain with these techniques.

Risk assessment is the basis of cleanups under the federal Superfund Program. The science and understanding of risk assessment is more than technically sufficient to justify its use in the area of environmental cleanup. The alternatives are to clean all sites to background; clean sites to an excessive degree of conservatism; or clean sites to arbitrary levels with no understanding of the risk associated with remaining concentrations of COCs. These endpoints will unnecessarily drive up costs and dissuade cleanups from occurring; and/or put the public at unknown risk. This rule requires cleanup levels to be developed within the range of acceptable risk adopted by the EPA and as such is appropriate. In fact, other commentors have criticized the rule, stating that in their opinion it is overly conservative and more stringent than federal requirements.

Ranger commented that in the beginning of the petroleum storage tank (PST) program, it was made clear through federal legislation that PST sites were not to be treated as are industrial RCRA/Superfund sites (such as the exemption of PST waste from hazardous waste requirements). Congress rightly realized that this sector of the economy (i.e. - underground storage tank owners and operators) had specific differences, needs and financial resources than the industrial segment of the economy. Thus, practical and economic concessions were made. Ranger does not believe it is appropriate for the TNRCC to require that PST sites be treated as RCRA/Superfund sites, as the proposed rules certainly have been created in the likeness of RCRA/Superfund requirements.

The commission acknowledges that the RCRA, Superfund and PST programs developed from different concerns and issues. However, the commission does not accept that the PST program is somehow a program of lesser concern and therefore should have lesser environmental comprehensiveness as seems to be suggested by the commentor. Congress has required up front financial assurance for corrective action for PST sites. This suggests substantial concerns that may result from such types of sites. Rather, specifically with regard to corrective action, the main difference between the RCRA, Superfund and PST program has been primarily of an artificial nature, reflecting different levels of regulatory oversight/process and differential degrees of philosophical conservatism. Therefore, the commission disagrees that the shifts in the PST corrective action program make it RCRA/Superfund like, as the level of associated regulatory oversight/process has decreased in those programs as a result of this rulemaking. The rule impacts the PST program as a consequence of re-focusing all program areas to an equitable balance of human health and environmental protection.

Ranger commented that they find it perplexing why the TNRCC has proposed to make it drastically more expensive to investigate and close sites when there is no threat to human health and the environment due to the current risk-based closure requirements. It is even more perplexing that the TNRCC would propose these rules for usage at PST and other hydrocarbon release sites on the heels of the publication of the 1997 Bureau of Economic Geology, Geologic Circular 97-1 (which was financed through grants from the EPA and the TNRCC). This publication documents that most hydrocarbon plumes are limited in extent, appear to be stabilized, and can be expected to attenuate naturally with time. The report further states that because hydrocarbon plumes attenuate naturally, active remediation is generally only necessary in special cases. In summary, Ranger does not believe there is any reasonable justification to warrant this tremendous increase in expenses to investigate and close sites.

The commission is adopting this rule to resolve inequities between current program areas, to increase the focus on long term natural resource management and protection, increase the assurance of future notice, and respond to the legal change resulting from the innocent owner/operator statute. The commission agrees that monitored natural attenuation may be a sufficient remedial alternative for benzene, toluene, ethylbenzene, and xylenes (BTEX). The commission specifically discusses monitored natural attenuation in §350.32(b)(3) and §350.33(b)(2) as a potentially acceptable remedy. Monitored natural attenuation can be used when appropriate for all three classes of groundwater. Further, the susceptibility of the BTEX compounds to natural attenuation makes them good candidates for plume management zones. The rule contains alternatives by which persons can contain costs.

EPA Region 6 commented that in situations such as the Base Realignment and Closure (BRAC) program, following the process described by the draft rule may result in the EPA not concurring on the transfer of federal property. Provisions in the rule such as the ones for: 1) no requirement to combine exposure pathways, 2) potential risk levels used to calculate PCLs, 3) lack of use of the route-to-route extrapolation, 4) modifying factor for arsenic, 5) soil lead PCL for residential land use, 6) total petroleum hydrocarbon evaluation procedures, and 7) issues with the Ecological Exclusion Criteria Checklist, may underestimate the potential risk and yield underprotective cleanup levels.

The commission has provided responses to each of the specific concerns (1) - (4) raised by EPA Region 6 in the following sections of the preamble: no requirement to combine exposure pathways (§350.71(j)); risk levels used to calculate PCLs (§350.72 and §350.72(b)(5)); lack of use of route-to-route-extrapolation for determining toxicity factors (§350.73(b)); residential soil PCL for lead (§350.76(c)); total petroleum hydrocarbon evaluation procedures (§350.76(g)); and issues regarding the Ecological Exclusion Criteria checklist (§350.77). However, a few brief comments are offered here.

The rule is fully protective of human health and the environment when correctly applied. The rule does combine exposure pathways when it is appropriate to combine them. The rule combines human health surface soil exposure pathways and combines exposure pathways across media when warranted on a site-specific basis as provided by §350.71(j). The commission notes that the EPA Soil Screening Guidance does not standardize the combination of exposure pathways to the extent this rule does and as such has resulted in some criticisms from the regulated community that the rule exceeds federal requirements/practices. Therefore, the commission is perplexed by this comment. The risk levels are clearly within the EPA risk range and is consistent with actual EPA practices.

With regard to total petroleum hydrocarbons, the use of total petroleum hydrocarbon analysis is not a substitute for analysis of individual COCs. Therefore, there is no basis for concern regarding the use of total petroleum hydrocarbons as it is only appropriate to address an otherwise unresolved mass of hydrocarbons where decisions based solely on individual COCs may not be adequate for site-specific reasons.

The commission disagrees that use of the Exclusion Criteria Checklist will have any such effect. The checklist will only screen out those sites that do not represent ecological threats so that limited resources can be brought to bear on those sites with ecological concerns.

Environmental Resources Management commented that, as proposed, Tier 1 lacks the flexibility of Standard 1 in defining "background," and of Standard 2 in allowing: 1) a revised cleanup standard based on the latest data, 2) a rigorous statistical analysis of site data to demonstrate that the average concentrations at a site meet cleanup standards, and 3) alternative methods for defining ground water protection standards based on site-specific data and information. The added costs and regulatory burden of proposed Tiers 2 and 3, especially the unnecessary public notice requirements when there is no threat to offsite properties, are a major impediment to encouraging voluntary cleanups.

The commission disagrees with the commentor. Background may be defined under Tier 1, 2, or 3. Sections 350.51(l), 71(k)(4), 78(c), and 79 all recognize the applicability of background determinations as limits to actions and therefore the commission does not understand the basis of any such claims. In fact, the commission proposed Texas median-background assumptions for metals under §350.51(m) that persons could use in lieu of site-specific determinations where it is beneficial to do so to make it easier to evaluate implications regarding background. However, persons have absolute latitude to establish background on a more site-specific basis in lieu of using the Texas median background levels.

The rule also allows persons to use the latest data. For example under Tiers 1, 2 and 3, the latest toxicity values are to be used, regardless of whether they adjust up or down. Additionally, the rule allows site-specific flexibility under Tiers 2 and 3 to modify affected property parameters and those exposure factors which are subject to changes as a result of site-specific activity patterns. The commission does acknowledge that the rule is not "wide open" with regard to some risk assessment aspects and has provided exhaustive reasoning for all limitations in responses to comments received for Subchapter D regarding Tier 3 flexibility and probabilistic risk assessment. The rule allows full use of statistics when appropriately applied under Tiers 1, 2, and 3 and rightly specifies limits on use of statistics in certain situations where there are particular concerns regarding the nature of how exposure occurs (e.g., groundwater ingestion).

With regard to groundwater, the commission has made certain policy decisions based on both human health protection and natural resource protection. The commission maintains that sufficient flexibility has been provided for managing groundwater impacts, particularly in consideration of the option to use plume management zones for class 2 and 3 groundwaters. The commission is not aware of any added burden that would dissuade participation in the VCP with regard to Tiers 2 and 3. These matters have been discussed with VCP management and a VCP representative has been integrally involved in the development of the rule. Specifically, based on a conversation with the manager of the VCP section, VCP rarely allows alternatives to the default exposure scenarios. To do so would make the duration of an issued Certificate of Completion dependent on whether or not persons are complying with the specific assumptions. The commission finds this to be an unmanageable situation. Therefore, the Tier 2 or 3 provisions of the rule should not represent any radical shift from current practices in the VCP.

Fulbright & Jaworski commented that without a collaborative approach in drafting the proposed rule, certain technical insight and information has not been exchanged between the regulated community and the TNRCC. For example, the TNRCC justifies its decision to exclude probabilistic risk assessment approaches from the proposed rule by stating that it "does not have personnel or expertise that would be necessary to support the use of probabilistic analysis techniques in evaluating contaminated sites." 24 TexReg at 2230. Through a collaborative approach, technical information could have been exchanged so that this approach and other state-of-the-art tools could have been included in the proposed rule. The use

of such tools under the proposed rule is important to achieving the TNRCC's goal of imposing protective and cost-effective cleanup standards. It is also important to promulgating a rule which will remain viable for several years. The published record does not demonstrate that the proposed rule will meet the TNRCC's goal of imposing protective and cost-effective cleanup standards. 24 TexReg at 2215. Therefore, substantial changes should be made to the proposed rule before it is promulgated. Fulbright & Jaworski also commented that the published record does not report any analysis of how the proposed rule would function on actual sites (e.g., a quantitative uncertainty analysis of RBEL and PCL values applied to sites presenting various conditions). Thus, the proposed rule does not appear to be adequately supported by technical evidence. Additionally, the published record does not give information adequate for the regulated community to conduct any such analysis and learn the extent to which cleanup standards would be overly stringent. This information will not become available during the comment period because guidance for calculating Tier 2, Tier 3 and ecological PCLs has not been drafted. 24 TexReg at 2230 (hereinafter "pending guidance"). Without such information and time to conduct relevant analyses, the regulated community faces great uncertainty as to the effect of the proposed rule.

Although the proposed rule might set cleanup standards appropriate for some sites, the published record does not provide information sufficient to demonstrate that the proposed rule would set standards appropriate for a substantial number of sites. Moreover, based on the information provided, the proposed rule would not set cleanup standards consistently among sites.

Fulbright & Jaworski commented that the proposed rule's default-driven approach was selected in order to achieve "consistency" in administering cleanup matters in various TNRCC programs. 24 TexReg at 2210. For convenience, this is referred to herein as "administrative consistency." Administrative consistency will be achieved by sacrificing consistency between the cleanup standard and the risk actually presented by the site at issue. The difference between the cleanup standard and actual risk is known as the "margin of safety." In order to impose reasonable cleanup standards, the proposed rule should achieve similar margins of safety at all sites. However, this will not occur under the proposed rule. For example, proposed §350.71 requires the regulated person to evaluate certain exposure pathways at all sites. 24 TexReg at 2227. Because different pathways will exist at different sites, this requirement will result in different margins of safety at different sites. Additionally, "the extent of risk overestimation is variable among the pathways, which indicates substantial scientific inconsistency among equations within the proposed rule." Newfields Report at 3. Thus, the margins of safety will differ substantially between sites depending upon the match between actual default exposure pathways.

With regard to the public record, to limit the size and complexity of the rule, the commission did not provide the references and justification used in deriving the exposure factor assumptions. It should also be noted that much of the supporting documentation had been provided in the December 16, 1996, Concept Document. The commission will consider issuing a new technical background document at a later date.

With regard to comments regarding probabilistic risk assessment techniques, the reader is referred to the portion of the preamble where responses are provided to General Probabilistic comments.

The commentor is taking a narrow view of "appropriateness" in cleanup levels. The regulatory focus is not only current exposure conditions, but also future considerations. Further, with respect to the cost-effectiveness of the rule, the commentor is not considering general costs to the public and affected landowners, and natural resource consequences that result from environmental contamination. The commission considers the rule appropriate in the context of current and future protectiveness and overall cost-effectiveness. The rule will set cleanup standards via a consistent process by which cleanup standards could vary based on site-specific considerations. So, the commission agrees the cleanup levels themselves will vary across affected properties. The commission also agrees that margins of safety will vary across affected properties, considering only

current use. However, the variability is acceptable and is appropriate considering the infinite variability in conditions across affected properties and current and future exposures.

The commission acknowledges that guidance is needed to facilitate implementation of the rule. However, the commission also points out that commentors recommended pulling certain details out of the rule, and then expressed concern when the rule is not detailed enough to understand implications. Additionally, it is not particularly compelling that persons cannot fully evaluate the rule until the guidance is developed as many persons routinely make the point that guidance is not rule and therefore not binding. Tier 2 and 3 guidance will need to be developed, but given that the Tier 2 PCL equations were included in the May 15, 1998, proposal and then subsequently excised from the rule in response to specific recommendations from stakeholders, and the fact that Tier 2 is non-binding as persons can use Tier 1 or 3, the absence of guidance is not overly consequential. With regard to ecological guidance, Exxon, who is represented by Fulbright & Jaworski in these comments, is directly and integrally involved in the stakeholder group developing the guidance. Therefore, Exxon should be able to conduct some analysis of the situation.

KOCH commented that the commission has expended considerable resources to prepare these proposed rules. They understand that the TNRCC believes the proposed rules will have a positive economic impact on responsible parties because of the shift to risk-based cleanup standards. However, it appears that these rules are not a substantial improvement compared to the current Risk Reduction Rule. The proposed rules lack appropriate flexibility to consider site-specific factors and experienced, professional judgement is essentially eliminated from this process.

The commission acknowledges the rule is not "wide open" risk assessment. Such a wide open risk assessment program, whereby the person incorporates exposure scenarios and parameters based on the specific use of the affected property today, is not necessarily in the best interest of the state due to inherent uncertainties concerning reasonable future uses of the property. Such a program makes it much more difficult to manage the natural resources of the state. Further, focus needs to be placed on future uses. The commission agrees in part with the pure risk-based tenet of no exposure - no risk; and as such has aggressively increased the potential to use exposure prevention remedies in lieu of cleanup remedies. However, the commentor is not considering other factors that the commission must manage, such as natural resource protection, and potential current and future human and environmental health and exposure. To expedite decision making and to enhance streamlining and consistency, the commission has made critical policy decisions. With specific regard to physical/chemical properties, it is fruitless to argue over a specific assumption such as the diffusivity of a COC in water when the outcome may only result in a fraction of a percent difference in the overall cleanup level. Further, the alternative value is often nothing more than an alternative literature value with absolutely no assurance that it is actually more representative than the default value. However, substantial flexibility is provided to adjust the soil-water partition coefficient (K_d) based on site-specific pH or organic carbon fraction (foc) as appropriate, which can have significant effects on cleanup levels. Some exposure pathways and points of exposure are essentially always relevant (e.g., human exposure to surface soils) considering current and future exposure, or are necessary for management of related COCs (e.g., ingestion of class 1 or 2 groundwater).

Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP would eliminate a number of existing standards and deadlines and make every cleanup decision a negotiation between the state and industry, with no role for the public. Moreover, with the responsible party holding the information and often the superior resources, TNRCC would be at a significant disadvantage under the proposed TRRP in most negotiations about the extent of cleanup.

The rule actually does quite the opposite. It will eliminate much of the negotiation that transpires today. The rule lays out specific performance objectives, sets requirements where variations are not

allowed, and sets up deadlines for the filing of institutional controls and for notification of the public. In fact, a chief criticism expressed by others is that the rule imparts too much influence to the general public when they may not be threatened in any manner from the affected property. Also, the commission points out that the rule does not obviate or otherwise eliminate any public participation requirements of other applicable statute or rule.

Henry, Lowerre, Johnson & Frederick commented that the commission should not adopt the proposed TRRP rule package. Instead, the commission should retain the existing rules and integrate into those rules some of the work of the staff. The changes in the TRRP that everyone agrees are improvements should be added to the current rules. They also commented that the existing TNRCC program for risk reduction for contaminated sites does no harm. It is not broken. The proposed TRRP could create serious problems, as it makes significant changes to many of the underlying policies. Those policy issues deserve the type of careful review and public input that cannot be done in such a large package of policy changes. TNRCC is proposing changing a very significant set of policies that affect future generations when the experience with the current rule does not justify most of the changes.

The commission disagrees with the commentor. Extensive evaluations have gone into the policies established for the rule. The rule was precipitated by the need to harmonize the 30 TAC Chapter 335 and Chapter 334 to effectively cover regulatory obligations and to enhance compliance, and to align critical policies that were incongruent or create policies that were absent under the existing rules. The only way to reach these goals is a new rule.

Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP rule relies heavily on exposure prevention as a means of addressing contamination problems, as opposed to exposure prevention coupled with long-term protection of groundwater resources. The predicted consequence of the proposed rules would be that small businesses desiring to sell their property would implement Remedy Standard A, while large industrial facilities would pursue the more liberal Remedy Standard B. The net impact of this would be to essentially "write off" the groundwater beneath these facilities. They further commented that the proposed TRRP allows regulated entities, regardless of their standard of care, extent of violations or intentions, to contaminate other people's land and, in many cases, avoid any responsibility for determining the extent of cleanup, for providing notice to the affected persons and local governments, for stopping the migration of contaminants, and for cleaning up the contamination. Even if a cleanup of contamination were not justified under certain circumstances, removal of all responsibility for the evaluation and notification of the contamination appears to be simply an effort to protect the responsible entities and hide information on contamination from the public. Thus, the rules give regulated entities the opportunity to externalize their costs created through poor environmental management practices and pass the costs on to the state/taxpayers.

The commission disagrees with the commentor. The reader is referred to the response to comments portion of the preamble for §350.33(a) and (b), and §350.55 where similar comments are addressed. The commission has placed more alternatives on the table with the intent that more sites will be addressed. Further, the commission notes that this rule enhances public notice and does not reduce public notice requirements to less than that required by the current rules. For example, the Risk Reduction Rule of 30 TAC Chapter 335 are silent to notice issues.

Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP would appear to create incentives for operators to decide not to take costly action that would stop the release of contamination at low levels or respond quickly to such a spill or other release, since there would often be little or no costs associated with responding to the contamination under the proposed TRRP. The TRRP should do the opposite and create incentives for prevention of future releases of contaminants at any level into the environment.

The commission does not agree with this statement. This assertion is addressed in part in the discussion for §350.33(a) and (b). Moreover, soil source areas must be removed, decontaminated, and/or controlled so that uncontaminated groundwater does not become contaminated and so as not to serve as an ongoing source of groundwater contamination. Also, for currently affected class 2 groundwater under Remedy Standard B, a plume management zone is not automatic but must be qualified for. The idea that TRRP is creating an incentive to pollute is incorrect. TRRP allows a more rational groundwater management strategy in certain circumstances, which should provide incentives to operators to manage groundwater plumes effectively and not circumvent the regulations. Additionally, the commission has other programs to address pollution prevention, such as the Clean Industries Plus program.

Environmental Resources Management, and Weston commented that they believe that the proposed rules continue to suffer from requirements that would reverse much of the progress made toward promoting voluntary cleanups. They strongly disagree with the TNRCC's contentions that the proposed TRRP's added regulatory burden is outweighed by its benefits. They also believe that the effect of the TRRP on brownfields initiatives will be to stifle participation in the VCP. With the advent of the Consistency Document for the current TRRP Rule, it is becoming apparent that fewer clients are inclined to "go the distance" with the TNRCC as they perceive that even small-scale, voluntary cleanups are being treated with the fine-toothed comb justifiable for abandoned hazardous waste sites.

The commission disagrees that the rule will reduce participation in the VCP. In fact, there are several changes (e.g., no deed recordation for properties obtaining residential standards under Remedy Standard A, plume management zones for residential properties, risk-based notification requirements) which will encourage participation in the VCP. Also, the commission disagrees that the development of PCLs is too complex or that the burden outweighs the benefits. The process for development of PCLs is more specific than the TRRP Rule (30 TAC Chapter 335), which will result in more timely development of PCLs with less potential for arguments over the appropriateness of the cleanup levels. The commentor suggested that "small-scale voluntary cleanup" should be treated differently than "abandoned hazardous waste sites." The commission notes that the rule does make distinctions between sites (e.g., the Tier 1 PCLs are based upon two different source areas, 0.5 acre and 30 acres) based upon technically valid considerations.

The commission takes particular exception with the implication of the "fine-toothed comb" statement by Weston regarding the VCP program. The comment implies that VCP sites either have been evaluated with a lesser degree of regulatory integrity or should be evaluated with a lesser level of regulatory integrity. The intent of the VCP program is not to cut regulatory integrity or protectiveness corners, but rather to cut some of the conventional regulatory red tape and to support quick and innovative regulatory review. The commission in no way has cut the level of regulatory integrity or protectiveness. Rather, the VCP is focused primarily on permanent remedies that are fully and adequately completed such that the certificates of completion can be issued. Actually, given that the VCP sites are more likely to be re-developed than abandoned hazardous waste sites, human exposure potentials may be greater at VCP sites than at abandoned hazardous waste sites, and therefore, may be deserving of greater regulatory vigilance, not less.

Environmental Fuel Systems, Inc., and ICE commented that they are concerned that the TRRP Rule, as proposed, is much more protective of human health and the environment than are the rules and guidance the PST program has practiced under since January 1994. The 1994 changes toward risk-based corrective action were viewed by many as much less protective than earlier rule and practice. ICE fears that some entities will challenge the practices of the last five years based on the more restrictive requirements in this rule package.

The commission has no intention of reactivating sites closed under the current PST program as a consequence of this rulemaking, and nothing in this rulemaking would re-open any closed site. The existing PST program is protective of human health. Some entities may challenge the protectiveness of the program, but they already can. If persons have appropriately characterized sites, established appropriate cleanup levels, taken warranted actions, and conducted proper notice to affected parties, then there should be greater certainty in the no further action status and protectiveness. If sites originally issued no further action status under the current program are subsequently re-opened due to change in site conditions which violates the basis of the no further action status, then the case would be re-evaluated under the existing PST program even after the effective date of this rule. The commission stands behind the protectiveness of the current PST program where it has been properly applied.

Groundwater Services, Inc., commented that the rules establish a consistent risk-based program for all remedial activities under the jurisdiction of the TNRCC Office of Waste Management, including PST, Industrial & Solid Waste Facilities, State Superfund Sites, VCP Sites, etc..

The commission agrees with the commentor.

McCulley Frick & Gilman commented that they observed a number of inconsistencies and contradictions between various sections of the rule that merit clarification. Several examples include:

1) The consideration of cumulative risk in downwardly adjusting PCL while not allowing upward adjustment of PCLs; 2) The use of different adult soil ingestion rates for estimating soil PCLs for all COCs, and for estimating a soil lead PCL when using the adult lead model; 3) The residential soil PCLs for aluminum, lead and manganese are less than the corresponding Texas-Specific Background Concentrations; 4) The use of default soil parameters for Tier 1 PCL calculation while requiring site specific soil parameters for the calculation of Tier 1 soil saturation values; and 5) The use of engineered controls or existing structures to exclude ecological pathways from evaluation when such controls cannot be used to exclude human exposure pathways. These examples, which are discussed in greater detail in their specific comments, represent significant inconsistencies within the proposed rule and detract from the overall objective of achieving consistency within the program.

The commission is fully aware of each of the differences between various sections of the proposed rule and believes such differences are in fact warranted. The commission's response to each of the first three issues raised by the commentor is provided in the following sections of the preamble: 1) consideration of cumulative risk in downwardly adjusting PCLs while not allowing upward adjustment of PCLs (§350.72(b) and (c)); 2) use of different adult soil ingestion rates for estimating soil PCLs for other COCs and for estimating a soil lead PCL when using the adult lead model (§350.76(c)); and 3) residential soil PCLs for aluminum, lead and manganese are less than the corresponding Texas-Specific Background Concentrations (§351.51(m)).

With regard to the theoretical soil saturation evaluation, there is no inconsistency, the commission simply characterizes such evaluation as a Tier 2 matter. The commission does not advocate the comparison of a Tier 1 PCL against a site-specific theoretical soil saturation limit, but rather a comparison of a site-specific PCL against the theoretical soil saturation limit using the same affected property parameters in both calculations. Section 350.75(i)(10) is adequately clear in this regard.

With regard to the consideration of physical controls in the ecological exposure pathway analysis, the commission acknowledges what seems to be an apparent inconsistency, and in response to this comment considered eliminating the practice as originally proposed for ecological exposure pathway evaluations. However, because the ecological exposure pathway will be remedied as a result of the human health-based physical control remedy, the ecological risks are simultaneously remedied. If a human health-based remedy is not employed, and ecological risks persist, then a remedy would be

required for the ecological risks and that remedy may be a physical control which would be required to meet the requirements of Remedy Standard B. Likewise, the presence of physical controls can also be considered in human health exposure pathway analysis, provided the physical control is formalized as a remedy and meets the requirements of Remedy Standard B. Further, human health and ecological exposure pathway analyses are not necessarily comparable. Areas covered extensively by physical structures and occupied with human activity are not likely to be areas of potential ecological impact from COCs as the human activity has likely driven out the ecological receptors. Conversely, the presence of extensive physical controls suggests the likely presence of human receptors. Therefore, the issue is not so much inconsistency as a remedial timing issue and a contrast in exposure considerations.

Fulbright & Jaworski commented that it would be adversely impacted by cost increases where remedial activities are pursued on the basis of risk overestimates.

The commission has acknowledged that costs could increase for the PST program under this rulemaking. However, in contrast to actions completed under the TRRP Rule of 30 TAC Chapter 335, this rule should represent a net cost savings. Flexibility is provided under 30 TAC §335.563(e)(2)(A) based on site-specific data. Very rarely are site-specific exposure data provided. Rather, alternative assumptions are often provided for sites with generally no better basis of applicability than the default assumptions provided in the existing rule. Such approaches are not necessarily better estimates of risk. As such, the commission is commonly not concurring with "site-specific" risk estimates today, and in fact, issued guidance on July 23, 1998, to make uniform where certain adjustments may be appropriate and to what degree to minimize some of the randomness in the risk assessments submitted to the executive director under Standard 3. In today's rulemaking the commission has provided flexibility where site-specific, activity-related considerations may affect risk estimates. The commission has also made commitments to initiate the development of a probabilistic risk assessment program for future adoption. Further, the commission has provided an option under Subchapter G to utilize the type of flexibility requested as a means to contain costs. The commission has provided ample opportunity under this rulemaking for persons to contain costs.

Ranger commented that another major concern associated with the proposed TRRP rules is the anticipated adverse impacts associated with real estate transactions and dealings with financial institutions on contaminated properties. Currently, it is typically achievable to secure loans from lending institutions for contaminated properties because the lending institutions have seen the TNRCC cleanup programs over the past several years, such as the VCP and the PST risk-based corrective action program, allow for reasonably cost-effective and timely closures on impacted properties. The proposed TRRP rules will dramatically increase the costs of site investigations and closures, as well as significantly slow down the site closure process. Under the proposed TRRP rules, Ranger believes that lending institutions will not want to readily lend money for properties where the site investigation costs alone will be at or near six figures, with no assurance of a timely closure. Once again, these types of properties will be seen by the lending institutions as poor financial investments.

The commission has acknowledged cost implications for the PST program under the TRRP rule in the RIA. However, for the VCP program, this rulemaking will provide better cost containment potential, not less, as explained in the preceding and following responses to similar comments. The assessment cost should not usually be any greater than under the existing rule. Regarding the commentor's assertion that the proposed rules will "significantly slow down" the site closure process and there will be no assurance of timely closures under the proposed rules, the commission notes that additional provisions for conditional no further action letters have been added to §350.34 to help facilitate property transfers. Further, this rulemaking has enhanced potentials for the use of exposure prevention remedies which will streamline the corrective action process for the VCP program. Regarding lending institutions, the commission disagrees with the commentor's assertions that under

the proposed rules, ". . . lending institutions will not want to readily lend money for properties where the site investigation costs alone will be at or near six figures. . .". Lenders' decisions to lend are based on a variety of factors, such as a borrower's financial condition, the financial viability of a proposed project and broad economic conditions. While lenders consider the environmental condition of real estate offered as collateral, it is only one of several factors a lender will consider and may or may not affect decisions to lend.

Weston and Environmental Resources Management commented that even with the changes that have been made, implementing the proposed rules will significantly increase investigation and evaluation costs when compared to the current TRRP rule for many of the smaller and less impacted properties (the majority of the VCP-type projects). Based on their experience, the estimated costs for implementing the new rule, which are discussed in the preamble, are very low and do not accurately reflect the actual costs that will be experienced. This increase in cost is due to both the increased investigation requirements and the increased level of effort that will be required for data evaluation/validation. These increased costs will be most significant for Brownfield-type sites. One of the significant sources of the increased investigation costs is the apparent broad definition used for chemical of concern and an assumption that a property is contaminated until it is proven clean. The "guilty until proven innocent" approach is very costly and time consuming. This is discussed in greater detail in the specific comments below. A better method of focusing on the chemicals and specific areas that are really of potential concern at a site needs to be established. They understand that the agency believes that the increased investigation costs will be offset by lower remediation costs; however, based on their understanding of the proposed rules and past experience, they do not believe that there will generally be any offsetting decrease in remediation costs. In addition, it is their opinion that the added cost for many of these sites will not result in lower risk to human health or the environment and will discourage voluntary remediations.

The commission disagrees that the rule will reduce participation in the VCP. In fact, there are numerous changes (e.g., no deed recordation for properties obtaining residential standards under Remedy Standard A, plume management zones for residential properties, risk-based notification requirements) which will encourage participation in the VCP. Also, the commission disagrees that the PCL development process is too complex. The process for development of PCLs is more specific than the current TRRP Rule (30 TAC Chapter 335), which will result in more timely development of PCLs with less potential for arguments over the appropriateness of the cleanup levels.

The commission has acknowledged that at some sites, there may be an increase in the site assessment costs. However, these increases are site-specific and if a person is adequately characterizing a site under the existing rules such that contaminants can remain on-site and be protective, then the commission doubts there will be a significant change in the assessment costs. In regards to data evaluation/validation, the commission is concerned that numerous commentors have indicated that there will be an increase in costs under the TRRP rule. It is important that the data used to make decisions regarding the protection of human health and the environment are appropriately evaluated and validated. This is not an area to cut corners. However, if persons are appropriately evaluating/validating data today, then there should not be a significant cost increase, if any at all. The commission is confident that the level of detail required in the TRRP rule is appropriate given the consequences of making decisions with data of unknown quality. It is important to note that the TRRP rule does not specify which COCs must be investigated at a particular site and that this decision is left to the program area. The commentor also expressed concern that the rule takes a "guilty until proven innocent" approach. The commission asserts that persons only become subject to the TRRP rule through the agency's various programs and that the TRRP rule does not by itself initiate response actions. Once a property is subject to the TRRP through one of the agency's program areas, then it is appropriate to assume that there may be COCs present. Once a release is established, then it is only appropriate that a good basis is provided for the levels of COCs that will remain following the response action, if any. Clearly, the burden is on the person to prove it is

protective, not on the commission to prove it is unprotective. This is not a “guilty until proven innocent” attitude but rather an appropriate level of responsibility for the regulated community.

Henry, Lowerre, Johnson & Frederick commented that the rule conflicts with Title VI, Civil Rights Act. Since TNRCC obtains federal funding for its programs, including the programs that will fall under the proposed TRRP, the U.S. Civil Rights Laws apply. The federal law, including statutory requirements in 42 USC §2000(d), regulatory requirements at 40 CFR, §7.36 and directives in the President's Executive Order on Environmental Justice would be violated if the proposed TRRP is approved. Under Title VI and EPA's regulations, TNRCC programs receiving EPA funds may not be administered in a manner that has the practical effect of subjecting individuals to discrimination based upon race.

TNRCC rules appear to violate Title VI. First, the rules fail to allow affected people and local governments to have input into decisions regarding assumed future uses and limits that can then be put on future uses. In an area like East Austin, historic zoning that mixed residential and industrial uses is being reversed to eliminate the environmental injustice and disparate impacts that the polluting industries have had on the low-income, minority communities in which they have been located. The TRRP would allow the presumption of continued industrial use, and would, therefore, exacerbate the historic violations of Title VI of the Civil Rights Act at a time when the cities and communities are trying to reverse the impacts of discrimination. In effect, under the TRRP, TNRCC's program, which does receive EPA funds, would have the practical effect of extending the discrimination based upon race.

Additional discriminatory impacts of the proposed TRRP include reduced protection for shallow aquifers in minority communities, because those ground waters are more likely to have contamination and classified as class 2 or 3 aquifers because of the historic and discriminatory placement of polluting industries in the communities.

The proposed TRRP will not allow Texas communities to have a role in determining how the state and local governments can best reverse the historic discrimination and end future discriminatory practices.

The rule is not in any violation of the Civil Rights Act. Contrary to the comments, the rule enhances public notice, and in no way lessens public participation requirements that are mandated by federal statutes (e.g., RCRA and CERCLA public participation). The rule provides landowners control with regard to the remedy planned for their property through the requirements for land owner concurrence for the use of institutional controls. Additionally, if variances are requested to exposure frequency and exposure duration factors, then public notice must be conducted and the public has an opportunity to provide input to the process. The rule also allows equivalent zoning or governmental ordinance as another means of providing notice and the ability to enforce controls. Citizens have opportunities to participate in zoning or governmental ordinance decisions made by their city councils. The commentor is also mistaken in their interpretation of the groundwater classification system. The presence or absence of groundwater contamination is not factored into the groundwater classification system. There is no reason to presume minority areas are preferentially or otherwise more likely to be located over class 2 or 3 groundwater more than any non-minority community. The commission notes that commercial/industrial areas may commonly be located within or proximal to minority areas, however, stimulating corrective action at those properties will collectively reduce risks to those minority communities.

The commentor states that the rules are subject to Title VI of the Civil Rights Act because some of the programs receive federal funds. The commission agrees that it is subject to Title VI of the Civil Rights Acts because it does receive federal funds for some of its programs subject to this rule.

The commentor states that the rules "may not be administered in a manner that has the practical effect of subjecting individuals to discrimination based upon race." Although the commission is not

clear as to what the above-quoted portion of the comment means, the commission assumes that the commentor believes that the rules may have the effect of subjecting individuals to discrimination based on race. See 40 CFR §7.35(b). The commission disagrees with this comment.

Henry, Lowerre, Johnson & Frederick commented that the proposed TRRP appears to make a number of unjustified and unsupported assumptions, including that: 1) costs of cleanup below PCLs are significant and unjustified in all cases, 2) the current set of standards for drinking water and other pathways of exposure to toxic chemicals will not be changed to lower the exposures in the future, and 3) improvements in the state of the scientific knowledge will not occur. As a result, the state will likely be left with many sites that will be considered significant risks in the future. Responsible parties will be allowed to leave contamination in place that under current rules they would have to remove. Instead of taking the conservative approach, TNRCC is willing to pass the risks on to future generations of Texans when the responsible parties could be long gone.

The commission disagrees. With regard to the first point concerning cleanup costs, and as evidenced by the many comments addressing costs associated with this rule, costs can be great in achieving cleanups to PCLs, and even greater when achieving cleanups to levels below PCLs. It is not an efficient use of limited resources to compel cleanups to levels below health-based limits. With regard to the second issue pertaining to changes to standards, the commission acknowledges that standards may change. However, the standards are based on reasonable maximum exposures (RME) under this rule. The conservatism inherent in assuming that a single individual would consistently experience the RME for each of the exposure pathways considered in developing the human health PCLs provides the commission with sufficient confidence to set risk-based cleanup levels. However, where a COC is determined to be significantly more toxic than realized earlier, §350.35(e) and §350.73(a) provide mechanisms to compel further action when warranted to protect human health and the environment. With regard to the third point, on the contrary, the commission presumes that the state of the science is highly likely to improve over time. In fact, it is for this very reason that the commission is more comfortable with a risk-based program than would have been the case ten years ago. The commission is not compromising protection for future generations. This rule provides needed flexibility to encourage the regulated community to address their sites now.

Henry, Lowerre, Johnson & Frederick commented that the program provides basically unlimited flexibility with respect to a majority of the requirements in the proposed rule.

The commission notes that the preponderance of the comments criticize the rule for not providing adequate flexibility. The rule provides an effective and appropriate level of flexibility. Flexibility is primarily afforded in tangible ways such as analysis of contaminant fate and transport, establishment of plume management zones, uses of controls, that is, options that can be observed and measured and decided upon with a high degree of certainty and confidence. Other issues which are inherently more uncertain, such as limited use of property, or the protectiveness of a control response action over time, are backed with institutional controls or post-response action care to lessen the probability of unprotective situations occurring.

Concerning Subchapter D, Groundwater Services, Inc., commented that the re-proposed TRRP rules offer greater flexibility for calculation of site-specific cleanup limits compared to the current TRRP rule.

The commission agrees with the commentor.

With regards to general guidance, Chevron commented that the TNRCC should include stakeholder committees and commissioner work sessions as TRRP guidance documents are developed. Utilizing the commissioner work session process, in conjunction with stakeholder committees, best ensures that TRRP guidance documents receive focused input from the commissioners. Chevron supports the TNRCC's

decision to reserve several detailed issues to be addressed via guidance rather than rule. However, guidance documents should not be developed without significant stakeholder involvement and commissioner oversight. Moreover, prevailing APA doctrine, the Texas Water Code and the Solid Waste Disposal Act require that limits be placed on the development of guidance documents to ensure that such guidance does not amount to improper rulemaking which imposes new requirements without a process providing for adequate stakeholder input.

Chevron commented that contrary to the statement in the preamble, the proposed TRRP provides all the equations and parameters for calculating PCLs, and these have not been placed in guidance. Moreover, although some portions of the previously proposed TRRP have been removed from this version with the expectation that they will be provided in guidance, such guidance has not been made available. It is very difficult to evaluate the impact and appropriateness of a proposed rule when the guidance that will implement the rule is not available.

Dow supports the significant simplification of the rule from the May 15, 1998, version with the movement of segments to guidance. Dow believes that the movement of these segments to guidance affords the agency and the regulated community more flexibility to respond to changes in the methodology and the science of risk assessments. Dow also strongly supports the involvement of the various industry stakeholders in the continued development of the guidance necessary for the implementation of the rule.

Eastman commented that proper analysis and comment on this proposed rule is difficult since its application and utilization are dependent upon guidance documents that have yet to be developed.

Eastman also requested that workgroups with active participation and representation from the general public and regulated community be used to develop the guidance documents to be used with the TRRP and that such participation be allowed at the earliest point possible in the document development. The proper functioning and application of this proposed TRRP is totally dependent on the development of accurate and reasonable guidance documents. Many of the comments contained here and the comments omitted from this response are based on the belief that accurate and complete guidance documents will be developed to govern the application of this risk rule. Outside participation in this process is critical.

Environmental Fuels Systems, Inc., and ICE commented that as a final, general point, last year's proposed rule language incorporated a lot of what they would call "guidance" prescribed in it. This year's version left much prescribed detail out, but they know they will see it again soon. Please recognize that interpreting what this proposed rule means is especially difficult when the guidance is not yet in hand. TNRCC management has expressed a desire in the past to team with industry to come up with such guidance, and they want very much to see that approach work.

Fulbright & Jaworski commented that advisory levels and other guidance which have not been promulgated themselves cannot be promulgated as proposed under this rule without violating due process.

KOCH commented that the proposed rules are substantially shorter than previous versions. Apparently the additional detail required to implement these rules will be provided in future guidance documents. They are very concerned that many of the more controversial or onerous provisions of the previous versions of the rules will be incorporated via guidance. The commission must open the development of guidance documents to all interested stakeholders. The recently drafted Investigation Report Form is apparently an early product of this guidance development process. Will this lengthy document have to be completed at every site, in addition to submitting an Affected Property Assessment Report (APAR)? They are very concerned that similar documents will be prepared to implement the proposed rules.

Mobil and Phillips commented that many details (e.g., statistics, QA/QC) have been eliminated from the regulation and will be addressed in the regulatory guidance which has yet to be developed. Mobil asked

that the development process for this guidance be as open and inclusive as has the development process for the rule itself. This guidance will play a large role in how the rule will be implemented.

Port of Houston Authority commented that the guidance document, which will provide details on TRRP implementation, has not been made available to the regulated community to view or make comments.

Ranger would like to offer a few additional general comments concerning the proposed rules. The rules, overall, are far too complex and 90% of the items that are included in the rules would be far better addressed in written policy and guidance. Rule packages are simply not the place for specific details on risk assessment methodologies, preferred sampling techniques, laboratory QA/QC procedures, site investigation strategies, etc.. These types of voluminous and technical issues are far better and more appropriately addressed in written guidance and policy. The TNRCC must keep in mind that environmental science is continually evolving, and thus any rule packages which include such minute technical details as are included in the proposed rules will probably be technically outdated by the time they are published.

Reliant Energy, AECT, and TU commented that they have a number of concerns regarding the regulatory and economic impacts of the proposed rule. While the repropoed version of the rule addressed many of their concerns, they have been unable to assess the potential cost impacts associated with the rule without the benefit of the guidance document, which contains many of the details, such as sample collection requirements, QA/QC, and the use of statistics. Review of the guidance document is critical to a comprehensive understanding of the rule and the potential cost impacts. They therefore encourage the timely development of the guidance document. It is their understanding that stakeholder involvement will be required to support this effort. Please be advised that Reliant Energy is prepared to support that effort in any way they can.

TCC/TXOGA support removing formerly prescriptive details, (e.g., statistics, analytical chemical methods, field sampling methods, and QA/QC, etc.) and including these elements in guidance. They have previously commented to the TNRCC that the proposed future guidance should not be created from the information previously used in the May, 1998 version of TRRP. TCC/TxOGA understand that the process to create this guidance has yet to be determined. They would like to participate in the development of the guidance and would appreciate the opportunity to share our ideas with other stakeholders at the earliest possible opportunity.

Weston commented that they understand that many of the details included in previous drafts of the TRRP were removed to reduce the specificity of the rule, allow more flexibility, and simplify the rule. They also understand that guidance will be prepared to accompany the TRRP. They strongly support this approach; however, there should be provisions for public comment and peer review of guidance documents prior to implementation. For development of significant guidance documents (such as site assessments, statistics, and QA/QC), they recommend formation of agency workgroups that include participants from the regulated community. These workgroups have been very successful in the past in producing documents that are supported by the regulated community.

The commission acknowledges that guidance is needed to facilitate implementation of the rule. However, the commission also points out that some of the commentors are recommending pulling certain details out of the rule, and then expressing concern when the rule is not detailed enough to understand implications. The commission will focus efforts to develop critical guidance. Critical elements are sufficiently developed to allow meaningful and comprehensive understanding of the rule. Additionally, it is not particularly compelling that persons cannot fully evaluate the rule until the guidance is developed as many persons routinely make the point that guidance is not rule and therefore not binding. Specifically, with regard to QA/QC, persons who submit data today with proper QA/QC should not see any negative consequence from the rule. Tier 2 and 3 guidance will

need to be developed, but given that the Tier 2 PCLs were included in the May 15, 1998, proposal and then subsequently excised from the rule in response to specific recommendations from the regulated community, and the fact that Tier 2 is non-binding as persons can use Tier 1 or 3, the absence of guidance is not overly consequential. The commission plans to develop the guidance with meaningful stakeholder input/participation, the form and level of which is yet to be decided. The guidance will be methodically and appropriately developed. In case there is some confusion, to clarify, only Tier 1 PCL equations have been provided in the rule. RBEL equations have also been provided. However, Tier 2 PCL equations have not been provided in the rule. Fulbright & Jaworski's comment regarding advisory level has been addressed in the response to comments on §350.74(f)(3)(A).

Fulbright & Jaworski commented that the proposed rule may result in needless litigation. As proposed, the TNRCC's approach would overstate the risk to human health and the environment at any particular site. Because this information would misstate the actual risk of a site, it is reasonable to conclude that it will be a factor in, and may in fact encourage, litigation between adversarial stakeholders and responsible parties. Further, it is likely that incorrect risk characterization will increase administrative litigation between responsible parties and the TNRCC.

The commission has not initiated this rulemaking to increase litigation. The over-characterization of risk concerns raised by the commentor is presumed to be related to the rule limitations on the use of alternate exposure factors and the prohibition against probabilistic risk assessments. The probabilistic risk assessment preclusion is a necessity at this point for reasons fully stated in this section of the preamble. The commission also presumes that the greatest litigation risks stem from off-site impacts. With this in mind, the concerns appear to be narrowly focused on current risks, and not sufficiently focused on future risks. With specific regard to exposure factor adjustments, the commission finds it highly questionable to assume non-default exposure assumptions for off-site properties when the person has no certainty as to off-site activity patterns and no way to control them. The commission must responsibly consider both and as such does not agree that risks have necessarily been overstated, or least to the excessive degree implied by the comment. At the basic level, the litigation is driven by the fact that there is environmental contamination. Persons can limit litigation liabilities by quickly and comprehensively addressing the COCs and completing assessments and corrective actions in a timely, pro-active manner.

Henry, Lowerre, Johnson & Frederick commented it is not clear that the criteria of "long term effectiveness" will be met under this rule. For example, natural attenuation could eventually meet that standard. Construction of a fence would not. The change from a criteria of true long-term effectiveness to the criteria in the proposed TRRP is inherently less protective.

Henry, Lowerre, Johnson, and Frederick asserted that it was not clear that the criteria of "long-term effectiveness" under this rule will be met. The commission disagrees. "Long-term effectiveness" refers to the ability of a response action to maintain a particular degree of protectiveness over time once the performance objectives have initially been attained. Response actions where the groundwater has been restored to the critical PCLs will have no trouble maintaining that degree of protection over time. With a plume management zone, there would be an extended period of monitoring at the attenuation monitoring points and the point of exposure. There is every reason to expect that this type of remedy will be just as successful as any other exposure prevention remedy. The rule requires any soil PCLE zone to be removed, decontaminated, and/or controlled such that any physical control which is used is capable of reliably containing COCs within and/or derived from the surface or subsurface soil PCLE zones over time. Also, the commentor mentions a fence in the context of being a response action. Fences surrounding affected properties with unresolved problems are not considered response actions and would not attain either of the TRRP remedy standards. In

response to this comment, the commission has amended the definition of “physical control” at §350.4(a)(64) to state that fences are typically not considered a physical control.

With regards to general misrepresentation, Henry, Lowerre, Johnson & Frederick commented that TNRCC rules encourage hiding information from or even misrepresenting information to TNRCC. There are no penalties for not providing accurate or complete information or in making false claims of confidentiality. Moreover, TNRCC has never sought a penalty for a misrepresentation or material omission, even when TNRCC had the authority to punish such acts. If TNRCC is going to give the parties responsible for the contamination such broad flexibility to determine the extent of investigation and remediation, the availability of penalties and the willingness of TNRCC to seek penalties for misrepresentations needs to be very clear in these rules. If the public is going to be allowed to participate in TNRCC's decisions, TNRCC also needs to create incentives to make sure that claims of confidentiality in reports to TNRCC are valid.

The commission acknowledges that misrepresentation is a problem when it occurs. To set the basis for enforcement when it is discovered, the rule has a provision in §350.2(a) which prohibits such misrepresentations. The commission takes the position that if environmental regulations are fair, logical, and sound, as the commission has prepared this rule to be, then there is less incentive to misrepresent the facts.

With regards to general one size fits all, Ranger commented that it is concerned that the TNRCC effort to harmonize risk-based cleanups has resulted in proposed rules which closely resemble RCRA/Superfund, instead of the more practical and cost efficient existing PST risk-based corrective action guidelines. Thus, the outcome of the effort to "harmonize" the rules has essentially resulted in the upgrading of all risk-based cleanups to more stringent requirements closely resembling those imposed on RCRA/Superfund sites, which have long been regarded by the public and regulated community as being overly-burdensome, ridiculously cumbersome and too costly. It also does not seem warranted that the TNRCC is proposing to impose RCRA/Superfund - style cleanup requirements on PST owners and operators just as the Petroleum Storage Tank Remediation (PSTR) Fund is nearing expiration.

Ranger also commented that under the "Explanation of Proposed Rule," it is stated that one of the goals of the new rules is "to create a unified performance-based approach to corrective action which will be the same regardless of which of the agency's program areas reviewed the adequacy of a proposed response action." While in an ideal sense this is a laudable goal, Ranger does not believe it is a practical goal, nor necessarily one which reflects what the public and elected officials desire.

The commission has pointed out the reason for the movement to a single risk-based corrective action rule in the preamble of the March 26, 1999 proposal at pages 24 TexReg 2210 - 2211. There are several, the most notable of which are the unjustifiable conflicts in standards and requirements across program areas which deal with the same types of COC releases, and the need to enhance the efficiency of available agency resources. There are sure to be varied public and elected official opinions regarding the appropriateness of the consolidation of all of the agency regulatory programs under a single remediation rule; however, the commission frequently receives questions from the regulated community, elected officials, and the public as to why sites are handled differently under different program areas. It is very difficult to legitimately explain why benzene released to the groundwater from a gasoline service station is regulated in a manner different than if the benzene had originated from a refinery or other non-PST source. The benzene is of the same toxicity, mobility characteristics, and potentially in the same type of receptor community and hydrogeologic setting.

The commission acknowledges that the RCRA, Superfund and PST programs developed from different concerns and issues. However, the commission does not accept that the PST program is somehow a program of lesser concern and therefore should have lesser environmental comprehensiveness as seems to be suggested by the commentor. Congress has required financial

assurance for corrective action of PST sites. This suggests substantial concerns are associated with such types of sites. Rather, specifically with regard to corrective action, the main difference between the RCRA, Superfund and PST programs has been primarily of an artificial nature, reflecting different levels of regulatory oversight/process and differential degrees of philosophical conservatism. Therefore, the commission disagrees that the shifts in the PST corrective action program make it RCRA/Superfund-like, as the level of associated regulatory oversight/process has decreased in those programs as a result of this rulemaking. The rule impacts the PST program as a consequence of re-focusing all programs areas to an equitable balance of human health and environmental protection.

The commission also notes that the timing of the adoption of this rule and the sunset of the PST Remediation Fund are purely coincidental. The commission began this rulemaking in 1995 with an initial goal of adoption within one year. At that time, there was no sunset to the PST Remediation Fund. The rulemaking has taken much longer than anticipated and the legislature has since adopted PST Remediation Fund sunset statutes.

Environmental Resources Management commented that the proposed rules employ a "one size fits all" approach to assessing site risks. This approach treats small properties and relatively small areas on larger properties as if they are Superfund sites that pose threats to nearby residents and workers. As previously submitted to the agency and as included in the comments of Environmental Resources Management and others, the added costs and regulatory burden of the proposed rules will, in their opinion, cause a detrimental impact to the cleanup programs related to Brownfield redevelopment. Slowing down Brownfield redevelopment will have a negative impact on the Texas economy and what previously has been a positive trend in the promotion of voluntary cleanups.

Weston commented that they are still concerned about the "one-size-fits-all" approach, and are concerned about the financial impacts for sites or properties that are only mildly impacted or which are only trying to demonstrate that they meet the risk-based remediation requirements in order to obtain financing. They are also concerned that the complexity and the effort that will be required to establish cleanup levels will discourage voluntary remediations and could complicate the transfer of industrial and commercial properties.

The commission notes that although the commentors have billed the rule as a one-size fits all rule, in fact, it contains ample flexibility through the tiered processes and remedy standards to develop custom tailored response actions. The goal of the program is to ensure that sites are protective, and not to just close sites using any possible means to create a fiction that they are protective. With specific regard to the Brownfields program, the TRRP generally represents increased flexibility. Notifications are less onerous, land owner consent to the placement of institutional controls is the same, with the exception of zoning or governmental ordinances, and persons have much greater flexibility to use exposure prevention remedies than is the case under 30 TAC Chapter 335.

Not all sites are treated as Superfund sites. The commission does not understand the conclusion that small sites automatically represent less risk than larger sites, and are therefore deserving of lesser treatment. The converse may be more often true given that the smaller sites are more likely to be proximal to residential neighborhoods or in urban areas where populations are densest and exposure potentials are the greatest. Very often the case is that the largest chemical plants and refineries are relatively isolated from residential areas either because of location and/or extensive property holdings and as such may often represent less actual exposure risk to the general population than small sites via soil or groundwater exposure pathways.

The rule is more than capable of addressing small, simple sites as well as large complex sites. Tier 1 in concert with Remedy Standard A can be used to address small sites, or mildly impacted problems

while the Tiers 2 and 3 with Remedy Standard B can be used to address larger or more complex matters.

With regard to sites trying to demonstrate they meet risk-based remediation standards for financing purposes, the demonstrations will be just as streamlined as is the current situation under 30 TAC Chapter 335.

Henry, Lowerre, Johnson & Frederick commented that while the goal of uniform rules for all programs is laudable, it is always not achievable. The proposed TRRP appears to be a clear example of where there are clear conflicts between the goal of uniformity and the law. For cleanup under different statutory and regulatory programs (at both the state and federal level), the goal of uniformity will not work. Instead, TNRCC should be seeking to develop rules to ease TNRCC's burden of enforcement, and the burdens on regulated industries and the public of complex rules.

Henry, Lowerre, Johnson & Frederick commented that while everyone can agree that the same numerical standard should be used for clean-up of a chemical like benzene in groundwater regardless of the cause, many other aspects of remediation, such as the extent of public notice, need to vary to fit the situation. All of the requirements that are appropriate for an underground gas tank will not be appropriate for contamination from a facility like Kelly Air Force Base, with 80 years of operations and contamination five miles off the base.

The commission maintains that the harmonization of regulatory programs is a legitimate and achievable goal and should lessen the commission's enforcement burden. The rule is flexible enough to handle most any given situation, even Kelly Air Force Base. Additionally, this effort has not run afoul of any law. The rule specifically states where more stringent requirements are applicable, those must be met.

Concerning general probabilistic techniques, Environmental Resources Management commented that the proposed rule precludes the use of probabilistic techniques such as Monte Carlo simulation based on the premise that the agency does not have the personnel or expertise to support this approach. The agency is risking falling behind the technological curve by refusing to implement readily available technology that is supported by EPA that could improve the accuracy and relevance of risk assessment in Texas. The agency and its contractors are staffed with toxicologists and statisticians that are knowledgeable in these techniques. This should be an option for Tier 3 PCLs, perhaps requiring prior agency approval.

Fulbright & Jaworski commented that their inability to evaluate the food-chain pathways (above and below ground vegetables) is indicative of serious problems inherent in the draft rule. Because essential information was not provided in the draft rule, a probabilistic analysis for vegetable intakes could not be performed. As indicated in Table 3, virtually every deterministic RBEL value associated with both soil pathways and inhalation was significantly greater than the probabilistically-derived RBEL values. The proposed rule does not allow cleanup standards to be based on actual site conditions. Instead, cleanup standards will be based on assumptions about exposure and toxicity that would overestimate risk. These are referred to as "default assumptions."

Fulbright & Jaworski also commented that the deterministic RBEL values given in the rule are significantly more conservative than similar values based on best-available science. Compared to the 90th percentile RBEL values, which is a typical percentile used by regulatory agencies that allow probabilistic risk-based decision making (e.g., California, Oregon), the soil ingestion RBEL calculated under the rule is 51 times more conservative than best available science would indicate. At least for the soil ingestion and dermal pathways, the cancer-based RBEL values are significantly more extreme than the noncancer-based RBEL values. Clearly, the cancer-based RBEL values will dictate PCLs at sites. The extent of overestimation is

variable among pathways, which indicates substantial scientific inconsistency among equations within the rule.

Fulbright & Jaworski believes, in general, the RBEL equations and input variables are impossible to evaluate for scientific validity because the rule fails to provide essential information (see Table 2). If evaluated pursuant to EPA's Policy for Risk Characterization (Browner, 1995), the section of the draft rule for calculating RBEL values fails all of the basic criteria required by EPA in risk assessments; namely transparency, clarity, consistency and reasonableness. The RBEL section of the rule is not transparent and not clear primarily because essential information is lacking. The RBEL values are inconsistent and unreasonable primarily because of the outmoded methodologies employed.

Fulbright & Jaworski commented that the results of the probabilistic analysis indicate the RBEL values given in the rule are overly conservative, particularly for carcinogenic substances, and lack pathway-to-pathway consistency (see Tables 3 and 4). According to the Newfields Report, the RBEL values upon which the Tier I PCLs are based will overestimate risk. For the RBEL values that could be analyzed for uncertainty, Newfields stated that "the deterministic RBEL values given in the rule are significantly more conservative than similar values based on best-available science." Newfields Report at 2. For example, the Newfields Report estimated that "the soil ingestion RBEL calculated under the rule is 51 times more conservative than best available science would indicate." *Id.* Analyses could not be conducted on all Tier I default values because the publication package did not contain information sufficient to do so. However, risk assessments performed pursuant to Tier 2 and Tier 3 would be expected to overestimate risk because they would employ algorithms similar to those used in Tier 1. Therefore, a cleanup standards set pursuant to those tiers would be overly stringent. Given that the RBEL values are only part of the mathematical process employed in deriving actual cleanup levels (i.e., PCL values), the amount of uncertainty and scientific inconsistency inherent in the overall process is additive and will be significantly magnified even further. The degree to which uncertainty and variability are compounded in deterministic methods as employed in the rule is directly related to the number of variables in the equations. To fully evaluate the full impact of the rule on the regulated community, both RBELs and PCLs associated with all pathways should be evaluated using the same probabilistic methodologies used herein for the soil and inhalation pathways. There was no information in the rule or accompanying documents sufficient to allow that evaluation to be conducted.

Henry, Lowerre, Johnson & Frederick commented that there are numerous concerns in the use of probabilistic risk assessment techniques. EPA has adopted, as a general policy, the consideration of the use of probabilistic risk assessment techniques in conjunction with the reasonable maximum exposure approach. Henry, Lowerre, Johnson & Frederick welcomes the opportunity to work with TNRCC in developing a mutually-workable approach to this challenging risk issue.

IT commented that probabilistic analysis methods are described in the preamble as requiring a level of sophistication far beyond the resources and knowledge of most federal and state regulatory agencies. Probabilistic analysis methods are similar or less sophisticated than many hydrogeologic fate and transport models used today.

The rationale given in the preamble for excluding probabilistic analyses from consideration in the TRRP rules is the same as published in 1993 to exclude their use under the Risk Reduction Standards. Research on probabilistic analysis and its applications has continued since 1993. The EPA has sponsored symposia and scientific reviews of methods and has provided guidance to help determine when a probabilistic analysis is appropriate and to specify requirements for an effective analysis (e.g., U. S. Environmental Protection Agency, Guiding Principles for Monte Carlo Analysis, EPA/630/R-97/001, March 1997). This guidance and others can serve as nucleus of experience to apply probabilistic analysis to those sites where it would be most appropriate and beneficial.

KOCH commented that a stated purpose of the proposed TRRP rules is to incorporate new and more scientifically sound methods and to update the risk reduction standards (preamble page 12). However, the proposed rules are silent on the issue of including commonly used, state of the art risk assessment techniques. The commission states in the preamble that they will not accept probabilistic (Monte Carlo) evaluations at this time. They apparently believe it will take "several years" for the commission to develop a policy framework and technical expertise necessary to review probabilistic evaluations. The commission continues by stating that probabilistic evaluations require a level of sophistication beyond the resources and knowledge of most federal and state agencies. They conclude that probabilistic evaluations have only been used on an "extremely limited basis" in the United States. These statements are incorrect and are not supported by actual developments in the field of risk assessment, the application in other regulatory programs and use in rule making.

Probabilistic evaluations are very powerful tools to incorporate natural variability and uncertainty into a risk assessment, clarify the often blurred distinction between risk assessment and risk management, and eliminate the insidious multiplication effect which leads to excessively conservative response objectives.

Probabilistic evaluations have been used since the 1950s in various engineering and business applications. Since the beginning of this decade, various EPA regional offices have published guidance documents on using probabilistic evaluations. The EPA Administrator and other headquarters staff have clearly stated the importance of using probabilistic evaluations. In 1995, ASTM felt sufficiently comfortable to recommend the use of probabilistic evaluations in their RBCA standard. In 1996 the EPA began formally supporting the use of probabilistic evaluations in risk assessments. The following year they published guiding principles for probabilistic evaluations. The EPA's support of probabilistic evaluations continues with the incorporation of probability distributions in the new Exposure Factors Handbook, the 1998 workshop on selecting input distributions, and plans to revise the Risk Assessment Guidance for Superfund to include probabilistic evaluations.

Probabilistic evaluations have been used by the EPA in rule making. For example, de-listing petitions using the Composite Model for Landfills, the RCRA Toxicity Characteristic Leaching (TCLP) rules, and the March 1991, water quality based toxics control program used probabilistic evaluations. The EPA has used probabilistic evaluations at Superfund sites (e.g., Rohm and Haas Bristol Landfill) and will use this approach for the Hudson River PCB Study.

Several of the exposure factors proposed in the rules (e.g., EF, ED, IR, etc.) have uncertain origins and are more the result of risk management decisions rather than based on actual data. Each of these factors has a range of applicable values that should be incorporated into risk assessment calculations. Allowing risk managers to only select arbitrary, upper-bound estimates for these calculations is inappropriate. The public would benefit from this knowledge on the range of values suitable for each exposure factor. This could eliminate or reduce the false sense of security that often results from reliance on a single input and single output.

The objective of a risk assessment is not to generate a "bright line" between what is safe and what is unsafe. Risk is the probability of harm occurring. The risk assessment calculations and output should reflect this probability. After more objective (and probabilistic) risk assessment calculations are completed, then risk managers and the public should decide how much risk is acceptable.

The multiplication of single point estimates, which are usually conservative, upper bound levels (i.e., 90th or 95th percentiles) leads to unreasonable exposure estimates. For example, a typical risk assessment calculation multiplies upper-bound estimates (e.g., exposure point concentrations, ingestion rates, exposure frequencies, and exposure duration) together to produce a chemical intake rate. By multiplying four 90th percentiles together, the intake rate now represents the 99.99th percentile of a population. Clearly this exceeds the intent of estimating reasonable maximum exposures (RMEs). Many other states have formally

adopted probabilistic evaluations. These include Arizona, California, Illinois, Iowa, Louisiana, Massachusetts, New Jersey, Ohio, Oklahoma, Oregon, South Dakota, Washington, and West Virginia. It is difficult to believe that all of these other state regulatory agencies have more experienced staff and technical expertise than Texas.

The commission should include probabilistic evaluations in the proposed rules. Legitimate concerns may exist over the commission's ability to evaluate probabilistic evaluations. However, the commission could have an outside reviewer evaluate these submissions. A person should be able to pay a reasonable fee to the commission for an outside reviewer to assess a submitted probabilistic evaluation. Alternatively, the commission could publish a definite schedule (e.g., within 12 months of promulgation) for establishing a sound, defensible framework for the use of probabilistic evaluations.

KOCH also commented that the commission states that it does not have the personnel or expertise to review probabilistic evaluations. These evaluations have been used successfully by the EPA and several regulatory agencies. The commission can either use outside reviewers or commit to a program of staff training. Alternatively, the commission could allow a person to pay a reasonable fee to have a probabilistic evaluation reviewed by an outside reviewer. A person should be able to use state of the art risk assessment techniques to incorporate site-specific variability. The proposed rule should be revised to allow use of probabilistic evaluations. As a compromise, a future date (e.g., 12 months after rule promulgation) could be established in the rules for the submittal of probabilistic evaluations.

SRA commented that while the protocols in the proposed program are state-of-the art in some areas, the omission of Monte Carlo simulation as a tool for the development of risk-based cleanup levels limits the information available for decision-making regarding the site. Although the preamble states that probabilistic methods are too sophisticated and resource intensive for the agency to handle, Monte Carlo simulation of exposure factors is decidedly less sophisticated and resource intensive than running a numerical fate and transport hydrogeological model. Tier 3 allows numerical models for evaluation of chemical fate and transport so it should also allow the use of probabilistic models to evaluate exposure and risk. There is a wide body of published literature from regulatory agencies and research institutions on this subject, much of which is located in the Society for Risk Analysis' journal *Risk Analysis*, that would assist the agency in determining how to implement this approach. This literature can serve as a nucleus for guidance to apply probabilistic analysis to those sites where it would be most appropriate and beneficial.

TCC/TXOGA commented that the agency has indicated in the Preamble, that ". . . At present, however, the agency does not have the personnel or expertise that would be necessary to support the use of probabilistic analysis techniques in evaluating contaminating sites." TCC/TXOGA believe that the agency needs to move toward this direction so that the best available science is incorporated/allowed and not necessarily three to five years away. The use of probabilistic methods is not new science and software is available (from EPA and states) which with guidance from TNRCC could be used in Texas. Allowing the use of the best risk assessment science will result in more sites remediated.

AFCEE commented that the preamble for §350.75 prohibits the use of probabilistic risk analysis because "at present, . . . , the agency does not have the personnel or expertise that would be necessary to support the use of probabilistic analysis techniques in evaluating contaminated sites." The rule does not say that probabilistic analysis is not scientifically valid, just that the staff is not adequately trained to handle the techniques. The AFCEE has investigated the use of probabilistic techniques and trained personnel to support the analysis. The AFCEE requests that the agency allows probabilistic techniques and either train agency staff to support its use or hire consultants to provide the expertise.

A number of commentors disagreed with the commission's decision to prohibit the use of probabilistic risk assessment techniques (e.g., Monte Carlo) at this time. In the preamble to the March 26, 1999 proposal, the commission briefly explained why probabilistic assessments were not

being allowed, while recognizing the validity and potential benefits of this class of statistical procedures. Several commentors found the rationale for not allowing probabilistic assessments unconvincing, and offered suggestions on ways to mitigate problems associated with the implementation of probabilistic techniques in the rule. Due to the number of comments received on this issue, the commission believes it would be beneficial to offer additional insight in terms of the issues which were considered by the commission in making the decision to not allow probabilistic techniques.

The commission wishes to clarify that it currently does have a limited number of technical staff who would be capable of reviewing probabilistic risk assessments. However, it is expected that the number of probabilistic assessments submitted would exceed the current resources of the commission. Comments which asserted that the number of probabilistic submittals would be very limited are inconsistent with the amount of attention given to this topic by commentors, as well as with information provided to the commission by the regulated community which indicated that the cost of conducting a probabilistic risk assessment is similar to traditional deterministic risk assessment. The commission does not want to be placed in a position where turnover or heavy workloads of several key technical staff who are assigned to review probabilistic assessments would delay the cleanup of sites in Texas. Further, in agreement with commentors who noted the complexity of the new rule, the commission is fully expecting that the rule will offer a technical challenge to agency staff, and that available training and development resources will have to be committed in order to meet that implementation challenge. It is clear that the review of probabilistic risk assessments, either directly by in-house staff or indirectly through oversight of outside contractors, will require additional agency resources.

With respect to concerns that the commission will fall behind the state-of-the-science if it delays immediate implementation of probabilistic assessments, the commission maintains that these types of assessments are not as widely applied in remediation risk assessment by state and federal agencies as some commentors suggest. Fulbright and Jaworski provided a list of state agencies where they believed probabilistic assessments were allowed. In contacting these agencies, it is apparent that there is a fundamental difference between a program which *does not specifically preclude probabilistic assessments*, and a program with *successful implementation of a comprehensive probabilistic framework*. For example, although Arizona was declared as having a well developed probabilistic program, staff informed the commission that only a single probabilistic assessment had actually been conducted in Arizona, and in fact, the risk assessment section was no longer in existence. There may be other circumstances which the commission or Arizona staff are not fully aware of, but nevertheless this is what the commission was told. Similarly, the EPA is only now beginning to explore the use of probabilistic assessments in back-calculating site-specific cleanup levels, and is proceeding cautiously.

In the preamble to the proposed rule, the commission recognized that probabilistic techniques have the potential to improve the characterization of uncertainty and variability in the risk assessment process, and committed to working with stakeholders in moving this process forward. The commission firmly maintains that a clearly defined and well-designed framework must be developed before probabilistic risk assessment can be successfully implemented in a remediation context. A key goal of this framework should be to establish appropriate guidelines which will ease the burden on agency staff and will serve to facilitate agency review in a consistent and timely manner.

With respect to the importance of this type of guidance, a parallel is offered in the commission's move from a background cleanup requirement to a comprehensive multi-pathway risk assessment approach to remediation. If the commission had simply opened up the risk-based process without specifying target goals, policy decisions, and other important criteria, the commission may have inadvertently jeopardized the entire risk-based process through delays in remediation and widespread inconsistencies. Similarly, the commission believes it is important to make certain that all critical

aspects of probabilistic-based decision making (e.g., identification of appropriate probability density functions, clarification on defining the tails of the risk distribution, guidance on back-calculation of cleanup levels) are addressed prior to modifying the rule to allow probabilistic risk assessment.

Fulbright & Jaworski commented that the deterministic approach employed in the draft rule completely removes the TNRCC's ability to include percentile of risk in the decision-making process. For example, the State of Oregon rules (OAR 340-122-084(l)(f)) define reasonable maximum or high-end exposures as those at the 90th percentile. It is not possible to calculate such percentiles using the methods given in the draft rule.

The commission disagrees with the comment that the use of a deterministic approach precludes consideration of the percentile of risk from the decision-making process. In fact, the exposure parameter values specified in the rule reflect the decision by the commission to base the calculation of RBELs and PCLs on protection of high-end segments of the population. The intent of this approach is to convey estimates of exposure in the upper range of the distribution, but to avoid estimates which are beyond the true distribution. Conceptually, high-end exposure means exposure above the 90th percentile of the population distribution, but not higher than the individual in the population who has the highest exposure. This approach should not be confused with “bounding estimates” or “worst-case scenarios” which are purposefully designed to overestimate exposure in an actual population (i.e., to be greater than the highest actual exposure in the population). Therefore, in accordance with EPA guidance, the commission selected exposure parameters which reflect high-end estimates for the one or two most sensitive parameters, while using central tendency or average values for all other exposure parameters. The commission believes that the approach employed in the rule as proposed is wholly consistent with that employed by other federal and state environmental agencies, including the State of Oregon. Oregon Administrative Rules (OAR) 340-122-0084 establishes a risk protocol for performance of human health and ecological risk assessments. The general requirements for the conduct of risk assessments is provided in OAR 340-122-0084(1). OAR 340-122-0084(1)(f) states specifically that “A plausible upper-bound or high-end exposure for both human health and ecological risk assessments is the 90th percentile upper confidence limit on the arithmetic mean of concentrations of hazardous substances that would be contacted by an exposed receptor and reasonable maximum estimate of the exposure factors used in the risk calculations, unless a greater or lesser best estimate is acceptable to the Department.” As already discussed, the approach employed by the commission was designed to approximate the 90th percentile of the population distribution. This is clearly consistent with requirements of the State of Oregon.

Further, the commentor should note that development of the TRRP reflects a determination made by the commission that the state-of-the-science was sufficient to warrant moving away from requiring that all investigations, notifications, and cleanups be to background levels. In the course of making this determination, the commission concluded that although there were uncertainties, conservative assumptions could be made in the derivation of RBELs and PCLs such that the commission could ensure protection of human health and the environment, yet move off past practices of investigating, notifying and cleaning to background levels. Embodied in this decision is the belief that as the state agency charged with the protection of human health and the natural resources of Texas, erring on the side of caution was critical in cases where uncertainty exists. Therefore, the commission determined that it was appropriate to develop RBELs and PCLs which would be protective of individuals who are more highly exposed rather than limiting protection to the average individual.

Finally, the commission acknowledges that probabilistic techniques have the potential to improve the characterization of uncertainty and variability in the risk assessment process and has committed to working with stakeholders in evaluating the utility of such techniques.

McCulley Frick & Gilman commented that the general philosophies reflected in the human health and ecological evaluations specified in the rule seem very inconsistent. It is clear that the ecological evaluation considers site-specific conditions of paramount importance. Notably, §350.77(c)(8) includes a requirement to develop an uncertainty analysis associated with the screening-level (Tier 2) ecological risk assessment, yet there is no discussion of performing an uncertainty analysis for the human health risk evaluation. An uncertainty analysis related to the development of the human health PCLs is of equal importance, particularly since many of the input values used in the calculations of the RBELs and PCLs are highly uncertain. For example, the default values for dermal absorption factor and age specific adherence factors used in the development of the $^{Soil}RBEL_{derm}$ values are highly uncertain. For many chemicals, the dermal pathway contributes significantly to the $^{Tot}Soil_{Comb}$ PCL; therefore, a discussion of the uncertainty associated with the development of PCLs is important. Since the Critical PCL is a single number (i.e. the most stringent of the PCLs) which may trigger extensive lateral delineation and/or costly remediation, the responsible party and the TNRCC should be aware of the uncertainties associated with the Critical PCL. Furthermore, McCulley Frick & Gilman stated that it is likely that the critical PCL will reflect future exposure assumptions, which in turn include more uncertainty than PCLs developed based on known current exposure conditions. Therefore, McCulley Frick & Gilman stated that to require the use of the Critical PCL to determine if a response action is necessary is overly restrictive. McCulley Frick & Gilman recommended that each of the PCLs developed for a particular site be evaluated in terms of their associated uncertainty prior to selecting a site specific target PCL. They also recommend that the definition of the critical PCL be revised to reflect the uncertainty associated with developing remediation targets. They believe that this approach will benefit the TRRP overall because the responsible party will be able to develop alternate PCLs based on a variety of exposures assumptions, including default TRRP assumptions. The responsible party and the TNRCC may then choose the appropriate target values based on site specific land use patterns.

Development of the TRRP reflects a determination made by the commission that the state-of-the-science was sufficient to warrant moving away from requiring that all investigations, notifications, and cleanups be to background levels. In the course of making this determination, the commission concluded that although there were uncertainties, conservative assumptions could be made in the derivation of RBELs and PCLs such that the commission could ensure protection of human health and the environment, yet move off of past practices of investigating, notifying and cleaning to background levels. Inherent in the development of each RBEL and PCL, the commission has in a sense specified the level of uncertainty it is willing to accept. Embodied in the decision concerning the acceptable level of uncertainty is the belief that as the state agency charged with the protection of human health and the natural resources of Texas, erring on the side of caution was critical in cases where uncertainty exist. The commission maintains that if the science was in fact as uncertain as many commentators seem to be suggesting, there would be no basis for moving away from requiring that all investigations, notifications, and cleanups be to background levels. Further, the commission acknowledges that probabilistic techniques have the potential to improve the characterization of uncertainty and variability in the risk assessment process and has committed to working with stakeholders in evaluating the utility of such techniques.

With regards to general process, Henry, Lowerre, Johnson & Frederick commented that TNRCC has also not prepared and distributed summaries, outlines, or comparisons of the proposed TRRP with existing rules and with existing programs. The lack of such documents and the failure of TNRCC staff to prepare responses to comments on prior drafts or comparisons of the proposed rules to the prior drafts has made participation by the public in the time allocated almost impossible. While the staff may have had no intention of doing so, its failures or lack of time and resources to assist the public makes it appear that the agency has attempted to limit the ability of the public, local governments, the press and others to evaluate and comment on the proposal. Moreover, TNRCC has not created a "record" for the rulemaking. TNRCC has made no provisions for a central or regional repository of the materials developed by TNRCC staff or submitted to TNRCC as part of the rulemaking process. Nor has the agency allocated resources necessary

to support public access to such documents. The good work that has been done by TNRCC's staff during the development of the draft TRRP can and should be salvaged. TNRCC should apply the improvements over which there is no disagreement to the current Risk Reduction Rule. As shown in Attachment 1 of the commentor's letter, despite valiant efforts, TNRCC staff was not able to assemble the basic records for public review in a timely fashion. The record needed to be maintained from the beginning, not pulled together when it was requested.

Henry, Lowerre, Johnson & Frederick commented that TNRCC has not created a record or a coordinated process for public access to documents prepared by TNRCC or submitted to TNRCC as part of the rulemaking process. These documents have been filed with TNRCC and are found in the Austin office. The inability of TNRCC to provide public access to its documents has greatly limited the ability of the public to participate in the development of this proposal. They ask that TNRCC's copy of the documents not attached as part of these comments be included in its record for this rule docket. They ask that the comments in these documents be considered and that TNRCC prepare responses to them as if they were set forth fully herein. Therefore, TNRCC should develop a new proposal for rulemaking based on the comments to the current proposal and create a process for effective public outreach and public input to the rules.

In response to Henry, Lowerre, Johnson & Frederick's concerns that the agency did not prepare and distribute summaries, outlines, or comparisons of the proposed TRRP with existing rules, the commission did in fact compare key provisions of the proposed TRRP rule with the Chapter 335 TRRP Rule and Chapter 334 PST rules in the preamble to the proposed TRRP rule. The commission has also created a record of the rulemaking. As noted at the beginning of the preamble in the SUMMARY, records associated with the development of the TRRP are located at the State Library & Archives and at TNRCC Building D Central Records. The files are updated regularly and available for viewing and photocopying by the public.

The commission is concerned that Henry, Lowerre, Johnson & Frederick has the impression that agency staff have attempted to limit the ability of the public, local governments, the press, and others to evaluate and comment on the proposed rule. On the contrary, the agency in no way attempted to limit the participation of these stakeholders in the rulemaking process. In fact, the rule has been the subject of an unprecedented level of public input. Since December 1995, staff have discussed the proposed rules in public forums such as TNRCC Regulatory Forums, public meetings and public hearings, workshops, etc. Requests from the press to discuss the proposed TRRP rules have always been accepted throughout the development of the rule. In addition, two concept papers, discussed in the "History of the Rulemaking" section of the preamble, were made available for broad public comment.

As Henry, Lowerre, Johnson & Frederick noted, agency staff have met with representatives of industry during the course of developing the rule to attempt to understand the impact of the proposed rules on various industry segments. The commission notes that staff also met with local government and environmental/public interest stakeholders during development of the rule to understand the impacts of the TRRP rule from their perspective.

Henry, Lowerre, Johnson & Frederick commented that with regards to general process, part of this problem must be attributed to the significant amount of time that the TNRCC staff has spent in meetings with representatives of the regulated industries. TNRCC has, in effect, created ad hoc advisory committees in violation of Texas law. TNRCC staff then had to spend tremendous amounts of time assisting the members of the advisory groups. There were no similar efforts for outreach to the public.

Henry, Lowerre, Johnson & Frederick suggested that TNRCC divide up the major policy issues raised by the proposed TRRP for evaluation in a series of steps. Each step should focus debate on one of the most

significant policy issues, such as the appropriate level for risk, the use of private condemnation versus the alternative current remedies, etc. TNRCC could make some significant improvements to the current rules now and improve them incrementally over the next few years. Responses are needed for all known cases of contamination; however, in almost all cases, there is time to make sure the responses are proper. Certainly the five year period needed for developing the proposed TRRP indicates that the issues are difficult and that TNRCC need not rush into new rules.

Henry, Lowerre, Johnson & Frederick commented that TNRCC can test the major policy changes proposed by the TRRP on a small scale or pilot level to make sure that they do not create bigger problems than they solve. TNRCC should test any significant and controversial change that results from a major policy shift by using a number of active sites that are selected for a trial run of the major changes in the rules. The sites should reflect the real world, i.e. comprise a set with a variety of conditions representative of what the rule could expect to encounter. Evaluate its strengths and weaknesses based upon this trial run, avoid the pain of learning with a final rule, which is much harder to change.

The commission intends to move forward and implement the rule in whole rather than in a piecemeal fashion. As Henry, Lowerre, Johnson & Frederick noted, the development of the rule has been ongoing for four (not five) years. Due to the level of public input in the process, the commission contends that those affected by the rule should be knowledgeable about the requirements of the rule. A piecemeal approach would only serve to cause confusion by mixing and matching programs. Additionally, the TRRP was developed as an integrated corrective action program; therefore, pieces of the rule are dependent upon other pieces. For example, the affected property assessment is dependent upon the development of protective concentration levels which is dependent upon the location of points of exposure.

Fulbright & Jaworski commented that in order to substantiate the need for and validity of the proposed rule, the published record should have provided the following information: Information regarding the practical flexibility for achieving cleanup standards (see 24 TexReg 2213) afforded by the proposed rule's remedy standard provisions. The published record gives no specific examples of how this flexibility would be realized in practice. Without specific examples, the published record fails to demonstrate that such flexibility will actually be afforded under the proposed rule.

Flexibility is provided by the remedy standards in several regards. First, Remedy Standard A can be achieved in a self-implemented fashion. Persons must file a self-implementation notice, but then initiate and proceed into completion of the remedy, providing response action effectiveness reports to demonstrate remedial progress. Persons are free to use any appropriate remedial strategy, including monitored natural attenuation, provided exposure hazards are addressed and the response is timely in the context of conditions at the affected property. Under Remedy Standard B, persons are able to avail themselves of exposure prevention remedies, without first proceeding through a formal remedy selection process/corrective measures study. For example, if the affected property already has an effective cap in place in the form of a parking lot, that parking lot may be the remedy for the site. Or, such response actions may be factored in during construction associated with Brownfield re-development. Specifically, with regard to class 2 and 3 groundwaters, persons may establish plume management zones in appropriate situations for on-site and off-site residential and commercial/industrial properties, and manage the groundwater plume to control its extent and prevent exposure to it in lieu of cleaning up the plume. Persons with ecological hazards may be allowed to provide compensatory restoration in lieu of cleanup of the actual affected area. Persons are required to file and seek approval of a response action plan under Remedy Standard B and obtain the concurrence of the landowner to file any necessary institutional controls. Also, for existing chemical plants and refineries under hazardous waste permit or commission corrective order, parties can establish facility operations areas when rule criteria are met, and defer the final application of

Remedy Standards within the facility operations area until the end of the life of the facility operations area.

Fulbright & Jaworski commented that in order to substantiate the need for and validity of the proposed rule, the published record should have provided the following information: Information sufficient to justify the proposed rule's default-based administrative consistency at the expense of setting cleanup standards that would not be consistent between the sites. Although the published record discusses the need for administrative consistency, it gives no factual examples of instances where differences in corrective action levels have led to results deleterious to program administration or to regulatory compliance. Without such information, the published record fails to support the need for administrative consistency.

The commission has numerous examples of corrective action delays while the acceptability of unsubstantiated site-specific exposure factors included in site-specific risk assessments are debated. Such situations have not uncommonly been mired for years. In fact, the situation was getting so taxing on staff that on July 23, 1998, the Remediation Division issued an Interoffice Memorandum for the Implementation for the existing TRRP rule, referred to as the "consistency document," which effectively standardized some of the "site-specific" pathways. The guidance was needed to move sites and allow consistent decisions to be made where there was no basis for making the alternative judgements as included in the risk assessment. The commission acknowledges the rule is a shift from current practices, but one that is justified. However, the commission is willing to avail staff to meet with stakeholders after the adoption and implementation the rule to visit issues such as the use of probabilistic techniques to determine how a more comprehensive program can be developed in that regard which does not overburden the commission or inappropriately place the public and environment at risk.

Fulbright & Jaworski commented that in order to substantiate the need for and validity of the proposed rule, the published record should have provided the following information: Information sufficient to allow the regulated community to analyze how the default values and requirements would affect risk estimates, how the proposed rule would be implemented in many respects, and whether the proposed rule would impose cleanup standards appropriate to site conditions. Information required to conduct this analysis would include, for example, the equations and assumptions that will be set forth in the pending guidance and that are discussed in the Newfields Report.

Fulbright & Jaworski also commented that in order to substantiate the need for and validity of the proposed rule, the published record should have provided the following information: Information regarding the lack of consistency in margins of safety that would be imposed through the proposed rule's default-based standards. Without such information, the regulated community cannot know the impact of the proposed rule on environmental protection and related cost considerations.

The commission maintains that much of this information was provided in either the proposed rule or previous versions of the Concept Document. However, in order to limit the size and complexity of the proposed rule, much of the technical detail provided in the Concept Document was not reiterated in the rule. Further, by making the Tier 1 PCLs available during the comment period, the commission believes it has provided all the information that is necessary for a person to determine the impact of the Tier 1 requirements on environmental protection and potential remedial costs. While these Tier 1 PCLs are reflective of the "default-based standards" discussed by the commentor, the commission also stresses that the tiered design of the rule encourages the application of site-specific information in Tiers 2 and 3 to develop cleanup levels which are most appropriate for site-specific conditions. Although the commentor criticizes the commission for providing certain general requirements without mandating how these requirements would be implemented at all sites (e.g., aesthetic issues, handling substantial changes in circumstance), the commission believes that these issues are best handled on a site-specific basis, and is concerned that establishing generic requirements could lead to

unsound and inflexible rule implementation. The commission further notes that the site-specific handling of these issues in the proposed rule does not represent a fundamental change in commission policy, as these issues are similarly handled in the current Risk Reduction Rule. Further, the commentor criticizes the fact that all equations that will be used in guidance have not been made available. The only other equations that would be provided are for Tier 2 PCLs, and given that Tier 2 is non-binding (Tier 1 or 3 may be used), the absence of the Tier 2 equations should not have any undue consequences.

Henry, Lowerre, Johnson & Frederick stated that the comments presented here involve new issues or issues not fully discussed in prior comments. The size and complexity of the rules and the extent of changes since the last version published create enormous problems for anyone trying to provide comments to TNRCC. The time provided for comments is entirely too limited. TNRCC's short extension of the comment deadline did not provide for the opportunities for public participation requested by many individuals and organizations. Evaluation of the new RIA alone requires a great deal of time. Nevertheless, comments are provided in the hope that the commission will seriously evaluate its proposed rules and the problems that they create for the public health, property rights, protection of urban and rural communities and protection of the environment. They also commented that even with the two week extension of the comment period, TNRCC did not provide adequate time for preparation of the type of detailed comments needed on the rule. An evaluation of the 80 page draft regulatory impact statement alone is a major undertaking. It is new and has not been available in the past. They again urge that the rules be rejected or that the comment period be extended by 60 days to allow for a full review and the preparation of comments that can include recommended changes to the specific sections of the rules. (Such comments were provided in the last round). Without this time needed, it is not possible to provide any comments except ones that point out the problems.

The commission granted an extension of the comment period from April 26, 1999, to May 11, 1999, and given that this was the second formal proposal of the rule, which followed public comment periods on two concept documents, the commission is of the opinion that ample time and opportunity have been provided. The commission acknowledges that this was the first opportunity to review and comment on the RIA, but still maintains adequate time was provided for persons to review the document and to provide meaningful comments.

Henry, Lowerre, Johnson & Frederick commented that the program requires pollution to be cleaned up only to the extent that there is an acceptable risk to the public health and the environment. There is little chance that a potentially exposed party will ever really know what that risk level is due to the various complex and muddled and flexible assumptions made about toxicity, exposure, and environmental fate.

The commission acknowledges that a risk assessment process can be complex but disagrees with the general assertion of the comment. Even though the rule does not require an explicit estimation of potential risks associated with the affected property, these PCLs are in fact based on a cancer risk level of 1×10^{-5} or less. Additionally, pursuant to §350.91(b)(11), PCL calculations will be documented such that the agency can verify the procedures used to document PCLs and exposure assumptions.

Amoco supports the comments of TCC and TXOGA.

Brown & Caldwell commented that these rules provide responsible parties with a sound, flexible framework to address Response Action. Further, they feel that these rules provide a good balance of risk reduction and resource protection, while allowing corrective action to be addressed in a cost-effective manner.

Chevron commented that the current proposal represents a refinement of the initially proposed rules. Nevertheless, further refinement is necessary to ensure that certain aspects of the proposed rules do not unduly burden the regulated community in a way that negates all other potential benefits of the rules.

Eastman commented that they are supportive of and agree with the use of a risk-based approach to determine the need and extent of any clean up or remediation. This approach is both protective of human health and the environment and helps ensure that limited resources are directed to areas where they will provide the most benefit and protection.

Exxon also commented that it supports the use of a tiered approach that includes considerations such as land use, groundwater classification, natural attenuation, and use of engineering and institutional controls. Exxon acknowledges that the TNRCC has made substantial progress toward a rule that would improve the remediation of contaminated sites by implementing these considerations. Exxon appreciates the TNRCC's substantial efforts to draft the proposed rule and its willingness to discuss various provisions of the proposed rule during the comment period.

Exxon supports the TNRCC's efforts to implement risk-based environmental cleanup standards in the State of Texas. Exxon supports the use of a tiered, risk-based approach to environmental assessment and remediation.

Henry, Lowerre, Johnson & Frederick commented that they support the risk reduction concept. It can reduce the costs of environmental cleanups, while providing protection to the public and the environment.

TCC and TXOGA commented that they continue to be supportive of a tiered risk-based framework to determine the need for and extent of cleanup at sites identified through TNRCC waste programs. A risk-based approach effectively provides facility risk managers and agency regulators with the information necessary to determine cleanup levels protective of human health and the environment. The use of multiple "tiers" allows the level of effort expended to determine appropriate protective levels to be commensurate with the complexity of the site or magnitude of the problem. While they support the changes and feel the TNRCC has improved the TRRP, TCC and TXOGA believe there are still significant issues of concern including limited flexibility in Tier 3 (inability to change exposure factors; agency policy not allowing the use of probabilistic techniques to give a more representative evaluation of the site, etc.); use of restrictive covenant; and scope and timing of notification. Protective cleanup standards based on land use and class of groundwater that allow for the consideration of natural attenuation, institutional and engineering controls, and fate and transport modeling are positive ingredients incorporated within the TNRCC proposed framework. TCC and TXOGA also commented that they support the limited flexibility allowed in Tiers 1 and 2.

TU believes the revised proposed rule is a significant improvement over the draft rule published in May, 1998.

TPWD commented that the department supports the efforts of TNRCC to establish a single set of risk based procedures that would apply to the cleanup of all sites, regardless of which TNRCC remedial program has the responsibility to manage them. This consolidation of evaluation techniques will ultimately result in more efficient and responsive remediation activities utilizing protective criteria, thereby reducing risks to human health and the environment. The department particularly appreciates provisions within the proposed rule requiring that an appropriate level of ecological risk assessment be conducted and the results be considered in the establishment of site specific clean-up standards.

The commission agrees that the rule is a refinement over the 1998 proposal and with the support for the risk-based approach. The commission also agrees that the rule provides a sound, flexible framework. The commission acknowledges the industry concern and sincere opinions that further

refinement is warranted. The commission is adopting this rule today, but commits to evaluation of the rule routinely and will seek to mitigate untenable situations to the extent possible. The commission fully understands that after implementation and evaluation of the rule, amendments may become necessary over time.

With regards to general work session, Chevron commented that leading up to and after the adoption of the TRRP, stakeholder committees and commissioner work sessions should be instituted to develop TRRP guidance documents that adequately consider stakeholder issues.

Chevron recommended that commissioner work sessions be instituted to discuss the major legal and policy issues associated with the TRRP. Chevron believes that the TNRCC and the public would be better served if the commissioners were more fully informed and consulted through the commissioner work session process regarding the key policy and cost impact issues raised above. Over the past few years, the commissioner work session process has become a favored policy-making tool at the TNRCC, for good reason: it facilitates a thorough yet efficient discussion of key policy issues between staff and the three commissioners which is not always available in the formal rulemaking process. Many key TRRP policy issues that have received extensive comment from the regulated community have yet to be discussed in a commissioner work session. This process need not unduly delay the final promulgation of the TRRP because the work sessions could be instituted immediately and concluded with sufficient time to adopt amended rules before the six month deadline set out in §2001.027 of the APA. Of course, even if the six-month deadline could not be met, the value of the work session process and the potential impact of the TRRP fully warrant the withdrawal and ultimate re-proposal of an amended TRRP.

The commission concurs that work sessions have become a very valuable tool. Further, the commission acknowledges that, in some instances, work sessions may be the appropriate forum for a limited number of important legal and policy issues related to the TRRP following adoption of the rule. At this time, however, the commission does not wish to commit itself to any specific issues or scheduled work sessions. As stated elsewhere, the commission is committed to an appropriate level of stakeholder involvement in the development of guidance for the rule.

General Comments on Tiered 3 Flexibility

Concerning additional flexibility at Tier 3, the commission received many comments. In some cases, the commentors specifically directed their comments at Tier 3 flexibility. In other cases, comments were specifically directed at specific sections, primarily in Subchapter D. Finally, some comments were directed at the use of probabilistic risk analysis. The commission has responded to comments on probabilistic risk in another response.

ARCADIS Geraghty & Miller, Campbell, George & Strong, Chevron, Environmental Resources Management, Fulbright & Jaworski, IT Corporation, KOCH, McCulley Frick & Gilman, Mobil, Phillips, SRA, TCC, TXOGA, and AFCEE requested more flexibility in Tier 3. The commentors indicated that the limited flexibility is unnecessarily restrictive and overly burdensome. Under Tier 3 it should be possible to vary more default exposure factors to take into account site-specific conditions. Provisions allowing site-specific risk assessment would allow the responsible person to base the points of exposure, pathways to be analyzed, fate and transport assumptions and models, exposure assumptions and models, toxicity factors, and chemical/physical parameters on site-specific data. In addition to Tier 3, McCulley Frick & Gilman also recommended variances from defaults for all exposure assumptions for Tier 2 and 3 evaluations. The commentors asserted that limitations on site-specific variations over-estimate risk, reduce the reliability of risk assessments, eliminate the use of professional judgement, increases cost, and is not consistent with the appropriate practice and philosophy of risk assessment. SRA specifically expressed concern with the use of purely hypothetical "worst-case" scenarios and assumptions required in the proposed TRRP combined with the limited flexibility. Campbell, George & Strong, Chevron and McCulley Frick & Gilman were

critical of the "One size fits all" approach commenting that all sites are not the same and it is incumbent on the TNRCC to evaluate sites (including the calculation of PCLs) on a site-specific basis. Environmental Resources Management, Fulbright & Jaworski, IT Corporation, McCulley Frick & Gilman and SRA asserted that site-specific approaches to setting cleanup standards have been adopted by the EPA and several states. IT Corporation and SRA cited EPA, Exposure Factors Handbook, Vol. I - III, Office of Research and Development, EPA/600/P-95/002a, August 1997. McCulley Frick & Gilman cited EPA's recently issued guidance (1998) that was intended to standardize planning, reporting, and reviewing Superfund risk assessments does not discourage the use of site-specific information or alternate, scientifically valid approaches for assessing risk as does the proposed rule.

Fulbright & Jaworski recognizes that default values may be used to set protective and cost-effective cleanup standards at some sites. Thus, Fulbright & Jaworski supports the use of the default values if the proposed rule allows the use of site-specific data and risk assessment methods where appropriate to derive protective and cost-effective standards. The risk would be assessed through the use of deterministic or probabilistic methods. McCulley Frick & Gilman recommended that the revised language indicate that other data from the open literature can be used in place of the default as well as data collected from site-specific studies. Chevron, Environmental Resources Management, KOCH, McCulley Frick & Gilman, and AFCEE inferred that the TRRP has substantially less flexibility built into it than the current Risk Reduction Standards because a person is able to incorporate "reasonable expected future exposure conditions at the facility" into the media cleanup levels under the current rules in §335.563(d)(3). The commentors also indicated the existing rules allow the use of site-specific data which deviates from standard exposure factors in §335.563(e)(1). AFCEE commented that the existing Risk Reduction Standard Number 3 allows for the use of a site-specific baseline risk assessment to evaluate the need for cleanup, and they recommended allowance of the baseline risk assessment. KOCH stated that modifying only natural attenuation factors provides very limited latitude in accurately reflecting all of the site-specific issues that can affect potential exposure and risk. Chevron commented that §350.74(j)(3) specifies those factors that cannot be changed. For example, the rule states that the person shall not vary skin surface area factor. This assumption will likely be unrealistic for many sites. Some facilities have Health and Safety Plans that all on-site workers and contractors must follow, including the use of gloves or other personal protective equipment. The required use of personal protective equipment should be considered in determining skin surface area contacted. Chevron, Mobil, TCC and TXOGA for a Tier 3 analysis the exposure factors shown in (A), (C), (D), (E), (G) or (H) may be modified provided adequate scientific and site-specific justification is provided and subject to executive director approval."

McCulley Frick & Gilman expressed concern that the rule restricts the person from calculating any soil cleanup levels during a Tier 2 or 3 evaluation other than those provided in Tables 1 and 2 for the Tier 1 $^{Tot}Soil_{Comb}$ PCL for all compounds since many exposure parameters can not be varied without a tremendous burden to the person. This effectively will make the soil PCLs for almost all sites in Texas the Tier 1 total soil combined values, regardless of the tier.

Phillips stated that the TRRP process allows the compounding of overly conservative assumptions and disallows modifications of parameter inputs to the risk assessment at any tier regardless of site specific data (or allowing such modification only under extremely onerous circumstances). The TRRP also requires the inclusion of mandatory pathways with limited ability to eliminate incomplete pathways (i.e. consider existing physical controls). The TRRP does not allow the use of probabilistic risk assessment techniques such as Monte Carlo, currently being implemented in similar programs by states including Oregon. The risk assessment process in the TRRP, like others, is inherently conservative and therefore requires the flexibility to modify assumptions and procedures based on the application of "good science".

ARCADIS Geraghty & Miller suggested that the needed flexibility could be incorporated into Tier 3 by limiting the use of alternate approaches to Remedy Standard B. McCulley Frick & Gilman commented that notice in the deed record will prevent future land owners from greater exposure conditions, or the

evaluation will be re-opened for additional consideration as described in §350.35 Substantial Change in Circumstances.

Fulbright & Jaworski suggested maintaining the tiered approach with the following changes: Tier 1) screening: The first tier would be similar to the proposed Tier 1; however, the screening values would be evaluated to better understand uncertainty and level of conservatism and to provide greater transparency; 2) Cleanup level development through streamlined risk assessment: The second tier would have elements of the proposed Tiers 2 and 3; however, use of site-specific data would be encouraged; and 3) Cleanup level development based on site-specific circumstances and defensible scientific methods: This approach would allow variation of any default exposure factor or pathway based on site-specific circumstances and would provide for use of complex models and statistical approaches. This approach is not allowed in and apparently was not considered as an alternative to the proposed rule.

KOCH noted that a recent peer-reviewed article by Valberg et al. provides an excellent example of using appropriate site-specific values while still protecting human health and the environment. The authors reviewed soil cleanup levels for arsenic cited in EPA Records of Decision (RODs) for a series of Superfund sites. The soil cleanup levels covered a million-fold range, from 0.004 milligrams per kilogram (mg/kg) (Thermo Chem, MI) to 1,000 mg/kg (Old Works/East Anaconda Development Area Site, MT; recreational use). All of the levels are protective of human health and the environment. The development of these RODs also included appropriate public participation. This variability in soil cleanup levels reflects both variations in site-specific characteristics and differences in risk assessment methodology. A similar level of variability or flexibility must be incorporated into the proposed TRRP rules.

Fulbright & Jaworski commented that, if promulgated, the proposed rule would not meet the goal of imposing protective and cost-effective cleanup standards that are consistent across sites. The proposed rule would set cleanup standards on the basis of default exposure assumptions (e.g., exposure factors, exposure pathways and toxicity factors) and requirements that do not reflect actual site conditions (e.g., points of exposure). Instead of allowing the regulated person to use actual data where appropriate, the proposed rule forces the person to assume that certain physical/chemical parameters, exposure pathways, and exposure parameters exist at the subject site. The proposed rule does not allow the person to vary those parameters and pathways without meeting extensive public notice requirements. Therefore, the proposed rule would not allow actual site conditions to be significantly considered in setting cleanup standards.

Environmental Resources Management and KOCH commented that Tier 3 in the national ASTM risk-based corrective action standard allows the use of any and all available site-specific information, including historic analyses, simulation model inputs, and the use of such long recognized statistical methods such as probabilistic analyses for assessing site risks and developing cost-effective cleanups that eliminate unnecessary actions. KOCH also stated there are other differences between ASTM and TRRP. As described by ASTM, a person should have the option of replacing non-site-specific assumptions and point(s) of exposure with site-specific data and information. This would include potential changes to any exposure factor or relevant parameter. This process of selecting site-specific data and information in a Tier 2 evaluation should be rapid and simple while still protecting human health and the environment.

With regard to the level of flexibility requested regarding human health exposure pathway analysis, commentors are overly focused on the current use and conditions of the affected property. Insufficient consideration is being given to the future. Persons are desiring the outright flexibility to qualitatively eliminate what in the future may be fully viable exposure pathways.

Many commentors stated that they should be given greater flexibility in the selection of relevant exposure scenarios, pathways, parameters, and toxicity factors to be used in the derivation of RBELs and PCLs for their sites. The commentors believe that persons should be allowed to determine the level of cleanup necessary at their site based on the specific use of the property today. The

requirements concerning evaluation of specific exposure scenarios and pathways, and use of specific exposure parameters in the proposed rule are the direct result of several fundamental policy decisions made by the commission early on in the development of the TRRP. First, the commission had to make a determination as to whether the state-of-the-science was sufficient to warrant moving away from requiring that all investigations, notifications, and cleanups be to background levels. The commission determined that although there were uncertainties, conservative assumptions could be made in the derivation of RBELs and PCLs such that the agency could ensure protection of human health and the environment, yet move off of past practices of investigating, notifying and cleaning to background levels. Embodied in this decision was the belief that as the state agency charged with the protection of human health and the natural resources of Texas, erring on the side of caution was critical in cases where uncertainties exist. In making such a determination, it is clear that the commission disagrees with the comment by Henry, Lowerre, Johnson & Frederick presented in the general concerns portion of the response to comments section of this preamble that "The scientific understanding necessary to assess accurately the human health and ecological risks posed by environmental contaminants is currently and will be for the foreseeable future insufficient for safe uses of the assessments proposed under the TRRP." Second, the commission had to make a determination as to whether the goal of the proposed TRRP was to restore commercial/industrial land use to some reasonable unrestricted, active and productive use or to some restricted use based on how a person is specifically using a property today. The rule as proposed reflects the decision by the commission that all commercial/industrial properties should be restored for some reasonable unrestricted, active and productive use. The commission agrees with the comment from Henry, Lowerre, Johnson & Frederick, as well as that of the PIC, both present with the responses to comments on §350.74(j)(2), that there are too many variables beyond the person's future control to have any degree of assurance that necessary restrictions associated with variances in default exposure parameters could be enforced indefinitely. In addition, allowing each individual property to be remediated based on its unique particular use at a specific point in time would place an overwhelming burden on the agency to ensure that all such sites were in fact protective for future uses. The commission believes, therefore, that requiring evaluation of a minimum set of specific exposure scenarios, pathways, and default exposure parameters will ensure that commercial/industrial properties are restored for a reasonable, unrestricted, active and productive use.

Several commentors here and in comments submitted §350.71(c) stated specifically that the rule should allow for the elimination of specific exposure pathways if it can be demonstrated that there are controls in place at the site to prevent contact (e.g., physical controls such as parking lots, requirements that workers wear personal protective equipment (PPE), etc.). In contrast, other commentors strongly supported the requirement for consideration of mandatory human health exposure pathways. The PIC, as presented with the responses to comments on §350.71(d), stated that "The person should not be allowed to circumvent the requirement of filing an institutional control (noting the use of the existing physical control) by 'screening out' the affected exposure pathway and thereby creating a fiction that the person has achieved a Standard A remedy." To allow qualitative exposure pathway screening on the concept of no exposure, no risk, effectively retards the degree of affected property assessment. In other words, the conditions of the property with respect to the presence/absence of COCs across the affected property would never be determined, as there would be no compelling reason to do so. Because of the lack of full understanding of the COC conditions at the affected property there is no basis of understanding of how a property should or should not be used in the future to prevent exposure to the existing COCs. As property uses shift, or as companies defunct and the environmental contamination becomes a public liability, there is nothing to fall back on. The project is essentially and substantially at the front end of the corrective action process as only very limited assessment has been completed, there is inadequate understanding of potential exposure pathways, and there is no understanding of how to quickly manage the site. The PST program has allowed a qualitative exposure pathway analysis approach to date for petroleum fuels because the risks are more limited. The behavior of the petroleum fuels in

the environment has been extensively characterized and the behavior of the petroleum fuels in the environment is fairly invariable across PST sites. The probable extent of petroleum fuels can be fairly certainly assumed (and where it can not be full assessments are required) to be a few hundred feet or less from the source, the petroleum fuels are readily amenable to natural degradation so they readily reach equilibrium and attenuate, the sources of the releases are fairly certainly known, and the release volumes are usually limited. When such strategies are opened in a broad sense, the level of confidence and predictability vaporizes.

The commission believes that §350.71(d) of the proposed rule provides sufficient flexibility for consideration of competent existing physical controls in that persons would not be required to remediate a site in cases where a competent existing physical control such as a parking lot was already present, just to incorporate that physical control as a Remedy Standard B response action. The commission believes that such an approach strikes an appropriate balance in that all critical potential exposure pathways are considered in the establishment of the assessment level which is necessary to determine the extent of contamination, as well as the adequacy of the existing physical control. If it is then determined that the existing physical control is in fact adequate, that physical control can be incorporated as a Remedy Standard B response action and no further action may be necessary. The commission believes that it would be inappropriate to allow persons to eliminate specific exposure pathways based on consideration of an existing physical control prior to calculating a PCL, since that PCL is the assessment level used to determine if the existing control is in fact adequate (e.g., does the existing parking lot extend over the entire area of concern?).

In addition, several commentors expressed concern that the rule as proposed precludes the incorporation of site-specific information in lieu of standard default assumptions in calculating human health-based RBELs and PCLs. The commission disagrees with this comment and believes that the rule as proposed already allows the incorporation of site-specific information in the development of human health-based RBELs and PCLs as specified in §350.73(e)(1) and (2), §350.74(j)(1) and (2), and §350.75(b)(1), (c)(2) and (d)(2). The commission acknowledges, however, that there appears to be a difference of opinion as to what the term "site-specific" means. For the purpose of the proposed rule, the commission interprets the term "site-specific" to mean a physical characteristic that is inherent to the affected property (e.g., soil pH, soil foc) or an exposure assumption that is governed by a physical characteristic that is inherent to the affected property (e.g., relative bioavailability of COCs in soil). The commentors, however, use the term "site-specific" to cover how the affected property is used today, that is, the specific activities on-going at the affected property today. As already discussed, the commission has determined that it is appropriate to require evaluation of a minimum set of specific exposure scenarios, pathways, and default exposure parameters in order to ensure that commercial/industrial properties are restored for a reasonable, unrestricted, active and productive use.

Several commentors stated the conservativeness of the Tier 1 PCLs when compared to background concentrations and PQLs for analytical methods provides justification for the need for greater flexibility in selecting appropriate exposure parameters. The commission has compared the critical Tier 1 PCLs for each COC to the median Texas-specific background concentrations provided in Figure 30 TAC 350.51(m), as well as to method quantitation limits (MQLs) for standard analytical methods (i.e., EPA and other nationally recognized analytical methods). The commission found the following: For groundwater, when the critical PCL was based on a federal MCL, 12.9% of the values were below the corresponding MQL, and when the critical PCL was calculated based on consideration of the groundwater ingestion pathway as required in Figure 30 TAC 350.75(b)(1), 12.3% of the values were below the corresponding MQL. With respect to soil, 22.5% of the critical Tier 1 PCLs were below the corresponding MQL. However, of those critical Tier 1 soil PCLs that were below the corresponding MQL, 19.4% were based on protection of underlying groundwater ($^{GW}Soil$), while only 3.2% were based on protection of human health ($^{TotSoil}_{Comb}$). In terms of

comparisons to background soil concentrations, the commission found four COCs which had critical Tier 1 soil PCLs below their corresponding Texas median background concentrations. However, of these four, only one was based on protection of human health ($^{Tot}Soil_{Comb}$), while three were based on protection of underlying groundwater ($^{GW}Soil$). It should be noted that for the purpose of this comparison, the commission used the 30-acre residential critical Tier 1 PCLs (i.e., the most conservative values) and therefore, the results obtained in terms of the percentage below background concentrations or MQLs reflect the worst-case. It should also be noted that the MQLs used for the purposes of this comparison do not necessarily reflect the most sensitive standard analytical method and therefore, again, the results of this comparison are likely biased high. Further, it should be apparent from this comparison that greater flexibility in selecting the exposure parameters to be incorporated into the human health protective RBEL and PCL equations will not alleviate concerns that the Tier 1 PCLs are below background levels and analytical capabilities given that the vast majority are driven by assumptions concerning fate and transport of COCs from soils to underlying groundwater (i.e., 92% of the residential critical Tier 1 PCLs are based on protection of underlying groundwater ($^{GW}Soil$), while 94% of the commercial/industrial critical Tier 1 PCLs are based on protection of underlying groundwater ($^{GW}Soil$)). Rather, concerns about the conservative nature of the majority of critical Tier 1 PCLs can be alleviated by adjusting the Tier 1 $^{GW}Soil$ PCL based on affected property characteristics, monitoring data, leachate tests, and other factors are described in §350.75(i)(7)(b) of the proposed rule.

The commission agrees that the risk assessment process is a potential area of flexibility. However, this not the only area where flexibility can be provided. Other significant areas of flexibility that have been proposed in this rule are exposure prevention remedies including plume management zone for affected class 2 and 3 groundwaters beneath residential and commercial/industrial properties, expanded allowances for fate and transport modeling analysis, enhanced acceptance of monitored natural attenuation where it can be demonstrated to meet performance objectives, expanded use of statistics to include any technically defensible approach to estimate exposure concentrations, and elimination of a remedial selection process. The commission has chosen to place emphasis in these non-risk assessment areas of the rule to provide significant flexibility in the rule.

Further, the rule provides much of the flexibility requested by the commentors in the form of the Facility Operations Area (FOA) provisions of Subchapter G. Many of the standard provisions of the of Subchapters B-F can be deferred or otherwise amended as provided in Subchapter G within the confines of the FOA over the life of the FOA. Within the FOA, very great flexibility is provided to qualitatively eliminate exposure pathways and use alternative exposure factors.

Finally, in response to comments which made the point that the proposed rule is inconsistent with the ASTM Risk-Based Corrective Action (*Standard Provisional Guide for Risk-Based Corrective Action, PS 104-98*), the commission points out that the standard specifically mentions that numerous technical policies must be made to implement the risk-based corrective action process. The commission has made those policy decisions.

Concerning Tier 3 Flexibility, AFCEE commented that they understand the agency's motivation for going to a more standardized approach ("one-size-fits-all") is in part due to staffing concerns. Allowing more innovative solutions and flexibility requires an increased resource commitment on the agency's part. However, for facilities that directly participate in the funding of agency oversight flexibility should not be limited. The Department of Defense through a memorandum of agreement with the states participates in the funding for state regulatory oversight. AFCEE stated that the rule should not limit options due to agency resource constraints if the regulated facility contributes to the funding of their oversight. Chevron commented that it understands the TNRCC's concern that limited staff resources will be expended if a more site-specific approach (under Tier 4 or a revised Tier 3) were adopted. Thus, Chevron proposed that the TNRCC allow sites seeking a more site-specific approach to be converted into the VCP so the additional

TNRCC staff resources necessary to review, assess, and approve the more site-specific analysis could be paid for through the VCP cost-shifting provisions.

With regard to the AFCEE comment that staffing concerns should not be a relevant factor where the Department of Defense funds regulatory oversight, the commission is already underfunded for the level of regulatory oversight it is currently providing for Department of Defense matters. However, more specifically, and even considering Chevron's VCP concept, the agency is faced with employee caps, office space constraints, and other administrative considerations. The agency cannot in any practical sense just solve the staffing limitations with increased funds.

As proposed, the TRRP established three tiers for PCL development; however, in their comments Chevron recommended that the TNRCC employ a Tier 4 or other alternative to address problems associated with the "one size fits all" approach of Tier 3 which will be Chevron stated will be too inflexible to adequately address very large, complex remedial efforts. Consistent with their comments on Tier 3 flexibility, Chevron stated that the TRRP Tier 3 process: (a) limits consideration of additional site-specific information, and (b) locks in the majority of factors that are variable terms in the RBCA standard. Chevron's suggested Tier 4 borrowed what it perceived to be useful aspects of Tier 3 and alleviates many of the unique burdens Tier 3 unnecessarily places on large remediation efforts. The proposed Tier 4 approach would simply employ a new process for developing PCLs for media. The RBELs (including target risk levels) would remain unchanged, and the facilities using this approach would still be held to the requirements of Remedy Standard A or B as appropriate. The proposed Tier 4 would be performed consistent with the existing compliance schedule in the facility's order or permit. Use of Tier 4 would not result in deferral of investigation or corrective action at the facility. Finally, Chevron stated this approach would only be used in conjunction with appropriate institutional controls, including deed notices and, where appropriate municipal ordinances, to establish the land use of the property as commercial/industrial. The existing requirements of the proposed TRRP, i.e., that facilities that meet commercial/industrial PCLs on-site must meet residential PCLs at the boundary, would still apply. Specifically, Chevron identified several options that could be included in a Tier 4 approach. The following are some examples: 1) Exposure factors for commercial/industrial receptors could be varied (see attached Table 1); 2) Exposure areas could be varied along with exposure factors to develop area-specific PCLs; 3) Probability density functions (i.e., statistical distributions) could be used in PCL equations instead of fixed default values; and 4) Risk management evaluation (including probabilistic techniques) could be included to assess the risk "big picture", and could form the basis for adjustments to the PCLs to address multiple sources. Chevron also proposed strict eligibility criteria designed to manage the use of Tier 4 to satisfy the TNRCC's well-founded interest in "keeping the eligibility bar high." The proposed criteria include: 1) the facility is subject to a commission order or permit (or, alternatively, is converted into the VCP); 2) the facility is prepared to file financial assurance for the estimated remediation cost at the time the RAP is submitted; and 3) access to the facility is continuously controlled, and/or the areas of significant contamination are located in the interior where the public cannot gain access.

The commission is not formally adopting the Tier 4 recommendations. For on-site situations, the commission has already provided the Tier 4 flexibility requested in the form of the Facility Operations Area (FOA). Within the FOA, very great flexibility is provided to qualitatively eliminate exposure pathways, use alternative exposure factors, and defer the full extent of the Subchapter B response objectives over the life of the FOA. The commission offers this flexibility and fully supports this flexibility within the FOA for several reasons. First, there is a "high bar" to get into the FOA. The applicant is required to conduct a FOA-wide hydrogeologic evaluation of the property to support a FOA-wide understanding of subsurface transport dynamics so FOA-wide corrective action strategies can be put in place. Second, financial assurance is provided, property access is restricted, and there is a high level of demonstration of overall protection of workers. Third, the FOA prevents a race to the bottom. With the option to obtain FOA status and the potential to lose FOA status, there is significant incentive to maintain a high level of environmental conscientiousness, regulatory

compliance, and maintain a very high standard of worker protection. The FOA provides a mechanism to level the playing field between facilities which place high priority on environmental compliance and those that do not place a priority on environmental compliance. Fourth, there is public benefit. With the FOA-wide strategy corrective action management plans are in place which address known problems, but also because the corrective action strategies are designed in the context of an overall understanding to the hydrogeologic dynamic and overall facility operations, currently unknown problems are also effectively addressed. The combination of addressing known and unknown problems in the broad scale, with monitoring and contingencies in place protects the welfare of the general public to a higher standard. Finally, the public will have a better overall cost-effective corrective action strategy that it can employ should the facility defunct. The Tier 4 option provides none of these benefits to the general public, but rather places greater risk to the general public as there is nothing to back up future protection beyond a well intentioned commitment from the person to respond to changing conditions should they occur.

Nonetheless, the commission is willing to avail staff to meet with stakeholders after the adoption and implementation of the rule to visit issues such as the use of probabilistic techniques to determine if a more comprehensive program could be developed. In considering any such future changes, it is important to note that the commission will work to ensure that any such changes do not overburden the commission or inappropriately place the public and the environment at risk.

STATUTORY AUTHORITY

The new rules were adopted under the following statutory authority: Texas Water Code, §5.103 and §26.011, which provide the commission with authority to adopt any rules necessary to carry out its powers, duties, and policies and to protect water quality in the state, Texas Water Code, §5.103(c), which states the commission must adopt rules when adopting, repealing, or amending any agency statement of general applicability that interprets or prescribes law or policy or describes the practice and procedure requirements of the agency, and Texas Solid Waste Disposal Act, Texas Health and Safety Code, §361.017, and §361.024, which provide the commission the authority to regulate industrial solid waste and municipal hazardous wastes and all other powers necessary or convenient to carry out its responsibilities. In addition, the new rules are adopted under Texas Water Code, §26.039, which states that activities which are inherently or potentially capable of causing or resulting in the spillage or accidental discharge of waste or other substances and which pose serious or significant threats of pollution are subject to reasonable rules establishing safety and preventive measures which the commission may adopt or issue; Texas Water Code, §26.121, which prohibits persons from discharging wastes into or adjacent to any water in the state unless authorized to do so and prohibits persons from committing any other act or engaging in any other activity which in itself or in conjunction with any other discharge or activity causes, continues to cause, or will cause pollution of any of the water in the state; Texas Water Code, §26.262, which states that it is the policy of this state to prevent the spill or discharge of hazardous substances into the waters in the state and to cause the removal of such spills and discharges without undue delay; and Texas Water Code, §26.264, which provides the commission with authority to issue rules necessary and convenient to carry out the policy referenced in §26.262. Authority to propose the new rules is also provided by Texas Water Code, §26.341, which states that it is the policy of this state to maintain and protect the quality of groundwater and surface water resources in the state from certain substances in underground and aboveground storage tanks that may pollute groundwater and surface water resources, and requires the use of all reasonable methods, including RBCA to implement this policy; Texas Water Code, §26.345, which provides the commission with the authority to adopt rules necessary to carry out the policy referenced in §26.341; and Texas Water Code, §26.401, which states that it is the policy of this state that discharges of pollutants, disposal of wastes, or other activities subject to regulation by state agencies be conducted in a manner that will maintain present uses and not impair potential uses of groundwater or pose a public health hazard, and that the quality of groundwater be restored if feasible.