

The Texas Commission on Environmental Quality (TCEQ, agency or commission) adopts amended §§331.2, 331.7, 331.13, 331.45, 331.46, 331.82, 331.84 - 331.86, 331.103 - 331.107, and 331.143. The commission adopts new §§331.87, 331.108, 331.109, and 331.220 - 331.225.

Sections 331.2, 331.82, 331.84, 331.103 - 107, 331.143, and 331.221 are adopted *with changes* to the proposed text and will be republished. Sections 331.7, 331.13, 331.45, 331.46, 331.85 - 331.87, 331.108, 331.109, 331.220, 331.222 - 331.225 are adopted *without changes* to the proposed text as published in the September 5, 2008, issue of the *Texas Register* (33 TexReg 7477) and will not be republished.

BACKGROUND AND SUMMARY OF THE FACTUAL BASIS FOR THE ADOPTED RULES

The changes adopted to this chapter are part of a larger adoption to revise the commission's radiation control and underground injection control (UIC) rules. The purpose of this rulemaking is to implement the remaining portions of Senate Bill (SB) 1604, 80th Legislature, 2007, its amendments to Texas Health and Safety Code (THSC), Chapter 401 (also known as the Texas Radiation Control Act (TRCA)), and House Bill (HB) 3838, 80th Legislature, 2007. This rulemaking incorporates new provisions for notice and contested case hearing opportunities related to Production Area Authorizations and UIC Area Permits, financial assurance requirements, and new state fees on gross receipts associated with the radioactive waste disposal. HB 3838 specifically addresses the period between uranium exploration, which is regulated by the Railroad Commission of Texas (RRC), and permitting of injection wells for in situ uranium mining, which is regulated by TCEQ. HB 3838 requires TCEQ to establish a registration program for exploration wells permitted by the RRC that are used for development of the UIC area permit application. In response to a previous petition for rulemaking, the commission has also directed staff to review, seek stakeholder input on, and recommend revision of commission rules related to in situ uranium

recovery. The adopted amendments to Chapter 331 implement legislative requirements in SB 1604, establishing requirements for area permits and production area authorizations for in situ recovery of uranium, and HB 3838 establishing registration requirements for wells used in the development of an application for an injection well permit authorizing in situ recovery of uranium and revisions based on the commission-directed staff review of the in situ program and the stakeholder input received.

Corresponding rulemaking is published in this issue of the *Texas Register* concerning 30 TAC Chapters 37, 39, 55, 305, and 336.

SECTION BY SECTION DISCUSSION

The commission adopts the amendment to §331.2, Definitions, by revising nine existing definitions and adding two new definitions. Existing definitions under §331.2(83), (85), and (87) - (112) will be renumbered to paragraphs (84), (86), and (88) - (114), respectively to accommodate the two new definitions.

The commission adopts the amendment to the definition of "Activity" under §331.2(2) to include the construction or operation of an injection or production well for the recovery of minerals, or any other classes of injection wells regulated by the commission. This change is necessary for completeness of the term "activity," which is used throughout the rules that apply to underground injection. With this adopted revision, any references to activities regulated under the TCEQ UIC Program will include construction and operation of injection wells. In response to comments, the commission revised this definition to include construction of a monitor well at a Class III injection well site.

In response to comments, the commission revised the term "Affected person" at §331.2(3) to be consistent with the definition of this term at §55.3, Definitions.

The commission adopts the amendment to the definition of "Area permit" under §331.2(10) to specify that an area permit is for two or more production or monitor wells used in operations associated with Class III well activities. This change is necessary to specify that area permits are issued only for Class III wells and not for other types of injection wells regulated by the commission.

In response to comments, the commission revised the definition of the term "Baseline quality" at §331.2(12) to refer to "injection operations" instead of "injection activities."

The commission adopts the amendment to the definition of "Control parameter" under §331.2(28) to clarify that the term includes physical parameters, such as pH or specific conductivity, and that monitoring of a control parameter includes measurement with instrumentation or laboratory analysis of a groundwater sample from a monitoring well. Control parameters are characteristics of the groundwater that are monitored to detect the movement of mining solutions out of the production zone at a Class III well site. In the past, control parameters were almost always a chemical attribute of the groundwater, such as the concentration of certain metals. Groundwater samples were collected and shipped to a laboratory where the concentrations of control parameters were measured using chemical analytical techniques. Physical characteristics of groundwater, however, also can serve as control parameters. Furthermore, advances in technology now allow measurement of certain parameters in the borehole. The change is necessary to allow physical parameters to be used as control parameters, and to allow for measurement of certain control parameters using suitable instrumentation. In response to comments, the commission

revised the definition of this term at §331.2(28) to include the word "field" before the word "instrumentation."

The commission adopts the amendment to the definition of "Excursion" under §331.2(38) to clarify that the determination of movement of mining solutions into a monitor well must be based on chemical analysis or instrument measurement of control parameters from groundwater.

The commission adopts the amendment to the definition of "Mine plan" under §331.2(63) which expands the term to include a schedule of proposed mining activities at a Class III well site. Currently, the definition includes only a map of the permit area. The expanded definition addresses the need for the holder of a Class III well area permit to provide the commission information regarding the sequence and timing of mining, and a schedule for aquifer restoration.

The commission adopts the amendment to the definition of "Monitor well" under §331.2(64) to clarify that the term has the same meaning as "monitoring well" as defined in Texas Water Code (TWC), §27.002. "Monitor well" is used throughout the Chapter 331 rules, and this change would provide consistency between these rules and the TWC with regards to the meaning of the two terms. Also, the commission adopts the amendment to §331.2(64)(A) to clarify that designated monitor wells are those wells for which water quality sampling or measurements with instrumentation is required. This change is necessary to clarify that water quality sampling may be accomplished by measuring water quality with appropriate instruments in addition to determining water quality through conventional chemical analysis of groundwater samples. In response to comments, the commission revised the definition of this term at §331.2(64) to add the word "field" before the word "instrumentation."

The commission adopts the amendment to the definition of "Production area authorization" under §331.2(82) to clarify that the term refers to an authorization issued under the terms of a Class III well area permit, and that this authorization includes requirements regarding production and aquifer restoration.

The current definition does not clearly indicate that this term applies to Class III well operations.

The commission adopts new §331.2(83) which defines "Production well." This term is used in existing rules, and should be defined. The adopted definition clarifies that a production well is one that is used for mineral recovery, not for waste injection. In response to comments, the commission revised the definition of this term at §331.2(83) to indicate it refers to a well used to recover uranium, and that the term including an injection well used to recover uranium.

The commission adopts the amendment to the term "Restored aquifer" under existing §331.2(86) to restrict the term to that portion of an aquifer that is within the boundaries of an area permit, and that the aquifer has been restored in accordance with the requirements of §331.104, Establishment of Baseline and Restoration Values. This change is necessary to clarify that "aquifer restoration" applies to the aquifer within the permit boundary, not the entire aquifer. In response to comments, the commission revised the definition of this term at §331.2(89) to refer to groundwater within a production area rather than to the boundaries of the permit.

The commission adopts new §331.2(87) which defines the term "Registered well." HB 3838 required the commission to establish a registration system for wells that would be used to develop applications for

Class III well area permits. This new definition is necessary to define this term that is used in Chapter 331, new Subchapter M, which is discussed further in this section.

The commission adopts the amendment to the definition of "Verifying analysis" under existing §331.2(107) to include measurements with instrumentation. Physical characteristics of groundwater also can serve as control parameters, and advances in technology now allow measurement of certain parameters in the borehole. The change is necessary to allow physical parameters to be used as control parameters, and to allow for measurement of certain control parameters using suitable instrumentation.

The commission adopts new §331.7(g) which addresses term limits of existing Class III well area permits. This change implements the requirements of SB 1604, which amended the TWC by adding TWC, §27.0513. Prior to adoption of SB 1604, Class III well area permits were issued without an expiration date. Under SB 1604, the holder of a Class III area well permit issued prior to September 1, 2007 must submit an application for permit renewal before September 1, 2012. Any permit issued prior to September 1, 2007 will expire on September 1, 2012 if an application for renewal is not submitted to the commission before September 1, 2012, although the holder of the permit would not be relieved of obligations under the permit or applicable rules to restore groundwater or to plug and abandon wells authorized under the permit.

The commission adopts the amendment to §331.13(e) to allow the commission to delegate to the executive director the authority to designate an exempt aquifer if no request for a public hearing is received during the comment period provided in public notice. Delegation of authority by the commission to the executive director in uncontested matters is a common practice for most permitting matters

addressed by the commission, including injection well permits that may be associated with an aquifer exemption. Delegation in this matter would reduce the time needed to process requests for aquifer exemptions.

The commission adopts the amendment to §331.45(4)(B) to clarify that a demonstration of mechanical integrity is not necessary for baseline wells. The existing rule currently excludes monitor wells from this requirement, and baseline wells are constructed and operated similarly to monitor wells. Unlike Class III injection and production wells through which mining fluids are being pumped on a near-continuous basis, no injection occurs in baseline and monitor wells, and only native groundwater periodically is pumped from baseline wells.

The commission adopts the amendment to §331.46(e) to remove any apparent implication regarding the approval of the use of materials other than cement for plugging wells. Under the existing language in subsection (e), use of a material other than cement for plugging wells requires approval in writing by the executive director. The existing rule language could be interpreted to mean that approval of the use of other plugging material could be granted by means other than permit modification or amendment. Closure of wells must be in accordance with an approved plugging and abandonment plan. A request to plug a well with material other than cement should be subject to the applicable rules for amendments or modifications, and subject to applicable public notice and public participation requirements.

The commission adopts the amendment to §331.82(a) to clarify that the casing in Class III wells must be cemented from the bottom of the casing to the surface. The revision is necessary as the current rule

requires casing be cemented to the surface, which implies casing could be cemented from a point above the bottom of the casing to the surface.

The commission adopts the amendment to §331.82(c)(2) to require a demonstration of mechanical integrity prior to injection or production from a Class III well and to require a pressure test each time a tool is placed in a Class III well when that tool could affect the mechanical integrity of the well. The current rule requires a demonstration of mechanical integrity following construction of the well, but not specifically before the well is put into operation. Although it is unlikely an operator of a Class III well would inject or produce fluids from the well prior to testing it for mechanical integrity, the rule revision clarifies that the mechanical integrity of a well must be demonstrated prior to operation of the well. Under existing §331.82(c), an additional test for mechanical integrity on a well may be required if the well has been repaired. During the life of a well, tools may be placed in and withdrawn from a well for various reasons such as to inspect casing, change or repair pumps or tubing, or to clean well screens. These types of actions can result in damage to the well casing, which could affect the mechanical integrity of a well. The revision allows the executive director to require an operator to pressure test a well whenever tools have been placed into the well that could damage casing and affect the mechanical integrity of a well. In response to comments, the commission has revised §331.82(c)(2) to indicate mechanical integrity shall be demonstrated both following construction of the well and prior to production or injection.

The commission adopts the amendment to §331.82(c)(2)(A)(i) to clarify that Class III wells can be tested for significant leaks using either a single point resistivity survey or a pressure test. The language in the prior rule is unclear, and suggests that both tests are required. The intent of the rule change is that either method may be used to test for significant leaks in a Class III well.

The commission adopts the amendment to §331.82(c)(2)(A)(ii) to clarify that cement records can be used to demonstrate the absence of significant fluid movement in a Class III well.

The commission adopts the amendment to §331.84(c) to clarify that the fluid level in a Class III well must be measured when such measurement is required in a permit. Section 331.84(c) is also amended to clarify that the required bi-monthly samples must be taken at 15-day intervals so as to ensure the collection of independent samples. The adopted 15-day interval would replace the current two-week interval that resulted in three samples a month for two months in each year. In response to comments, the commission has revised §331.84(c) to refer to a "calendar month" instead of "month."

The commission adopts the amendment to replace requirements in existing §331.85(a) with new reporting requirements in §331.85(a). Under the existing rule, an updated map illustrating all newly constructed or newly discovered wells was required under existing subsection (a). Adopted subsection (a) requires an annual report by January 31st of each year. This report, in addition to the updated map that is presently required, must also include data on any newly constructed or newly discovered wells, and updated cost estimates for well closure and aquifer restoration, an update mine map, an updated mining schedule, and an inventory of all injection, production, and monitor wells. This information has been required in the past, and the adopted rule consolidates it into one report due in January each year, which would assist commission staff in reviewing this information.

The commission adopts §331.85(h) to require an operator of a Class III well facility to maintain at the facility copies of all information required under §331.85. Adopted §331.85(h) assists TCEQ field

personnel to more expeditiously determine facility compliance with all applicable rules and permit requirements during an inspection of a facility.

The commission adopts the amendment to §331.86(a) to remove language that implies plugging and abandonment plans may be modified through written approval from the executive director. The intent of this section is that any revision of plugging and abandonment plans must be done through a permit amendment or modification, which would need to be approved by the executive director as part of a permit application process.

The commission adopts new §331.87. Under this new section, field measurement using instrumentation, of groundwater parameters is allowed for monitoring purposes provided the field measurement is at least equivalent in quality and sensitivity as that of a chemical analysis. This new section is necessary to address advancements in technology that allow field measurements for certain groundwater quality parameters.

The commission adopts the amendment to §331.103(a) to clarify that the placement of monitor wells to meet the spacing requirements of subsection (a) may be based on information from exploration drilling, as updated with information from production drilling. It is the commission's contention that information from these types of wells is sufficient for the determination of monitor well placement to meet the spacing requirements in subsection (a). As a further point of clarification, monitor wells must meet the spacing requirements in §331.103(a) with respect to the outermost injection and production wells within the production area, not with respect to injection and production wells in the interior of the production area.

In response to comment, the commission revised this subsection to refer to the distance between adjacent mine area monitor wells.

The commission adopts the amendment to §331.104, Establishment of Baseline and Restoration Values, to address both the establishment of baseline groundwater values for restoration and the establishment of parameters for excursion detection.

The commission adopts the amendment to §331.104(a) to require that groundwater samples from monitor and baseline wells be both independent and representative, as both of these characteristics are necessary for valid statistical analysis. A statistically-independent sample is required so that one sampling event will not affect the results or quality of a subsequent sampling event from the same well.

The commission adopts an amendment to re-designate §331.104(b) as subsection (d) with no other changes, and would remove subsection (c), as discussed elsewhere in this section. Under adopted §331.104(b) all baseline wells must be completed within the production zone. Under existing §331.104(d), baseline water quality values for determination of restoration could be based on analytical measurements of groundwater samples from either the baseline wells completed in the production zone within the production area, or from monitor wells completed in the production zone but outside of the production area (that is, outside of the zone of uranium mineralization that is to be mined using in situ techniques). It is the commission's determination that aquifer restoration goals should be based on data from groundwater samples collected from the baseline wells only, as these are the wells that are completed in the production zone within the area of mineralization. Information from wells outside of the production area does not provide pre-mining information on the quality of groundwater within the

production zone of the production area. Adopted §331.104(b) would also require the owner or operator to propose a suite of groundwater parameters for restoration.

In response to comments, the commission has made several revisions to §331.104(b). Under the proposed rule, an owner or operator was required to sample all baseline wells and analyze the samples for a suite of parameters determined by the owner or operator and approved by the executive director. This subsection has been revised to require these samples be analyzed for a suite of 26 parameters, with allowance for the owner or operator to add or remove parameters to this list (except for uranium and radium-226) with executive director approval. Also, §331.104(b)(3) was revised to refer to groundwater production zone. Lastly, §331.104(b)(4) was revised to refer to "any other applicable information provided by the applicant or permittee."

The commission adopts §331.104(c), under which a minimum of five baseline wells or one baseline well for every four acres of production area, whichever is greater, are required. Under existing §331.104(a)(2), which would be removed under the adopted amendment, the production area baseline value must be based on samples from at least five wells completed in the production zone. Although this current rule allows for more than five baseline wells, owners and operators typically propose only five baseline wells. Because a production area may range in size from a few acres to several tens of acres, five wells may or may not provide sufficient characterization of the groundwater for establishment of restoration goals. The adopted amendment ensures a minimum number of baseline wells based on acreage of a production area. Adopted §331.104(c) also requires all baseline wells to be sampled and the results of analyses of those samples be used to determine the suite of restoration parameters.

The commission adopts the amendment to remove existing §331.104(c), under which an owner or operator is required to determine control parameter upper limits from baseline water quality values. It is the commission's intention that control parameter upper limits should be based on information from monitor wells, not baseline wells. Control parameter upper limits are the values of certain parameters that are monitored in the monitor wells that encircle a production area. The purpose of this monitoring is to determine if mining fluids have migrated from the production area by detection of changes in water quality in the monitor wells. In order to do so, the water quality in the monitor wells must be established. Water quality in the monitor wells should be established from information from the monitor wells, which are located outside the zone of mineralization, not from baseline wells, which are completed within the zone of mineralization.

As discussed previously, existing §331.104(b) is being relettered to §331.104(d) under this rulemaking. No other changes to §331.104(d) are adopted. Existing §331.104(d) is deleted so that the requirements for establishing restoration table values can be placed in §331.107, Restoration.

The commission adopts §331.104(e) to require operators to determine control parameters for production and nonproduction wells.

In response to comments, the commission is revising §331.104(e) to remove paragraph (1). Under this paragraph, an owner or operator could determine the presence of an excursion by comparing monitoring results to the mean pre-mining concentration when that mean was estimated using at least 30 measurements for a particular monitoring parameter. Upon further review, the commission realizes that §331.104(b)(1) was incorrectly worded. Paragraph (1) has been removed and paragraph (2), which

requires excursions be determined using a statistical method proposed by the owner or operator and approved by the executive director, has been combined with §331.104(e). Additionally, the commission realized that §331.104(e) did not include a requirement that control parameter upper limits for production zone monitor wells shall be determined from pre-mining groundwater sample data from production zone monitor wells, and control parameter upper limits for nonproduction zone monitor wells shall be determined from pre-mining groundwater sample data from nonproduction zone monitor wells. Section 331.104(e) was revised to include these requirements. Lastly, the commission revised §331.104(e) to replace the term "statistical hypothesis test" with the term "statistical method."

The commission adopts the amendment to §331.104(f) to address requirements for groundwater restoration in the case where an owner or operator has requested to re-enter a previously-mined area for additional mining. Under this subsection, an owner or operator would be required to meet the groundwater restoration goals previously established for the production area to be re-entered. It is the commission's intention that when a previously mined area is to be re-entered for additional in situ recovery of uranium, the groundwater restoration goals should be those established prior to in situ mining operations, or as modified by any amendments in accordance with §331.104, Establishment of Baseline and Restoration Values and Control Parameters for Excursion Detection and §331.107, Restoration.

The commission adopts the amendment to §331.105(1) - (4) to refer to Routine Monitoring, Monitoring Duration, Verifying Analysis, and Excursion Monitoring, respectively, instead of Routine Sampling, Duration of Monitoring Program, Verifying Analysis, and Sampling Frequency when mining solutions are present, respectively. Section 331.105(1), (3), and (4) is also amended to clarify that monitoring includes instrument measurements. Additionally, adopted §331.105(3) clarifies that a verifying analysis

must be done if the upper control limit is equaled or exceeded in designated monitor wells. Lastly, adopted §331.105(1) and (4) requires monitoring results for control parameters to be completed by the second working day after a sample is collected. In response to comments, the word "field" was added before the word "instrumentation" in §331.105(1).

The commission adopts amendments to §331.106, Remedial Action for Excursion, to refer to the existence of an excursion rather than that mining solutions are present. By making this change, the language in §331.106 would refer to a term, in this case, "excursion" that is defined in previous §331.2, Definitions, rather than the undefined phrase, "that mining solutions are present."

The commission adopts the amendment to §331.106(2) to require, in addition to other parameters identified in this paragraph, analysis for uranium and radium-226 for a verifying analysis. These two parameters are mobilized into the groundwater during in situ mining. Their presence in a verifying analysis of a groundwater sample from a monitor well would provide evidence that an indication of an excursion was associated with the movement of a mining solution from the production area to a monitor well. The commission revised §331.106(2)(A) to remove the phrase "values consistent with."

The commission adopts the amendment to §331.107(a) to require that groundwater in the production zone of the production area must be restored when mining is complete, to require restoration be achieved for all parameters specified in the suite of restoration parameters, and to specify that restoration may be demonstrated by either of two methods. The first method is a direct comparison between the measurement from a groundwater sample for a restoration parameter and the mean for that parameter as determined from all measurements from groundwater samples collected from baseline wells prior to mining activities.

The second method is a statistical test proposed by the owner or operator and approved by the executive director. As part of a permit or production area authorization application, the applicant would be required to provide a sufficient explanation for the use of alternative statistical methodology for determining restoration table values. These proposed methods are similar to those for excursion detection and provide the owner or operator two statistical methods for determining if restoration has been achieved. The commission revised §331.107(a) to indicate each Class III injection well permit or production area authorization shall contain a description of the method for determining that groundwater in the production zone within the production area has been restored, rather than requiring it upon issuance or renewal, as production area authorizations are not subject to renewal.

The commission adopts the amendment to §331.107(b) and (c) to specify that aquifer restoration applies to a production area, not the entire permitted area. The commission revised §331.107(b) to require reestablishment of groundwater quality in the affected permit or production area aquifers in accordance with the requirements of §331.107(a), rather than to levels consistent with the values listed in the restoration table for that permit or production area.

The commission adopts the amendment to §331.107(d) to identify the information that must be submitted with the required semi-annual restoration progress report. This information includes analytical data, graphs of analytical data for each restoration parameter, the volume of fluids injected and produced, the volume of fluids disposed, water level measurements, a potentiometric map for each production area, and a summary of progress achieved towards aquifer restoration. In response to comments, the requirement for submission of a hydrograph for each well was removed and the remaining subsections renumbered.

The commission adopts §331.107(e) under which stability sampling is required once restoration has been demonstrated. Section 331.107(e) would be re-designated as subsection (f), and would be amended to extend the period for stability sampling from 180 days to one year. This extended period for stability sampling would allow the owner or operator to determine if water quality is affected by seasonal changes.

The commission adopts an amendment to re-designate §331.107(f) as subsection (g), and amend the subsection to require a permittee to notify the executive director of a determination to cease restoration operations if the permittee decided to request amendment of the restoration values. Under §331.107(f), if a permittee is unsuccessful in restoring the groundwater in a production zone within a production area, he or she may cease restoration operations without notifying the executive director, and request the restoration values to be raised, and the executive director can approve such an amendment after considering the factors identified in §331.107(g)(1). Under the adopted rule, written permission from the executive director would be required for a permittee to cease restoration activities. The permittee would also be required to submit the request for amendment of restoration values within 120 days of receipt of authorization from the executive director to cease restoration operations. These adopted changes allow the executive director to evaluate the permittee's decision to cease restoration operations, and would require the permittee to submit a request for amendment in a timely manner.

The commission adopts the amendment to §331.107(g)(3) to require a permittee to conduct stability sampling for a period of two years (instead of one year) if restoration values are amended. The inability to restore groundwater to the initial restoration values is an indication that in situ mining may have altered the chemistry of the groundwater within the production zone of a production area, and that this change has resulted in making the affected groundwater resistant to a reduction in the concentrations of

parameters in the groundwater. As this affected groundwater moves through natural groundwater flow, it would migrate into areas adjacent to the production zone that are unaffected by in situ mining. Once in these areas, it is the commission's contention that chemically reducing conditions in these areas would immobilize these parameters, decreasing the risk of off-site contamination. However, because there may be some increased risk of off-site contamination because original restoration table values are not achieved in such a case, the commission is requiring a stability period of two years when restoration values are amended. Under the adopted rule, the commission would allow a permittee to provide a demonstration that a period of less than two years is appropriate. The commission revised §331.107(g) to indicate that an amendment to a restoration table is contingent upon the owner or operator having made an appropriate effort to achieve restoration in accordance with the requirements of §331.107(a), rather than to levels consistent with values listed in the restoration table for a production area.

The commission adopts the amendment to §331.107(g)(4) to require a permittee to resume restoration efforts if an amendment to the restoration values is not granted.

The commission adopts new §331.108, Independent Third-Party Experts. Under the adopted revision to §55.201, Requests for Reconsideration or Contested Case Hearing, an application for a production area authorization is not subject to a contested case hearing when the application addresses the initial establishment of monitor wells, and the executive director uses the recommendations of an independent, third-party expert. Under SB 1604, the TWC was amended by adding TWC, §27.0513(e), under which the requirements for use of an independent third-party expert are identified.

The commission adopts new §331.108(a) under which the executive director may use the recommendations of an independent third-party expert if requested by an applicant. Under this adopted subsection, the executive director would use the recommendations from an expert provided the expert meets the qualifications identified in §331.108(b), the applicant pays for the cost of the work of the expert, the applicant is not involved in the selection of the expert or the direction of the expert's work, the expert's recommendations meet all applicable statutory and regulatory requirements for the initial establishment of monitor wells, and, in the opinion of the executive director, the expert's recommendations are necessary for the protection of underground sources of drinking water.

The commission adopts new §331.108(b) to require that an expert be either a licensed professional engineer or a licensed professional geoscientist who currently is authorized to practice engineering or geology, respectively, in Texas. In determining whether to designate a person as an expert, the executive director would also consider the person's experience in geology and hydrogeology, experience with in situ mining of uranium, current and previous work experience with the applicant, current and previous work experience with person's or entities that are in opposition to in situ uranium mining, and any other factors the executive director considers to be relevant.

The commission adopts new §331.108(c), under which the executive director would not designate an expert unless a written request from the applicant is received. The commission intends that the choice to use an expert lies with the applicant, who would have to pay the cost of the expert.

The commission adopts new §331.108(d). Under this new subsection, an application for a production area authorization for the initial establishment of monitor wells is not subject to opportunity for a hearing if the executive director uses the recommendations of an expert.

Under adopted new §331.108(e), if the executive director does not use the recommendations of an expert, the application is subject to opportunity for a contested case hearing.

The commission adopts new §331.108(f), under which a person may request to be considered an expert by submitting information to the executive director to demonstrate qualifications under this section.

The commission adopts new §331.108(g), to provide that the use of an expert does not constitute the applicant's selection of the expert.

The commission adopts new §331.108(h), to provide that an expert cannot be an employee of the commission.

The commission adopts new §331.109(a), under which financial assurance for aquifer restoration must be based on cost estimates provided under §331.143, Cost Estimates for Plugging and Abandonment and Aquifer Restoration.

The commission adopts new §331.109(b), under which financial assurance for plugging and abandonment of wells must be based upon cost estimates provided under §331.143.

The commission adopts the amendment to §331.143(a) to include a cost estimate for aquifer restoration for each production area authorization. Existing §331.143(a) requires a cost estimate for plugging and abandonment only. Although financial assurance for aquifer restoration is held under a radioactive materials license, cost estimates for aquifer restoration are reviewed by the UIC program staff. This change would formalize an intra-agency arrangement (and previous interagency arrangement when the licensing program was at the Department of State Health Services) to clearly indicate that responsibility for review of cost estimates for aquifer restoration lies with the UIC program and establish that an applicant must submit the cost estimates for aquifer restoration of a permit or production area as part of the application. Also, the requirement that plugging and abandonment cost estimates, as well as aquifer restoration cost estimates, must equal the maximum cost of each of these items at the point in a facility's operating life has been revised to require that these estimates take into account all costs related to plugging and abandonment and aquifer restoration, respectively. This requirement has been moved to adopted subsection (b). This change is necessary to more clearly state the requirements for cost estimates for both plugging and abandonment as well as for aquifer restoration.

The commission adopts the replacement of existing §331.143(b) with adopted subsection (b) that would require that both the cost estimates for plugging and abandonment and for aquifer restoration must be included. The current rule only refers to plugging and abandonment cost estimates.

The commission adopts an amendment to re-designate §331.143(b) to subsection (c). Adopted subsection (c) would refer to cost estimates both for plugging and abandonment and for aquifer restoration.

The commission adopts §331.143(d), under which the owner or operator of a Class III well facility would be required, on or before December 31st of each year, to review and update as necessary the cost estimates required under §331.143(a). Amended §331.143(d) also requires the owner or operator to submit these updates to the executive director no later than January 31st of each year. Although these estimates currently are submitted to the executive director, there is no specific date on which they must be submitted. The adopted rule establishes a specific date for submission of this information. In response to comments, the commission has revised §331.143(d) to include the requirement to review and update as necessary the cost estimate for aquifer restoration.

The adopted rules amend Chapter 331 by adding new Subchapter M: Requirements for Existing Wells Used for Development of Class III UIC Well Applications. This new subchapter implements the requirements of HB 3838. Under this legislation, the TWC was amended to add TWC, §27.023 and §27.024, and amended TWC, §27.073. These new statutory sections establish requirements for the registration of wells that are used for the development of a Class III injection well permit application. These wells, which initially are drilled under an exploration permit issued by the RRC, are not plugged because they can be used to develop an application for a Class III injection well area permit. Currently, these wells continue to be regulated by the RRC unless they are included in an application for a Class III injection well area permit. The adopted new subchapter would establish regulatory requirements for these wells, including development of a registration to document their existence. Ultimately, these wells would either be permitted under a Class III injection well area permit or would be plugged and abandoned.

The commission adopts new §331.220, Applicability, to establish that the requirements of new subchapter M apply to wells that are used to obtain information to develop an application for a Class III injection well area permit for in situ mining of uranium.

Under the requirements of HB 3838, any wells that are used for the development of an application for a Class III injection well area permit must be registered with the TCEQ. The commission adopts new §331.221(a) to require all existing wells used to develop a Class III injection well permit application be registered with the TCEQ within 30 days of completion and prior to submission of the application, and would require wells drilled after submission of the application to be registered within 30 days of well completion. In response to comments, the commission has revised §331.221(a) to specify that these wells must be registered with the TCEQ, and registration must be within 30 days of completion of casing and well development.

The commission adopts new §331.221(b), under which the type of information required for well registration is identified. This information includes a unique well designation, well location, well depth, well construction information, well operator, name of person who owns land on which the well is located, water level data, and if applicable, the groundwater conservation district in which the well is located.

The commission adopts new §331.221(c), under which the owner or operator would be required to maintain mechanical integrity of any registered well, as defined in adopted §331.2(87). This adopted subsection also requires that any registered well not cause or allow movement of fluid that would result in groundwater pollution. Also, this adopted subsection prohibits injection in a registered well.

The commission adopts new §331.221(d), under which an owner or operator is required to plug and abandon any registered well that is not subsequently authorized under a Class III injection well area permit. In response to comment, the commission revised §331.221(d) to require submission of a certificate of plugging and abandonment of registered wells not covered under a Class III injection well area permit to the executive director within 30 days. The commission further revised this subsection to allow a permittee to submit a request to the executive director for an extension of time for completion of plugging and abandonment required under this subsection. Any request for an extension under this subsection must provide reasonable justification for the extension.

The commission adopts new §331.221(e), under which registered wells are not subject to the commission's permitting, public notice, or hearing requirements. Under TWC, §27.023(b), registered wells are excluded from these requirements, unless they are converted to a well authorized under a Class III injection well permit under adopted new §331.222, Conversion of Registered Wells to Class III Wells.

The commission adopts new §331.222, Conversion of Registered Wells to Class III Wells, which addresses changing the status of a registered well. Under this adopted new section, once a registered well is authorized under a Class III injection well area permit, the registration status of the well ceases and the well is subject to all applicable commission rules, including those regarding permitting, public notice, and hearing requests.

The commission adopts new §331.223(a), under which an owner or operator is required to provide certain information on registered wells to a groundwater conservation district if the proposed permit boundary is within the district's area. The owner or operator must provide to the district information regarding wells

that are not in the public record when such wells are encountered, locations of all wells that are recorded in the public record and within the proposed permit area, pre-mining water quality data collected from registered wells, the amount of water produced monthly from each registered well, and a record of strata encountered from each registered well, except for information that is confidential.

The commission adopts new §331.223(b), under which an owner or operator of a registered well is required to provide the information required under adopted new §331.223(a) to the groundwater conservation district within 90 days of receipt of the final information for that well.

The commission adopts new §331.224, Record of Strata, under which the executive director may require a person who receives a Class III injection well area permit or a production area authorization to maintain and provide accurate records regarding the character of strata encountered in drilling an injection well, monitor well, or production well.

The commission adopts new §331.225, Geophysical or Drilling Log, under which the commission may require an applicant for a Class III injection well permit to provide a geophysical or drilling log of an existing well.

FINAL REGULATORY IMPACT ANALYSIS DETERMINATION

The commission adopts the rulemaking action under the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the action is not subject to §2001.0225 because it does not meet the definition of "a major environmental rule" as defined in the statute. "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. The rulemaking action implements legislative requirements in SB 1604, establishing requirements for area permits and production area authorizations for in situ recovery of uranium, and HB 3838 establishing registration requirements for wells used in the development of an application for an injection well permit authorizing in situ recovery of uranium. The rulemaking is not anticipated to 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, because the amendments do not alter in a material way the existing requirements for injection wells used for in situ recovery of uranium. The rulemaking action also amends technical requirements for radioactive materials licenses and establishes fees for applications and waste disposal in Chapter 336; amends license application requirements and permit term limits in Chapter 305; amends financial assurance requirements in Chapter 37; amends public notice requirements in Chapter 39; and amends public participation requirements in Chapter 55.

Furthermore, the rulemaking action does not meet any of the four applicability requirements listed in Texas Government Code, §2001.0225(a). Texas Government Code, §2001.0225 only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law. The rulemaking action does not exceed a standard set by federal law, an express

requirement of state law, a requirement of a delegation agreement, nor does it adopt a rule solely under the general powers of the agency.

The commission's UIC program is authorized by the United States Environmental Protection Agency (EPA) and the adopted changes for injection well permits, production area authorizations, and aquifer exemptions do not exceed a standard of federal law or requirement of a delegation agreement. There are no federal standards for production area authorizations or for registrations for wells used in the development of a permit application. The adopted rules are compatible with federal law.

The adopted rules do not exceed a requirement of state law. TWC, Chapter 27, the Injection Well Act, establishes requirements for the commission's UIC program. SB 1604 amended the Injection Well Act to establish requirements for area permits used for in situ recovery of uranium, and production area authorizations. HB 3838 amended the Injection Well Act to require the registration of wells used in the development of a permit application. The purpose of the rulemaking is to implement requirements consistent with TWC, Chapter 27, as amended by SB 1604 and HB 3838.

The adopted rules are compatible with the requirements of a delegation agreement or contract between the state and an agency of the federal government. The commission's UIC program is authorized by the EPA, and the adopted rules are compatible with the state's delegation of the UIC program.

The adopted rules are adopted under specific laws. TWC, Chapter 27, establishes requirements for the commission's UIC program and TWC, §27.019, requires the commission to adopt rules reasonably

required to implement the Injection Well Act, and TWC, §27.0513 authorizes the commission to adopt rules to establish requirements for production area authorizations.

The commission invited public comments regarding the draft regulatory impact analysis during the public comment period. No comments were received on the draft regulatory impact analysis.

TAKINGS IMPACT ASSESSMENT

The commission evaluated these rules and performed a preliminary assessment of whether the Private Real Property Rights Preservation Act, Texas Government Code, Chapter 2007 is applicable. The commission's preliminary assessment is that implementation of these adopted rules would not constitute a taking of real property.

The purpose of these rules is to implement legislative requirements in SB 1604, establishing requirements for area permits and production area authorizations for in situ recovery of uranium, and HB 3838 establishing registration requirements for wells used in the development of an application for an injection well permit authorizing in situ recovery of uranium. The adopted rule changes in Chapter 331 would substantially advance this purpose by amending the requirements applicable to in situ uranium mining.

Promulgation and enforcement of these adopted rules would be neither a statutory nor a constitutional taking of private real property. The adopted rules do not affect a landowner's rights in private real property because this rulemaking action does not constitutionally burden, nor restrict or limit, the owner's right to property and reduce its value by 25% or more beyond which would otherwise exist in the absence of the regulations. The adopted rules for injection wells, permits, production area authorizations and well

registrations do not affect real property. The adopted rules apply only to those who use or apply for authorization of injection wells for in situ recovery of uranium. Significant requirements for wells used for in situ recovery of uranium apply in the absence of these adopted rules, including statutory requirements from SB 1604 and HB 3838. Therefore, the adopted rules do not affect real property in a manner that is different than would have been affected without these revisions.

CONSISTENCY WITH THE COASTAL MANAGEMENT PROGRAM

The commission invited public comment regarding the consistency with the coastal management program during the public comment period. No comments were received on the coastal management program.

PUBLIC COMMENT

The commission held a public hearing on September 16, 2008. The public comment period closed on October 6, 2008. The commission received comments from Armstrong Ranch (Armstrong), Blackburn Carter, P.C. (BC), the Coastal Bend Group of the Sierra Club (CBGSC), the Goliad County Groundwater Conservation District (GCGCD), the Kleberg County Citizen Review Board (KCCRB), Mesteña Uranium, LLC (Mesteña), Lone Star Chapter of the Sierra Club (Sierra Club), South Texas Opposes Pollution, Inc. (STOP), Texas Mining and Reclamation Association (TMRA), Kelly Hart and Hallman, L.P. on behalf of Uranium Energy Corp and AREVA (KHH), URI, Inc. (URI), and two individuals.

RESPONSE TO COMMENTS

General Comments

Armstrong commented that landowners should also have a say on setting priorities for uses of groundwater in Texas.

The commission in general agrees with this statement, and notes that with the exception of certain restrictions that may be imposed by a local Groundwater Conservation District, landowners, especially those who own surface, oil and gas, and mineral rights on their property essentially have complete control of the use of groundwater beneath that property. No changes were made in response to this comment.

Several persons and entities commented on the use of "valid" statistical methods. GCGCD and STOP both recommended the proposed rules be revised to require valid statistical tests to be performed to remove outliers and to determine the distribution of the data, using either the mean or median. An individual commented the proposed rules do not require the use of even the most basic valid statistical methods, and that proposed revised §331.104 must be significantly revised further to assure valid sampling in obtaining baseline wells. CBGSC recommended that a valid statistical analysis of sample data requires that samples be obtained on a systematic grid across the entire mining area. Sierra Club and STOP commented that the proposed rules lack clarity regarding how to determine a statistically valid number of monitor wells in the production zone or in strata above or below it, and recommended the proposed rules be revised to require a statistically valid number of monitor wells, and valid and accurate statistical testing of monitor well baseline. STOP recommended that a valid statistical test be performed on the water quality data for each well to remove outliers. An individual commented that valid statistical methods should be required.

The commission agrees that any statistical test used to make inferences about populations should be, in the general sense, valid. To the commission, this would include the following considerations:

1) In the case of parametric tests, the data used in the test is appropriate for the distributional characteristics of the data; 2) In the case of the use of a parametric test, the sample data are evaluated to make inferences about the distributional characteristics of the population from which the sample data were obtained; 3) In the case of statistical estimation, the statistical estimator is unbiased (or at least the degree of bias is acceptable, such as in the case of the estimator s , which provides an estimate of σ , the true standard deviation of a distribution), and to the extent possible, the estimator has minimum associated variance; 4) In the case where a statistical hypothesis test is used to make inferences about population parameters, the sampling distribution of the statistic is known (or can be reasonably estimated) under the null hypothesis and under any alternative hypotheses of interest; 5) For a statistical hypothesis test, the critical value of the statistic is chosen such that the test has an acceptable type I error rate; and 6) For a statistical hypothesis test, to the extent possible, the associated power of the statistic is sufficient to detect any desired effect size, thereby reducing the type II error rate to an acceptable level.

It is these factors that the commission, in accordance with proposed revised §331.104(a) and §331.107(a)(1)(B), will take into consideration in evaluating any proposed statistical method proposed by an applicant. No changes were made in response to this comment.

During stakeholder discussion, the term "statistical hypothesis test" in proposed §331.104(e) was indicated to be vague, and it was noted the term is not defined in commission rules. It was suggested the term be replaced with "statistical method."

The commission considers the term "statistical hypothesis test" to be a well-defined and understood term in statistics. However, to avoid potential confusion or vagueness, the final rule is revised to replace the term "statistical hypothesis test" with "statistical method."

An individual expressed concern regarding the rights of surface owners who do not also own the mineral rights on their property, specifically regarding possible contamination of her private water wells by in situ uranium mining. An individual questioned why the commission did not require mining companies to first prove they would not contaminate groundwater. Lastly, the individual expressed the opinion that mining companies know they cannot restore groundwater using technology presently available.

The commission recognizes that conflicts may arise when the oil and gas or mineral rights beneath a property have been severed from the surface rights of that property, and that the extraction of oil and gas or minerals potentially may result in contamination. Although the commission has no authority to restrict or prohibit the development of minerals based on such potential conflicts, the commission does have the authority to require that in situ mining is done in accordance with all the applicable requirements of Chapter 331. These requirements are designed to prevent contamination of underground sources of drinking water (USDW), as defined at §331.2(105), and as is required under §331.5, Prevention of Pollution, and in general, to protect groundwater in the vicinity of in situ mining operations. No changes were made in response to this comment.

BC stated that borings and tests necessary for uranium exploration may disturb the aquifer at the outset, and that an accurate groundwater baseline should be established BEFORE (BC's emphasis) exploration begins, and added to as the process continues. KCCRB commented that the proposed rules should include

a provision that requires background groundwater quality to be determined in exploration areas. BC further commented that baseline should include "a geologic evaluation that incorporates all elements involved with the baseline framework, including but not limited to faults, pinchouts, and other complexities." BC also commented that all water wells in and around the exploration area should be located and evaluated at the outset. Lastly, BC commented that the public and appropriate groundwater conservation districts should be given notice and opportunity to witness testing and split sampling, and that the public has had enough of the industry's "trust me" (BC's emphasis) attitude.

The commission notes that exploration wells are regulated by the RRC; the TCEQ has no authority to adopt rules that apply to the drilling of exploration wells or the sampling and sharing of data from existing water wells to determine pre-exploration groundwater quality. The commission also notes that HB 3837, passed during the 80th Legislature, 2007, amended Natural Resource Code, Chapter 131, to add Subchapter I. This new subchapter included new §131.357, under which a person issued an exploration permit by the RRC is required to provide pre-exploration groundwater quality information to a groundwater conservation district if the exploration area identified in the permit is within a groundwater conservation district's jurisdiction. Rules to implement these requirements will be adopted and enforced by the RRC. No changes were made in response to this comment.

BC commented that the network of baseline wells established at the beginning of exploration should include several wells outside of the ore body itself; in part to examine the aquifer background water quality and in part to serve as a first alert for unexpected consequences of the mining and restoration process.

The commission again emphasizes that the TCEQ does not regulate exploration wells in any manner, and that these wells are under the jurisdiction of the RRC. The commenter appears to be referring to monitor wells required under a Class III injection well area permit and any production area authorizations. If this is the case, the commission notes that requirements for these types of wells are addressed in §331.103, Production Area Monitor Wells. No changes were made in response to this comment.

BC commented that inasmuch as the rules, as proposed, do not discuss exploration, it is difficult to cite a rule area; and that they simply urge the commission to consider the potential for disturbance created by concentrated borings, and to add notice and baseline requirements. GCGCD emphasized the importance of determining pre-mining groundwater quality unaffected by exploration activities.

The commission again notes that regulation of exploration wells is under the jurisdiction of the RRC; the TCEQ has no authority to adopt rules that apply to exploration wells. However, the TCEQ does have jurisdiction over Class III injection wells, which are used for in situ mining. In accordance with the previously applicable and newly adopted requirements of §331.104(a), three separate baselines (pre-mining groundwater quality) must be determined for Class III injection well sites: the mine area baseline, the production area baseline, and nonproduction area baselines. The respective baselines for the mine area and nonproduction area are necessary for the detection of excursions of mining fluids, and the production area baseline is necessary for aquifer restoration. The validity of any of these three baselines depends on each baseline being determined from analysis of groundwater samples that are representative of each respective zone.

Regarding the establishment of baseline values for aquifer restoration, the commission can, if relevant, take into consideration any possible effects exploration drilling may have on water quality in an area. However, the commission is unaware of any evidence that the drilling of shallow exploration wells, such as those drilled for exploration of uranium in South Texas, will disturb an aquifer in a manner that affects the concentrations of chemical species in the groundwater. These wells typically are drilled to depths of a few hundred feet using standard mud-rotary drilling systems. Certain intervals may be cored using a core barrel. Drilling fluids are a mixture of native groundwater and bentonite clay, which is chemically inert. Wells are mechanically logged using conventional geophysical logging tools to measure the natural gamma ray radiation, spontaneous potential, and resistivity of the geologic units penetrated by the borehole. Groundwater quality information in permit applications generally indicate that groundwater quality within zones of uranium mineralization is not significantly different from groundwater quality outside of uranium mineralization with the exception of uranium and radium-226, even in areas where numerous exploration wells were drilled. Within mineralized zones, measurements of uranium concentrations and radium-226 radioactivity are significantly higher than measurements for these constituents in groundwater outside of the mineralized zone. In that uranium obviously occurs in these mineralized zones, and given that radium-226 is one of the products of radioactive decay ("daughter products") of uranium-238, their presence in the groundwater within the mineralized zones is to be expected. These data suggest exploration drilling does not affect groundwater quality. No changes were made in response to this comment.

BC commented that baseline well density and aquifer evaluation elements should be specified at the outset, and that the aquifer characterization should consider the aquifer well beyond the ore body in order to provide an accurate and continuing evaluation of the effects of exploration, mining, and restoration activities.

The commission does not agree with this comment. Baseline well density currently is specified in §331.103, both for production zone and nonproduction zone monitor wells. As discussed in a previous response, determination of groundwater quality is required for the production zone within the production area, the production zone outside of the production area, and for nonproduction zones within the production area. Establishment of these baselines is for detection of excursions of mining fluids from the production zone of the production area, and for aquifer restoration. Also, as discussed in a previous comment, the commission may consider, if relevant, possible effects of exploration activity, but presently is unaware of any evidence that exploration drilling affects groundwater quality to any significant degree. No changes were made in response to this comment.

BC commented that aquifer characterization should include tests to evaluate the effects of in situ mining before it begins, and that these tests should include, but not be limited to, pump tests, modeling, water level data, and potentiometric maps, and that "the effect of mine production should be predicted in a way that allows objective third-party, that is public information, testing, as the process continues." Lastly, BC commented that copies of required reports and studies should be made available to the groundwater conservation district, and thus, the public.

The commission is unsure of the intent of the comment "evaluate the effects of in situ mining before it begins," but assumes the commenter means the site proposed for in situ mining should be properly characterized with regards to geology and hydrogeology. All applications for Class III injection well area applications and applications for production area authorizations are reviewed for compliance with applicable rules in Chapter 331. Prior to recommendation for issuance of a Class III injection well area permit, the commission considers the items in 30 TAC §331.122, Class III Wells. These items include geologic and hydrogeologic information, and a proposed formation testing program. Within a designated permit area, there may be several production areas, and the results of formation testing for each production area must be submitted with the respective production area authorization application. Unless designated as confidential, all information submitted to the TCEQ is a matter of public record and available to anyone who wishes to review it under the Public Information Act. With regards to confidentiality, the commission discourages the submission of confidential material to the agency. The confidentiality of any material submitted to the agency may be challenged. If information designated as confidential is requested, the matter is referred to the Attorney General of Texas for a determination of confidentiality. No changes were made in response to this comment.

BC commented that the concepts of baseline (and wells) for restoration purposes and monitoring for contaminant migration detection are not clearly separated and described, and noted as an example that the language in §§331.103 - 331.107 seems to mix the concepts and goals of the two. BC suggested these sections of the proposed rules could benefit from clearly stated purposes, goals, and standards for baseline and monitoring concepts, thereby allowing citizens to determine whether the mine was in violation of its permit by reviewing monitoring reporting and related self-enforcement.

The commission strives to provide rules that are clear and concise, and acknowledges that the commenter considers the proposed rules in §§331.103 - 331.107 to not meet this standard. However, without comments that identify BC's specific concerns regarding these proposed rules or the suggestion of alternative rule language, the commission is unable to revise these rules to address those specific concerns. No changes were made in response to this comment.

BC commented that an aquifer exemption should be granted only after a comprehensive demonstration that the hydrogeologic situation meets the EPA standard for an exemption, and that this demonstration must show that the proposed exempted aquifer portion is properly isolated and will remain so during and after completion of exploration, mining, and aquifer restoration. BC further commented that simply drawing an exemption boundary to avoid water wells is hardly the substance of an appropriate proof. BC also commented that the public should be able to review all exploration data, aquifer tests, means of isolation, aquifer behavior computer modeling (in a manner replicable to the public), and other pertinent information as it is developed for each stage of the permit process.

The TCEQ's rules regarding criteria for an aquifer exemption are essentially identical to the criteria in the federal rules for aquifer exemptions; the only difference being the state rule includes an allowance for removal of the exemption. Any revisions to the federal criteria are the purview of the EPA. The commission notes that an aquifer exemption is not required for exploratory drilling. All information submitted with a request for an aquifer exemption is available to the public for review, duplication, and comment, and the commission is adopting formal public notice

requirements for an aquifer exemption under Chapter 39. No changes were made in response to this comment.

BC commented that if an application is part of a large contemplated effort, like vertical or lateral expansion, the entire project should be evaluated at the outset, as the public has had enough of the proverbial "camel's nose under the tent" approach to stepwise permitting.

The commission does not agree with this comment. For Class III injection wells, the commission has the authority to make recommendations on issue of Class III injection well permits and production area authorizations based on the type and sufficiency (with respect to applicable regulatory requirements) of information submitted in the respective applications. However, the commission has no authority to require an applicant to address all possible scenarios regarding future activities at a site. First, the applicant may not know what future activities it may decide to pursue, and second, the commission cannot verify an applicant has or is contemplating any such future plans. The commission notes that applications for each of the required authorizations needed to conduct in situ mining in Texas (Class III injection well area permit, aquifer exemption, production area authorizations, Class III injection well, and radioactive materials license) are subject to the applicable regulatory requirements, technical review by the commission, public notice and comment, and opportunity for a contested case hearing. Any subsequent permit or license revisions for expansion of activities would involve a major amendment to the permit or license, and such amendments are subject to the same requirements as the initial permit or license applications. No changes were made in response to this comment.

The commission assumes that the phrase "step-wise permitting" refers to the fact that authorization for in situ mining involves a Class III injection well area permit, an aquifer exemption if the mineralization is in an underground source of drinking water, at least one production area authorization, a Class I injection well permit for disposal of wastewater generated during the mining process, and a radioactive materials license for a processing facility. The commission appreciates that this approach may be frustrating in that anyone opposed to an in situ mining project may have to contest five separate authorization actions. Although an applicant may choose to submit applications for all of the authorizations at one time and request they be processed together, in accordance with the requirements of 30 TAC Chapter 33, Consolidated Permit Processing, the commission has no authority to require an applicant to do so. No changes were made in response to this comment.

BC commented that the proposed rules are silent regarding what information is required of an applicant to demonstrate that an aquifer meets the criteria for exemption under §331.13, Exempted Aquifer. BC also commented that the public is entitled to a complete geologic characterization of the aquifer or portion of an aquifer being proposed for exemption, including the results of tests of isolation concepts involved, such as pump tests, pilot injection, and recovery experiments.

The commission does not agree with this comment. The explicit criteria for exemption of an aquifer or a portion of an aquifer are in §331.13. Demonstration that an aquifer or a portion of one should be exempted will depend on site-specific factors, which must be addressed in a request for an exemption. The commission notes that with few exceptions, requests for aquifer exemptions are submitted with an application for a Class III injection well area permit, which includes a geologic

and hydrogeologic characterization of the site. A request for an aquifer exemption is subject to public notice and opportunity for a contested case hearing (§331.13(e)). No changes were made in response to this comment.

BC commented that deference to the EPA with regards to aquifer exemptions is likely circular, since the EPA appears to rely on recommendations from the TCEQ. BC also commented that exempting part of a drinking water aquifer in South Texas is a serious matter and the public is entitled to a serious effort to prove that a proposal for exemption will work. BC further commented that at proposed new §39.655, Aquifer Exemption, notice requirements for aquifer exemptions provide opportunity for public meeting and contested case hearing, but questioned what such a contested case hearing would be about, and stated the proposed rules would benefit from a statement of what is expected of an applicant for an aquifer demonstration—both an initial demonstration and enforceable rules if predicted isolation was incorrect.

The commission is unaware of any evidence that the EPA relies solely on TCEQ recommendations when considering revision of the state's underground injection control program to include an exemption of an aquifer or a portion of an aquifer. The commission agrees that exempting an aquifer or a portion of one, in accordance with the criteria in §331.13 is a serious matter, be it in South Texas or anywhere else in the state. Any request for an aquifer exemption is evaluated with respect to the criteria in §331.13.

The commission emphasizes that under existing §331.13(e), a request for an aquifer exemption is subject to public notice and opportunity for contested case hearing. Proposed new §39.655 will codify how those requirements are to be met. With regards to the meaning of these proposed new

rules, an opportunity for a contested case hearing is just that; anyone who opposes an aquifer exemption may contest the matter through the TCEQ's contested case hearing process. The commission is unsure if the commenter is proposing that proposed new §39.655 should be revised to include requirements for a demonstration to support a request for an aquifer exemption, or if other rules, such as §331.13 should be so revised. In any case, the commission does not agree that specific requirements, other than meeting the criteria in §331.13, should be identified in rule. It is the responsibility of the requestor for the aquifer exemption to provide the necessary information to demonstrate these criteria are met. Any demonstration will be reviewed by the commission for sufficiency. Lastly, the commission notes that isolation of the aquifer or portion of an aquifer for which an exemption is requested is not a criterion for exempting an aquifer or a portion of one. No changes were made in response to this comment.

BC commented that aquifer restoration has been a "black mark" (BC's emphasis) on Texas' environmental protection ledger, from open pit lignite and other mining to in situ uranium mining to clean up of oil and gas aquifer contamination, with problems involving delays, deliberate financial inability to perform and a myriad of roadblocks. BC also commented that Texas has had enough of dishonest aquifer restoration efforts, and this rulemaking is an opportunity for change. STOP commented that in disregard of federal law, state agencies in Texas responsible for regulating in situ mining have, over the past 30 years, issued 36 Class III injection well area permits under rules that do not require real aquifer restoration. STOP notes that the TCEQ has never required the holder of a Class III injection well area permit to restore groundwater in the production zone within a production area to its initially-established pre-mining groundwater quality. In all cases, the owner or operator was granted an amendment to the initially-

established pre-mining concentrations of groundwater parameters (that is, the owner or operator was allowed to raise these concentrations).

The commission notes that coal mining and exploration for oil and gas both are regulated by the RRC. Therefore, the commission cannot comment on groundwater contamination or remediation at these types of sites. The commission notes that with the exception of one site, groundwater within the mined zone at in situ uranium mining sites was not restored to the initially-established pre-mining groundwater quality, despite efforts by site operators. The concentration of some constituents in the groundwater, which became elevated due to in situ mining activities, could not be reduced to their respective pre-mining concentrations. In these cases, site operators requested, in accordance with the requirements of §331.107(f), that for certain constituents, higher concentrations be allowed for restoration. Typically at these sites, aquifer restoration could be achieved with regard to many groundwater constituents, and the concentrations of other constituents could be lowered, but not to established pre-mining concentrations. In all cases where an operator requested revision of the established pre-mining concentrations of constituents in the groundwater of the mined zone, the commission evaluated each request under the criteria in §331.107(g)(1) and (2).

The commission is unaware that any Class III injection well area permits were issued contrary to any applicable laws, state or federal, that were in effect at the time the permit was issued. No changes were made in response to this comment.

BC commented that aquifer restoration should proceed according to a firm schedule and meet firm water quality standards, with amendments of each granted only under the most difficult and unforeseen circumstances. BC also commented that the people have had enough of deliberate delays and amended restoration values that have made a mockery of restoration in the past, and that this rulemaking is the time to do it right.

The commission notes that a mine plan, which includes a schedule for mining and restoration, must be submitted with an application for a Class III injection well area permit (Form TCEQ-10313), and that this schedule is included in a permit. However, a mine schedule is an estimation of activities that occur years in the future, and reasonable adjustments to this schedule may be needed. Under §331.107(b), aquifer restoration must commence within 30 days of completion of mining. Also, under §331.107(c), authorization for expansion of mining into new production areas may be contingent upon an owner or operator achieving restoration progress in previously mined production areas within the schedule set forth in the mine plan. With respect to groundwater quality, pre-mining groundwater quality must be established in accordance with the requirements at §331.104. All amendments to aquifer restoration tables are evaluated based on the considerations under previous §331.107(f)(1).

Further, all requests for amendments to restoration values are approved by the commission only after realization of the findings under previous §331.107(f)(2) which included a determination that reasonable restoration effort had been made, the restoration parameters had stabilized, the formation water would be suitable for any use to which it was suited prior to mining, and that

further restoration efforts would consume energy, water or other natural resources of the state without providing a corresponding benefit to the state.

With regards to the commission's statement in the preamble to the proposed rules that aquifer restoration goals should be based on data from groundwater samples collected from baseline wells only, GCGCD commented that there are two considerations: first, a methodology should be provided for obtaining water quality for baseline and monitor wells that accurately represents pre-mining water quality that has not been affected by exploration activities. Second, groundwater quality in the monitor wells must be maintained independent of and in addition to the water quality in the baseline wells located in the production zone. GCGCD further commented that applying TCEQ assumptions that baseline and monitor wells provide a separate set of information, maintaining the integrity of the pre-mining water quality at the monitor wells is critical for the protection of a drinking water aquifer, and that restoration of water in the monitor well must also be addressed if a deterioration of water quality is identified.

The commission agrees with these comments in part. With regards to the establishment of pre-mining water quality unaffected by exploration activities and as expressed in a previous response, it has not been demonstrated that exploration activities affect groundwater quality to any significant degree, or that any such effects persist. The commission further notes that as also discussed in another previous response, pre-exploration baseline must be established in accordance with recent changes to the Texas Natural Resources Code under HB 3837, 80th Legislature, 2007, and that the RRC will adopt rules to address this requirement.

As a matter of clarification regarding subsequent responses, the commission notes the meanings of the following terms. The term "production zone" is the stratigraphic interval extending vertically from the shallowest to the deepest stratum into which mining solutions are authorized to be introduced. The term "production area" is the area generally defined by a line through the outer perimeter of injection and production wells used for in situ mining. Therefore, mining will be in that part of the production zone that underlies the production area. The term "mine area" is that area within a line through the ring of designated monitor wells completed in the production zone. The term "nonproduction zone" is any zone other than the production zone.

The commission agrees that baseline groundwater quality must be established for both the production area and the mine area. (However, the commission emphasizes that the purpose of establishing pre-mining water quality in the production zone within the production area is for aquifer restoration, whereas the purpose of establishing pre-mining water quality in the mine area is for detection of mining fluids that have migrated from the production zone within the production area outwards to a monitor well (such movement of mining fluids is an "excursion," which is defined at §331.2(28))). Aquifer restoration is required for the production zone within the production area; it is not required for groundwater in the monitor wells. Aquifer restoration is necessary (and required in accordance with §331.107) in the production zone within the production area because the groundwater in this zone is affected by the repeated injection and extraction of mining fluids. This is not the case with the groundwater in the monitor wells, which are located outside of the production area. The presence of mining fluids in a monitor well is addressed in previous rule §331.106.

GCGCD and STOP recommended several procedures for establishing pre-mining groundwater quality, both in the production and mine areas, and in monitor well ring. GCGCD and STOP recommended for baseline samples in the mine and production areas: "(1). Baseline wells shall be screened over the entire thickness of sand; if necessary, multiple wells, each screened over a portion of the sand, shall be completed at each monitoring location such that the entire thickness of sand is screened."

The commission agrees that all baseline wells should be screened so as to provide representative samples from a particular zone. However, the commission does not support mandatory screening over an entire interval. The adequacy of a screened interval, or the necessity for multiple screens over an interval should be evaluated based on site-specific factors, such as the thickness of the interval, distribution of mineralization over the interval, and the nature of the parameters for which baseline is being established. No changes were made in response to this comment.

GCGCD and STOP also recommended for baseline samples in the mine and production areas:

"(2). A minimum of four samples shall be collected from each well at a frequency of no less than one sample a month."

The commission supports the collection of an adequate number of samples for establishment of pre-mining water quality. However, this can be accomplished by sampling a number of baseline wells, and by the collection of more than one sample from each well. Certainly "the more samples the better" applies to any statistical estimation, prediction, or hypothesis test, but the commission fails to see the significance of four samples, other than to arbitrarily set some minimum requirement. Any evaluation of an applicant's proposed method for establishment of baseline, both under

§331.104(b) for aquifer restoration and under §331.104(e) for excursion detection will be based, at least in part, on the number of samples used to establish these baselines, and on the method in which data from these samples are used to establish respective baselines. Any such evaluation would also consider whether or not the samples were independent and representative, as required under §331.014(a). No changes were made in response to this comment.

GCGCD and STOP also recommended for baseline samples in the mine and production areas:

"(3). Valid statistical tests shall be performed on the water quality data for each well to remove outliers and determine the distribution of the data. If data for a groundwater quality parameter are distributed normally or log-normally, the mean (average) may be calculated (minus outliers) for that parameter. For data that are not distributed normally or log-normally, the median value shall be used for the parameter (minus outliers), or additional samples may be collected to retest the distribution. If outliers are removed, a minimum of three samples must remain to calculate the mean or median for a parameter."

The commission agrees that "valid" statistical methods should be used in any statistical analysis, and a discussion of the term "valid" is provided in a previous response. However, the commission opposes the arbitrary elimination of outliers. Although statistical tests should be performed to identify any potential outliers, the commission does not agree that all outliers should be summarily discarded. Any outlier (either high or low) should not be discarded unless it is determined its value was the result of a typographical or transcription error, faulty analysis, or improper sampling. Methods may be used to accommodate an outlier (for example, see Outliers in Statistical Data by V. Barnett and T. Lewis, 1994, 3rd edition, John Wiley and Sons), but one should never be discarded

except under the above-mentioned circumstances. Also, the commission notes that the sample mean (average) is a point estimate of the true mean of a distribution, and the sample median is a point estimate of the true median of a distribution. For a normal distribution (or any other symmetrical distribution, for that matter), the true mean equals the true median, whereas in a log-normal distribution the true mean is greater than the true median (see Statistical Methods for Environmental Pollution Monitoring, 1987, by Richard O. Gilbert, page 171). Therefore, the commission does not see the logic in using the sample mean for data presumed to be from a population characterized by a normal or log-normal distribution, but using sample median for data presumed not to be from a population characterized by one of these distributional types. Lastly, the commission notes that use of the sample median is a method used to accommodate outliers. No changes were made in response to this comment.

GCGCD and STOP also recommended for baseline samples in the mine and production areas:

"(4). If multiple wells are installed at a monitoring location, the mean or median from each well will be used to determine the baseline value for each parameter at the well location. A valid statistical test will be performed with the mean or median values to determine the distribution of each parameter. If a normal or log-normal distribution is demonstrated, the mean (average) can be calculated for the parameter. For data that do not follow a normal or log-normal distribution, the median value shall be used to represent the parameter for that well location."

The commission agrees that all wells installed at a monitoring location should be sampled. However, with regards to use of the sample mean or sample median, the commission offers the same explanation provided in response to the commenters' item (3). That is, the

commission does not agree that a sample mean should be used for data presumed to be from a normally or log-normally distributed population and that a sample median should be used for data presumed to be from a population that is not normally or log-normally distributed. No changes were made in response to this comment.

GCGCD and STOP also recommended for baseline samples in the mine and production areas:

"(5). Baseline water quality in the mine area and production area will be established independently and calculated using the mean or median for each parameter from each well location. A valid statistical test will be performed with the mean or median values to determine the distribution of each parameter."

The commission agrees that groundwater quality in the baseline wells should be established independently from groundwater quality in the monitor wells, but again emphasizes that groundwater quality in the baseline wells (those wells completed in the production zone of the production area) is to be used for aquifer restoration goals and groundwater quality in the monitor wells is to be used for detection of excursions. With respect to the suggested use of mean and median, the commission does not agree that a sample mean should be used for data presumed to be from a normally or log-normally distributed population and that a sample median should be used for data presumed to be from a population that is not normally or log-normally distributed. No changes were made in response to this comment.

GCGCD and STOP also recommended for baseline samples in the mine and production areas:

"(6). The baseline water quality for the mine area and production area will serve as the restoration

values for the mine area and production area. Each area will be restored to its pre-mining baseline levels."

The commission again emphasizes that aquifer restoration is required for the area where the production zone is mined using in situ techniques; that is the production zone within the production area. It is the groundwater in this zone within the production area that is affected by injection of mining fluids, and therefore must be restored to pre-mining conditions. For the mine area, which is the area enclosed by the ring of production zone monitor wells that surround the production area, groundwater quality is determined so that any injected mining fluids that migrate from the production zone within the production area can be detected. Because mining fluids are not purposefully injected into the production zone outwards from the production area, this part of the production zone should not be affected by mining fluids, except for short periods of time during an excursion. All excursions must be addressed in accordance with the existing requirements in §331.106. No changes were made in response to this comment.

For baseline samples for the monitoring well ring, GCGCD recommended a methodology consisting of six items. Items 1 through 5 in this recommended methodology are identical to items 1 through 5 of their recommended methodology for baseline samples in the mine and production zone, in items 1 through 5 for the production areas. For these five items, the commission's responses are identical, respectively, to the responses to items 1 through 5 of GCGCD's recommended methodology for baseline sample in the production and mine area. Item 6 of GCGCD's recommended methodology for baseline samples for the monitor well ring was as follows: "(6). Upper control limits for excursions will be calculated for the baseline values using a valid statistical test (e.g., upper 95% confidence interval)."

The commission agrees that the term "control parameter" is defined at §331.2(28) as a groundwater constituent monitored on a routine basis to detect or confirm the presence of mining solutions in a monitor wells. The term "upper limit" is defined at §331.2(108) as a parameter value that, when exceeded, indicates mining solutions may be present in a monitor well should be based on statistical methods for which the sampling distribution is known, or at least can be estimated, and on a test that is appropriate for the distribution of the data (at least in the case of a parametric test). Lastly, the critical value for the statistic should be chosen to provide an acceptable type I error rate, and, to the extent possible, the power of the statistic should be sufficient to provide reasonable assurance that the null hypothesis is not being accepted incorrectly. With regards to use of a 95% confidence interval, the commission refers GCGCD to the discussion on tolerance intervals elsewhere in this response to comments.

STOP provided recommendations identical to those made by GCGCD with regard to items 1 through 5, respectively, for baseline samples in the mine and production area, and for baseline samples for the monitor well ring, except that STOP referred to the second category as "baseline samples in the non-production zone of the production area and in the non-production zone of the mine area."

The commission's response to STOP's recommendations are the same as the responses to GCGCD's recommendations regarding these items.

With regards to baseline samples in the mine and production areas, and with baseline samples in the non-production zone of the production area and in the non-production zone of the mine area, STOP made the

following recommendations: a four-acre grid shall be established over the non-production zone of the production area and a baseline well installed at each node of the grid; an eight-acre grid shall be established over the non-production zone of the mine area and a baseline well installed at each node of the grid; and wells shall be installed as soon as preliminary exploratory boreholes have delineated the ore deposit, and must be completed and sampled at least once before exploration activities are finished.

The commission does not agree with these recommendations. Non-production zone monitoring currently is required under §331.104(b) for the purpose of detecting excursions from the production zone within the production area to non-production zones. In accordance with these requirements, an owner or operator must have monitor wells in any freshwater aquifer overlying the production zone. These wells must be located within 50 feet on either side of a line through the center of the production area, with a minimum of one well per every four acres, and one well per eight acres for wells completed in any additional overlying freshwater aquifers. The executive director may authorize changes or adjustments in the location of these wells to ensure detection of excursions. The commission notes that exploratory wells are regulated by the Railroad Commission of Texas. The TCEQ has no authority to impose the requirements for exploration activities. No changes were made in response to this comment.

GCGCD commented that the monitoring requirements in 30 TAC Chapter 330, Municipal Solid Waste, are prescriptive and more protective of human health and the environment, relative to the monitoring requirements in Chapter 331, and questions why Chapter 331 does not have this rigorous approach.

CBGSC commented that Chapter 330 is far superior in its statistical approach as compared to proposed revised §331.104, and that a similar approach to §331.104 would be good. An individual suggested it

would be wise to revise the proposed rules to conform to those in Chapter 330 with regards to statistical requirements.

The commission acknowledges the commenters' assessment of the groundwater monitoring requirements in Chapter 330 as compared to groundwater monitoring requirements in Chapter 331. The relative protectiveness afforded by each set of monitoring rules is a matter of opinion, and, although a detailed comparison of the groundwater monitoring requirements from each of these chapters is beyond the scope of this response to comments, the commission notes that under §330.403(a)(2), the minimum spacing for monitor wells is 600 feet, and greater spacing is allowed if it can be demonstrated to be protective. The Chapter 330 rules regarding statistical methods are more prescriptive in that specific statistical tests are required although other tests, approved by the executive director, are allowed (§330.405(e). Also, under §330.407(a)(1), four independent samples are required, although the executive director may approve an alternate sampling frequency §330.47(a)(2). The commission contends the requirements of proposed §331.104, although they do not specify specific statistical tests, are comparable to the Chapter 330 requirements for detection monitoring at §330.407, Detection Monitoring Program for Type I Landfills. No changes were made in response to this comment.

GCGCD commented that water quality in the monitor wells must be maintained independent of and in addition to the water quality in the baseline wells completed in the production zone of the production area.

The commission agrees with this comment and notes that proposed revisions to §331.104 include this requirement. However, the commission again emphasizes that the purpose of a determination of water quality in baseline wells is for aquifer restoration, whereas the purpose of a determination of water quality in monitor wells is for excursion detection. Aquifer restoration in the production zone of the production area is necessary because the continuous injection of mining fluids over time in this zone within this area affects its groundwater quality. In the area of the production zone monitor wells, mining fluids are not purposely injected, and therefore will not affect this groundwater to the degree groundwater is affected in the production zone within the production area. In accordance with the requirements in §331.106 and proposed revisions to this section, when mining fluids are detected in a monitor well, the operator must take actions to clean up the excursion in a practical and expeditious manner.

GCGCD commented that if groundwater in a monitor well is affected, that groundwater should be restored if there is a deterioration of its water quality.

The commission agrees with the comment and notes that any excursions detected in a monitor well must be addressed in accordance with the requirements of §331.106 which includes notification, analysis and clean-up.

Sierra Club commented that they are supportive of a more regional approach to groundwater quality, and that mining companies also provide information and testing of any existing wells in the mining area and adjacent lands. Sierra Club also commented that water quality data from other state agencies should be included in the application.

The commission notes that in accordance with §331.122(2)(B), the commission, prior to issuing a Class III injection well permit, shall consider a tabulation of all reasonably available data on all wells within the area of review. This information would include any available water quality data from wells within the area of review, as defined at §331.42, Area of Review.

Sierra Club and STOP recommended the proposed rules be revised to include the following specific requirements: 1) A statistically valid number of monitor wells in the production zone, including the strata above and below the mining, sufficient to determine the water quality and detect any excursion in a timely manner; 2) A valid and accurate statistical testing of the monitoring wells to determine pre-mining baseline; 3) Upper control limits based on a valid statistical test or the monitor well baseline, such as the upper 95% confidence interval; 4) Nested wells where the thickness of the sand is too great for a single screen interval; 5) Restoration of the Mine Area and the monitor well area to actual pre-mining concentrations; and 6) Notice requirements to the TCEQ and property owners within two hours if there is a change in concentration of any constituent which may affect drinking water quality of a private well.

The commission offers the following comments on each of these respective suggested requirements:

1) The commission is unclear as to the meaning of "a statistically valid number of monitor wells."

The number of monitor wells should be dependent on such considerations as geology and

hydrogeology, and the commission is uncertain how this would be determined in a statistical

manner. No changes were made in response to this comment; 2) The commission agrees that

determination of pre-mining baseline for excursion detection is essential, and notes this subject is

addressed in new §331.104(e). Under new §331.104(e), any statistical test chosen by an applicant or

operator must be approved by the executive director, who will evaluate the proposed method. No changes were made in response to this comment; 3) As expressed in the previous comment, the commission agrees that determination of baseline for excursion detection should be based on appropriate statistical tests. With regards to the provided example of an upper 95% confidence interval, the commission notes that use of this method carries the same observations the commission makes in a subsequent response regarding use of a tolerance interval. That is, the commission does not agree that a tolerance interval methodology must be used, but that the choice of statistical method for a hypothesis test should be based on the appropriateness of the method to the distributional characteristics of the data. No changes were made in response to this comment; 4) The commission agrees that multiple monitor wells may be necessary at a single monitoring location in certain circumstances, such as excessive sand thickness. However, the commission can require such wells, when necessary, under §331.103, Production Area Monitor Wells. No changes were made in response to this comment; 5) The commission disagrees that aquifer restoration should be required for the area between the production area and the surrounding monitor well ring. It is within the production zone of the production area that mining fluids are injected, and it is groundwater in this zone within this area that will require restoration. Any excursions of mining fluids from this zone will be detected in the monitor wells, prompting remediation of the excursion in accordance with the requirements of existing §331.106. No changes were made in response to this comment; and 6) Under proposed §331.106, an operator is required to notify the commission of any excursions, sample the affected wells for an expanded list of groundwater parameters, and initiate actions to clean up the groundwater in the affected wells to baseline quality for the monitor wells. Also, when mining fluids are present in a monitor well, the operator must increase the sampling frequency to twice a week (§331.105(4)). These actions provide a rapid response to an excursion,

and are designed to ensure an excursion is contained and remedied, preventing it from further migration and possibly affected off-site wells. Although the commission can and would notify any property owner if it thought an excursion could affect that property owner's well, it sees no need to require notification of landowners in the event of any excursion. In addition, the executive director is required under TWC, §5.235 to notify a county judge and county health officials when the executive director acquires information that confirms that a potential public health hazard exists because usable groundwater has been or is being contaminated. No changes were made in response to this comment.

CBGSC commented that a valid statistical analysis of sample data requires samples to be obtained from wells located on a systematic grid across the entire mining areas surrounded by monitor wells or randomly selected with an appropriate statistical procedure, and that no such requirements for locating baseline wells are included in the proposed rules. CBGSC emphasized that without these requirements, data resulting from sampling of baseline wells cannot be representative in a statistical sense, and will not yield valid statistical results.

The commission agrees that data used to establish baseline should be representative of the groundwater for which baseline is to be established. In evaluating an applicant's proposed baseline determination, the commission takes into consideration whether the samples used to establish baseline are representative, and has revised §331.104(a) to require representative samples. Obtaining representative samples would certainly involve evaluation of the locations of baseline wells, and any evaluation by the commission regarding whether samples are representative would include consideration of how the baseline wells were located.

CBGSC recommended that because data obtained from sampling of baseline wells are all-important in establishing aquifer restoration values, the commission should consult with the most highly qualified statisticians specializing in applied sampling design in order to establish protocols for obtaining a systematic or random sample of baseline wells. CBGSC emphasized that establishment of such protocols would assure that data used to determine aquifer restoration values are statistically sound.

The commission appreciates that there are statisticians that specialize in sample design, and that the establishment of such protocols are valuable in assuring that aquifer restoration values are determined in a statistically sound manner. The commission notes that there are agency employees that have statistical expertise to address issues, such as sample design, and that numerous guidance documents and texts on statistical analysis also are available to agency staff.

An individual commented that they were surprised to learn that groundwater at in situ uranium mining sites in Texas has never been restored to pre-mining groundwater quality.

Commission records indicate that with the exception of one production area authorization (Production Area Authorization UR01941PAA3 at COGEMA's O'Hearn Mine), aquifer restoration values at all other sites were amended to allow for higher concentrations of certain groundwater constituents to meet aquifer restoration requirements. As discussed in a previous response, the commission notes that at these sites, the concentration of many of the groundwater constituents were reduced to the initially-established aquifer restoration values, but that for other constituents, concentrations were reduced by restoration efforts, but not to the initially-established restoration

values. All amendments to restoration values were in accordance with the requirements of existing §331.107(f). The commission also notes that the pre-mining groundwater quality at all mining sites did not meet federal primary drinking water standards for one or more regulated constituents, and that at all sites, the radioactivity associated with radium-226 in the groundwater exceeded the primary drinking water standard of 5.0 picocuries per liter.

KCCRB commented that although groundwater quality within a uranium mineralized zone is affected by this mineralization, groundwater in other portions of an aquifer above and below the mineralized zone may not be affected, and the groundwater in these zones could be suitable for any use and that this groundwater should be protected. KCCRB recommended that the rules should include requirements that groundwater quality be established for the entire thickness of the aquifer, not just for those portions in the immediate vicinity of the aquifer.

The commission agrees that groundwater quality within a uranium mineralized zone is affected by this mineralization, and that groundwater in other portions of an aquifer above and below the mineralized zone generally is not affected by this mineralization. Further, the commission emphasizes that all underground sources of drinking water (USDW) are protected, and that in situ mining can only be conducted in an aquifer or portion of an aquifer that is not a USDW because it either does not meet the definition at §331.5 for a USDW, or because it has been exempted in accordance with the requirements in §331.13. Also, under existing §331.103, groundwater monitoring currently is required in the production zone outside of the production area and in nonproduction zones above the production zone, and any excursion on mining fluids from the production zone within the production area must be addressed in accordance with the

requirements of §331.106. An owner or operator is required to determine the quality of groundwater quality in the production zone within the production area, in the production zone outside of the production area, and in non-production zones. No changes were made in response to this comment.

STOP commented that with the passage of SB 1604, the opportunity for a contested case hearing apparently has been eliminated regarding amendments to restoration tables.

The commission does not agree with this comment. Section 32 of SB 1604, passed during the 80th Texas Legislature, 2007, amended TWC, Chapter 27 by adding new §27.0513. Under new TWC, §27.0513(d)(1), an application for a production area authorization is an uncontested matter not subject to opportunity for a contested case hearing unless the application seeks an amendment to a restoration table. Therefore, such an application is subject to opportunity for a contested case hearing. This part of the statute is codified under the final rule at §55.201(i)(11)(A).

STOP commented that if the commission cannot determine the actual pre-mining groundwater quality based on regulations that do not require objective sampling and proper statistical analysis, then there is no basis for drawing a conclusion about the restoration of mined areas.

The commission does not agree that pre-mining groundwater quality cannot be determined based on applicable rules. Under new §331.104(a), all samples must be independent and representative, and a determination of aquifer restoration must be based on average values for aquifer restoration parameters or a statistical method approved by the executive director. These requirements will

ensure that pre-mining groundwater quality will be appropriately determined, which is necessary for determining if aquifer restoration has been accomplished in accordance with the requirements of §331.107.

STOP requested the following changes be made to the proposed rules: a requirement for separate baseline testing for the production zone in the production area, the production zone in the mine area, the non-production zone in the production area, and the non-production zone in the mine area; use of an appropriate statistical method to select the location and depth of wells to be sampled to ensure that baseline wells are representative of the area being studied; use of an appropriate number of wells so that the results obtained are representative of the area being studied; collection of an appropriate number of water samples from each selected well so that the results obtained are representative of the water being studied; collection of water samples by a qualified independent contractor; use of appropriate methods to collect and preserve water samples for the laboratory; appropriate timing of each sample collected to assure that each water sample is independent; and use of the mean if a normal distribution or lognormal distribution is found; otherwise, use of the median.

The commission again notes that groundwater quality must be established for the production zone within the production area, the production zone outside of the production area, and for non-production zones. However, for the reasons discussed in a previous response, pre-mining groundwater quality for the purpose of aquifer restoration is required only for the production zone within the production area. Determination of pre-mining groundwater quality in the production zone outside of the production area and in non-production zones is necessary for groundwater monitoring to determine if an excursion has occurred.

The commission does not agree with these recommendations for the following reasons: the depth of wells is determined by the depth of the zone to be monitored; and location of monitor wells is prescribed under §331.103. Under proposed new §331.104(b), baseline wells for the determination of aquifer restoration must be completed in the production zone within the production area, although the location of these wells otherwise is not specifically addressed by rule. However, the commission will evaluate the location of these wells pursuant to new §331.104(a), with respect to the requirement for representative samples. Likewise, the number of baseline wells and the number of samples from each of these wells will be evaluated under this criterion. The commission does not agree that the collection of samples by an independent contractor is necessary. All samples collected by the owner or operator must be in accordance with an approved sampling plan referenced in the Class III injection well area permit, and the commission conducts sampling on a routine basis to ensure the integrity of the sample results reported by the owner or operator. Again, all samples must be independent and representative. As discussed in another response, independence, in a strict statistical sense, is difficult to demonstrate. However, the commission can require that any sampling frequency can be reasonably based on other factors (for example, see method described in EPA Guidance Document on the Statistical Analysis of Ground-water Monitoring Data at RCRA facilities). Lastly, as discussed in a previous response, the commission does not see the logic in using the sample mean for data that are normally or lognormally distributed, and the sample median for data that are not. No changes were made in response to this comment.

STOP commented that uranium mineralization that is mined using in situ techniques in South Texas occurs in drinking water aquifers, and cited Uranium Resources, Inc.'s (URI's) Kingville Dome Mine in

Kleberg County as an example. STOP noted that uranium mineralization at this site occurs in sands of the Goliad Formation, which is the only aquifer that provides groundwater in Kleberg County. STOP further noted that according to the Texas Water Development Board, numerous drinking water wells are completed with sands of the Goliad Formation within the same interval that contains the uranium mineralization at the Kingsville Dome Mine, including wells that supply drinking water to the city of Kingsville. STOP also noted that a cone of depression is associated with this well field, inducing groundwater in the area to flow towards the wellfield. Lastly, STOP noted that URI reported in 2008 that the concentration of uranium within the groundwater at their production area authorization PAA2 is above 3,000 micrograms per liter, even after years of restoration efforts.

The commission acknowledges that in South Texas, those areas of uranium mineralization that have been mined using in situ techniques all occur in formations that would be underground sources of drinking water, if the portion of the aquifer had not been designated as an exempt aquifer. The commission is unsure of the term "drinking water aquifer" as this term is not defined in state statutes or regulations. However, the commission assumes the term refers to an aquifer that contains groundwater that meets or essentially meets primary drinking water standards. The commission also acknowledges the importance of the Goliad Formation as a source of groundwater, not only for Kleberg County, but for numerous counties in South Texas. With respect to STOP's comments regarding the wells that supply water to the City of Kingville and the associated cone of depression, the commission is unsure of the significance of this comment. STOP appears to be implying that the groundwater within URI's PAA2, which contains elevated concentrations of uranium, could be directed toward the cone of depression created by pumping of Kingville's water wells. The commission notes that all mining operations are required to confine mining solutions

within the production zone within the area of designated production zone monitor wells under §331.102, Confinement of Mining Solution, regardless of the groundwater gradient.

STOP commented that the legislature has required the commission to establish the methods for determining restoration table values, but that the proposed changes to those rules do not follow the statute as written. STOP also commented that under TWC, §27.0513(c) the legislature has required the commission to write rules in which the sampling process is objective and in which proper statistical measurements are used so that the results are reliable and valid, and that any other meaning is absurd. STOP further commented that the proposed rules: provide for sampling that is not objective, as the company selects which wells to test and performs all testing; are biased toward a finding of high concentrations of uranium and radium by excluding 75% of the groundwater within the authorization to mine (only the ore zone is required to be tested); provide for the arithmetic mean which allows any outlier to unfairly influence the result; and alternatively, allow an owner or operator to select the method for determining groundwater quality. Therefore, according to STOP the proposed rules are neither reliable nor valid.

The commission notes that at TWC, §27.0513(c) the commission is required by rule to establish application requirements, technical requirements, including the methods for determining restoration table values, and procedural requirements for any authorization. The commission's opinion is that the existing rules and the proposed revisions to those rules meet this requirement. Regarding the specific requirements STOP believes are implied in the requirement at TWC, §27.0513(c), the commission notes all of these issues are specifically addressed in other responses. No changes were made in response to this comment.

STOP commented that improper determination of aquifer restoration values has led to a misrepresentation of groundwater quality in South Texas by the mining industry and the commission. STOP noted that the proposed rules continue to allow amendments to aquifer restoration values, allowing mining companies to leave mine sites contaminated with radiation. STOP emphasized this rulemaking is an opportunity to correct past errors regarding amendments to aquifer restoration values.

The commission does not agree with this comment. Groundwater in the production zone within the production area at all production area authorizations was restored in accordance with the requirements of §331.107. The allowance of amendments to aquifer restoration values is necessary to allow for higher aquifer restoration values in certain cases. The commission contends that aquifer restoration in all cases should result in attainment of pre-mining groundwater quality in the production zone within the production area unless this requirement must be met by the use of excessive amounts of groundwater and other resources, without providing a corresponding benefit to the state. The commission notes that groundwater quality in all cases was improved and that at all sites, pre-mining groundwater quality did not meet primary drinking water standards. The revisions to the previous rules provide greater protection to groundwater resources in the vicinity of in situ uranium mines.

STOP commented that the proposed rules do not meet the requirements of TWC, §27.0513(c) in that they do not address application requirements, technical requirements, including the methods for determining restoration table values, and procedural requirements for any authorization. STOP expressed the opinion that the proposed rules for the determination of water quality in the monitor well ring and establishment

of upper control parameters fail to provide objective sampling and valid result, nor do these proposed rules require sufficient monitor wells to produce either a representative sample or to detect excursions. STOP further opined that that excursions are cleaned up, but restoration is not required. Lastly, STOP commented that there are no notice requirements for wells monitored in accordance with §331.84(d) (wells within 1/4 mile of the injection site).

The commission does not agree with these comments, as expressed in other provided responses that address these respective comments and concerns.

Definitions

KHH commented that the definition of "activity" at §331.2(2) should include a reference to monitoring wells.

The commission agrees with this comment. Under the proposed rules, the definition of the term "Activity" at §331.2(2) was revised to include injection or production wells and other classes of injection wells regulated by the commission. In that monitor wells at Class III injection well sites are regulated by the commission, the final rule at §331.2(2), is amended to include a reference to monitor wells.

TMRA commented that the definition of the term "affected person" at §331.2(3) should be revised to be consistent with the definition of this term at TWC, §5.115 and at §55.3.

The commission agrees with this comment and the final rule at §331.2(3) has been revised accordingly.

TMRA commented that the definition of the term "area permit" at proposed revised §331.2(10) should be revised to delete the comma following the word "production" and the following words "or monitoring."

The commission is unsure of the purpose of this proposed revision. Under this rulemaking, the commission proposed revision of this definition to include all wells that are authorized under a Class III injection well area permit; these wells include injection wells, production wells, and monitor wells. No changes were made in response to this comment.

KHH commented that the definition of the term "baseline quality" at §331.2(12) may be confusing because this definition includes the term "injection activities." KHH emphasizes that the definition of the term "activity" includes construction of wells, but that under §331.2(12), baseline quality must be determined prior to "injection activities." KHH commented that based on these two definitions, a person could interpret §331.2(12) to mean that baseline quality must be established prior to well construction, which clearly is impossible, and suggested §331.2(12) be revised by replacing "injection activities" with "injection operations."

To avoid possible confusion regarding this matter, the commission has amended the final rule at §331.2(12) to refer to "injection operations" rather than "injection activities."

Mesteña and TMRA commented that the definition of the term "control parameter" in §331.2(28) should be further revised to indicate the term includes measurement with field instrumentation.

The commission agrees with these comments, and the final rule at §331.2(28) had been amended to indicate the term "control parameter" to include measurement with field instrumentation.

TMRA commented that the proposed revisions to the term "excursion" at §331.2(38) should be deleted, as further refinement of the term serves no practical purpose. TMRA further commented that it is not the definition of the term "excursion" that triggers permit obligations, but rather one or more exceedences of control parameter upper limits, and stated "because of this direct linkage to exceedence of one or more control parameter upper limits, the stated purpose of the amendment has already been accomplished without any amendment being required. As stated, the proposed change to the definition appears to needlessly foreclose consideration of any information other than control parameter analysis in determining whether an excursion has or has not occurred."

Although the commission agrees that it is not the definition of the term "excursion" that triggers the requirements under §331.106, it is the existence of an excursion that causes an operator to respond, in accordance with the requirements of §331.106, to an excursion. The purpose of the proposed revisions to §331.2(38) is to emphasize that identification of an excursion is based on analysis of groundwater samples from monitor wells, and the analysis of those samples for the presence of designated control parameters. The commission is unaware of how an excursion would be identified except through the use of control parameters. No changes were made in response to this comment.

With regards to the proposed revised definition of the term "mine plan" at §331.2(63), TMRA and URI commented that it is important to note the significance of estimating the schedule and that the estimated nature of the mine plan schedule should be included in the definition. TMRA and URI also commented that the TCEQ should also recognize that the report is adjusted annually. TMRA further commented that a clarification is needed for the proposed subsection (b) language, as it is not clear how the scheduling weighs into permit approval or subsequent permit regulation, if it does at all. TMRA stated that the progression of the mining is subject to many technical and economic factors that may accelerate or slow the mining schedule and that the schedule should not be used to regulate the progress of mining. TMRA asked the question "if a mine does not progress in accordance with the timetable included in the permit application, what is the regulatory implication?" TMRA commented that the basis for this provision, an explanation of how it will be used, and the boundary of enforcement in the context of mining timetables is not included in the preamble and as such, is potentially subject to unanticipated use. Without context and proper safeguards, this proposed provision adds unacceptable uncertainty into the permit regulatory process and should not be included in the adopted rule.

The commission does not agree with this comment. The proposed revised definition at §331.2(63)(B) specifies that the mine plan will include an estimated schedule indicating the sequence and timetable for mining and any required aquifer restoration. Annual updates of the mine plan already are required under proposed revisions to §331.85(3)(B). The commission appreciates that the progression of mining is subject to many technical and economic factors and that some flexibility is necessary regarding the projected time to complete various operations associated with mining. Revisions to a mine schedule will occur; this is why the schedule is an estimate. However,

the commission's concern is not so much that the mine schedule is strictly followed, but that mining operations and subsequent restoration are completed within a reasonable amount of time, with allowances for technical and economic factors. The time required for mining and restoration should not be indefinite, with numerous extensions that are not reasonably justified. No changes were made in response to this comment.

TMRA commented that the definition of the term "monitor well" at proposed new §331.2(64) should include the term "instrumentation" to indicate sampling from a monitor well may be done using field instrumentation.

The commission agrees with this comment, and the final rule at §331.2(64) has been revised to indicate that a monitor well is any well used for the sampling or measurement with field instrumentation of any chemical or physical property of subsurface strata or their contained fluids.

TMRA commented that the proposed new definition for the term "production well" at §331.2(83) should not be adopted. TMRA notes that this proposed new definition is inconsistent with the existing definition for this term at TWC, §27.002(16) in that the definition in the statute includes injection wells, and refers only to wells used to recover uranium. Given this existing statutory definition, the commission is revising proposed new §331.2(83) to be consistent with the existing statutory definition.

The commission disagrees that this proposed new definition should be deleted. As discussed in the preamble to the proposed rule, this term is used in Chapter 331, and therefore should be defined. However, the commission acknowledges that the definition of this term at TWC, §27.002(16)

includes any well used for injection to recover uranium. The commission also notes that "injection well" is defined at §331.2(47) as a well into which fluids are being injected. Therefore, the commission is keeping the definition of the term "production well" in the final rule, but is amending the definition to be compatible with the definition at TWC, §27.002(16).

KHH commented that the proposed revised definition of the term "restored aquifer" at §331.2(89) referenced the aquifer within the permit area. KHH noted that aquifer restoration is required for the aquifer within a production area, not the entire permit area, and suggested this definition be revised to reflect this requirement. Mesteña and TMRA commented that the proposed revised definition of the term "restored aquifer" at §331.2(89) does not reference this term to the exempt portion of the aquifer. Also, Mesteña and TMRA commented that the definition incorrectly suggests that completion of aquifer restoration requires achievement of restoration table values rather than restoration to water consistent with restoration table values. Mesteña, TMRA, and URI recommended this definition be revised to reference the exempted portion of the aquifer, and to include a statement that restoration is achieved if the groundwater quality is returned to the same class of use to which to values of the applicable restoration table indicate it is suited.

The commission agrees with the comment from KHH, and the proposed revised definition of "restored aquifer" is amended to refer to "production area" rather than "permit area" in the final rule. The commission acknowledges that restoration will occur in the exempted portion of the aquifer, in cases where an aquifer exemption was required. However, mineralization could occur in a unit that is not an exempted aquifer or an underground source of drinking water (although the commission is aware that in Texas, areas of uranium mineralization that have been mined using in

situ techniques all have occurred in exempted USDW-quality aquifers). In such a case, the suggested reference to an exempted aquifer may cause unnecessary confusion. With regards to Mesteña's and TMRA's comment on restoration to a class of use, the commission notes that in accordance with the requirements of §331.107(b), there is no mention of "class of use" in these requirements. Consideration of class of use is only in accordance with requests for amendments to restoration values (§331.107(g)(1)(A) and (2)(C)). Therefore, the commission sees no need to revise this definition as proposed by Mesteña and TMRA.

TMRA commented that under existing definition at §331.2(108) for the term "upper limit, an exceedence of an upper limit indicates mining solutions may be present in designated monitor wells. TMRA noted that the term "verifying analysis," defined under §331.2(109) indicates mining solutions are assumed to be present if such an exceedence is confirmed by a verifying analysis. TMRA recommended existing §331.2(108) be revised to read "Upper limit—a value for a parameter of groundwater in one or more designated monitor wells which, when exceeded, may indicated the presence of mining solution in that groundwater."

The commission fails to see the advantage of TMRA's proposed definition for the term "upper limit" over the existing definition at §331.2(108): a parameter value established by the commission in a permit/production area authorization which when exceeded indicates mining solutions may be present in a designated monitor well. If an upper limit for the parameter is exceeded in a monitor well, this exceedence is interpreted to be an indication of an excursion mining fluids from the production zone within the production area to a monitor well. With respect to the definition of the term "verifying analysis" at §331.2(109), the commission sees no conflict between this definition

and the one at §331.2(108). If an upper limit is exceeded, it is an indication that mining fluids may be present in a monitor well. In such a case, the operator is allowed to take a second groundwater sample from that well and analyze that sample to confirm the exceedence. No changes were made in response to this comment.

TMRA commented that the definition of the term "verifying analysis" at §331.2(109) should be revised to include the phrase "or measurement with instrumentation" as measurements with field instrumentation can yield representative, reliable, and reproducible results.

The commission notes that proposed rule §331.2(109) contained this term as does the final rule.

Exempted Aquifer

Sierra Club commented that they did not support the proposed revisions to §331.13(e), which would allow the commission to delegate to the executive director the authority to designate an aquifer exemption if no request for a contested case hearing is received within the designated comment period provided in the public notice. Sierra Club stated that the commissioners should continue to make decisions about aquifer exemptions, even if it is only to agree with the executive director. Sierra Club also commented that they support a requirement for an aquifer exemption to be recorded in the county deed, and that they support a time limit on aquifer exemptions. Sierra Club provided suggested alternate draft language for §331.13(e) that included these suggested changes. TMRA commented that they supported the proposed revision, but that the proposed language invited a conflict with §331.13(d), under which no aquifer exemption shall be final unless approved by the EPA.

The commission does not agree that the commission should not delegate to the executive director the authority to designate an exempt aquifer in the absence of opposition to that exemption. As stated in the proposed rules, delegation of authority by the commission to the executive director in uncontested matters is a common practice for most permitting matters addressed by the commission, including injection well permits that may be associated with aquifer exemptions. Delegation in this matter would reduce the time needed to process requests for aquifer exemptions.

The commission considered proposing rules that would require an aquifer exemption to be recorded in the county deed. The intent of such a requirement would be to provide additional notice to a potential buyer of property that was over an exempted aquifer. However, after further consideration, the commission did not require deed recordation of an aquifer exemption, but did include expansion of the notice requirements for aquifer exemptions.

The commission was intrigued by Sierra Club's recommendation to place a term on aquifer exemptions. However, placing a term limit on aquifer exemptions is problematic. Under §331.13(f), an aquifer exemption can only be removed by the commission after notice and opportunity for a public hearing. Additionally, an aquifer exemption involves a change to the state's authorized underground injection control program, and any changes to this program must be approved by the EPA. Placing a term on an aquifer exemption would effectively circumvent these existing requirements.

With regards to a possible conflict with existing §331.13(d), the commission does not agree that the proposed new language at §331.13(e) may be in conflict with the proposed language to revise

existing §331.13(e). The proposed language speaks only to decisions made by the commission on the designation of an exempt aquifer. The commission has the authority to designate an exempt aquifer. However, for that aquifer exemption to be in effect, the commission must petition the EPA for a revision to its authorized underground injection control program to include this designation. Even if the executive director designates an exempt aquifer, final approval is required by the EPA as part of an UIC program revision. Without EPA's approval of this petition, the aquifer exemption is not in effect.

Executive Director Approval of Construction and Completion

TMRA commented they are in favor of the proposed revision to §331.45(4)(B), which excluded baseline wells from the requirement for mechanical integrity testing.

The commission acknowledges TMRA's support of this proposed revision, and this revision is retained in the final rule.

Closure Standards

KHH commented that under §331.46(d), changes in plugging and abandonment of wells might constitute a permit amendment rather than a permit modification. KHH further notes that under §305.72(b), amendments to plugging and abandonment plans is a minor modification. KHH requested clarification on this matter.

Under §305.72(b)(6), the executive director may amend a plugging and abandonment plan that has been updated under §305.154(7) as a minor modification of the permit. Other changes to plugging and abandonment plans, as referenced at §331.46(d), would necessitate a permit amendment.

TMRA commented that because §331.83(g) and (i) appear to indicate monitor wells are included in the scope of Class III wells, it is unclear whether existing §331.46(d) is limited to Class III injection well or also reaches baseline and monitor wells associated with Class III uranium solution mining operations. TMRA further commented that they do not support the inclusion of baseline and monitor wells in the scope of §331.46(d) as this level of regulation is inconsistent with the regulatory requirements in other program areas of the TCEQ with regards to monitor wells.

The commission notes that there are no rules at §331.83(g) and (i), but acknowledges that both baseline wells (as defined at existing §331.2(13)) and monitor wells (as defined at existing §331.2(64)) are not explicitly identified as being Class III injection wells, as defined at §331.11(2). However, the commission emphasizes that both baseline and monitor wells are included in a production area authorization as the term is defined in §331.2(82). Section 331.11(c) provides that baseline and monitor wells associated with Class III injection wells with the jurisdiction of the commission are subject to the rules specified in Chapter 331. Further, the Class III injection well area permit application (Form TCEQ-10313) includes a requirement that the applicant provide a description of closing procedures to be taken to restore affected surface areas to include plugging of wells. To the commission, this requirement applies to all wells at the site. Therefore, the requirements for plugging and abandonment of wells apply to baseline and monitor wells.

KHH commented that under §331.46(i), there is reference to "a Class III production zone that underlies or is in an exempted aquifer." KHH stated that production cannot lawfully occur in a non-exempt portion of an aquifer, therefore a production zone cannot underlie an exempted aquifer, and suggested this section be revised to state that the closure plan shall demonstrate that no contaminants from the production zone will enter a USDW or freshwater aquifer.

The commission does not agree with this comment. Although all in situ mining of uranium in Texas to date has occurred in exempted USDW-quality aquifers, in situ mining of uranium or other minerals conceivably could occur in an aquifer that is not of USDW quality. Therefore, in situ mining could occur in a production zone underlying an exempted aquifer.

Construction Requirements

Mesteña and TMRA commented that to avoid confusion, mechanical integrity, as described in revised §331.82(c)(2), should be revised to indicate mechanical integrity must be demonstrated both following well construction and prior to injection. Mesteña and TMRA also commented that this revision was necessary to avoid conflict with the definitions of the terms "injection operations" at §331.2(51), "underground injection" at §331.2(103), and "well injection" at §331.2(109). TMRA asked for a clarification of the meaning of the term "tool," and who will make the determination that the "tool" could affect the mechanical integrity.

The commission agrees with this comment in regard to the requirement that integrity must be demonstrated both following well construction and prior to injection, but is unsure of the specific relation of this requirement to the other three referenced definitions. Nevertheless, §331.82(c)(2)

has been further revised to indicate that mechanical integrity must be demonstrated both following well construction and prior to injection. The term "tool," as used in the drilling industry, logically includes numerous mechanical devices; however the intent of this proposed revision is to address any potential damage to the casing that could occur from insertion of any such device in the well. An obvious example would be the use of any device used to retrieve a defective packer, a stuck pump, or parts that had broken from a drill bit. The commission would not consider the insertion of a sonde for standard geophysical logging to represent a "tool" that could affect mechanical integrity, except in cases where the sonde is lost in the hole (requiring that a device be inserted in the well to retrieve the sonde) or the sonde becomes stuck in the well requiring insertion of a device to free it. The commission is relying on the operator to make a judgment when the use of a tool may compromise mechanical integrity of a well, and strongly emphasizes all Class III wells must have mechanical integrity as described in §331.43.

STOP commented that §331.82(i) addresses the determination of the number and location of monitor wells, but does not address how a statistically valid number of monitor wells should be determined. STOP emphasized this determination is important for determining representative pre-mining baseline water quality.

As discussed elsewhere in this response, the commission notes that under §331.104(a), baseline samples must be representative and independent, which speaks to the condition of baseline well spacing and to the adequate number of samples for establishment of baseline.

Monitoring Requirements

TMRA commented that the term "calendar" should be included in the proposed revision to §331.84(c) to distinguish between a calendar month and a 30-day period.

Under §331.84(c), two samples were required each month, and these samples have to be taken at two-week intervals. This requirement was problematic in that if the two-week interval is strictly enforced, an operator would be required to take 26 samples in a year, whereas the two-sample-per-month requirement is 24 samples a year. The purpose of these samples is to identify any changes in the groundwater quality. The requirement for two samples a month, at two-week intervals, is to avoid a situation where the two samples are taken close together, such as one or two days apart. The proposed revision sets the time interval for the two samples at 15-days, rather than two-weeks. The commission agrees with TMRA that the designation should be each calendar month, rather than every 30 days, and the final rule at §331.84(c) has been amended accordingly.

Sierra Club commented that in addition §331.84(d) requires quarterly monitoring of private wells located within 1/4 mile of mining, but there is requirement of notice should the values be above safe drinking water levels, and no requirement for clean-up. Essentially the mining company and TCEQ will be made aware of potential problems for local users, but they themselves will not know. STOP commented that §331.84(d) does not address the correction of the migration of mining fluids into a private well, nor does it contain a notice requirement.

The commission is uncertain regarding the intent of Sierra Club's comment, but assumes they are noting there are no requirements for notice. Under existing §331.84(d), the commission may specify at least quarterly monitoring for wells within 1/4 mile of the injection site to detect any migration

from the injection zone into fresh water. This provision speaks to existing §331.42(b)(3), under which an applicant for a Class III injection well area permit must identify all existing wells within the project area (that is, the requested permit area), plus the area 1/4 mile outward from the permit area boundary. The purpose of the requirement at §331.42(b)(3) is to identify any wells that, because of their age, construction, or condition, could serve as a pathway for injected fluids to migrate into a USDW. The purpose of §331.84(d) is to allow the commission to require, in addition to the monitor well requirements at §331.103, the monitoring of any other wells within 1/4 mile of the permit area. Typically, such wells are hydrologically down-gradient of the injection site, and provide an additional point for monitoring groundwater quality at the site. The commission notes that these wells usually are on private property, and monitoring of these wells is contingent on permission to do so from the landowner. No changes were made in response to this comment.

Reporting Requirements

Sierra Club commented that they supported the proposed revisions to §331.85, which details the information required in the annual report. Sierra Club recommended this provision be revised to also include submission of water quality data and water quantity use, and that this information should be submitted to any groundwater conservation district whose jurisdiction includes the area of the permitted Class III injection well site.

The commission does not agree with this comment. Water quality data presently is submitted to the executive director on a quarterly basis in accordance with the requirements of §331.85(e). Although the commission appreciates the concerns regarding the amount of water used for in situ operations, the commission has no authority to regulate water use at in situ sites; therefore, an owner or

operator is not required to maintain records on water use. These reports certainly may be of interest not only to groundwater conservation districts but to other entities and persons as well. The commission emphasizes that these reports are a matter of public records, and as such, are available to the public at TCEQ headquarters in Austin for viewing and copying subject to the Public Information Act. Requirements to provide reports to a third-party are difficult for the TCEQ to enforce and may inundate a third-party with unwanted documents or may subject an entity to record management requirements for records that may not be wanted or needed. Given this public availability, the commission sees no need to require they be sent to a groundwater conservation district. No changes were made in response to this comment.

TMRA commented that the proposed revisions to §331.85(a) appear to require a due date of January 31, not December 31, for the annual report, as stated in the preamble to the proposed rules. TMRA suggested the proposed rules should be revised to allow the agency to stagger the dates on which annual reports are required of various permittees to allow the agency to better manage its work flow.

The commission agrees that the date of December 31st in §331.85(a) in the proposed rule is in error. The final rule has been amended to reference a due date of January 31st for the annual report required under §331.85. Although the commission appreciates TMRA's suggestion to stagger submission of annual reports, the commission cannot readily impose different requirements on different companies, at least not in regard to submission of reports.

With regards to the proposed new §331.85(a)(3), under which an operator is required to provide in the annual report updated cost estimates for well closure and aquifer restoration, URI and TMRA commented

they agree the annual report is the proper venue for the review of cost estimates for well closure and aquifer restoration, and is consistent with the Nuclear Regulatory Commission's (NRC's) regulations at 10 Code of Federal Regulations (CFR) Part 40, Appendix A, Criterion 9 for the regulation of in situ uranium mining operations in non-agreement states. TMRA and URI further commented that as specified in the comment on §305.49(b)(6), a uranium operator will annually have additional delineation and operating data that will provide for a reasoned evaluation of changes that may be warranted to these estimates.

The commission acknowledges TMRA's comment regarding this proposed revision to §331.85(a)(3).

TMRA commented that with respect to proposed new §331.85(h), under which an operator is required to maintain copies of all data required under this section such that these documents are available for inspection at all times by the executive director, this proposed revision should be revised to allow for all documents to be submitted and kept in a readily accessible electronic form.

The commission is agreeable to an operator maintaining data in an electronic format, provided the format is one that does not allow alteration of the document (that is, the report is maintained in a "read only" format).

Production Area Monitor Wells

Sierra Club commented that the maximum well spacing for production zone monitor wells required under §331.103 should be 200 feet rather than the present 400 feet to better ensure the detection of an excursion.

The commission does not agree with this comment, as it is unaware of any evidence to indicate the existing maximum spacing requirements at §331.103 are inadequate. At in situ uranium sites in Texas, excursions have been detected and addressed. Additionally, there are no documented cases of off-site contamination associated with these sites. The commission emphasizes that the present 400-foot spacing is a maximum; closer spacing can be required by the executive director if warranted by local geologic and hydrogeologic conditions. The executive director also notes that in NUREG-1569, the NRC recommends a maximum spacing of 500 feet at these sites, and that the maximum spacing allowed at municipal solid waste landfills is 600 feet, with allowance for a greater spacing if justified. No changes were made in response to this comment.

With regard to the proposed revisions to §331.103(a), TMRA and URI commented that it is troublesome to use an exact spacing requirement of 400 feet from the production area when the extent of the production area is based on exploration drilling, which by its nature is not exact. TMRA and URI recommended revisions to this section to reflect the fact that the 400 feet is a target distance estimated from the results of exploration drilling. Also, TMRA commented that they considered problematic the proposed rule language to the distance "between each of the monitor wells," as distance can be measured only between a pair of points and it cannot be measured "between" one point only. TMRA recommended proposed revisions to existing §331.103(a) be revised as follows: ". . . monitor wells shall be spaced no greater than 400 feet from the production area." The measurement shall be based, at the permittee's election either as the location of the anticipated production area was once estimated based on exploratory drilling or as the location of the production area appeared after the completion of mining ". . . The distance between each pair of adjacent mine area monitor wells shall be . . ."

The existing requirement at §331.103(a) is that monitor wells be spaced no greater than 400 feet from the production area, and the intent of the proposed revision simply was to allow the operator to make this determination on information from exploration drilling. This approach is logical to the commission, as the boundary of the production zone is first established by exploration drilling. By allowing the operator to base the extent of the production area on exploration drilling, he or she is protected from possible endless numbers of amendments to a production area authorization because the boundary of the production area, through mining, is found to vary such that the 400-foot requirement is exceeded by a few feet for some monitor wells. TMRA's suggested revisions appear to include this intent, with the option of demonstrating this spacing requirement on the final delineation of the production area, although the commission finds the suggested language to be confusing by its lack of completeness. With regards to this second option, the commission is not comfortable with an operator demonstrating compliance with the 400-foot spacing requirement after mining is complete. The purpose of monitor wells is for the detection of mining fluids that have escaped from the production zone within the production area. The spacing and angle requirements in §331.104(a) are designed to ensure that these escaped mining fluids are detected. Compliance with these spacing requirements should be demonstrated prior to mining, not after it is completed. The commission has revised the final, as suggested by TMRA, to refer to the spacing between adjacent wells.

Establishment of Baseline and Control Parameters for Excursion Detection

KCCRB commented that if mining activities have occurred, proposed revised §331.104 should be further revised to include a demonstration that all samples used to establish baseline and control parameter concentrations are unaffected by the mining operations. KCCRB also commented that the definition of

"mining operations" should include any activity that could reasonably be expected to affect groundwater, such as the injection of fluids from mining or well development.

The commission is unsure of the meaning of KCCRB's comment, as both baseline for aquifer restoration and for the establishment of control parameter values must be established prior to any mining activities in a production area. The commission assumes KCCRB is referring to a situation where one production area within a permitted area has been mined, and the operator is developing baseline data for a subsequent production area. Further, the commission assumes the commenter is concerned that the groundwater within the subsequently planned production area may have been affected by mining activities at the first production area.

Under such a scenario, groundwater in the subsequent production area would have to have been affected by an excursion of mining fluids from mining at the first production area. The commission notes, however, that any excursions would be detected in the production zone monitor wells, and under the requirements of existing §331.106, an operator must clean up the excursion in any affected monitor well. With regard to well development, the commission notes that development of a well involves alternate pumping and production of water to flush fine material from the sand or gravel packed in the annular space between the wellbore and the screen. However, this procedure should not affect groundwater quality in the well to any degree or for any extended period of time. Sampling procedures, such as purging prior to sampling, also will ensure the groundwater sample is representative. No changes were made in response to this comment.

KHH commented that the meaning of the term "independent" at revised §331.104(a), with regards to samples, was unclear, and suggested this section be revised to replace "independent and representative" with "statistically." TMRA asked for an explanation of the meaning of these two terms.

The commission notes that the statistical methods commonly employed in groundwater monitoring (and for baseline determination at Class III injection well sites) are based on the presumption the data are representative and independent. Independence in this case refers to samples that are not correlated. For example, groundwater samples collected one minute apart, from the same well, have a high probability of being similar, whereas samples taken 6 months apart, from the same well, have a much lower probability of being similar, or in this case, correlated. Also, respective samples taken at the same time from two wells ten feet apart have a high probability of being correlated, whereas respective samples taken at the same time from two wells 5,000 feet apart, have a much lower probability of being similar. As a practical matter, independence may be difficult to quantify, but some reasonable efforts should be made by the operator to ensure samples are independent. One common method is to take groundwater velocity into consideration for example, see the method described in EPA's Guidance Document on the Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities. Another common method is to provide adequate well spacing, avoiding using data only from wells that are close together, or "clustered." No changes were made in response to this comment.

KHH commented that its clients are in agreement with the proposed revisions to §331.104(b), which would allow the list of aquifer restoration constituents to be determined on site-specific conditions.

However, KHH expressed concern that subsection (b)(1) and (2) would be difficult to implement. Under

subsection (b)(1), an applicant must identify all constituents in the groundwater in the production zone of the production area; under subsection (b)(2), an applicant must identify all constituents in the solutions injected into the production zone. KHH suggested that this proposed rule be revised to require the 26 constituents identified in TCEQ's UIC Technical Guidance I: Groundwater Analysis

(http://www.tceq.state.tx.us/permitting/waste_permits/uic_permits/UIC_Guidance_Class_3.html),

unless the applicant can demonstrate that not all 26 constituents occur in the area, or that other constituents, not on the list, occur in the groundwater in the production area. Mesteña offered similar comments, noting that the proposed requirements were unrealistically broad, and that the standard list of 26 constituents has been used for decades. Mesteña proposed that proposed revised §331.104(b) be further revised to require baseline be determined from the standard list of 26 parameters and any other parameters required by the executive director, and to delete proposed new §331.104(b)(1) - (4).

TMRA commented that this proposed subsection is particularly at risk of inconsistent interpretation and implementation, and noted that as indicated in the preamble, the uranium solution mining industry has routinely analyzed groundwater samples for the parameters list included in TCEQ Technical Guideline I: Groundwater Analysis. TMRA also stated that while the proposed new language may provide for flexibility, it also potentially invites/requires extensive groundwater sampling and analysis to determine what might be or might not be present in the groundwater as a regulator may be unwilling to agree to a parameters list without a degree of sampling that may become excessive and unreasonable. TMRA further stated that the intent of the subsection, which is essentially to inject better science into the process, may be to refer to the standard list of 26 parameters and then provide flexibility on a case-specific basis to recommend other parameters or a subset of the 26 parameters. URI commented that the proposed requirements are unrealistically broad, and potentially will require an owner or operator to sample for

every element in the periodic table. URI emphasized that the standard list of constituents is based on years of experience in uranium in situ mining in Texas, and absent a compelling reason to expand this list, this historical analysis list should not be changed.

TMRA stated that inclusion of "approved by the executive director" adds confusion and is potentially superfluous depending on the planned manner in which this subsection will be implemented, and that by the very nature of the permitting process, executive director approval of the content of a permit application is a mandatory condition for permit application approval. TMRA suggested that unless this language indicates another executive director approval or preliminary approval, in advance of the permitting review process, it should be stricken. TMRA advocated that the TCEQ allow a preliminary approval process for a parameters list to be approved in advance of permit application submission and review. Then, if the executive director disagrees with the proposed parameters list, adjustments, which might include additional sampling, can be completed before the application is submitted, which will streamline the process and make compliance with stipulated deadlines for applicant response to any TCEQ Notices of Deficiency less contingent on the possible need for additional collection, analysis, and review of analytical data for groundwater samples.

The purpose of this proposed rule was to provide applicants a method to base the list of aquifer restoration constituents on the actual quality of the groundwater in the production zone within the production area, rather than analyzing for all 26 constituents identified in agency guidance and required in the agency's application for a production area authorization. Additionally, the commission wanted to ensure that all possible constituents in the groundwater, or that might be introduced into the groundwater, were identified. However, the commission appreciates that

determining all constituents in groundwater is an open-ended requirement. Therefore, in the final rule, §331.104(b) is revised to require an applicant to establish aquifer restoration values for the traditional 26 constituents, but allow for the applicant to propose an alternate list of restoration constituents, and to allow the commission to require analysis for constituents other than the 26 required under this new rule. Also, §331.104(b) is further revised in the final rule to require demonstration to support any alternate list, provided that any alternate list must include uranium and radium-226.

TMRA recommended the term "all" in proposed new §331.104(b)(1) be replaced with "the relevant and appropriate" as "all" has literally limitless interpretation. TMRA also commented that the proposed language suggests a reference to the concentrations of some typical constituents of the native groundwater of the production zone and perhaps to a few physical properties such as pH and conductivity, and recommended the rule provision should be revised to state the customary list of 26 or so constituents and the properties of pH and alkalinity.

As discussed in the previous response, proposed new §331.104 has been revised to require an applicant to establish aquifer restoration values for the traditional 26 constituents, but allow for the applicant to propose an alternate list of restoration constituents. Also in the final rule, §331.104(b) is further revised to require demonstration to support any alternate list, provided that any alternate list must include uranium and radium-226.

TRMA commented that proposed new §331.104(b)(2) does not include a list of the relevant physical characteristics and chemical constituents of the proposed lixiviant.

The commission notes that this proposed rule has been revised in the final rule from being a requirement to being a consideration taken by the executive director in evaluating a proposed list of alternate restoration parameters. The purpose of this proposed rule is to allow an applicant or operator to propose the removal or addition of constituents to the standard list of 26 parameters based on any relevant physical or chemical characteristics of the injected fluid that could affect the groundwater quality. In that the applicant or operator must make this demonstration, it is the responsibility of the applicant to identify any relevant characteristics of the proposed injection fluid.

TMRA commented that proposed new §331.104(b)(3) invites a list or a subset of the list of the chemical constituents which may be mobilized from the host matrix of the production zone during mining. TMRA further commented that as was the case with the prior requests for "all parameters," this cannot be a list of "all parameters" because such a request is literally limitless and therefore, does not serve a purpose.

TMRA suggested that this proposed rule be revised to read as follows: "the constituents which may be mobilized from the host matrix of the production zone during the in situ recovery process; and. . ."

The commission notes that this proposed rule has been revised from being a requirement to being a consideration taken by the executive director in evaluating a proposed list of alternate restoration parameters. Otherwise, the commission agrees with the recommended change, and the final rule has been revised accordingly.

Sierra Club commented that proposed new §331.104(b) should be revised to include the following requirements: sampling of groundwater-bearing zones above and below the production zone to establish pre-mining groundwater quality in these zones for excursion control; baseline wells shall not be clustered; each baseline well is sampled a minimum of twice a month over a period of four months; and split sampling with the TCEQ.

The commission notes that under §331.104(a) and proposed new §331.104(e) an operator is required to establish baseline water quality in non-production zones. Also, the commission currently conducts split sampling with operators during site inspections. The commission agrees that baseline wells should not be clustered, but emphasizes that under proposed §331.104(a), baseline samples must be representative and independent, which speaks to the condition of baseline well spacing and to the adequate number of samples for establishment of baseline.

Sierra Club commented that with respect to proposed new §331.104(c), it supports the comments of hydrogeologist George Rice, who recommends using a 95% upper tolerance limit for the declaration of excursions and the use of nested wells with shorter screen lengths to prevent dilution. Sierra Club further commented that these requirements would make detection of excursions more likely than the methods presently suggested in NRC guidance document NUREG-1569. STOP agreed with the use of this method as proposed by Mr. Rice, and noted that by using this method to evaluate monitoring data from URI's Kingsville Dome Mine, Mr. Rice concluded there were more excursions than reported by URI, based on their use of other methods.

The commission in general is not opposed to the use of a tolerance interval methodology for excursion detection, provided the percentage of analytical measurements below the detection limit is not too high, and provided the data used in the test are from a normal distribution (or, in the case of log-normally distributed data, the data are log-transformed to yield normally-distributed data) when a parametric tolerance interval methodology is used. However, the commission does not agree that a tolerance interval methodology should be required by rule. The choice of statistical method for a hypothesis tests should be based on the appropriateness of the method to the distributional characteristics of the data (at least in the case of parametric tests).

The commission notes that the tolerance interval is a technique to estimate a population proportion. Tolerance intervals are constructed to contain a particular proportion of a population (known as the "coverage") with a particular probability. For example, a tolerance interval could be constructed such that the interval has an associated probability of 0.95 of containing 95% of a population. Such an interval is generally described as a 95/95 tolerance interval. The commission further notes that although tolerance intervals are for interval estimation, they are sometimes used as a statistical hypothesis test, such as in groundwater monitoring. Background data are collected and used to construct a tolerance interval; then subsequent compliance sample measurements are compared to the tolerance interval (generally to the upper tolerance limit). If the compliance sample measurement exceeds the upper tolerance limit, it is concluded that the groundwater has been affected; otherwise it is concluded that there is no effect. Again, the commission in general is not opposed to using tolerance intervals in this manner, but emphasizes that if a tolerance interval methodology is used, a new tolerance interval must be constructed for each test (in the case of groundwater monitoring, a new interval must be constructed for each sampling period). Only by

doing this can the associated type I error rate of 0.05 be maintained. No changes were made in response to this comment.

STOP commented that under §331.104, an owner or operator is allowed to establish aquifer restoration values simply by averaging sample results from five wells completed in the production zone. STOP further commented that this rule allows an owner or operator, unsupervised, to select any five laboratory results from hundreds of wells, submit these results to the TCEQ, who then simply average them to establish aquifer restoration values.

The commission agrees that under §331.104(a)(2), an owner or operator must use data from at least five production area baseline wells. The commission also agrees that under §331.104(d)(1), an owner or operator is allowed to base aquifer restoration values on the sample mean, or under §331.104(d)(2), aquifer restoration may be based on predictions of restoration quality that are reasonably certain after giving consideration to the factors specified in §331.107(f).

The commission notes that the five-well requirement is a minimum. Also, as is allowed under existing §331.104(d)(1), an owner or operator may, to establish aquifer restoration values, use either the average values from samples from the baseline wells completed in the production zone within the production area, or the average values from samples from the production zone monitor wells. The commission agrees that determination of aquifer restoration values should be based on an adequate number of sample analyses, and notes that revisions to §331.014(c) require a minimum of five baseline wells completed in the production zone of the production area, or one well for every four acres of production area, whichever is greater. The commission disagrees that an owner or

operator chooses five samples from hundreds of possible exploration wells. These exploration wells are not cased, screened, or developed, and any determination of water quality based on analysis of groundwater from one of these wells would not be accepted as being representative of groundwater at that location. The main problem would be that any sample from an uncased well most likely could be diluted from the drilling mud, resulting in an underestimation of concentrations of constituents in the groundwater. The existing allowance at §331.104(d) for the use of the sample mean (average) for determining aquifer restoration values has been retained in the final rule at §331.107(a)(1)(A), with an option for use of a statistical method approved by the executive director at §331.107(a)(1)(B).

STOP commented that aquifer restoration values should not be based on pre-mining groundwater quality data from just the production zone within the production area, as is required under the final rule at §331.104(b). Instead, STOP recommends aquifer restoration values be based on data from groundwater throughout the entire vertical section of the aquifer, including non-production zones above and below the production zone, both within the production area and the mine area. STOP's main concern regarding establishment of aquifer restoration values solely on groundwater quality data from production zone within the production area appears to be that groundwater outside of the production zone within the production area could be contaminated by excursions of mining fluids, and that these affected zones and areas also need to be restored. STOP commented that there is no requirement that the groundwater quality outside the production zone of the production area be established.

The commission does not agree with these comments. Aquifer restoration values should be based on the pre-mining groundwater quality in the zone to be mined (the production zone within the

production area). The pre-mining groundwater quality in this zone within this area is affected by the presence of naturally-occurring uranium mineralization. Neither the production zone outside of the production area nor non-production zones are mineralized; therefore, groundwater quality within them will be different from that which is in contact with uranium mineralization (that is, the production zone within the production area). Given these differences in groundwater quality, and given that it will be the groundwater within the production zone within the production area that will be affected by in situ mining, the commission fails to understand how basing aquifer restoration in the production zone within the production area on groundwater quality data not from this zone and area would be representative of the pre-mining groundwater quality in the production zone within the production area.

The commission notes that groundwater quality, for the purpose of the detection of excursion, must be established in the production zone outside of the production area and in non-production zones §331.104(e), and that any excursions affecting these areas and zones must be addressed under §331.106. Aquifer restoration in accordance with §331.107 is not required for these zones and areas because Class III injection wells are not operated in these zones. The injection and re-injection of mining fluids is confined to the production zone within the production area, as that is where the uranium is; injection of mining fluids does not occur in non-production zones or in the production zone outside the production area.

STOP commented that determination of control parameter upper limits, as required under §331.104(c), is based on groundwater quality data from the ore zone (that is, the production zone within the production area), not the monitor well ring outside of the ore zone. STOP also commented that few chemical

constituents are used for groundwater monitoring to detect the excursions of mining fluids from the production zone within the production area to monitor wells outside of this zone. STOP noted that at URI's Kingsville Dome Mine, only uranium, conductivity, and chlorides are used as monitoring parameters for excursion detection. STOP further noted that upper control limits for these three control parameters were determined as follows: 5.0 milligrams per liter (mg/L) was added to the highest pre-mining sample value for uranium; and 25% was added to the highest pre-mining sample value for conductivity and chlorides.

The commission acknowledges these comments, and notes that control parameters are those parameters that are used to detect excursions, and that the upper limit for a control parameter is the value of that parameter that, when exceeded, indicates mining fluids may be present in a monitor well. Typically, owners or operators have been allowed to base control parameter upper limits on the highest measured value for a parameter in a groundwater sample either from the production zone within the production area or from the production zone outside the production area.

The commission notes that under the requirements of previous §331.104(c), the baseline water quality values for a permit or production area were used to determine control parameter upper limits. Under previous §331.104(a), three separate baselines were identified (mine area, production area, and non-production area), the commission in the proposed rule revised §331.104 to require data from wells completed in the production zone within the production area to be used for determination of aquifer restoration values (final rule at §331.104(b)). Similarly, it is the commission's determination that upper control limits should be based on data from the monitor

wells, not the baseline wells completed in the production zone within the production area. However, the commission notes that this specific requirement was not clearly included in the proposed rule. Accordingly, new §331.104(e) has been revised to include this requirement.

The commission notes that historical data from in situ sites in South Texas indicate that groundwater quality from the production zone of these two areas (the production zone within the production area and the production zone outside the production area) tends to be similar except for uranium and radium-226. The use of either adding 5.0 mg/L to the highest value for a parameter or by adding 25% to the highest value for a parameter is recommended in NRC Guidance Document NUREG-1569. As discussed elsewhere in this response, the commission is not opposed to using data from both these areas to determine upper control limits, provided the data are subjected to an appropriate statistical test to determine if they are from the same population.

The commission also notes that adequate detection of excursions does not require the use of numerous control parameters. Control parameters should be those constituents in the groundwater that are mobile and easily detected (such as chlorides, for example). The commission notes that under §331.106(2), when an excursion in a monitor well has been verified, the owner or operator must sample for an expanded list of groundwater parameters, including uranium and radium-226.

TMRA commented that in proposed new §331.104(d), if the "accepted methods" and the "TCEQ Quality Assurance Project Plan (QAPP)" are stated in rules formally adopted by the TCEQ, the rule(s) should be cited. TMRA notes that unless formally adopted as rules, these cannot be valid or effective except perhaps against specific individuals subject to permits containing them as conditions. TMRA further commented

that unless these have been adopted as rules, TCEQ is barred from enforcing them as rules. See TWC, §5.103(a) and (c) and §5.105 and Texas Government Code, §2001.004 and §2001.005.

The commission does not agree with this comment. The commission is complying with TWC, §5.103 and §5.105 and the Administrative Procedures Act because the commission is requiring that sampling be in accordance with the TCEQ QAPP, as a requirement of the rule stated in §331.104(d).

KHH commented that the direct comparison method described in paragraph (1) of proposed new §331.104(e)(1) was inappropriate in that this method would result in an unacceptable level of "false positive." KHH also questioned the reason for the requirement of 30 samples, and asked if the intent was 30 samples total or 30 samples from each monitor well. Mesteña commented that this proposed requirement would result in an unacceptably high type I error rate (that is, a decision that an excursion has occurred when it has not). With regard to proposed new §331.104(e)(1), Mesteña also commented that the standard for identifying excursions is based on Nuclear Regulatory Guidance Document NUREG-1569, in which the authors suggest upper control limits for excursion detection should be determined by one of the following methods: a statistical test (such as the student t-test); adding 25% to the highest sample value for a parameter; adding 5 standard deviations to the sample mean for a parameter (in areas with groundwater that contains less than 500 mg/L total dissolved solids); or increasing the concentration of a parameter by a specific amount (for parameters that have a narrow statistical distribution).

Mesteña appeared to recommend that language in proposed new §331.104(e)(1) be revised to remove the statement: "the baseline water quality values for a permit or production area shall be used to determine

control parameter upper limits." Given that this statement is not included in the proposed rule, the commission is unclear as to the intent of Mesteña's apparent recommendation. Mesteña also recommended that proposed new §331.104(e)(1) be revised to require that if a sample measurement from a groundwater sample for a control parameter exceeds the maximum (rather than the mean) value determined by the pre-mining sample set, then an excursion will be assumed to have occurred.

TMRA submitted similar concerns to those of Mesteña's regarding the use of the sample mean for excursion detection, and recommended the proposed rule be revised to require that conductivity, uranium, and chloride be used as control parameters, and that upper control limits be calculated as follows: add a value of 5 mg/L to the maximum uranium value determined on the baseline sampling of the mine area Wells and the production area wells of the production area being authorized; add 25% to the maximum conductivity value determined in the baseline sampling of the mine area wells and the production area wells of the production area being authorized; or add 25% to the maximum chloride value determined in the baseline sampling of the mine area wells and the production area wells of the production area being authorized.

URI commented that the method proposed in new §331.104(e) will not work because of the natural variability in the concentrations of groundwater parameters across an area. The proposed method, according to URI, will result in excursions being declared even in areas where there has been no mining, and provided an example using data from URI's Vasquez Mine. URI noted that historically, the methods for excursion detection approved by the TCEQ are the three methods listed in the comments from TMRA. URI stated that these methods account for natural variability, prevent false positives, and provide an early and reliable indication of an excursion. URI also noted these three methods are the ones evaluated by the

NRC for in situ mines outside of Texas (URI referenced NRC Guidance Document NUREG-1569: Standard Review Plan for In-situ Uranium Extraction License Application, p. 5-40). URI's recommended revisions to this proposed rule were the same as the recommendations suggested by TMRA and Mesteña.

Upon further review of proposed §331.104(e)(1), the commission realized that the proposed language is in error because the detection of a control parameter in a monitor well that is greater than the mean value of the control parameter before mining is not an indicator of an excursion. The intent of this proposed rule was to provide a method for excursion detection that was based on the z-test, as described in "Probability and Statistics for Engineers and the Sciences, 1987, 2nd edition, Jay, L. Devore, Brooks/Cole Publishing Co." With a sample size of 30, valid test results can be obtained without requiring that the data be normally distributed. However, this test is not a direct comparison of the sample mean to future sample values as described in the proposed rule. Although the commission appreciates the suggested revisions recommended by TMRA and Mesteña recommendation regarding comparison of sample results to pre-mining sample values for excursion detection, the commission has decided to require that excursion detection be based on a statistical method proposed by the applicant and approved by the executive director. This allows the applicant flexibility in deciding what statistical method is appropriate for a site based on specific distributional characteristics of the groundwater sample data, and based on an acceptable type I error rate for the statistical test. Accordingly, new §331.104(e)(1) has been deleted.

Sierra Club expressed support of proposed new §331.104(e), under which an operation is required to choose control parameters that will provide timely and reliable detection of excursions. However, Sierra

Club commented that proposed new §331.104(e) lacked clarity about how to determine a statistically valid number of monitor wells, both in the production zone and in non-production zones.

The commission acknowledges Sierra Club's support of new §331.104(e), and their concern regarding determination of an adequate number of monitor wells. However, the purpose of new §331.104(e) is to provide the requirement that selected control parameters are suitable for detection of excursions. Control parameters should be those constituents in the groundwater that are mobile and easily detected (such as chlorides, for example). With regard to the number of monitor wells, as previously discussed, the commission may require additional monitor wells if there is evidence that a smaller well spacing is necessary, based on site-specific conditions.

With regards to monitoring for excursions, STOP commented that proposed new §331.104(e)(1) partly corrects the existing rule.

The commission acknowledges this comment. However, §331.104(e)(1) was proposed in error and has been deleted.

Monitoring Standards

TMRA commented that they support the proposed revisions to §331.105(1) and (3) to include instrument measurement in the proposed language, and noted that field instrumentation coupled with the appropriate field quality assurance/quality control can yield representative, reliable, and reproducible results. This will potentially reduce analytical costs and streamline the process. The proposed rule should be amended to allow for direct instrument analysis. With regards to the proposed revisions to §331.105(3), TMRA

also commented that the proposed revised rule should be further revised to reference "any well" with "designated well" to promote consistent interpretation and consistency in terminology with §331.105 and §331.105(4).

The commission acknowledges TMRA's support of the proposed revisions to these rules. However, the commission is unsure of TMRA's intent in suggesting the proposed revised language be further revised to allow "direct" measurement. Based on previous comments from TMRA regarding instrument measurement, the commission is further revising the language to allow for measurement by field instrumentation. Also, the commission agrees that revised §331.105(3) should be further revised to reference "designated monitor wells" rather than "any well," as this monitoring standard applies specifically to designated monitor wells; the final rule has been amended accordingly.

Remedial Action for Excursion

TMRA commented that the proposed revision to §331.106, under which the existing language "if the verifying analysis indicates that mining solutions are present in a designated monitor well..." is revised to "if the verifying analysis indicates the existence of an excursion in a designated monitor well..." is unnecessary because the presumption that an excursion is due to mining solutions from permitted activities seems clear, and therefore there is no need to indicate it in the text.

The commission acknowledges that the proposed revision (33 TexReg 7478) to this rule is minor, as the definition at §331.2(38) for the term "excursion" is "the movement of mining solutions into a designated monitor well." The commission intends to use defined terms in the rules. Based on the

definition of the term "verifying analysis," reference to an "excursion" rather than to "that mining solutions are present" at §331.105 is preferable to the commission. The commission notes that under §331.106(2)(B), an operator can make a demonstration that the change in groundwater quality (as evidenced by the verifying analysis) is not due to the presence of mining fluids, and that the adopted change better speaks to the assumption of the presence of mining fluids in the definition of the term "verifying analysis."

Sierra Club commented that it agrees that uranium and radon must be added under §331.106 as basic constituents as part of groundwater monitoring.

The commission acknowledges this agreement, but notes that the revisions to §331.106 in the adopted rule adds uranium and radium-226 to the expanded list of constituents for which an operator must sample during an excursion. Radon is not included in §331.106. No change has been made in response to this comment.

STOP commented that under proposed §331.106(2)(A), an owner or operator must clean up all designated monitor wells, all zones outside of the production zone, and the production zone outside of the mine area that contain mining fluids, and that clean up is deemed to have been accomplished when water quality in an affected monitor well has been restored to values consistent with current local baseline, as confirmed by three consecutive daily samples for control parameters. STOP noted that the terms "clean up" and "current local baseline" are not defined. STOP also noted that only the groundwater in the affected monitor well is "cleaned up," and the stabilization period is only three days. Therefore, according to

STOP, the area contaminated by mining fluids between the production area and the ring of monitor wells encircling the production area is not addressed.

The commission emphasizes that under revised §331.106(2)(A), well clean up is deemed to be accomplished when water quality in a designated well is restored to current local baseline quality as confirmed by three consecutive daily samples for the control parameters. Therefore, the term "clean up," although not specifically defined, is based on a specific requirement. Based on other comments, the phrase "consistent with" has been deleted due to the vagueness of the term. The commission appreciates that an excursion will extend from the edge of the production area outward to a monitor well, and that the area between these two points also will contain mining fluids. However, the restoration of this area, at least in the context of the term with regards to the production zone within the production area, is warranted. Under §331.102, mining fluids must be confined to the mine area, or the area within the monitor well ring that surrounds the production area. Excursions will affect the area between the edge of the production zone and the monitor well ring, but this effect is in no way comparable to that in the production zone within the production area, where mining fluids are injected and re-injected on a continuous basis for extended periods of time. Excursions typically are addressed by increasing the withdrawal rate in nearby production wells, which induces groundwater to flow towards the production area, thereby "pulling" the excursion back into the production area.

Restoration

STOP commented that proposed revisions to §331.107, which must be read in conjunction with proposed revisions to §331.104, allow for aquifer restoration values to be established either by taking the mean

concentration for each restoration parameter, or by using a statistical method proposed by the owner or operator and approved by the executive director. STOP expressed the opinion that these methods are biased towards the owner or operator of an in situ mining operation.

The commission acknowledges STOP's opinion regarding this matter, but disagrees that these methods represent a regulatory bias for the owner or operator. The commission intends that independent and representative water quality samples be taken based on accepted methodologies for sample collection, preservation and analyses.

STOP commented that proposed changes to §331.107 continue the practice of allowing amendments to aquifer restoration values, and as a result, drinking water with the mine is degraded with chemicals that are a danger to public health.

The commission acknowledges that revisions to §331.107(g) do not remove the allowance of amendments to aquifer restoration values. The commission also acknowledges that the in situ mining process results in the elevation of concentrations of certain parameters in the groundwater within the production zone within the production area. With respect to this groundwater posing a danger to public health, the commission emphasizes that groundwater within a zone that contains naturally-occurring uranium mineralization generally is not suitable for human consumption prior to any mining activities. Historical commission records confirm that pre-mining groundwater quality at all in situ uranium mining sites in Texas exceeded primary drinking water standards for various parameters. That is to say, groundwater within the mineralized zones at these sites was unsuitable for human consumption before any mining was done.

In accordance with the requirements of §331.102, mining fluids must be confined to the production zone within the mine area. To help ensure this requirement is met, both production zone and non-production zones monitor wells are required. Once mining is complete, the affected groundwater must be restored to pre-mining quality, determined in accordance with the requirements of §331.104, in accordance with the requirements in §331.107. Amendments to the initially-established aquifer restoration values are allowed, but after consideration of the factors at §331.107(g)(1), and only after making affirmative findings in §331.107(g)(2) that reasonable restoration effort had been made, that the restoration parameters had stabilized, that the formation water would be suitable for any use to which it was suited prior to mining, and that further restoration efforts would consume energy, water or other natural resources of the state without providing a corresponding benefit to the state.

STOP submitted the following comment regarding aquifer restoration: furthermore, by using "class of use" or "any use to which it was reasonably suited prior to mining," any error in the pre-mining baseline which set the concentration of a particular chemical above the MCL allowed for drinking water, livestock and irrigation changes the "use." Therefore, a concentration of uranium which allegedly was above 0.03 mg/L pre-mining can be amended to any value above 0.03 mg/L, greatly changing water quality – a change which then threatens all adjacent areas once the mine is closed and negative pressure is removed. An example of this can be found at Uranium Resources, Inc.'s Longoria Mine PAA2 where the Restoration Table value of uranium was 0.037 mg/L. This value was amended to 3.0 mg/L, eighty-two times higher, but still within the same "class of use" since it can be argued that 0.037 is above the MCL for uranium.

The commission assumes the commenter is referring the use of the term "any use to which is was reasonably suited prior to mining" at §331.107(g)(1)(A). The commission notes that the term "class of use" does not appear in §331.107, but assumes the commenter is referring to §331.107(f)(2)(C) "the formation water present in the aquifer would be suitable for any use to which it was reasonably suited prior to mining." Also, the commission notes that although maximum concentration levels (MCLs) have been established for public drinking water systems (30 TAC Chapter 290), which provide water for human consumption, rules have not been adopted that establish MCLs for other uses, such as livestock, farming, industry, and wildlife.

The commission disagrees that an initially-established aquifer restoration value can be amended to any value. All aquifer restoration values that have been amended were done so in accordance with the requirements of §331.107(g). The commission notes that any determination of the "class of use" of groundwater is based on many factors, such as the actual pre-mining use of the groundwater and the groundwater's possible future use. Specific MCLs for different groundwater parameters may vary within a "class of use." For example, the recommended (but not regulatory) upper concentration limits for dissolved solids in water depends on the type of livestock that will use the water (see page 213 of United States Geological Water-Supply Paper 2254). The concentrations of parameters that may be incorporated into crops through irrigation may or may not be important depending on how a crop's harvest is used. It is these types of factors the commission takes under consideration before allowing an amendment to a restoration table value. No changes were made in response to this comment.

STOP commented that both EPA and commission rules allow for an aquifer or a portion of one to be exempted from being a USDW, whereby that aquifer or its portion is no longer protected as a USDW. STOP expressed the opinion that the EPA and the commission collaborated to apply this exemption to areas that include both the production area and the mine area at all in situ uranium mining sites in Texas, which has resulted in exempted areas that are larger than the area of the ore zone. STOP also noted that production area authorizations have required establishment of groundwater quality outside of the ore zone, which clearly demonstrates groundwater outside the ore zone is suitable for domestic use. Lastly, STOP commented that it is indefensible for the commission to use an invalid statistical approach for determination of baseline for aquifer restoration, then to adopt rules that allow that baseline to be increased, resulting in commission-authorized contamination of a domestic water supply. STOP requested that the commission not allow for amendments to aquifer restoration values.

The commission acknowledges that aquifer exemptions are allowed in the federal rules at 40 CFR §146.4 and in the state rules at §331.13. The criteria for designating an exempt aquifer are the same in both the federal and state rules, although §331.13(a) subjects any request for an aquifer exemption to public notice and opportunity for a contested case hearing. Further at §331.13(d), no designation of an exempted aquifer is final until approved by the EPA.

The area of an aquifer exemption necessarily extends beyond the area of mineralization to accommodate the production zone monitor wells that encircle the production area. The fact that the quality of the groundwater outside of the production zone of the production area in no way demonstrates or implies that this groundwater is suitable for domestic use (that is, for human consumption). Whether or not it is suitable for such use is irrelevant in this case. Groundwater

quality is established outside of the production zone within the production area for the purposes of groundwater monitoring required under §331.103. By establishing this groundwater quality prior to mining, any subsequent changes in this groundwater quality, determined from monitoring this groundwater through the use of monitor wells, can be evaluated to determine if mining fluids have traveled outside of the production zone within the production area, subjecting the owner or operator to the requirements of §331.106 (Remedial Action for Excursion). As discussed elsewhere in this response, the allowance for amendments to aquifer restoration values is warranted, and that the commission needs the flexibility to approve such amendments. The use of "valid statistical methods" is addressed previously in response to another comment. The commission intends that any statistical test used to make an inference about a population should be valid. Lastly, the commission disagrees that amendments to aquifer restoration values represent commission-sanctioned contamination of a domestic water supply. First, amendments are justified in certain cases, each of which is evaluated in accordance with the criteria in §331.107(g). Second, as discussed in a previous response, the groundwater in all the zones mined in Texas did not meet primary drinking water standards prior to mining. No changes were made in response to this comment.

STOP commented that because the commission's regulations do not require a statistically valid baseline and allow amendments to so-called pre-mining baseline, they have resulted in 30 years of allowing owners and operators to leave mines contaminated. STOP expressed the opinion that the term "restoration," within the context of in situ mining, has no meaning today, and because amendments to all restoration tables have been allowed in Texas, the state is viewed as the poster child of bad uranium mining regulation and practice.

The commission notes that the subject of "valid" statistical methods is addressed previously in response to another comment. The commission intends that any statistical test used to make an inference about a population should be valid. Also, the commission has noted in previous responses that groundwater in the mined production zones within the production areas has not been restored to the initially-established pre-mining groundwater quality (with one exception). However, the commission notes that the pre-mining groundwater quality in the production zone within the production area at these sites did not meet primary drinking water standards prior to mining. The commission further notes that the concentrations of many of the groundwater parameters in the production zone within the production area at these sites was reduced to at or below pre-mining concentrations. The concentration of other groundwater parameters at these sites were reduced, but not to at or below pre-mining levels. Decisions to allow for amendments to restoration values that were not achieved were based on the considerations in §331.107(g)(1) and on the findings in §331.107(g)(2).

URI commented that the TCEQ rules at §331.107 should be revised to clearly state that aquifer restoration requirements are "goals" (URI's emphasis) and that groundwater within a mined zone must be restored to levels consistent with pre-mining groundwater quality of the mined zone (that is, the production zone within the production area). URI stated that stakeholders recently have claimed (mistakenly, in URI's opinion), that the groundwater in the mined zone must be restored "exactly" (URI's emphasis) to pre-mining quality. URI expressed the opinion that aquifer restoration is not meant to be determined by "hard-and-fast" values because natural variation of concentrations for each groundwater parameter will result in the concentration of a parameter exceeding a precisely calculated value. Rather, according to URI, groundwater quality that has been affected by in situ mining should be restored to a

quality that is consistent with pre-mining groundwater quality. URI suggested that groundwater quality should be restored to an average concentration within an appropriate statistical range of variability, and the standard of "consistent with" should be retained in the rule to provide the commission with the flexibility to judge if a deviation from established aquifer restoration values is meaningful, or just due to natural variability.

The commission disagrees with the concept to make restoration values merely goals. The commission acknowledges that because established restoration table values are determined by the mean value of a number of baseline wells or by some other statistical method there is inherent variability above or below the established restoration table value for each baseline well. However, there needs to be a method to determine readily when restoration has been completed. The restoration table values are established for a production area prior to mining in the permittee's application for production area authorization. If the permittee doubts that the values in the production area authorization can be achieved, the permittee should not mine. The permittee should continue restoration until the values in each baseline well are equal to or below the restoration table values (or within an established range for pH). If the permittee's efforts to restore cannot achieve restoration by demonstrating that each baseline well has been restored to values for all parameters equal to or below the restoration table value (or within an established range for pH), then the permittee may apply for a restoration table amendment under the process of §331.107(g).

TMRA commented that §331.107 appears to codify permit conditions, and that the inclusion of "approved by the executive director" adds confusion and is potentially superfluous depending on the planned manner in which this subsection will be implemented. TMRA noted that by the very nature of the permitting

process, executive director approval of the content of a permit application is a mandatory condition for permit application approval. TMRA recommended that unless this language indicates another executive director approval or preliminary approval, in advance of the permitting review process, it should be deleted.

The commission assumes TMRA is referring to the revision to existing §331.107(a), under which upon issuance and renewal, Class III injection well permits or production area authorizations shall contain a description of the method for determining that groundwater in the production zone within the production area has been restored. The commission disagrees that the language is codifying permit conditions. Rather, the revision to §331.107(a) is requiring that aquifer restoration be addressed in a permit or production area authorization. The requirement of approval by the executive director at both new §331.107(a)(1)(B) and (2)(B) is necessary because each of these new provisions offer the owner or operator the option of using a statistical method, and any such proposed method should require executive director approval. The commission emphasizes that it is not the intent of new §331.107(a)(1)(B) to allow for formal approval by the executive director of a proposed statistical method prior to submission of an application. The executive director will review a proposed statistical method as part of the review of an application.

Based on a review of the revisions to §331.107(a) in response to TMRA's comments, the commission notes that the phrase "upon issuance and renewal, Class III permits or production area authorizations shall contain..." needs further revision, as this phrase is incorrect in that production area authorizations are not subject to renewal, as are Class III injection well permits (see §305.127(A)(ii)). Also, the commission notes that amended permits or production area

authorizations should contain a description of the method for determining that groundwater in the production zone within the production area has been restored. Accordingly, §331.107(a) is further revised to require this description in any permit or production area authorization.

TMRA commented that although the proposed rules allow for relief from a restoration table, the proposed restoration rule does not acknowledge the possibility of any exception for any reason.

The intent of the revisions to §331.107(a) were to allow an operator to demonstrate that aquifer restoration has been achieved either by a direct comparison of groundwater sample analysis results to established restoration values (which are documented in a restoration table) or by use of a statistical method. The commission does not consider the second option as being relief from a restoration table, but rather the opportunity for an operator to demonstrate established restoration goals have been met, and to make this demonstration with a statistical method other than a direct comparison.

TMRA commented that under the current and the proposed definitions of a "mine plan" (see §331.2(63)), a "mine plan" clearly is only an estimate of the sequence and timetable for any required aquifer restoration, and that proposed §331.107(c) defeats this definition by converting the estimated timetable into a presumptively binding and enforceable requirement. TMRA further commented that this proposed rule makes this inconsistent change without mention of any relevant policy considerations or analysis and certainly without mention of who, if anyone, may be adversely affected and whether such a person had other appropriate remedies beyond the scope of commission jurisdiction. TMRA noted that many, if not all, of those who have recently complained to the commission of delayed groundwater restoration have

been persons who either had no justiciable interest in the matter (for example, they did not complain of the quality of water from any well on their property nor the water from any well they relied upon) or if they had an interest, they were bound by and had legal remedies under leases or surface use agreements which remained unimpaired by any permit but outside the commission's jurisdiction.

As discussed in previous comments, the mine schedule submitted in a mine plan is an estimate of the time required to complete mining and aquifer restoration activities in a production area, and because it is an estimate, it is awkward to enforce. Again, however, the commission emphasizes that the time required for mining should not be indefinite, and that the commission expects owners and operators to make every reasonable effort to complete mining and restoration with the time specified in the mine schedule. If progress is not made in restoring mined production areas, the commission may deny or limit expansion of further mining. And, the executive director may consider initiation of permitting or enforcement actions to require a permittee to conduct restoration activities in accordance with the permit and authorization if a permittee fails to conduct required restoration.

Both KCCRB and Sierra Club commented that they oppose the amendment of restoration values, as is allowed under proposed revised §331.107, and recommended that if such amendments are to be allowed, only one amendment for each production area authorization should be allowed. Sierra Club also commented that the proposed changes to §331.107 continue the practice of allowing an amendment to initially-established pre-mining groundwater quality in the production zone within the production area.

The commission appreciates the recommendation that an operator should not be allowed to amend restoration values over and over. However, although the commission prefers to be parsimonious regarding any changes to established restoration values, the commission needs the flexibility to allow more than one amendment to restoration values at any particular production area. Any amendments to restoration values will be in accordance with the criteria in §331.107(g).

BC commented that the proposed rules seem to assume an applicant will extend the timetable and amend the restoration values. This section should be done to "motivate" (emphasis BC's) the applicant to do what he says he will do in the application. BC also commented that, at least, proposed revised §331.107(c) should read SHALL (emphasis BC's) rather than may, and that amended restoration value applications should be formal and subject to notice and opportunity for a contested case hearing. Sierra Club recommended the proposed rules include a requirement that within a permitted area, authorization to mine a new production area cannot commence until aquifer restoration is achieved in previously mined production areas in that permitted area.

The commission disagrees that the rules are based on an assumption that a permittee will extend the timetable in the mine plan and amend restoration values. With respect to using the word "shall" rather than "may" in §331.107(c), the commission assumes the commenter is referring to the phrase "authorization for expansion of mining into new production areas may {shall} be contingent upon achieving restoration progress in previously mined production areas within the schedule set forth in the mine plan." The commission does not agree with this suggested rule revision. Certainly the commission will invoke this restriction in a case where an operator is not making a good faith effort to meet the aquifer restoration requirements of §331.107, or in the case

where an operator is experiencing significant difficulty in restoring the aquifer in a mined production area. However, in cases where aquifer restoration is proceeding in a satisfactory manner at a mined production area, the commission should have the option to allow the operator to proceed with mining at a new production area. The commission does agree that amendments to restoration values should be formal and subject to public notice and opportunity for a contested case hearing, and notes that any amendment to restoration values in a production area authorization is considered to be an major amendment, as defined in §305.62, Amendment, which is subject to public notice and opportunity for a contested case hearing.

Sierra Club commented that the terms "class of use" and "or any use to which it was reasonably suited prior to mining" allows companies the ability to drastically amend restoration values, provided doing so does not change the class of use of the groundwater. Sierra Club further commented that the commission has for over 30 years allowed companies to amend restoration tables, which effectively allowed these companies to contaminate groundwater without cleaning it up.

The commission does not agree with this comment, and responds that amendments to restoration table values were approved only if the requirements of §331.107(g) were met. Although the approval of these amendments by the commission has allowed companies to restore groundwater in the production zone within the production area to levels above the initially-established background levels for certain constituents, the commission considers these instances to be in full accordance with §331.107(g) and does not constitute contamination of an underground source of drinking water. Therefore, under both state and federal regulation, no further restoration or remediation is required in such cases. The commission assumes that the commenter is referring to the

considerations in existing §331.107(f) regarding amendments to restoration tables regarding the terms "class of use" and "or any other use to which it was reasonably suited prior to mining."

Under §331.107(g), an operator may request amendment of a restoration table value after appropriate effort has been made to achieve aquifer restoration. In evaluating such a request, the commission considers, in accordance with the requirements of §331.107(g)(1), among other things, uses for which the groundwater in the production area was suited at baseline water quality levels; actual existing use of ground water in the production area prior to and during mining; potential future uses of groundwater of baseline quality and of proposed restoration quality; and the harmful effects of levels of a particular parameter. Under the requirements of §331.107(g)(2), the commission may amend a restoration table if certain findings are realized, including that the values for the restoration parameters have stabilized; and that the formation water in the exempted portion of the aquifer would be suitable for any use to which it was reasonably suitable prior to mining.

KCCRB commented that they support proposed new §55.201(i)(11), under which opportunity for a contested case hearing exists in the case of an amendment to a restoration table. Sierra Club recommended that the proposed rules be revised to add language to make it clear that an amendment to a restoration table should be open to opportunity for a contested case hearing.

The commission notes that under §55.201(i)(11)(A), an application for a production area authorization is not subject to opportunity for a contested case hearing unless the authorization seeks an amendment to a restoration table value. Therefore, an amendment to change any restoration value is subject to opportunity for a contested case hearing.

Mesteña commented that the requirements under proposed revised §331.107(a)(1)(A), that aquifer restoration values be based on the mean concentration of all sample measurements from baseline wells prior to mining activities, is problematic because the location of the baseline wells is not indicated. Mesteña emphasized that analysis of groundwater samples from wells completed in the production zone should be used to determine the pre-mining groundwater quality that will be the basis for aquifer restoration. Mesteña further emphasized that analysis of groundwater samples from wells completed in the production zone but not in the production area also should be used for this baseline determination, as is currently allowed under §331.104(d)(1). According to Mesteña, data from these wells will provide additional information regarding variability of the groundwater quality in the production zone. Lastly, Mesteña referenced NRC's NUREG-1569, and recognized that in this guidance, the NRC recognizes the difference in groundwater quality between mine area and the production area, and recommended proposed new §331.107(1)(A) be revised to distinguish between wells completed in the production zone of the production area and other wells. Mesteña recommended that proposed revised §331.107(1)(A) be revised to allow for baseline determination as is currently allowed under §331.104(d)(1). TMRA and URI submitted comments and recommendations similar to Mesteña's.

The revisions to §331.107(a)(1)(A) are based on the premise that groundwater quality in the production zone within the production area (that is, the area that contains the zone of uranium mineralization to be mined), may be, at least for certain constituents, different from the groundwater quality in the production zone outside of the production area (that is, the area of the production zone peripheral to, but beyond the mineralized area). For aquifer restoration, it is the quality of groundwater in the production zone within the production area that is of interest. It is

this groundwater quality that represents the pre-mining groundwater quality of the zone to be mined, and that will be affected by in situ mining. Therefore, although the commission understands that any estimation of groundwater quality in any zone within any area is improved with additional data, all data used to determine groundwater quality should be representative of the particular groundwater. The groundwater quality data from the production zone outside the production area is not necessarily representative of the groundwater quality in the production zone within the production area. Therefore, the commission again emphasizes that the establishment of baseline for aquifer restoration (or for any groundwater baseline conditions, for that matter) should be based on representative data.

The commission acknowledges that under previous §331.107(d)(1), determination of baseline was based on the higher of two sample means: the sample mean of data from wells completed in the production zone of the production area (production area baseline wells); or the sample mean of data from wells completed in the production zone outside the production area (the production zoned monitor wells). The commission fails to understand, however, how this method provides a good estimate of the groundwater quality in the production zone within the production area. Using this methodology, a person is assuming two separate populations (the groundwater quality in the production zone in the production area, and the groundwater quality in the production zone outside the production area), computing a point estimate of the true mean of each population, and then choosing the higher estimate as representative of the true mean of the population represented by the groundwater in the production zone within the production area.

A more defensible methodology would be to use an appropriate statistical test to compare the two sample data sets to determine if they were from the same population. If the test indicated they were from the same population, then the sample mean could be computed using the combined data from both populations. Because of the increased sample size, this estimate of the true mean would have less associated variance than either estimate based on the separate data sets, and therefore would provide a better estimate of the true mean. The commission contends such a methodology could be proposed by an applicant under new §331.107(a)(1)(2).

The CBGSC also commented on proposed new §331.107(a)(1)(A), stating that determination of restoration values on the sample mean from a limited sample data set was unadvisable because the sample mean is sensitive to extreme values (CBGSC provided an example based on data from the Vasquez Mine in Duval County to illustrate this effect). CBGSC recommended that in situations where the sample data set includes extreme values, the sample median should be used instead of the sample mean. An individual commented that companies are allowed to use a small sample size to calculate a sample mean, and if the sample data set contain outliers, the sample mean will be biased. The individual also commented that using a small sample data set to identify the distributional characteristics of the underlying distribution is not a statistically sound practice.

The commission agrees that the sample mean can be influenced by extreme values, be they extremely high or extremely low, and that extreme values have less effect on the sample median. The method described in new §331.107(a)(1)(A) presently is allowed under §331.104(d)(1) and was retained to allow its use, albeit in a more restricted manner in that restoration values must be based on data from wells completed in the production zone within the production area. In such cases as

the example provided by CBGSC, the commission can determine that a sample data set is not representative, as required under revised §331.104(a), and require additional samples from existing baseline wells or the completion of additional baseline wells. Alternatively, under new §331.107(b), the commission may allow use of the sample median. The commission notes that in the case of a small data set that has an extreme value, which can significantly affect the sample mean, use of the sample median is a example of accommodation of an outlier. The commission also agrees that the power associated with a statistical hypothesis test used to determine the distributional characteristic of the population from which the sample is drawn will increase as the sample size increases (the term "sample size," as used in statistics, refers to the number of realizations drawn from a population; that is, the number of samples taken). Any test for determining normality should be done using a suitable sample size, and the commission would take this factor into consideration regarding any test used to test data.

KHH commented that under proposed revised §331.107(d), the informational requirements for the semi-annual aquifer restoration report are burdensome to both the operator and the commission, and that the informational requirements for water levels, hydrographs, and potentiometric maps provide no meaningful measure of aquifer restoration progress. KHH suggested these requirements be eliminated.

The purpose of the revisions to §331.107(d) was to identify specific information that should be included in these semi-annual reports. The requested information is the type that typically is collected during restoration activities. With regards to potentiometric maps, the commission considers such maps a basic element of any groundwater report. However, the requirement for

hydrographs of each baseline and monitor well is not essential to evaluating aquifer restoration progress. Section 331.107(d) is revised to remove this requirement.

TMRA commented that the wording "have been restored to the values. . ." at proposed new §331.107(e) is inconsistent with the wording "levels consistent with the values. . ." as used in §331.107(b). Different wording invites confusion unless it is meant to indicate a different threshold. If it does indicate a different threshold, the difference in thresholds is unclear as well as why a different threshold is intended.

The commission agrees with this comment, and notes that the definition of the term "restored aquifer" at §331.2(89) was revised to delete the phrase "levels consistent with restoration table values or better as verified by an approved sampling program" in the final rule. The term "consistent with" does not provide sufficient certainty for determining when restoration is complete. In making this revision, the commission inadvertently neglected to remove it from §331.106(2)(A) and §331.107(b) and revised §331.107(g). The adopted rules have been revised to correct these omissions. If a permittee cannot restore to levels equal to or better than the restoration table values, the permittee may apply for an amendment of the production area authorization to revise the restoration table values.

GCGCD commented that the stability period requirements in §331.107(e), which is proposed new §331.107(f) should be based on groundwater flow velocity rather than a set time period because it is the groundwater flow velocity that determines how fast groundwater travels from the production zone to the monitor wells. GCGCD emphasized that slower moving groundwater from the production zone may not reach a monitor well in the proposed one year stability period; therefore groundwater from a production

zone that was not properly restored would not be detected in such a situation. KCCRB commented that not much is known about the kinetics of oxidation-reduction reactions involved with in situ uranium mining, making it difficult to predict the length of time required for conditions within the mined portion of an aquifer to return to pre-mining reducing conditions. Because of this, KCCRB recommended that revised §331.107(f) (Stability Sampling), under which the stability period is revised from 180 days to one year, or to two years if the restoration table was amended, should be revised to five years, and that this could be reduced to two years in a future rulemaking if subsequent information indicates no problems during the five-year period. KCCRB also commented that if monitoring is limited to one or two years, possible problems may not be detected, and that given the uncertainty with reestablishing reducing conditions, a five-year monitoring period is reasonable. Mesteña, TMRA, and URI commented that the presently required 180-day stability period is consistent with requirements in other states, and absent evidence supporting the need to increase the monitoring period, the industry should not be arbitrarily compelled to extend this period. LSCSC commented that they fail to see the rationale for either a one-year or a two-year stability sampling period, and experience of Texas communities has been that groundwater quality after mining can vary depending upon local conditions. Sierra Club recommends a five-year stability sampling period, one-year of data simply is insufficient time to determine if groundwater quality has stabilized. TMRA recommended that absent evidence supporting the need to increase the monitoring period, TCEQ should not arbitrarily burden property owners with the additional delay resulting from extending this period. Armstrong commented that the stability period should only be as long as is scientifically justified. TMRA and URI expressed the opinion the current language in §331.107(e) that requires the executive director to determine within 45 days of receipt of all sample analysis results whether or not restoration has been achieved is reasonable, and should not be deleted, as proposed.

The commission does not agree with these comments. The stability period commences only after the owner or operator has determined aquifer restoration has been achieved in accordance with §331.107. Production area baseline wells are monitored for stability, not the production zone monitor wells in the monitor well ring. There is no injection or production of fluids from the production zone within the production area during the stability period. The purpose of the stability period is to verify that the concentrations of constituents in the groundwater, after restoration activity, have stabilized. This stabilization is verified through groundwater sampling in accordance with the requirements of §331.107(f) in the final rule. The assumption that an aquifer has not been restored is tested during the stability period. Under the adopted rules, the stability period is increased from 180 days to one year to account for possible seasonal variations in the concentrations of groundwater constituents. In the case where restoration values have been revised in accordance with the requirements of §331.107(f), the stability period is two years. The commission contends that a longer stability period is warranted in the case of amended restoration values because such amendments are the result of an operator being unable, at least for some constituents, to return groundwater constituent concentrations to the initially-established pre-mining levels. As discussed in the preamble to the proposed rule, the inability to restore groundwater to initially-established pre-mining conditions may indicate that in situ mining affected the chemistry of the groundwater within the production zone of a production area, making the affected groundwater resistant to restoration. Because of difficulty by the operator to restore the affected aquifer to initially-established pre-mining conditions, thus requiring an amendment to restoration values, an extended stability period is warranted to help ensure that stability has been achieved. The commission emphasizes that the two-year stability period would begin only after aquifer restoration activities have ceased. This revision quadruples the stability period presently

required, and should provide adequate assurance that the affected groundwater has stabilized.

With regards to Sierra Club's comments regarding the experience of Texas communities, this comment appears to imply that wells providing drinking water for human consumption have been affected by in situ mining. If this assumption is correct, the commission is unaware of any documented case where in situ mining has resulted in off-site contamination.

The commission appreciates that other states only require a stability period of 180 days. However, as previously discussed, the commission contends that one year of stability sampling is necessary to evaluate if any changes in groundwater quality are due simply to seasonal variation or to lingering effects of in situ mining. Again, the need to amend restoration values is an indication that in situ mining may have affected the aquifer to an extent that the groundwater is resistant to restoration.

The commission contends that a minimum period of two years in such a case is warranted to ensure that aquifer restoration efforts have overcome affected groundwater's apparent resistance to restoration. The commission also notes that under §331.107(g)(3), an operator may provide a demonstration that two years of stability sampling is not warranted. Lastly, for the reasons discussed above, the commission considers the required stability periods to be scientifically justified.

With regards to the amount of time allowed to the executive director to determine if aquifer restoration has been achieved, (45 days from receipt of all sample analysis results under the current rule), the commission emphasizes the importance of such a determination, and further emphasizes that the executive director's review time should not be limited. Further, the commission notes that

the review of these data will be accomplished as expeditiously as possible. No changes were made in response to this comment.

TMRA commented that proposed revisions to §331.107(e) (re-designated as §331.107(f) in the final rule) do not provide for long term monitoring.

The commission is unsure of meaning of the term "long term monitoring" as used by TMRA. Generally, the term refers to monitoring after facility operations have ceased and a facility has been closed. For example, at hazardous waste landfill facilities, once the landfill has been closed, groundwater monitoring is required for a period of 30 years (40 CFR §264.117). In this respect, the commission agrees that the final rule at §331.107(f) does not provide for long term monitoring.

TMRA commented that the 45 days allowed to the executive director for determination of achievement of aquifer restoration under §331.107(f) is reasonable.

The commission does not agree with this comment. Given the importance of the data submitted to demonstrate achievement of aquifer restoration, the executive director should not be limited to 45 days for review of these data. No change has been made in response to this comment.

Mesteña and TMRA commented that in proposed revised §331.107(g)(2)(B) and (3), the value of 180 should be revised to 365 days to match the text.

The commission notes that these proposed revised rules specify one calendar year for stability sampling, not 180 days.

Mesteña and TMRA commented that the two-year stability sampling period required under §331.107(g)(3) when a restoration table has been amended is counter-intuitive. TCEQ approval to amend restoration values implies that all items in §331.104(f)(A) - (D) have been met. Mesteña stated that if this is the case, then "the hazard has been quantified, and was deemed acceptable by the TCEQ." Mesteña further commented that the proposed language should be deleted as it results in no added benefit for the State or the permittee. URI commented that absent some evidence supporting the need to increase the stability period, the industry should not be burdened with extending this period.

The commission notes that there is no existing §§331.104(f)(A) - (D), and that §331.104(f) pertains to re-entry into previously mined area for additional mining. The commission assumes the commenters possibly were referring to the considerations under revised §331.107(g)(1), which the commission uses to determine if a restoration table should be amended. If so, the commission emphasizes that any decision to amend restoration values is based on these considerations and the findings detailed at §331.107(g)(2), and involves no implications of any kind. Amendments to restoration tables typically involve raising the restoration values for certain constituents to the levels that have been achieved at the time the amendment is requested, and, any approval by the commission of such an amendment means the commission considers the amendment request to be consistent with the requirements of §331.107(g). In any event, whether an operator has achieved aquifer restoration based on the initially-established restoration values or on amended restoration values, a stability period is still required. As discussed in a previous response, the commission

contends that an extended stability period is justified when aquifer restoration values have been amended. No changes were made in response to this comment.

Independent Third-Party Experts

BC commented that the concept of an independent third-party expert, addressed under proposed new rule §331.108 is unclear, and that it appears an applicant can choose to request use of such an expert for the purpose of the initial establishment of requirements pertaining to monitoring wells, and that by doing so avoids opportunity for a contested case hearing. BC asked if use of an expert removes just the monitoring well plan from opportunity for a contested case hearing, or does it remove the entire application from such an opportunity? BC commented that there are numerous issues related to an application for a production area authorization, not just the initial establishment of monitor wells, yet proposed §331.108(c) may be read to indicate the opportunity for a contested case hearing on an application for a production area authorization that includes initial establishment of monitoring wells is available only if the commission determines that the monitoring well plan is inadequate. BC further commented that the idea of removing the opportunity for a contested case hearing under these circumstances is not right, and that the present language in §331.108(c) appears to be ill-planned. KCCRB commented that simply because an independent, third-party expert advises the TCEQ on a limited portion of an application, the entire application should not be exempt from opportunity for a contested case hearing. GCGCD questioned if proposed new §331.108(d), under which there is no opportunity for a contested case hearing if the executive director uses the recommendations of an independent, third-party expert, is a denial of the public's rights. Sierra Club commented that even if the commission uses the recommendations of an independent, third-party expert regarding the initial establishment of monitor wells, opportunity for a

contested case hearing is available regarding all other parts of an application for a production area authorization.

The language in new §331.108 is based on SB 1604, §32 adopted during the 80th Legislature, 2007, which revised the TWC to add new §27.0513. Based on TWC, §27.0513(e), the concept regarding an independent, third-party expert is that any conclusions reached by such an expert are not influenced by the applicant, either through selection of the expert, compensation to the expert, or through supervision of the expert's work. Under TWC, §27.0513(d), an application for a production area authorization submitted after September 1, 2007 is an uncontested matter not subject to a contested case hearing or the hearing requirements of Texas Government Code, Chapter 2001. This exemption from opportunity for a contested case hearing applies to the entire application. Three exceptions are provided at TWC, §27.0513(d)(1) - (3) regarding this exemption from opportunity for a contested case hearing. At TWC, §27.0513(d)(2), an application that seeks the initial establishment of monitoring wells for any area covered by the authorization is subject to opportunity for a contested case hearing unless the executive director uses the recommendations of an independent, third-party expert. Regarding TWC, §27.0513(d)(2), an application that seeks the initial establishment of monitoring wells for any area covered by the authorization is subject to opportunity for a contested case hearing, and this opportunity applies to the entire application. However, if the executive director used the recommendations of an independent, third-party expert with regards to the initial establishment of monitor wells, then no opportunity for a contested case hearing exists for the entire application. Although the application for the production area authorization is not subject to an opportunity for a contested case hearing, the application will still

be subject to an opportunity for public comment, and the public can comment on the recommendations of the third-party expert.

Sierra Club commented that in regard to the independent, third-party expert addressed in proposed new §331.108, the proposed rules should be revised to allow for public comment on any person selected as an independent, third-party expert.

The commission does not agree with this comment. Proposed new §331.108 is based on SB 1604, §32 which was passed during the 80th Legislature, 2007. This section of the bill amended the TWC, by adding new §27.0513. Under new TWC, §27.0513(e), the legislature described the requirements for use of such an expert by the commission. These requirements did not include public comment on any designated expert. However, even though not subject to a contested case hearing, an application and a draft production area authorization are still subject to existing opportunities for public comment, and the public may comment on the recommendations and use of the third-party expert.

TMRA commented that proposed new §331.108(a)(1) - (3) respond to specific provisions of SB 1604, §32(d)(2) now codified as TWC, §27.0513, which allow for a production area authorization application to avoid hearing exposure if the executive director "uses the recommendation of an independent, third-party expert chosen by the commission" in deciding the adequacy of the location, number, depth, spacing and design of monitor wells initially designated for a production area. TMRA noted that the statutory language does not require nor even allow the TCEQ to give up or delegate its authority or responsibility in approving production area monitor wells to another person. Rather, according to TMRA, it merely allows the executive director to "use the recommendation" of an independent and qualified expert in

determining whether proposed monitor wells (which have already been proposed, installed, tested and documented) are adequate in number, location, depth, spacing and design to serve their intended purpose.

The commission does not agree that the language in new §331.108(a)(1) - (3) says the commission is surrendering its authority or responsibility in approving production area monitor wells to another person (in this case, an independent, third-party expert). Rather this new language simply implements the requirements of TWC, §27.0513(e), under which the executive director may use an independent third-party expert. These requirements, which are at TWC, §27.0513(e)(1) - (3), are that the expert meet the qualifications set by commission rules for such an expert, the applicant for the authorization agrees to pay for the costs for the work of the expert; and the applicant for the authorization not be involved in the selection of the expert or the direction of the work of the expert.

TMRA commented that to ensure the statutory language at TWC, §27.0513(d)(2) is implemented effectively, the TCEQ should keep the process as simple as possible consistent with implementing the statutory provisions and allowing the TCEQ to take the benefit of additional expertise in its decision-making processes.

The commission agrees with this comment, and notes that the new language at §§331.108(a)(1) - (3) is identical to the statutory language at TWC, §27.0513(e)(1) - (3). With regards to the exemption from opportunity for a contested case hearing pursuant to TWC, §27.0513(d)(2), the commission notes that the rule language at §55.201(i)(11) is identical to the statutory language at TWC, §27.0513(d)(2). With regard to the process of use of an independent, third-party expert for the

purpose of new §55.201(i)(11), the commission envisions that an applicant will prepare an application for a new production authorization, which will include information regarding the initial establishment of monitor wells. The applicant, at the time of submission of this application to the commission, will request that the commission procure the services of an independent, third-party expert to review that portion of the application that addresses initial establishment of monitor wells. The executive director will procure the services of such an expert, in accordance with the commission's procurement process, to review that portion of the application that addresses initial establishment of monitor wells, and submit recommendations to the executive director regarding that portion of the application. If the executive director uses the recommendations of the expert, the application will be exempt from opportunity for a contested case hearing. If the executive director does not use the recommendations of the expert, the application will be subject to opportunity for a contested case hearing.

TMRA commented that there is no need for the executive director to be burdened by onerous details in selecting and contracting with qualified experts, as the executive director and the TCEQ are well able to identify qualified professionals and to identify those who are sufficiently independent to offer the executive director useful advice. TMRA also commented that the qualifications set out in §331.108(b) should be stated as guidance for the executive director to consider in anticipation of selecting an "expert" whose advice will prove both independent and useful.

The commission does not agree with this comment. Under TWC, §27.0513(e)(1), the commission by rule is required to establish qualifications for independent, third-party experts. Given the importance of the expert (use of his or her recommendations exempts certain applications from

opportunity for a contested case hearing), any requirements for an expert should be in rule. If that guidance is not enforceable (except when so designated by rule), the qualifications for an expert necessarily must be established by rule, not guidance. To this end, the commission crafted these proposed qualifications to be both specific (with regards to the expert being either a licensed professional engineer or a licensed professional geoscientist), and general regarding work experience and other relevant factors.

TMRA commented that the exact statutory language is extremely important: the statute does not call for the executive director to give up TCEQ regulatory authority by "adopting," "incorporating," or "approving" the advice of an independent, third-party expert. Rather, TMRA noted, the statute instead calls upon the executive director to "use the expert's recommendation, which calls for the executive director to take the benefit of the expert's advice and presumably for the TCEQ, which is the state's designated repository of expertise in such matters, to digest that advice in reaching its decision on a production area authorization application.

As expressed in a previous response, the commission is not surrendering any of its authority or responsibility through the proposed rules regarding the use of an independent, third-party expert. With regards to the term "uses" in TWC, §27.0513(d)(2), the commission considers this to mean that an independent, third-party expert has submitted recommendations regarding the initial establishment of monitor wells, and that the commission has reviewed these recommendations and accepts them.

TMRA commented that the statute does not dictate either the specific question or questions to be asked of the expert; nor does it dictate the scope, form or detail of the response to be required from the expert.

Therefore, to avoid an illegal delegation of ultimate authority to a third-party, the executive director should not ask the independent expert to answer for the TCEQ the ultimate regulatory questions the TCEQ must provide. Instead, the TCEQ should solicit commentary on any matters the executive director may regard as useful and within the province of the expert's professional expertise.

The commission agrees that the statute appears to be silent on these matters. Again, the commission does not consider the rules regarding independent, third-party experts to represent the commission's surrender of any of its authority or responsibilities.

TMRA commented that the language of proposed §331.108(a)(4) would require the executive director to task the independent, third-party expert with framing a new and independent monitoring proposal and allow the executive director to "use" such advice only in the case that the third-party expert's proposal met all of the applicable regulatory requirements. TMRA suggested this language be deleted for two reasons: first, a production area authorization application determination is about the adequacy of the applicant's application; and in the case of the expert, it is specifically about the monitor wells the applicant has already installed, not about a third person's recommendation for some other set of wells; second, the expert need not and should not be asked to present and justify a new set of monitor wells for examination by the TCEQ. TMRA suggested the starting point should be the pending production area authorization application, and the expert's contribution may be directed to any number of questions: what changes must be made to the proposed monitor well configuration to make it effective; or, if it is effective, what

changes, if any, could make it better? TMRA also recommended that for consistency, "monitoring" should be revised to "monitor."

The commission does not agree that the new language in §331.108(a)(4) requires the executive director to task the expert in the manner described by TMRA. Section 331.108(a)(4) simply allows the executive director to not use the expert's recommendations if they are contrary to existing statutory and regulatory requirements. This language does not set out the requirements detailed by TMRA. The commission notes that revisions to the definition of the term "monitor well" at §331.2(64) specify that the term is synonymous with the term "monitoring well." No changes were made in response to this comment.

TMRA commented that they consider proposed new §331.108(d) to be fatally defective because the statute under which the use of an independent, third-party expert may be used by the commission does not require the commission to require the expert to produce a wholly new monitor well proposal, nor does it require the commission to adopt, incorporate, or impose the expert's recommendations. Rather, according to TMRA it calls for the commission to USE (TMRA's emphasis) the expert's recommendations. TMRA proposed the language of this proposed new provision be revised to reflect the action to be taken when the commission has made a decision after "using" (TMRA's emphasis) the recommendation of the expert.

The commission finds this comment to be vague, as TMRA places emphasis on the terms "use" and "using," but provides no explanation for this emphasis. TMRA appears to imply that if an independent, third-party expert submits recommendations (however detailed or trivial) regarding the initial placement of monitor wells, and if the commission simply reviews these

recommendations, then the commission has "used" the recommendation of an independent, third-party, and there is no opportunity for a contested case hearing on the application.

With regards to the term "uses" in TWC, §27.0513(d)(2), the commission considers this to mean that an independent, third-party expert has submitted recommendations regarding the initial establishment of monitor wells, and that the executive director has reviewed these recommendations and accepts them. The purpose of new §331.108(d) is to allow the executive director to not accept the recommendations of the expert if those recommendations are in conflict with the requirements of §331.103. And, if the executive director does not accept (that is, use) the recommendations of the expert, then the application should not be exempt from opportunity for a contested case hearing. The executive director's "use" of the expert's recommendation is not all or nothing. The executive director may enter into a contract or other arrangement with the expert to delineate the scope of work and the expectations from the expert's review. If the executive director has questions or concerns about the adequacy of the expert's recommendations, these concerns can be worked out through the contract process or the executive director could seek the recommendations of another expert. The commission emphasizes that the executive director's acceptance under §331.108(d), of an expert's recommendations regarding the initial establishment of monitor wells exempts the entire production area application from opportunity for a contested case hearing, which is no small matter. Given the importance of this matter, any recommendations from an expert accepted by the executive director should at least have the integrity of being consistent with the requirements of applicable rules, especially the requirements at §331.103. If an applicant requests the benefit of the third-party expert provision, the commission intends for the expert's input to be meaningful. The commission would expect the expert to opine on whether the

proposed monitor wells comply with rule and permit requirements and if site-specific information at a proposed production area warrants any additional considerations with respect to monitor wells, such as for example, the placement of additional non-production zone monitor wells in any overlying or underlying aquifers. If the executive director determines that the recommendation meets the requirements and uses the recommendation in the production area authorization, the application is not subject to the contested case hearing requirements. No changes were made in response to this comment.

TMRA and URI commented that the proposed §331.108(e) states that if the executive director determines that the recommendations from the designated independent third-party expert do not meet the requirements for the initial establishment of monitor wells in accordance §331.103, either in whole or in part, the application for a production area authorization will be subject to opportunity for contested case hearing, regardless of subsequent changes to the application. TMRA and URI further commented that this provision potentially gives the recommendation of the expert greater weight over the applicant's proposed monitor well plan than the applicant's proposal and the authority of the executive director to approve or deny the applicant's plan and/or seek an adjustment in the applicant's plan which would achieve compliance with the rule. TMRA and URI expressed the opinion that, in effect, proposed §331.108 would give the independent expert the ability to nullify the applicant's ability to avoid a hearing, just by giving an arbitrary recommendation that is inconsistent with the rule.

The commission does not agree with this comment. Again, the commission emphasizes that exempting an application from opportunity for a contested case hearing is not a matter to be considered lightly. Also, the commission emphasizes that such exemptions are dependent on the

statutory requirement at TWC, §27.0513(d)(2) that the executive director use the recommendations of the expert; however, it does not compel the executive director to use these recommendations. The commission does not consider it likely that an expert would provide recommendations on monitoring wells that are contrary to the rule or permit requirements applicable to monitoring wells because the process for the procurement of the expert's services would identify the activities that the expert is requested to perform. The executive director may enter into a contract or other arrangement with the expert to delineate the scope of work and the expectations from the expert's review. If the executive director has questions or concerns about the adequacy of the expert's recommendations, the concern's can be worked out through the contract process or the executive director could seek the recommendations of another expert. Therefore, if the executive director does not use the recommendations of the expert, the exemption from opportunity for a contested case hearing does not apply to the application. The language at new §331.108(e) in no way compromises the executive director's authority regarding approval or denial of an application. It simply gives the executive director the option of rejecting (that is, not using) the recommendations of the expert if those recommendations are contrary to statutory or regulatory requirements, specifically the requirements at §331.103. No change has been made in response to this comment.

TMRA and URI commented that the proposed process is wrong because the statutory language at proposed new §331.108(e) does not allow the executive director to yield its authority or responsibility in reviewing or approving underground injection control permits or authorizations to an expert; neither does it give the expert the authority to modify, withdraw or negate a pending production area authorization application. Rather, it merely allows the executive director to "use the recommendation" of an

independent and qualified expert in determining whether the monitor wells are adequate in number, location, depth, spacing and design to serve their intended purpose.

The commission does not agree with this comment. As discussed in previous responses, new §331.108(e) does not compel the executive director to surrender any of its authority or responsibility regarding independent, third-party experts. Additionally, this new language conveys no authority to the expert. No change has been made in response to this comment.

TMRA and URI expressed the opinion that the statute does not require adopting, incorporating, or approving the expert's advice. The expert's determination is about the adequacy in accordance §331.103 of the applicant's monitor well placement. It does not require or allow the expert to formulate an alternate monitor well proposal. By simply "using the recommendation" of the expert, the executive director is able to take the benefit of the expert's advice, digest and either use it or discard it in whole or part in reaching the expert's decision on a production area authorization application. Certainly the executive director should not be bound to take bad expert advice, that does not meet the requirements for the initial establishment of monitor wells in §331.103, and be forced to send that bad recommendation to a hearing examiner for a ruling.

The commission agrees in part with these comments. The commission agrees that the statute does not require the executive director to adopt or incorporate, or approve the recommendations from an independent, third-party expert; it simply allows the executive director to use these recommendations. The commission agrees (and has advocated in previous comments) that any recommendations from an expert should speak to the requirements at §331.103. The commission

agrees that the expert is not required to formulate an alternate monitor well proposal. However, the expert may offer recommendations on the applicant's proposed initial establishment of monitor wells. Indeed, that is the responsibility of the expert; that is the purpose for which the applicant requests such an expert, and agrees to compensate the expert for his or her recommendations.

The executive director's "use" of the expert's recommendations is not all or nothing. With regards to "using the recommendations" of the expert, as suggested by TMRA, the commission again emphasizes the decision to use these recommendations lies with the executive director; the commission is not compelled by statute to use them.

Mesteña commented that under proposed new §331.108(e), if the executive director determines the recommendations from an independent, third-party expert do not meet the requirements for the initial establishment of monitor wells, regardless of subsequent changes, the application for a production area authorization will not be exempt from opportunity for contested case hearing, as is allowed under proposed new §55.201(i)(11). Mesteña further commented that the proposed rules regarding such experts are restrictive and opaque to the point of being unworkable. Mesteña recommended that this section be revised to remove the reference to opportunity for a contested case hearing, to indicate these applications are subject to final technical review for compliance with §331.103, and to state that if the executive director use the expert's recommendations regarding the initial establishment of monitor wells, no opportunity for a contested case hearing exists.

It appears that Mesteña is contending that if an independent, third-party expert submits recommendations on the initial establishment of monitor wells, this is all that is required for the

production area authorization application, in total, to be exempt from opportunity for a contested case hearing. It appears that Mesteña is also contending that this is the case, regardless of the nature of the recommendation of the expert. As discussed in the previous response, the commission contends it is not the intent of TWC, §27.0513(d)(2) to exempt this type of application from opportunity for a contested case hearing simply because an independent, third-party expert submitted recommendations to the commission. If the commission does not use these recommendations because they do not satisfy regulatory requirements, then the requirements of TWC, §27.0513(d)(2) have not been met, and the application is not exempt from opportunity for a contested case hearing. No changes were made in response to this comment.

During stakeholder discussion, it was noted that it is unclear if an application is subject to opportunity for a contested case hearing if the executive director uses some, but not all, of an expert's recommendations, and it was asked that the commission clarify what percentage of an expert's recommendations must be used to remove the opportunity for a contested case hearing on an application, as allowed under the final rule in §55.201(i)(11).

The executive director's use of the expert's recommendations is not all or nothing. The commission considers it will have used the recommendations of an independent, third-party expert if it uses a substantial portion (and not necessarily all), of the expert's recommendations. In that it is problematic to set a specific percentage of the expert's recommendations, no such percentage is being established in this rulemaking. Use of the expert's recommendations will be determined on a case-by-case basis. The commission notes that this process will include discussions with the expert regarding his or her recommendations, with opportunity for the expert to explain the

recommendations. The commission may return the recommendations to the expert for reconsideration if the recommendations do not meet the requirements of §331.103 for the establishment of monitor wells. Opportunity for an expert to reconsider any recommendations he or she makes will be included in the contract between the commission and the expert.

Cost Estimates for Financial Assurance

With regards to proposed new §331.109, Cost Estimates for Financial Assurance, TMRA commented that the commission should not use the issuance of a production area authorization as the occasion to set or approve the form or amount of financial assurance to be provided by a permittee, and referenced rule §305.49(b)(6). TMRA further commented that as a practical matter, because delineation drilling and development of a production area may take two years or more, there is no practical way for a miner to make a meaningful estimate of the total aquifer restoration cost for an entire production area before commencing mining within one or more wellfields within a production area. Therefore, useful estimates of restoration costs cannot be provided prior to the drilling and operations for which a production area authorization is required. URI commented the requirements for a cost estimate for aquifer restoration is unworkable as stated in their comments on proposed revisions to §§37.9045(b), 305.49(b)(6), and 55.201(i)(11).

The commission notes that in accordance with new §305.49(6), relating to Additional Contents of Application for an Injection Well Permit, an application for a production area authorization shall be submitted with and contain a cost estimate for aquifer restoration and well plugging and abandonment. The commission assumes that by submitting an application for a production area authorization, the owner or operator has completed detailed work on delineating the ore-body to be

mined (both in terms of depth and area), installed required monitor wells, and investigated and identified the aquifer characteristics of the production zone for determination of Class III well spacing, at least on an initial basis. In fact, the commission questions why a person would submit an application for a production area authorization without having completed these tasks.

Furthermore, any decision to pursue mining (and obtaining the necessary production area authorization) is based on economic considerations, and the cost required for plugging and abandonment of all wells and for aquifer restoration certainly must be included in any economic analysis. The commission realizes that these cost estimates will be adjusted over time. Submission of these initial cost estimates in an application for a production area authorization provides the commission the opportunity to review and comment on the factors taken into consideration to estimate these costs. For example, factors such as required pore volumes, flare factors, effective porosity of the production zone, pumping and electrical costs, water treatment and disposal costs, and laboratory analytical costs are all factors to be considered regarding the cost of aquifer restoration. If a permittee believes that it will be too difficult to establish a cost estimate for restoring an entire production area up front as part of the application of the production area authorization, the permittee should consider reducing the size of the production area. In any case, as required under new §305.49(b)(6), these estimates must be included in an application for a production area authorization. These cost estimates should also be available for review by the public as part of an application. Lastly, the commission notes that establishment of the form of financial assurance for plugging and abandonment of wells and for aquifer restoration is not required under new §305.49(b)(6), and therefore is not required under new §331.109. Financial assurance for aquifer restoration is required to be held under the radioactive material license. Because the financial assurance for aquifer restoration is held under the licensing requirements of

Chapter 336, and the financial assurance for well plugging and abandonment is held under the area permit requirements of Chapter 331, an amendment application for the production area authorization is not required and the exception in TWC, §27.0513(d)(3) or §55.201(i)(11)(C) would not be triggered for subsequent updates to financial assurance for aquifer restoration or well plugging and abandonment for inflation adjustments or cost increases. No changes were made in response to this comment.

Cost Estimates for Plugging and Abandonment and Aquifer Restoration

Mesteña commented that the requirement at proposed revised §331.143(a) specifies the cost estimate for plugging and abandonment of wells must be based on the time when such activities are "most expensive" is vague, and that the cost estimates should be based on those accepted by the executive director. Mesteña recommended the proposed revised rule be further revised to remove the reference to "most expensive" and add language to reflect such estimates must be in an amount acceptable to the executive director and consistent with the facility. Mesteña also recommended that proposed revised §331.143(a)(2) (concerning Cost Estimates For Aquifer Restoration) be revised from "aquifer restoration for each production area authorization" to read as follows: the cost for independent third-party completion of all aquifer restoration for subsection (i): all injection operations for the same permit area in which mining has been completed but for which the corresponding aquifer restoration obligations have not been discharged, clause (ii) all injection operations within the same permit area which are underway; and clause (iii) - all injection operations in the same permit area which will be commenced in the next 60 days.

The commission emphasizes that any cost estimates must be acceptable to the executive director.

The commission emphasizes the importance of having financial assurance that is based on the most

current cost estimates for plugging and abandonment of wells and aquifer restoration. The intent of these requirements is to ensure all factors have been considered in deriving these cost estimates. Factors that may affect when activities are most expensive include the permittee's plans for the maximum number of wells, changes to expected electrical rates, changes to well servicing expenses, or growing current cost estimates to future costs based on inflation and time-value of money to the projected time when closure is scheduled to occur. However, to avoid confusion, the final rule in §331.143(b)(1) and (2) is revised to remove the term "most expensive" and replace it with the requirement that these estimates must take into account all costs related to plugging and abandonment and aquifer restoration, respectively. With regard to Mesteña's proposed revision to §331.143(a)(2), this amount of detail is not necessary and could restrict the ability to assess adequate closure costs. No changes were made in response to this comment.

Mesteña recommended that proposed new §331.143(b)(1) should be revised to remove the requirement that the cost estimate for plugging and abandonment must be equal to the cost of plugging and abandonment at the point in the facilities life that makes this activity most expensive, and that this language should be further revised to require these costs must equal those acceptable to the executive director.

The commission again emphasizes that any cost estimates must be acceptable to the executive director. As discussed in the previous response, the final rule in §331.143(b)(1) has been revised to remove the term "most expensive," and to require that the estimate take into account all costs related to plugging and abandonment.

Mesteña recommended that proposed new §331.143(b)(2) should be revised to remove the requirement that cost estimates for aquifer restoration must be equal to the cost of for aquifer restoration at the point in the facilities life that makes this activity most expensive. Mesteña further recommended that proposed revised §331.143(b)(2) to add the following language: the cost estimate under subsection (a)(2) must include the cost for independent, third-party completion of all aquifer restoration; for clause (i) all injection operations for the same permit area in which mining has been completed but for which the corresponding aquifer restoration obligations have not been discharged; clause (ii) all injection operations within the same permit area which are underway; and clause (iii) all injection operations in the same permit area which will be commenced in the next 60 days and specified in the most recent annual report in subsection (d).

As expressed in the previous response, the purpose of the "most expensive" requirement is to ensure that the operator has considered all factors in deriving these cost estimates. As discussed in the previous response, the final rule in §331.143(b)(1) has been revised to remove the term "most expensive," and to require that the estimate take into account all costs related to aquifer restoration.

TMRA and URI commented that proposed revisions to §331.143 are confusing and conflicting regulatory requirements. TMRA and URI stated that first, the paragraph seems to be tailored to plugging and abandonment for a single injection well, and that in the case of a single well it may be possible to perform a worst case "most expensive" analysis. However, TMRA and URI noted that Class III injection wells, permitted under an area permit, are continuously increased in number, and "most expensive" is impossible to determine early in a project. Therefore according to TMRA and URI, reliance on the annual update is

necessary. TMRA and URI recommended the estimate be prepared in accordance with the provisions of §336.1125(c).

As discussed in the previous response, the final rule in §331.143(b)(1) has been revised to remove the term "most expensive," and to require that the estimate take into account all costs related to plugging and abandonment and aquifer restoration, respectively. The commission agrees that any updates made regarding financial assurance should be noted in the annual report required under §331.85(a). However, the commission does not agree that any such update can be delayed until submission of the annual report. No changes were made in response to this comment.

TMRA and URI commented that the proposed language at §331.143, which requires the "most expensive" analysis for aquifer restoration, is entirely subjective and inconsistent with the TCEQ rules in §331.107. TMRA and URI noted that historically, the industry must restore groundwater to a quality that is consistent with baseline, and that the current rule at §331.107(f) provides for a number of considerations to determine if a restoration table should be amended that would provide the endpoint for future effort including the cost of further restoration efforts. TMRA and URI expressed the opinion that any cost estimate for aquifer restoration that was based on a consideration of when such restoration would be most expensive would be nonsensical because the owner or operator would exercise his or her right to amend the restoration table and end restoration according to the nine criteria provided for in §331.107.

As discussed in the previous response, the final rule in §331.143(b)(1) has been revised to remove the term "most expensive," and to require that the estimate take into account all costs related to plugging and abandonment.

TMRA and URI commented that for the cost of aquifer restoration, proposed revisions to §331.143 rely on a cost analysis for each production area authorization, but that the proposed language omits the requirement that the calculation be made using the information in the annual report. TMRA emphasized that as they stated in previous comments, the annual report is the only reasonable spot to include both an updated calculation of plugging and abandonment for Class III wells and aquifer restoration.

The requirements for the annual report and the required cost estimates are used in conjunction with each other. Section 331.85 requires the submission of an annual report to the executive director that includes updated cost estimates for well closure and aquifer restoration. Section 331.143 provides additional details for deriving the cost estimates for well closure and aquifer restoration.

TMRA commented that the December 31 and January 31 anniversary dates in proposed new §331.143(d) regarding updates to the cost estimates for plugging and abandonment and for aquifer restoration, and submission of these cost estimates, respectively, may create peak workloads that could be performed more efficiently by fewer employees if the work were spread out by selecting different due dates for different permittees. TMRA suggested the December 31 and January 31 dates should be changed to mitigate the problem.

The commission does not anticipate a workload problem regarding new §331.143(d). Although the commission appreciates TMRA's suggestion to stagger submission of annual reports, the

commission cannot readily impose different requirements on different companies, at least not regarding submission of reports. No changes were made in response to this comment.

Mesteña recommended that proposed new §331.143(d), regarding updating of cost estimates for plugging and abandonment and aquifer restoration, be revised to require updates of both the cost estimate for plugging and abandonment and the cost estimate for aquifer restoration, rather than just updated cost estimates for plugging and abandonment.

The commission agrees with this recommended revision, and §331.143(d) has been revised accordingly.

Requirements for Existing Wells Used for Development of Class III UIC Well Applications

KHH commented that in the commission's Section by Section discussion, the explanation of proposed new Subchapter M to Chapter 331 is not entirely accurate. KHH is concerned that in the Section by Section discussion, the commission stated that once an exploration well is cased, jurisdiction of that hole is transferred from the RRC to the TCEQ through an informal agreement between the RRC and the TCEQ. KHH emphasized that certain cased exploration wells are used as rig supply wells and others are used to gather data necessary for a Class III injection well area permit, and that prior to the passage of HB 3837 and HB 3838 during the 80th Legislature, 2007, jurisdiction of these cased wells did not automatically transfer from the RRC to the TCEQ.

The commission reviewed correspondence between the RRC and the TCEQ regarding this matter, and based on that review, agrees with the comment. The cased wells referenced in this correspondence were wells within the area of a Class III injection well area permit.

TMRA commented that proposed new §331.221(a) is implemented to comply with a new statute, but as presented, compliance with the subsection is difficult to regulate. TMRA expressed the opinion that the trigger for necessitating registration is not black and white, and by the time triggered, the timeframe may be later than 30 days following completion. TMRA also asked with what agency must a well be registered? Also, TMRA commented that the decision to proceed with a permit application may not have been made until well after 30 days following completion of a well, and that a more effective means to regulate the registration is register with the TCEQ prior to submission of a permit application to the TCEQ. At that point, the wells are either registered or not, and in violation if they are not registered. Otherwise, compliance is based on a phantom condition that the applicant cannot substantiate or the TCEQ prove to the contrary, or a post 30-day timeframe that makes compliance impossible.

The commission agrees that there are some difficulties regarding the "triggering" of when a well must be registered, as the applicable statute at TWC, §27.023(a) appears to be silent on the exact timing of when a well should be registered, other than to require registration with the TCEQ of any well used during the development of an application to obtain required pre-mining geologic, hydrologic, and water quality information. The commission included the 30-day requirement on the assumption that by this time a potential applicant would have made a decision regarding the use of that well for the development of an application. The commission notes that wells that may be used to obtain information for an application for the most part will be exploration wells drilled under an exploration permit issued by the RRC. Once completed, such wells must be plugged and abandoned

almost immediately; they cannot be left open for any extended length of time unless they are cased. Exploration wells generally are cased for two reasons: to provide water for drilling operations, in which case they remain under RRC jurisdiction; or to be used to obtain information to develop a permit application. In the second case, jurisdiction of the well transfers from the RRC to the TCEQ. The commission agrees that the rule needs to specify with what agency a well must be registered. Based on TMRA's comments, new §331.221(a) is revised to require a well that is to be used to obtain information for the development of a permit application to be registered with the commission 30 days after completion of casing and development of the well. The commission can determine compliance with this requirement through a review of the information required at new §331.221(b).

TMRA commented that under proposed new §331.221(d), the criterion "immediately" is not effective in a regulatory sense. What is the definition of "immediately?" TMRA suggested that a superior performance standard is "as soon as reasonably possible," but even that is not particularly meaningful. TMRA recommended that the regulation be limited to submission of plugging and abandonment reports to TCEQ within 30 days of permit authorization, as this is a clear regulatory benchmark on which to base compliance. Of course, with any regulatory requirement, the concept of prosecutorial discretion should be practiced by the TCEQ to allow extensions for situations outside the reasonable control of the permittee (e.g., recent Hurricane Ike).

The commission notes that the intent of the requirement for immediate plugging and abandonment of any registered well that was not subsequently included in a Class III injection well area was to avoid the situation where a registered well was within the area of a Class III injection well area

permit, but was not authorized under that permit, as different regulatory requirements apply to wells authorized under a permit than apply to a registered well. However, the commission appreciates that plugging and abandonment of any well takes time. Therefore, the commission agrees with TMRA's recommendation for an allowance of 30 days for plugging and abandonment of such wells, with a consideration of a time extension approved by the executive director, and has revised new §331.221(d) accordingly.

KHH commented that the commission stated in the section by section discussion regarding proposed new §331.222, Conversion of Registered Wells to Class III Wells, that once a registered well is authorized under a Class III injection well area permit, the registration status of that well ceases and the well is subject to all applicable commission rules including those regarding permitting, public notice, and hearing requests. KHH expressed the opinion that the registration status of a well ceases when that well is included in an application for a Class III injection well area permit, and it is at that time the well becomes subject to all applicable commission rules including those regarding permitting, public notice, and hearing requests.

The commission agrees with this comment in part. A registered well that is included in a permit application is subject to all of the requirements of the application. However, once a permit is issued, the well is authorized under the permit and the registration ceases under TWC, §27.023(c). The Section by Section discussion has been revised accordingly.

SUBCHAPTER A: GENERAL PROVISIONS

§§331.2, 331.7, and 331.13

STATUTORY AUTHORITY

The amendments are adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The amendments are also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted amendments implement Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007, and TWC, §27.023 and §27.0513.

§331.2. Definitions.

General definitions can be found in Chapter 3 of this title (relating to Definitions). The following words and terms, when used in this chapter, have the following meanings.

(1) **Abandoned well**--A well which has been permanently discontinued from use or a well for which, after appropriate review and evaluation by the commission, there is no reasonable expectation of a return to service.

(2) **Activity**--The construction or operation of any of the following:

(A) an injection well for disposal of waste;

(B) an injection or production well for the recovery of minerals;

(C) a monitor well at a Class III injection well site;

(D) pre-injection units for processing or storage of waste; or

(E) any other class of injection well regulated by the commission.

(3) **Affected person**--Any person who has a personal justiciable interest related to a legal right, duty, privilege, power, or economic interest affected by the proposed injection operation for which a permit is sought.

(4) **Annulus**--The space in the wellbore between the injection tubing and the long string casing and/or liner.

(5) **Annulus pressure differential**--The difference between the annulus pressure and the injection pressure in an injection well.

(6) **Aquifer**--A geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(7) **Aquifer restoration**--The process used to achieve or exceed water quality levels established by the commission for a permit/production area.

(8) **Aquifer storage well**--A Class V injection well used for the injection of water into a geologic formation, group of formations, or part of a formation that is capable of underground storage of water for later retrieval and beneficial use.

(9) **Area of review**--The area surrounding an injection well described according to the criteria set forth in §331.42 of this title (relating to Area of Review) or in the case of an area permit, the project area plus a circumscribing area the width of which is either 1/4 mile or a number calculated according to the criteria set forth in §331.42 of this title.

(10) **Area permit**--A permit that authorizes the construction and operation of two or more similar injection, production, or monitoring wells used in operations associated with Class III well activities within a specified area.

(11) **Artificial liner**--The impermeable lining of a pit, lagoon, pond, reservoir, or other impoundment, that is made of a synthetic material such as butyl rubber, chlorosulfonated polyethylene, elasticized polyolefin, polyvinyl chloride (PVC), other manmade materials, or similar materials.

(12) **Baseline quality**--The parameters and their concentrations that describe the local groundwater quality of an aquifer prior to the beginning of injection operations

(13) **Baseline well**--A well from which groundwater is analyzed to define baseline quality in the permit area (regional baseline well) or in the production area (production area baseline well).

(14) **Buffer area**--The area between any mine area boundary and the permit area boundary.

(15) **Caprock**--A geologic formation typically overlying the crest and sides of a salt stock. The caprock consists of a complex assemblage of minerals including calcite (CaCO_3), anhydrite (CaSO_4), and accessory minerals. Caprocks often contain lost circulation zones characterized by rock layers of high porosity and permeability.

(16) **Captured facility**--A manufacturing or production facility that generates an industrial solid waste or hazardous waste that is routinely stored, processed, or disposed of on a shared basis in an integrated waste management unit owned, operated by, and located within a contiguous manufacturing complex.

(17) **Casing**--Material lining used to seal off strata at and below the earth's surface.

(18) **Cement**--A substance generally introduced as a slurry into a wellbore which sets up and hardens between the casing and borehole and/or between casing strings to prevent movement of fluids within or adjacent to a borehole, or a similar substance used in plugging a well.

(19) **Cementing**--The operation whereby cement is introduced into a wellbore and/or forced behind the casing.

(20) **Cesspool**--A drywell that receives untreated sanitary waste containing human excreta, and which sometimes has an open bottom and/or perforated sides.

(21) **Commercial facility**--A Class I permitted facility, where one or more commercial wells are operated.

(22) **Commercial underground injection control (UIC) Class I well facility**--Any waste management facility that accepts, for a charge, hazardous or nonhazardous industrial solid waste for disposal in a UIC Class I injection well, except a captured facility or a facility that accepts waste only from other facilities owned or effectively controlled by the same person.

(23) **Commercial well**--An underground injection control Class I injection well which disposes of hazardous or nonhazardous industrial solid wastes, for a charge, except for a captured facility or a facility that accepts waste only from facilities owned or effectively controlled by the same person.

(24) **Conductor casing or conductor pipe**--A short string of large-diameter casing used to keep the top of the wellbore open during drilling operations.

(25) **Cone of influence**--The potentiometric surface area around the injection well within which increased injection zone pressures caused by injection of wastes would be sufficient to drive fluids into an underground source of drinking water or freshwater aquifer.

(26) **Confining zone**--A part of a formation, a formation, or group of formations between the injection zone and the lowermost underground source of drinking water or freshwater aquifer that acts as a barrier to the movement of fluids out of the injection zone.

(27) **Contaminant**--Any physical, biological, chemical, or radiological substance or matter in water.

(28) **Control parameter**--Any physical parameter or chemical constituent of groundwater monitored on a routine basis used to detect or confirm the presence of mining solutions in a designated monitor well. Monitoring includes measurement with field instrumentation or sample collection and laboratory analysis.

(29) **Desalination brine**--The waste stream produced by a desalination operation containing concentrated salt water, other naturally occurring impurities, and additives used in the operation and maintenance of a desalination operation.

(30) **Desalination concentrate**--Same as desalination brine.

(31) **Desalination operation**--A process which produces water of usable quality by desalination.

(32) **Disposal well**--A well that is used for the disposal of waste into a subsurface stratum.

(33) **Disturbed salt zone**--Zone of salt enveloping a salt cavern, typified by increased values of permeability or other induced anomalous conditions relative to undisturbed salt which lies more distant from the salt cavern, and is the result of mining activities during salt cavern development and which may vary in extent through all phases of a cavern including the post-closure phase.

(34) **Drilling mud**--A heavy suspension used in drilling an injection well, introduced down the drill pipe and through the drill bit.

(35) **Drinking water treatment residuals**--Materials generated, concentrated or produced as a result of treating water for human consumption.

(36) **Drywell**--A well, other than an improved sinkhole or subsurface fluid distribution system, completed above the water table so that its bottom and sides are typically dry except when receiving fluids.

(37) **Enhanced oil recovery project (EOR)**--The use of any process for the displacement of oil from the reservoir other than primary recovery and includes the use of an immiscible, miscible, chemical, thermal, or biological process. This term does not include pressure maintenance or water disposal projects.

(38) **Excursion**--The movement of mining solutions, as determined by analysis for control parameters, into a designated monitor well.

(39) **Existing injection well**--A Class I well which was authorized by an approved state or United States Environmental Protection Agency-administered program before August 25, 1988, or a well which has become a Class I well as a result of a change in the definition of the injected waste which would render the waste hazardous under §335.1 of this title (relating to Definitions).

(40) **Fluid**--Material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state.

(41) **Formation**--A body of rock characterized by a degree of lithologic homogeneity which is prevailing, but not necessarily, tabular and is mappable on the earth's surface or traceable in the subsurface.

(42) **Formation fluid**--Fluid present in a formation under natural conditions.

(43) **Fresh water**--Water having bacteriological, physical, and chemical properties which make it suitable and feasible for beneficial use for any lawful purpose.

(A) For the purposes of this subchapter, it will be presumed that water is suitable and feasible for beneficial use for any lawful purpose only if:

(i) it is used as drinking water for human consumption; or

(ii) the groundwater contains fewer than 10,000 milligrams per liter (mg/L) total dissolved solids; and

(iii) it is not an exempted aquifer.

(B) This presumption may be rebutted upon a showing by the executive director or an affected person that water containing greater than or equal to 10,000 mg/L total dissolved solids can be put to a beneficial use.

(44) **General permit**--A permit issued under the provisions of this chapter authorizing the disposal of nonhazardous desalination concentrate and nonhazardous drinking water treatment residuals as provided by Texas Water Code, §27.023.

(45) **Groundwater**--Water below the land surface in a zone of saturation.

(46) **Groundwater protection area**--A geographic area (delineated by the state under Safe Drinking Water Act, 42 United States Code, §300j-13) near and/or surrounding community and non-transient, non-community water systems that use groundwater as a source of drinking water.

(47) **Hazardous waste**--Hazardous waste as defined in §335.1 of this title (relating to Definitions).

(48) **Improved sinkhole**--A naturally occurring karst depression or other natural crevice found in carbonate rocks, volcanic terrain, and other geologic settings which has been modified by man for the purpose of directing and emplacing fluids into the subsurface.

(49) **Individual permit**--A permit, as defined in the Texas Water Code (TWC), §27.011 and §27.021, issued by the commission or the executive director to a specific person or persons in accordance with the procedures prescribed in the TWC, Chapter 27 (other than TWC, §27.023).

(50) **Injection interval**--That part of the injection zone in which the well is authorized to be screened, perforated, or in which the waste is otherwise authorized to be directly emplaced.

(51) **Injection operations**--The subsurface emplacement of fluids occurring in connection with an injection well or wells, other than that occurring solely for construction or initial testing.

(52) **Injection well**--A well into which fluids are being injected. Components of an injection well annulus monitoring system are considered to be a part of the injection well.

(53) **Injection zone**--A formation, a group of formations, or part of a formation that receives fluid through a well.

(54) **In service**--The operational status when an authorized injection well is capable of injecting fluids, including times when the well is shut-in and on standby status.

(55) **Intermediate casing**--A string of casing with diameter intermediate between that of the surface casing and that of the smaller long-string or production casing, and which is set and cemented in a well after installation of the surface casing and prior to installation of the long-string or production casing.

(56) **Large capacity cesspool**--A cesspool that is designed for a flow of greater than 5,000 gallons per day.

(57) **Large capacity septic system**--A septic system that is designed for a flow of greater than 5,000 gallons per day.

(58) **Licensed professional geoscientist**--A geoscientist who maintains a current license through the Texas Board of Professional Geoscientists in accordance with its requirements for professional practice.

(59) **Liner**--An additional casing string typically set and cemented inside the long string casing and occasionally used to extend from base of the long string casing to or through the injection zone.

(60) **Long string casing or production casing**--A string of casing that is set inside the surface casing and that usually extends to or through the injection zone.

(61) **Lost circulation zone**--A term applicable to rotary drilling of wells to indicate a subsurface zone which is penetrated by a wellbore, and which is characterized by rock of high porosity and permeability, into which drilling fluids flow from the wellbore to the degree that the circulation of drilling fluids from the bit back to ground surface is disrupted or "lost."

(62) **Mine area**--The area defined by a line through the ring of designated monitor wells installed to monitor the production zone.

(63) **Mine plan**--A plan for operations at a mine, consisting of:

(A) a map of the permit area identifying the location and extent of existing and proposed production areas; and

(B) an estimated schedule indicating the sequence and timetable for mining and any required aquifer restoration.

(64) **Monitor well**--Any well used for the sampling or measurement with field instrumentation of any chemical or physical property of subsurface strata or their contained fluids. The term "monitor well" shall have the same meaning as the term "monitoring well" as defined in TWC, §27.002.

(A) Designated monitor wells are those listed in the production area authorization for which routine water quality sampling or measurement with field instrumentation is required.

(B) Secondary monitor wells are those wells in addition to designated monitor wells, used to delineate the horizontal and vertical extent of mining solutions.

(C) Pond monitor wells are wells used in the subsurface surveillance system near ponds or other pre-injection units.

(65) **Motor vehicle waste disposal well**--A well used for the disposal of fluids from vehicular repair or maintenance activities including, but not limited to, repair and maintenance facilities for cars, trucks, motorcycles, boats, railroad locomotives, and airplanes.

(66) **New injection well**--Any well, or group of wells, not an existing injection well.

(67) **New waste stream**--A waste stream not permitted.

(68) **Non-commercial facility**--A Class I permitted facility which operates only non-commercial wells.

(69) **Non-commercial underground injection control (UIC) Class I well facility**--A UIC Class I permitted facility where only non-commercial wells are operated.

(70) **Non-commercial well**--An underground injection control Class I injection well which disposes of wastes that are generated on-site, at a captured facility or from other facilities owned or effectively controlled by the same person.

(71) **Notice of change (NOC)**--A written submittal to the executive director from a permittee authorized under a general permit providing changes to information previously provided to the agency, or any changes with respect to the nature or operations of the facility, or the characteristics of the waste to be injected.

(72) **Notice of intent (NOI)**--A written submittal to the executive director requesting coverage under the terms of a general permit.

(73) **Off-site**--Property which cannot be characterized as on-site.

(74) **On-site**--The same or geographically contiguous property which may be divided by public or private rights-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous

properties owned by the same person but connected by a right-of-way which the owner controls and to which the public does not have access, is also considered on-site property.

(75) **Out of service**--The operational status when a well is not authorized to inject fluids, or the well itself is incapable of injecting fluids for mechanical reasons, maintenance operations, or well workovers or when injection is prohibited due to the well's inability to comply with the in-service operating standards of this chapter.

(76) **Permit area**--The area owned or under lease by the permittee which may include buffer areas, mine areas, and production areas.

(77) **Plugging**--The act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

(78) **Point of injection**--For a Class V well, the last accessible sampling point prior to fluids being released into the subsurface environment.

(79) **Pollution**--The contamination of water or the alteration of the physical, chemical, or biological quality of water:

(A) that makes it harmful, detrimental, or injurious:

(i) to humans, animal life, vegetation, or property; or

(ii) to public health, safety, or welfare; or

(B) that impairs the usefulness or the public enjoyment of the water for any lawful and reasonable purpose.

(80) **Pre-injection units**--The on-site above-ground appurtenances, structures, equipment, and other fixtures including the injection pumps, filters, tanks, surface impoundments, and piping for wastewater transmission between any such facilities and the well that are or will be used for storage or processing of waste to be injected, or in conjunction with an injection operation.

(81) **Production area**--The area defined by a line generally through the outer perimeter of injection and recovery wells used for mining.

(82) **Production area authorization**--An authorization, issued under the terms of a Class III injection well area permit, approving the initiation of mining activities in a specified production area within a permit area, and setting specific conditions for production and restoration in each production area within an area permit.

(83) **Production well**--A well used to recover uranium through in situ solution recovery, including an injection well used to recover uranium. The term does not include a well used to inject waste.

(84) **Production zone**--The stratigraphic interval extending vertically from the shallowest to the deepest stratum into which mining solutions are authorized to be introduced.

(85) **Public water system**--A system for the provision to the public of water for human consumption through pipes or other constructed conveyances as defined in §290.38(47) of this title (relating to Definitions).

(86) **Radioactive waste**--Any waste which contains radioactive material in concentrations which exceed those listed in 10 Code of Federal Regulations Part 20, Appendix B, Table II, Column 2, and as amended.

(87) **Registered Well**--A well registered in accordance with the requirements of §331.221 of this title (relating to Registration of Wells).

(88) **Restoration demonstration**--A test or tests conducted by a permittee to simulate production and restoration conditions and verify or modify the fluid handling values submitted in the permit application.

(89) **Restored aquifer**--An aquifer whose local groundwater quality, within a production area, has, by natural or artificial processes, returned to the restoration table values established in accordance with the requirements of §331.107 of this title (relating to Restoration).

(90) **Salt cavern**--A hollowed-out void space that has been purposefully constructed within a salt stock, typically by means of solution mining by circulation of water from a well or wells connected to the surface.

(91) **Salt cavern confining zone**--A zone between the salt cavern injection zone and all underground sources of drinking water and freshwater aquifers, that acts as a barrier to movement of waste out of a salt cavern injection zone, and consists of the entirety of the salt stock excluding any portion of the salt stock designated as an underground injection control (UIC) Class I salt cavern injection zone or any portion of the salt stock occupied by a UIC Class II or Class III salt cavern or its disturbed salt zone.

(92) **Salt cavern injection interval**--That part of a salt cavern injection zone consisting of the void space of the salt cavern into which waste is stored or disposed of, or which is capable of receiving waste for storage or disposal.

(93) **Salt cavern injection zone**--The void space of a salt cavern that receives waste through a well, plus that portion of the salt stock enveloping the salt cavern, and extending from the boundaries of the cavern void outward a sufficient thickness to contain the disturbed salt zone, and an additional thickness of undisturbed salt sufficient to ensure that adequate separation exists between the outer limits of the injection zone and any other activities in the domal area.

(94) **Salt cavern solid waste disposal well or salt cavern disposal well**--For the purposes of this chapter, regulations of the commission, and not to underground injection control (UIC)

Class II or UIC Class III wells in salt caverns regulated by the Texas Railroad Commission, a salt cavern disposal well is a type of UIC Class I injection well used:

(A) to solution mine a waste storage or disposal cavern in naturally occurring salt; and/or

(B) to inject hazardous, industrial, or municipal waste into a salt cavern for the purpose of storage or disposal of the waste.

(95) **Salt dome**--A geologic structure that includes the caprock, salt stock, and deformed strata surrounding the salt stock.

(96) **Salt stock**--A geologic formation consisting of a relatively homogeneous mixture of evaporite minerals dominated by halite (NaCl) that has migrated from originally tabular beds into a vertical orientation.

(97) **Sanitary waste**--Liquid or solid waste originating solely from humans and human activities, such as wastes collected from toilets, showers, wash basins, sinks used for cleaning domestic areas, sinks used for food preparation, clothes washing operations, and sinks or washing machines where food and beverage serving dishes, glasses, and utensils are cleaned.

(98) **Septic system**--A well that is used to emplace sanitary waste below the surface, and is typically composed of a septic tank and subsurface fluid distribution system or disposal system.

(99) **Stratum**--A sedimentary bed or layer, regardless of thickness, that consists of generally the same kind of rock or material.

(100) **Subsurface fluid distribution system**--An assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. This definition includes subsurface area drip dispersal systems as defined in §222.5 of this title (relating to Definitions).

(101) **Surface casing**--The first string of casing (after the conductor casing, if any) that is set in a well.

(102) **Temporary injection point**--A method of Class V injection that uses push point technology (injection probes pushed into the ground) for the one-time injection of fluids into or above an underground source of drinking water.

(103) **Total dissolved solids**--The total dissolved (filterable) solids as determined by use of the method specified in 40 Code of Federal Regulations Part 136, as amended.

(104) **Transmissive fault or fracture**--A fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.

(105) **Underground injection**--The subsurface emplacement of fluids through a well.

(106) **Underground injection control**--The program under the federal Safe Drinking Water Act, Part C, including the approved Texas state program.

(107) **Underground source of drinking water**--An "aquifer" or its portions:

(A) which supplies drinking water for human consumption; or

(B) in which the groundwater contains fewer than 10,000 milligrams per liter total dissolved solids; and

(C) which is not an exempted aquifer.

(108) **Upper limit**--A parameter value established by the commission in a permit/production area authorization which when exceeded indicates mining solutions may be present in designated monitor wells.

(109) **Verifying analysis**--A second sampling and analysis or measurement with instrumentation of control parameters for the purpose of confirming a routine sample analysis or measurement which indicated an increase in any control parameter to a level exceeding the upper limit. Mining solutions are assumed to be present in a designated monitor well if a verifying analysis confirms that any control parameter in a designated monitor well is present in concentration equal to or greater than the upper limit value.

(110) **Well**--A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension, a dug hole whose depth is greater than the largest surface dimension, an improved sinkhole, or a subsurface fluid distribution system but does not include any surface pit, surface excavation, or natural depression.

(111) **Well injection**--The subsurface emplacement of fluids through a well.

(112) **Well monitoring**--The measurement by on-site instruments or laboratory methods of any chemical, physical, radiological, or biological property of the subsurface strata or their contained fluids penetrated by the wellbore.

(113) **Well stimulation**--Several processes used to clean the well bore, enlarge channels, and increase pore space in the interval to be injected thus making it possible for wastewater to move more readily into the formation including, but not limited to, surging, jetting, blasting, acidizing, and hydraulic fracturing.

(114) **Workover**--An operation in which a down-hole component of a well is repaired, the engineering design of the well is changed, or the mechanical integrity of the well is compromised. Workovers include operations such as sidetracking, the addition of perforations within the permitted injection interval, and the addition of liners or patches. For the purposes of this chapter, workovers do not include well stimulation operations.

§331.7. Permit Required.

(a) Except as provided in §331.9 of this title (relating to Injection Authorized by Rule) and by subsections (d) - (f) of this section, all injection wells and activities must be authorized by an individual permit.

(b) For Class III in situ uranium solution mining wells, Frasch sulfur wells, and other Class III operations under commission jurisdiction, an area permit authorizing more than one well may be issued for a defined permit area in which wells of similar design and operation are proposed. The wells must be operated by a single owner or operator. Before commencing operation of those wells, the permittee may be required to obtain a production area authorization for separate production or mining areas within the permit area.

(c) The owner or operator of a large capacity septic system, a septic system which accepts industrial waste, or a subsurface area drip dispersal system, as defined in §222.5 of this title (relating to Definitions) must obtain a wastewater discharge permit in accordance with Texas Water Code, Chapter 26 or Chapters 26 and 32, and Chapter 305 of this title (relating to Consolidated Permits), and must submit the inventory information required under §331.10 of this title (relating to Inventory of Wells Authorized by Rule).

(d) Pre-injection units for Class I nonhazardous, noncommercial injection wells and Class V injection wells permitted for the disposal of nonhazardous waste must be either authorized by a permit issued by the commission or registered in accordance with §331.17 of this title (relating to Pre-Injection

Units Registration). The option of registration provided by this subsection shall not apply to pre-injection units for Class I injection wells used for the disposal of byproduct material, as that term is defined in Chapter 336 of this title (relating to Radioactive Substance Rules). Pre-injection units for Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals are not subject to authorization by registration but are subject to authorization by an individual permit or under the general permit issued under Subchapter L of this chapter (relating to General Permit Authorizing Use of a Class I Injection Well to Inject Nonhazardous Desalination Concentrate or Nonhazardous Drinking Water Treatment Residuals).

(e) The commission may issue a general permit under Subchapter L of this chapter. The commission may determine that an injection well and the injection activities are more appropriately regulated under an individual permit than under a general permit based on findings that the general permit will not protect ground and surface fresh water from pollution due to site-specific conditions.

(f) Notwithstanding subsection (a) of this section, an injection well authorized by the Railroad Commission of Texas to use nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals as an injection fluid for enhanced recovery purposes does not require a permit from the commission. The use or disposal of radioactive material under this paragraph is subject to the applicable requirements of Chapter 336 of this title.

(g) Permits issued before September 1, 2007 for Class III wells for uranium mining will expire on September 1, 2012 unless the permit holder submits an application for permit renewal under §305.65 of this title (relating to Renewal) before September 1, 2012. Any holders of permits for Class III wells for

uranium mining issued before September 1, 2007 who allow those permits to expire by not submitting a permit renewal application by September 1, 2012 are not relieved from the obligations under the expired permit or applicable rules, including obligations to restore groundwater and to plug and abandon wells in accordance with the requirements of the permit and applicable rules.

§331.13. Exempted Aquifer.

(a) An exempted aquifer is an aquifer or a portion of an aquifer which meets the criteria for fresh water but which has been designated an exempted aquifer by the commission after notice and opportunity for public hearing. Those aquifers or portions of aquifers which were designated for exemption by the Texas Department of Water Resources in its original application for program approval submitted to the United States Environmental Protection Agency shall be considered to be exempted aquifers.

(b) Except for injection authorized by rule, the commission may require a permit for injection into an exempted aquifer to protect fresh water outside the exempted aquifer which may be subject to pollution caused by the injection.

(c) An aquifer or portion of an aquifer may be designated as an exempted aquifer if the following criteria are met:

(1) It does not currently serve as a source of drinking water for human consumption; and

(2) Until exempt status is removed according to procedures in subsection (f) of this section, it will not in the future serve as a source of drinking water for human consumption because:

(A) It is mineral, hydrocarbon or geothermal energy bearing with production capability;

(B) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

(C) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or,

(D) It is located above a Class III well mining area subject to subsidence or catastrophic collapse.

(d) No designation of an exempted aquifer submitted as part of a UIC Program shall be final until approved by the EPA as part of the delegated UIC program.

(e) Subsequent to program approval or promulgation, the commission may, after notice and opportunity for a public hearing, identify additional exempted aquifers. The commission delegates to the executive director the authority to designate an exempt aquifer under this section if no request for a public hearing is received within the designated comment period provided in the public notice.

(f) After notice and opportunity for public hearing, the designation of exempted aquifer may be removed by the commission thereby eliminating the exempt status, provided restoration has been accomplished if required.

SUBCHAPTER C: GENERAL STANDARDS AND METHODS

§331.45, §331.46

STATUTORY AUTHORITY

The amendments are adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The amendments are also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted amendments implement Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007; and TWC, §27.023 and §27.0513.

§331.45. Executive Director Approval of Construction and Completion.

The executive director may approve or disapprove the construction and completion for an injection well or project. In making a determination whether to grant approval, the following shall be reviewed for compliance with the standards of this chapter:

(1) for Class I wells, except for those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, and salt cavern disposal wells and associated salt caverns:

(A) actual as-built drilling and completion data on the well;

(B) all logging and testing data on the well;

(C) a demonstration of mechanical integrity;

(D) anticipated maximum pressure and flow rate at which the permittee will operate;

(E) results of the injection zone and confining zone testing program as required in §331.62(7) of this title (relating to Construction Standards) and §331.65(a) of this title (relating to Reporting Requirements);

(F) the actual injection procedure;

(G) the compatibility of injected wastes with fluids in the injection zone and minerals in both the injection zone and the confining zone and materials used to construct the well;

(H) the calculated area of review and cone of influence based on data obtained during logging and testing of the well and the formation, and where necessary, revisions to the information submitted under §331.121 of this title (relating to Class I Wells);

(I) the status of corrective action required for defective wells in the area of review;

(J) compliance with the casing and cementing performance standard in §331.62(5) of this title, and where necessary, changes to the permit to provide for additional testing and/or monitoring of the well to insure the continuous attainment of the performance standard; and

(K) compliance with the cementing requirements in §331.62(6) of this title.

(2) for Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals:

(A) all available logging and testing program data on the well;

(B) a demonstration of mechanical integrity;

(C) the anticipated maximum pressure and flow rate at which the permittee will operate;

(D) the results of the formation testing program;

(E) the actual injection procedure;

(F) the compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone; and

(G) the status of corrective action on defective wells in the area of review.

(3) for salt cavern disposal wells and associated salt caverns:

(A) actual as-built drilling and completion data on the well;

(B) all logging, coring, and testing program data on the well and salt pilot hole;

(C) a demonstration of mechanical integrity of the well;

(D) the anticipated maximum wellhead and casing seat pressures and flow rates at which the well will operate during cavern development and cavern waste filling;

(E) results of the salt cavern injection zone and salt cavern confining zone testing program as required in §331.163(e)(3) of this title (relating to Well Construction Standards);

(F) the injection and production procedures for cavern development and cavern waste filling;

(G) the compatibility of injected materials with the contents of the salt cavern injection zone and the salt cavern confining zone, and with the materials of well construction;

(H) land subsidence monitoring data and groundwater quality monitoring data, including determinations of baseline conditions for such monitoring throughout the area of review;

(I) the status of corrective action required for defective wells in the area of review;

(J) actual as-built specifications of the well's surface support and monitoring equipment; and

(K) conformity of the constructed well system with the plans and specifications of the permit application;

(4) for Class III wells:

(A) logging and testing data on the well;

(B) a satisfactory demonstration of mechanical integrity for all new wells, excluding monitor and baseline wells;

(C) anticipated operating data;

(D) the results of the formation testing program;

(E) the injection procedures; and

(F) the status of corrective action required for defective wells in the area of review.

§331.46. Closure Standards.

(a) Applicability. Subsections (b) - (n) and (q) of this section apply to Class I wells except for salt cavern disposal wells and those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals. For salt cavern disposal wells, only subsections (c) and (e) - (q) of this section apply. For Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, only subsections (e) - (h) and (q) of this section apply.

(b) For Class I wells, prior to closing the well, the owner or operator shall observe and record the pressure decay for a time specified by the executive director. The executive director shall analyze the pressure decay and the transient pressure observations conducted pursuant to §331.64 of this title (relating to Monitoring and Testing Requirements) and determine whether the injection activity has conformed with predicted values.

(c) For all Class I wells, prior to well closure, appropriate mechanical integrity testing shall be conducted to ensure the integrity of that portion of the long string casing and cement that will be left in the ground after closure. Testing methods may include:

(1) pressure tests with liquid or gas;

(2) radioactive tracer surveys for wells other than salt cavern disposal wells;

(3) noise logs, temperature logs, pipe evaluation logs, cement bond logs, or oxygen activation logs; and

(4) any other test required by the executive director.

(d) For Class I wells, prior to well closure the well shall be flushed with a nonhazardous buffer fluid.

(e) In closure of all Class I wells, Class III wells, and permitted Class V wells, a well shall be plugged in a manner which will not allow the movement of fluids through the well, out of the injection zone either into or between underground sources of drinking waters (USDWs) or to the land surface. Well plugs shall consist of cement or other materials that provide protection equivalent to or greater than that provided by cement.

(f) The permittee shall notify the executive director before commencing closure according to an approved plan. For Class I wells this notice shall be given at least 60 days before commencement. At the discretion of the executive director, a shorter notice period may be allowed. The executive director shall review any revised, updated, or additional closure plans.

(g) Placement of the plugs in the wellbore shall be accomplished by an approved method that may include one of the following:

(1) the balance plug method;

(2) the dump bailer method;

(3) the two-plug method; or

(4) an alternate method, approved by the executive director, that will reliably provide a comparable level of protection.

(h) Prior to closure, the well shall be in a state of static equilibrium with the mud or nonhazardous fluid weight equalized top to bottom, either by circulating the mud or fluid in the well at least once or by a comparable method prescribed by the executive director.

(i) Each plug used shall be appropriately tagged and tested for seal and stability before closure is completed.

(j) The closure plan shall, in the case of a Class III production zone which underlies or is in an exempted aquifer, also demonstrate that no movement of contaminants that will cause pollution from the production zone into a USDW or freshwater aquifer will occur. The commission shall prescribe aquifer cleanup and monitoring where deemed necessary and feasible to ensure that no migration of contaminants that will cause pollution from the production zone into a USDW or freshwater aquifer will occur.

(k) The following shall be considered in determining the adequacy of a plugging and abandonment plan for Class I and III wells:

- (1) the type and number of plugs to be used;
- (2) the placement of each plug including the elevation of the top and bottom;
- (3) the type, grade, and quantity of plugging material to be used;
- (4) the method of placement of the plugs;
- (5) the procedure used to plug and abandon the well;
- (6) any newly constructed or discovered wells, or information, including existing well data, within the area of review;

(7) geologic or economic conditions;

(8) the amount, size, and location by depth of casings and any other materials left in the well;

(9) the method and location where casing is to be parted if applicable;

(10) the estimated cost of the plugging procedure; and

(11) such other factors that may affect the adequacy of the plan.

(l) For Class I wells only, a monument or other permanent marker shall be placed at or attached to the plugged well before abandonment. The monument shall state the permit number, date of abandonment, and company name.

(m) Each owner of a Class I hazardous waste injection well, and the owner of the surface or subsurface property on or in which a Class I hazardous waste injection well is located, must record, within 60 days after approval by the executive director of the closure operations, a notation on the deed to the facility property or on some other instrument which is normally examined during a title search that will, in perpetuity, provide any potential purchaser of the property the following information:

(1) the fact that land has been used to manage hazardous waste;

(2) the name of the state agency or local authority with which the plat was filed, as well as the Austin address of the Underground Injection Control staff of the commission, to which it was submitted; and

(3) the type and volume of waste injected, the injection interval or intervals, and for salt cavern wells, the maximum cavern radius into which it was injected, and the period over which injection occurred.

(n) Within 30 days after completion of closure, the permittee shall file with the executive director a closure report on forms provided by the commission. The report shall be certified as accurate by the owner or operator and by the person who performed the closure operation (if other than the owner or operator). This report shall consist of a statement that the well was closed in accordance with the closure plan previously submitted and approved by the executive director. Where the actual closure differed from the plan previously submitted, a written statement shall be submitted specifying the differences between the previous plan and the actual closure.

(o) For salt cavern disposal wells, prior to sealing the cavern and plugging the well, the owner or operator shall complete any pre-closure monitoring of the cavern and its contents required by rule or permit.

(p) For salt cavern disposal wells, the cavern shall be closed according to §331.170 of this title (relating to Cavern Closure).

(q) The obligation to implement the closure plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the closure plan requirement is a condition of the permit.

SUBCHAPTER E: STANDARDS FOR CLASS III WELLS

§§331.82, 331.84 - 331.86, and 331.87

STATUTORY AUTHORITY

The amendments and new section are adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The amendments and new section are also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted amendments and new section implement Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007; and TWC, §27.023 and §27.0513.

§331.82. Construction Requirements.

(a) Casing and cementing. All new Class III wells, baseline wells, and monitor wells associated with the mining operations shall be cased, cemented from the bottom of the casing to the surface, and capped to prevent the migration of fluids which may cause the pollution of underground sources of drinking water (USDWs) and maintained in that condition throughout the life of the well. In addition, existing wells in areas where there is the potential for contamination and other harmful or foreign matter to enter groundwater through an open well, shall also be cemented to the surface and capped. The casing

and cement used in the construction of each well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

(1) depth to the injection zone;

(2) injection pressure, external pressure, internal pressure, axial loading, etc.;

(3) hole size;

(4) size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);

(5) corrosiveness of injected fluids and formation fluids;

(6) lithology of injection and confining zones; and

(7) type and grade of cement.

(b) Alterations to construction plans. Any proposed changes or alterations to construction plans after permit issuance shall be submitted to the executive director and written approval obtained before incorporating such changes.

(c) Logs and tests. Appropriate logs and other tests shall be conducted during the drilling and construction of all new Class III wells and after an existing well has been repaired. A descriptive report interpreting the results of those logs and tests shall be prepared by a knowledgeable log analyst and submitted to the executive director. The logs and tests appropriate to each type of Class III well shall be determined based on the intended function, depth, construction, and other characteristics of the well, availability of similar data in the area of the drilling site, and the need for additional information that may arise from time to time as the construction of the well progresses.

(1) During the drilling and construction of Class III wells, appropriate deviation checks shall be conducted on holes, where pilot holes and reaming are used, at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling.

(2) Mechanical integrity, as described in §331.43 of this title (relating to Mechanical Integrity Standards), shall be demonstrated both following construction of the well, and prior to production or injection. For Class III uranium solution mining wells, a pressure test shall also be conducted each time a tool that could affect mechanical integrity is placed into the well.

(A) Except as provided by subparagraph (B) of this section, the following tests shall be used to evaluate the mechanical integrity of the injection well:

(i) to test for significant leaks under §331.43(a)(1) of this title, monitoring of annulus pressure, or pressure test with liquid or gas, or radioactive tracer survey. For Class

III uranium solution mining wells only, a single point resistivity survey in conjunction with a pressure test can be used to detect any leaks in the casing, tubing, or packer; and

(ii) to test for significant fluid movement under §331.43(a)(2) of this title, temperature log, noise log, radioactive tracer survey, cement bond log, oxygen activation log. For Class III uranium solution mining wells only, cement records that demonstrate the absence of significant fluid movement can be used where other tests are not suitable. For Class III wells where the cement records are used to demonstrate the absence of significant fluid movement, the monitoring program prescribed by §331.84 of this title (relating to Monitoring Requirements) shall be designed to verify the absence of significant fluid movement.

(B) The executive director may allow the use of a test to demonstrate mechanical integrity other than those listed in subparagraph (A) of this paragraph with the written approval of the administrator of the United States Environmental Protection Agency (EPA) or his authorized representative. To obtain approval, the executive director shall submit a written request to the EPA administrator, which shall set forth the proposed test and all technical data supporting its use. The EPA administrator shall approve the request if it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the EPA administrator shall be published in the *Federal Register* and may be used unless its use is restricted at the time of approval by the EPA administrator.

(3) Additional logs and tests may be required by the executive director when appropriate.

(d) Construction and testing supervision. All phases of well construction and testing shall be supervised by a person who is knowledgeable and experienced in practical drilling engineering and who is familiar with the special conditions and requirements of injection well construction.

(e) Injection zone characteristics - water bearing formation. Where the injection zone is a water bearing formation, the following information concerning the injection zone shall be determined or calculated:

- (1) fluid pressure;
- (2) temperature;
- (3) fracture pressure;
- (4) other physical and chemical characteristics of the injection zone;
- (5) physical and chemical characteristics of the formation fluids; and
- (6) compatibility of injected fluids with formation fluids.

(f) Injection zone characteristics - non-water bearing formations. Where the injection formation is not a water bearing formation, the fracture pressure shall be determined or calculated.

(g) Monitor well location. Where injection is into a formation which contains water with less than 10,000 mg/L TDS, monitoring wells shall be completed into the injection zone and into any USDW above the injection zone which could be affected by the mining operation. These wells shall be located to detect any excursion of injection fluids, production fluids, process by-products, or formation fluids outside the mining area or zone. If the operation may be affected by subsidence or catastrophic collapse, the monitoring wells shall be located so that they will not be physically affected. Designated monitoring wells shall be installed at least 100 feet inside any permit area boundary, unless excepted by written authorization from the executive director.

(h) Subsidence or catastrophic collapse. Where the injection wells penetrate a USDW in an area subject to subsidence or catastrophic collapse an adequate number of monitor wells shall be completed into the USDW to detect any movement of injected fluids, process by-products or formation fluids into the USDW. The monitor wells shall be located outside the physical influence of the subsidence or catastrophic collapse.

(i) Monitor well criteria. In determining the number, location, construction, and frequency of monitoring of the monitor wells the following criteria shall be considered:

(1) the population relying on the USDW affected or potentially affected by the injection operation;

(2) the proximity of the injection operation to points of withdrawal of drinking water;

(3) the local geology and hydrology;

(4) the operating pressures and whether a negative pressure gradient is being maintained;

(5) the chemistry and volume of the injected fluid, the formation water, and the process by-products; and

(6) the injection well density.

§331.84. Monitoring Requirements.

(a) Injection fluid shall be analyzed for physical and chemical characteristics with sufficient frequency to yield representative data on its characteristics. Whenever the injection fluid is modified to the extent that the analysis is incorrect or incomplete, a new analysis shall be submitted to the executive director.

(b) The injection pressure, the injection volume, and the production volume shall be recorded.

(c) Fluid level when required by permit and the parameters chosen to measure water quality in monitor wells completed in the injection zone shall be monitored twice a month. For a given calendar month, the second sample shall be collected 15 days after the first sample is collected.

(d) Specified wells within 1/4 mile of the injection site shall be monitored at least once every three months to detect any migration from the injection zone into fresh water.

(e) All Class III wells may be monitored on a field or project basis rather than on an individual well basis by manifold monitoring. Manifold monitoring may be used in cases of facilities consisting of more than one injection well operating with a common manifold. Separate monitoring systems for each well are not required, provided the owner/operator demonstrates that manifold monitoring is comparable to individual well monitoring.

(f) Quarterly monitoring of wells required by §331.82(h) of this title (relating to Construction Requirements).

§331.85. Reporting Requirements.

(a) Annual report. The permittee shall submit annually, by January 31st, a report including:

(1) an updated map of the area of review showing locations of newly constructed or newly discovered wells that penetrate the production zone within the area of review, not included in the technical report accompanying the permit application or in later reports; and

(2) a tabulation of data as required by §331.122(2)(B) of this title (relating to Class III Wells) for wells within the area of review that penetrate the production zone;

(3) For Class III uranium mining permits:

(A) an update of the cost estimate for well closure and groundwater restoration;

(B) an updated mine map;

(C) an updated mining schedule;

(D) an inventory of all injection, production, baseline, and monitor wells; and

(E) a document, signed by the owner or operator, or his or her designated representative, that the inventory of wells required in subparagraph (D) of this paragraph is true and correct to the best of his or her knowledge.

(b) Except for routine monitoring required in §331.84(d) of this title (relating to Monitoring Requirements), results of required monitoring shall be maintained on site and reported to the executive director upon request or as specified in the permit.

(c) Results of mechanical integrity and any other periodic test required by the executive director shall be reported upon request or as specified in the permit.

(d) Monitoring may be reported on a project or field basis rather than on an individual well basis where manifold monitoring is used.

(e) Routine monitoring data required in §331.84(c) and (d) of this title shall be reported at least quarterly to the executive director on a form provided by the executive director and in accordance with the form completion instructions. These reports must be postmarked no later than the tenth day of the following reporting period.

(f) In the event an excursion is verified in a designated monitor well, the permittee shall submit a written remedial action report at least every month to include for each well affected:

(1) an explanation of required and other actions since the verifying analysis was taken.

The explanation should include the date on which actions were initiated and completed;

(2) a description of actions to be taken during the following report period;

(3) sample analysis results for control parameters;

(4) permittee's efforts to define the extent and probable cause of the presence of mining solutions in a designated monitor well.

(g) The first report required by subsection (f) of this section shall include a groundwater analysis in the manner required by §331.106(2) of this title (relating to Remedial Action for Excursion). A copy of all reports shall be mailed to the executive director, postmarked within two days of the end of each report period. The first report period shall begin with the day the presence of mining solution in a designated

Monitor Well is verified. The permittee shall continue to make remedial action reports until clean-up is accomplished.

(h) Copies of all data required under this section shall be maintained at the permitted facility such that these documents are available for inspection at all times by the executive director.

§331.86. Closure.

(a) Mine facilities. Within 120 days after acknowledgment of completion of mining activities, or if final restoration of the mine area aquifers is required, upon completion of final restoration, the permittee shall accomplish closure of the mining facilities in accordance with approved plugging and abandonment plans submitted as part of the supplementary technical report. An extension of time limit past 120 days must be approved in writing by the executive director.

(b) Acknowledgment of closure. When closure has been accomplished, the permittee shall notify the executive director. The executive director will conduct a final inspection of the site to certify that closure has been accomplished in accordance with the permit terms. If closure is certified by the executive director, he shall issue written acknowledgment and permit cancellation procedures will be initiated.

§331.87. Methods of Measurement.

Determination of a physical or chemical parameter in groundwater may be by chemical analysis of a sample or by field measurement by an instrument. Any field measurement of a groundwater parameter using instrumentation must be done using methods and instruments that yield a measurement that is at least equivalent in quality and sensitivity as a measurement determined by chemical analysis.

**SUBCHAPTER F: STANDARDS FOR CLASS III WELL PRODUCTION AREA
DEVELOPMENT**

§§331.103 - 331.107, 331.108, and 331.109

STATUTORY AUTHORITY

The amendments and new sections are adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The amendments and new sections are also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted amendments and new sections implement Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007; and TWC, §27.023 and §27.0513.

§331.103. Production Area Monitor Wells.

(a) Production zone monitoring. Designated production zone monitor wells shall be spaced no greater than 400 feet from the production area, as determined by exploratory drilling. The distance between adjacent mine area monitor wells shall be no greater than 400 feet. The angle formed by lines drawn from any production well to the two nearest monitor wells will not be greater than 75 degrees. Changes or adjustments in designated production zone monitor well locations may be authorized by the

executive director so as to assure adequate containment. These wells shall be subject to the sampling, corrective action, and reporting requirements in §331.105 of this title (relating to Monitoring Standards) and §331.106 of this title (relating to Remedial Action for Excursion).

(b) Nonproduction zone monitoring. At a minimum, designated nonproduction zone monitor wells shall be completed in the production area in any freshwater aquifer overlying the production zone. These wells shall be located not more than 50 feet on either side of a line through the center of the production area with a minimum of one per every four acres of production area for wells completed in the first overlying freshwater aquifer and one per every eight acres for wells completed in any additional overlying freshwater aquifers. Changes or adjustments in designated nonproduction zone monitor well locations may be authorized by the executive director so as to assure adequate containment. Those wells completed in the first overlying freshwater aquifer shall be subject to sampling, remedial action, and reporting requirements of §331.105 of this title (relating to Monitoring Standards) and §331.106 of this title (relating to Remedial Action for Excursion). Monitor wells completed in any additional overlying freshwater aquifers shall be subject to monitoring, remedial action, and reporting requirements specified in the permit.

§331.104. Establishment of Baseline and Control Parameters for Excursion Detection.

(a) Independent and representative water samples shall be collected from each of the following:

(1) mine area monitor wells completed in the production zone;

(2) mine area monitor wells completed in nonproduction zones; and

(3) baseline wells completed in the production zone within the production area.

(b) All baseline wells must be completed in the production zone within the production area.

The owner or operator shall analyze all groundwater samples from the baseline wells for the following parameters. This suite of parameters shall be the basis for the aquifer restoration required under §331.107 of this title (relating to Restoration). With the exception of uranium and radium-226, any of these parameters may be removed from the list of restoration parameters if an applicant or permittee can demonstrate that a parameter or parameters is not a suitable restoration parameter. An applicant or permittee also can demonstrate that a parameter should be added to the list of restoration parameters. The executive director may require an applicant or operator to establish baseline parameters additional to the above list as appropriate, based on site-specific information. In evaluating a demonstration regarding removing or adding parameters to the list of parameters, the executive director may consider the following:

Figure: 30 TAC §331.104(b)

Calcium (Ca) in mg/L	Alkalinity (Alk) in standard units
Magnesium (Mg) in mg/L	pH in standard units
Sodium (Na) in mg/L	Arsenic (As) in mg/L
Potassium (K) in mg/L	Cadmium (Cd) in mg/L

Carbonate (CO ₃) in mg/L	Iron (Fe) in mg/L
Bicarbonate (HCO ₃) in mg/L	Lead (Pb) in mg/L
Sulfate (SO ₄) in mg/L	Manganese (Mn) in mg/L
Chloride (Cl) in mg/L	Mercury (Hg) in mg/L
Nitrate (NO ₃ , as nitrogen (N)) in mg/L	Molybdenum (Mo) in mg/L
Fluoride (F) in mg/L	Selenium (Se) in mg/L
Silica (SiO ₂) in mg/L	Uranium (U) in mg/L
Total Dissolved Solids (TDS) in mg/L	Ammonia as N (N) in mg/L
Electrical Conductivity (EC) in unhos/cm	Radium-226 (Ra-226) in pCi/L

(1) all parameters that occur in the groundwater within the production zone prior to in situ recovery;

(2) all parameters that are in the solutions injected into the production zone;

(3) all parameters that may be dissolved from the aquifer material of the production zone into the groundwater during in situ recovery; or

(4) any other applicable information provided by the applicant or permittee.

(c) A minimum of five baseline wells, or one baseline well for every four acres of production area, whichever is greater, shall be completed in the production zone within the production area. All

baseline wells shall be sampled in accordance with subsection (a) of this section and analyzed in accordance with subsection (d) of this section. All valid analytical measurements shall be used to determine the suite of restoration parameters required under subsection (b) of this section.

(d) All samples shall be collected, preserved, analyzed, and controlled according to accepted methods as stated in the permit and in accordance with the TCEQ Quality Assurance Project Plan (QAPP).

(e) The permittee shall propose for subsequent approval by the commission control parameters for detection of excursions in production and nonproduction wells. Control parameters shall be those constituents in the groundwater that will provide timely and reliable detection of the presence of mining solutions in production and nonproduction wells. Control parameter upper limits for production zone monitor wells shall be determined from pre-mining groundwater sample data from production zone monitor wells, and control parameter upper limits for nonproduction zone monitor wells shall be determined from pre-mining groundwater sample data from nonproduction zone monitor wells. Determination of the presence of an excursion shall be based on a statistical method proposed by the owner or operator and approved by the executive director.

(f) If a previously mined permit or production area is to be re-entered for additional in situ mining before completion of restoration under §331.107 of this title or completion of closure under §331.83 of this title (relating to Closure), baseline water quality values for determination of control parameter upper limits and aquifer restoration requirements for the area to be re-entered for mining shall be as originally required by the existing production area authorization or as modified by any amendments to the

authorization pursuant to §331.104 of this title (relating to Establishment of Baseline and Control Parameters for Excursion Detection) and §331.107 of this title.

(g) If a previously mined and restored area is to be re-entered for additional in situ uranium mining, baseline water quality values for determination of control parameter upper limits and aquifer restoration requirements for the area to be re-entered for mining shall be determined as required by subsections (a) - (d) of this section.

§331.105. Monitoring Standards.

The following shall be accomplished to detect mining solutions in designated monitor wells:

(1) Routine monitoring. Water samples and, if applicable, field instrument measurements, shall be conducted in accordance with the requirements of §331.84(c) of this title (relating to Monitoring Requirements) from all monitor wells for permit/production area(s) in which mining solutions have been introduced. Monitoring results for the control parameters shall be completed by the second working day and reported as required in §331.85(e) of this title (relating to Reporting Requirements). The determined values shall be entered on appropriate forms within three working days after analysis or instrument measurement. These data shall be kept readily available on site for review by commission representatives.

(2) Monitoring duration. The program of monitoring detailed in paragraph (1) of this subsection shall be continued in each permit/mine area until the executive director is officially notified that restoration has commenced. Further monitoring as required by permit shall continue until aquifer

restoration and stabilization in that particular permit/mine area has been achieved in compliance with §331.107 of this title (relating to Restoration).

(3) Verifying analysis. If the results of a routine sample analysis or instrument measurement show that the value of any control parameter in designated monitor wells is equal to or above the upper limit established for that permit/mine area, the operator shall complete a verifying analysis of samples taken from each apparently affected well within two days.

(4) Excursion monitoring. During the period of time when mining solutions are present in a designated monitor well, water samples or measurements will be taken at least two times per week and monitoring results for all control parameters shall be completed by the second day after the sample or measurement is taken.

§331.106. Remedial Action for Excursion.

If the verifying analysis indicates the existence of an excursion in a designated monitor well, the operator shall take the following actions:

(1) notification--notify the commission regional office by the next working day by telephone and notify the executive director by letter postmarked within 48 hours of identification of the excursion. The notification must identify the affected monitor well and the control parameter concentrations.

(2) analysis--complete a groundwater analysis report for each affected well on forms provided by the executive director (including accuracy checks and stiff diagram) for the following: pH, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, silica, total dissolved solids (180 degrees Celsius), specific conductance and dilute conductance, uranium, radium-226 and any other specified constituents. Results shall be reported in accordance with §331.85(f) of this title relating to Reporting Requirements).

(A) The permittee will clean up all designated monitor wells, all zones outside of the production zone, and the production zone outside of the mine area that contain mining solutions. The permittee may use any method judged necessary and prudent to define the extent of the mining solutions and to effect this clean-up in an expeditious and practical manner. Well clean-up is deemed to be accomplished when the water quality in the affected monitor well(s) has been restored to current local baseline water quality as confirmed by three consecutive daily samples for the control parameters.

(B) The executive director may determine that cleanup is not necessary if the permittee can demonstrate that the change in water quality is not due to the presence of mining solutions or fluids from other mining activities.

§331.107. Restoration.

(a) Aquifer restoration. Groundwater in the production zone within the production area must be restored when mining is complete. Each Class III permit or production area authorization shall contain a description of the method for determining that groundwater has been restored in the production zone

within the production area. Restoration must be achieved for all values in the restoration table of all parameters in the suite established in accordance with the requirements of §331.104(b) of this title (relating to Establishment of Baseline and Control Parameters for Excursion Detection).

(1) Restoration table. Each permit or production area authorization shall contain a restoration table for all parameters in the suite established in accordance with the requirements of §331.104(b) of this title. A restoration table value for a parameter shall be established by:

(A) The mean concentration or value for that parameter based on all measurements from groundwater samples collected from baseline wells prior to mining activities; or

(B) A statistical analysis of baseline well information proposed by the owner or operator and approved by the executive director that demonstrates that the restoration table value is representative of baseline quality.

(2) Achievement of restoration. Achievement of restoration shall be determined using one of the following methods:

(A) When all sample measurements from groundwater samples from all baseline wells for a restoration parameter are equal to or below (or, in the case of pH, within an established range) the restoration table value for that parameter, then restoration for that parameter will be assumed to have occurred. Complete restoration will be assumed to have occurred when the measurements from all

samples from all baseline wells for all restoration parameters are equal to or below (or, in the case of pH, within an established range) each respective restoration table value; or

(B) A statistical analysis of information from groundwater samples from baseline wells proposed by the owner or operator and approved by the executive director that demonstrates that the groundwater quality is representative of the restoration table values.

(b) Mining completion. When the mining of a permit or production area is completed, the permittee shall notify the appropriate commission regional office and the executive director and shall proceed to reestablish groundwater quality in the affected permit or production area aquifers in accordance with the requirements of subsection (a) of this section. Restoration efforts shall begin as soon as practicable but no later than 30 days after mining is completed in a particular production area. The executive director, subject to commission approval, may grant a variance from the 30-day period for good cause shown.

(c) Timetable. Aquifer restoration, for each permit or production area, shall be accomplished in accordance with the timetable specified in the currently approved mine plan, unless otherwise authorized by the commission. Authorization for expansion of mining into new production areas may be contingent upon achieving restoration progress in previously mined production areas within the schedule set forth in the mine plan. The commission may amend the permit to allow an extension of the time to complete restoration after considering the following factors:

(1) efforts made to achieve restoration by the original date in the mine plan;

(2) technology available to restore groundwater for particular parameters;

(3) the ability of existing technology to restore groundwater to baseline quality in the area;

(4) the cost of achieving restoration by a particular method;

(5) the amount of water which would be used or has been used to achieve restoration;

(6) the need to make use of the affected aquifer; and

(7) complaints from persons affected by the permitted activity.

(d) Reports. Beginning six months after the date of initiation of restoration of a permit or production area, as defined in the mine plan, the operator shall provide to the executive director semi-annual restoration progress reports until restoration is accomplished for the production area. This report shall contain the following information:

(1) all analytical data generated during the previous six months;

(2) graphs of analysis for each restoration parameter for each baseline well;

(3) the volume of fluids injected and produced;

(4) the volume of fluids disposed;

(5) water level measurements for all baseline and monitor wells, and for any other wells being monitored;

(6) a potentiometric map for the area of the production area authorization, based on the most recent water level measurements; and

(7) a summary of the progress achieved towards aquifer restoration.

(e) Restoration table values achieved. When the permittee determines that constituents in the aquifer have been restored to the values in the Restoration Table, the restoration shall be demonstrated by stability sampling in accordance with subsection (f) of this section.

(f) Stability sampling. The permittee shall obtain stability samples and complete an analysis for certain parameters listed in the restoration table from all production area baseline wells. Stability samples shall be conducted at a minimum of 30-day intervals for a minimum of three sample sets and reported to the executive director. The permittee shall notify the executive director at least two weeks in advance of sample dates to provide the opportunity for splitting samples and for selecting additional wells for sampling, if desired. To insure water quality has stabilized, a period of one calendar year must elapse

between cessation of restoration operations and the final set of stability samples. Upon acknowledgment in writing by the executive director confirming achievement of final restoration, the permittee shall accomplish closure of the area in accordance with §331.86 of this title (relating to Closure).

(g) Amendment of restoration table values. After an appropriate effort has been made to achieve restoration in accordance with the requirements of subsection (a) of this section , the permittee may cease restoration operations, reduce bleed and request that the restoration table be amended. With the request for amendment, the permittee shall submit the results of three consecutive sample sets taken at a minimum of 30-day intervals from all production area baseline wells used in determining the restoration table to verify current water quality. Stabilization sampling may commence 60 days after cessation of restoration operations. The permittee shall notify the executive director of his or her intent to cease restoration operations and reduce the bleed 30 days prior to implementing these steps. The permittee shall submit an application for an amendment to the restoration table within 120 days of receipt of authorization from the executive director to cease restoration operations and reduce the bleed.

(1) In determining whether the restoration table should be amended, the commission will consider the following items addressed in the request:

(A) uses for which the groundwater in the production area was suitable at baseline water quality levels;

(B) actual existing use of groundwater in the production area prior to and during mining;

(C) potential future use of groundwater of baseline quality and of proposed restoration quality;

(D) the effort made by the permittee to restore the groundwater to baseline;

(E) technology available to restore groundwater for particular parameters;

(F) the ability of existing technology to restore groundwater to baseline quality in the area under consideration;

(G) the cost of further restoration efforts;

(H) the consumption of groundwater resources during further restoration; and

(I) the harmful effects of levels of particular parameter.

(2) The commission may amend the restoration table if it finds that:

(A) reasonable restoration efforts have been undertaken, giving consideration to the factors listed in paragraph (1) of this subsection;

(B) the values for the parameters describing water quality have stabilized for a period of one year;

(C) the formation water present in the exempted portion of the aquifer would be suitable for any use to which it was reasonably suited prior to mining; and

(D) further restoration efforts would consume energy, water, or other natural resources of the state without providing a corresponding benefit to the state.

(3) If the restoration table is amended, restoration sampling shall commence and proceed as described in subsection (f) of this section, except the stability period shall be for a period of two years unless the owner or operator can demonstrate through modeling or other means that a period of less than two years is appropriate for a demonstration of stability.

(4) If the request for an amendment of the restoration table values is not granted, the permittee shall restart restoration efforts.

§331.108. Independent Third-Party Experts.

(a) If requested by an applicant for a production area authorization submitted after September 1, 2007, the executive director may use the recommendations from an independent third-party expert regarding the initial establishment of requirements pertaining to monitoring wells for any area covered by the application, provided:

(1) the expert meets the qualifications in subsection (b) of this section;

(2) the applicant for the production area authorization pays the cost of the work of the expert;

(3) the applicant for the production area authorization is not involved in the selection of the expert or the direction of the work by the expert;

(4) the recommendations of the independent third-party expert, in the opinion of the executive director, meet all applicable statutory and regulatory requirements for monitoring wells authorized under a production area authorization; and

(5) the recommendations of the independent third-party expert, in the opinion of the executive director, are necessary for the protection of underground sources of drinking water or fresh water.

(b) In order to be considered for designation as an independent third-party expert, a person must be either a licensed professional engineer currently authorized to practice engineering in the State of Texas (unless exempted under the Texas Occupations Code, Chapter 1001, Subchapter B), or a licensed professional geoscientist currently authorized to practice geoscience in the State of Texas (unless exempted under Texas Occupations Code, §1002.252). In determining whether to designate a person as an independent third-party expert, the executive director also will consider the following:

(1) the person's work experience in geology and hydrogeology, in particular the person's experience in the area of the proposed in situ mining operation;

(2) the person's work experience related to in situ mining of uranium;

(3) the person's current and previous work experience with the applicant;

(4) the person's current and previous work experience with persons or entities that are in opposition to in situ uranium mining; and

(5) any other factors that may be relevant to determine the person's objectivity regarding their function as an independent third-party expert.

(c) The executive director will not designate an independent third party expert for the purposes of subsection (a) of this section unless requested to do so in writing by the applicant.

(d) If the executive director determines that the recommendations from the designated independent third-party expert meet the requirements for the initial establishment of monitor wells in accordance with §331.103 of this title (relating to Production Area Monitor Wells), those recommendations will be incorporated into the production area authorization, and, in accordance with §55.201(i)(11)(B) of this title (relating to Requests for Reconsideration or Contested Case Hearing), in regards to the initial establishment of monitoring wells for the area covered by the requested authorization, no opportunity for a contested case hearing will exist.

(e) If the executive director determines that the recommendations from the designated independent third-party expert do not meet the requirements for the initial establishment of monitor wells in accordance §331.103 of this title, either in whole or in part, the application for a production area authorization will be subject to opportunity for contested case hearing, regardless of subsequent changes to the application.

(f) Any person may request to be considered an independent third-party expert under this section by submitting information to the executive director to demonstrate qualifications under this section.

(g) The use of an independent third-party expert qualified and approved under this section does not constitute the applicant's selection of the expert under subsection (a)(3) of this section.

(h) A person providing an independent third-party recommendation under this section shall not be an employee of the commission.

§331.109. Cost Estimates for Financial Assurance.

(a) Each production area authorization must establish the amount of financial assurance for aquifer restoration of the production area based upon cost estimates provided under §331.143 of this title (relating to Cost Estimate for Plugging and Abandonment and Aquifer Restoration) approved by the executive director.

(b) Each area permit or production area authorization must establish the amount of financial assurance for plugging and abandonment of the injection wells, production wells, recovery wells, monitor wells, and baseline wells of the permit area or production area based upon cost estimates provided under §331.143 of this title approved by the executive director.

SUBCHAPTER I: FINANCIAL RESPONSIBILITY

§331.143

STATUTORY AUTHORITY

The amendment is adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The amendment is also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted amendment implements Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007; and TWC, §27.023 and §27.0513.

§331.143. Cost Estimate for Plugging and Abandonment and Aquifer Restoration.

(a) The owner or operator must prepare a written estimate, in current dollars, of the cost of:

(1) plugging the well(s) in accordance with the plugging and abandonment plan as specified in this chapter; and

(2) aquifer restoration for each production area authorization.

(b) Cost Estimates.

(1) The cost estimates required under subsection (a)(1) of this section must take into account all costs related to plugging and abandonment in accordance with the applicable requirements of §331.46 of this title (relating to Closure Standards) and the requirements of §331.86 of this title (relating to Closure).

(2) The cost estimate required under subsection (a)(2) of this section must take into account all costs related to aquifer restoration.

(c) During the operating life of the facility, the owner or operator must keep at the facility the latest cost estimates for plugging and abandonment and for aquifer restoration prepared in accordance with subsection (a) of this section.

(d) On or before December 31st of each year, the owner or operator shall review and update as necessary the written estimate of the cost of plugging all wells and the cost of aquifer restoration to account for changes in costs exclusive of the inflation adjustment required under §37.131 of this title (relating to Annual Inflation Adjustments to Closure Cost Estimates). This update shall be submitted to the executive director no later than January 31st of each year.

**SUBCHAPTER M: REQUIREMENTS FOR EXISTING WELLS USED FOR
DEVELOPMENT OF CLASS III UIC WELL APPLICATIONS**

§§331.220 - 331.225

STATUTORY AUTHORITY

The new sections are adopted under Texas Water Code (TWC), §5.103, concerning Rules, and §5.105, concerning General Policy, which authorize the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state. The new sections are also adopted under TWC, §27.019, which requires the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act; and §27.0513, which requires the commission to establish rules for procedural, application and technical requirements for production area authorizations.

The adopted new sections implement Senate Bill 1604 and House Bill 3838, 80th Legislature, 2007; and TWC, §27.023 and §27.0513.

§331.220. Applicability.

The requirements of this subchapter apply to wells used to obtain information for the development of an application for a Class III injection well area permit for in situ mining of uranium.

§331.221. Registration of Wells.

(a) All wells described in §331.220 of this title (relating to Applicability) that are completed prior to submission of an application for a Class III injection well area permit must be registered with the Texas Commission on Environmental Quality within 30 days of completion of casing and development of the well and prior to submission of such an application. All wells described in §331.220 of this title that are completed after submission of such an application must be registered within 30 days of well completion.

(b) Registration of wells described in §331.220 of this title shall be completed on forms provided by the executive director. The owner or operator of any well to be registered shall provide the following information for each well:

- (1) a unique, site-specific, designation for the well;
- (2) the location of the well on a map;
- (3) latitude and longitude of the well, with datum specified;
- (4) the depth of the well;
- (5) construction, completion and casing information on the well;
- (6) the identification of the operator of the well;
- (7) the identification of the landowner for the property on which the well is located;

(8) water level data; and

(9) identification of the groundwater conservation district in which the well is located, if applicable.

(c) The owner or operator of a well registered under this subchapter must maintain mechanical integrity of the well. A well registered under this subchapter shall be cased and cemented so as to not cause or allow the movement of fluid that would result in the pollution of an underground source of drinking water or fresh water. No injection may be authorized into a well registered under this subchapter.

(d) Any well, registered in accordance with the requirements of this subchapter, that is not subsequently authorized under a Class III injection well area permit in accordance with §331.222 of this title (relating to Conversion of Registered Wells to Class III Wells), shall be plugged and abandoned in a manner that prohibits the movement of fluids into underground sources of drinking water or fresh water. Within 30 days of permit issuance, the permittee shall submit a certification to the executive director that the well has been plugged and abandoned in accordance with the requirements of this subsection. A permittee may submit a request to the executive director for an extension of time for completion of plugging and abandonment required under this subsection. Any request for an extension under this subsection must provide reasonable justification for the extension.

(e) The registration of a well under this subchapter is not subject to the commission permitting, public notice, and hearing requirements, until such time as it is converted to a Class III well in accordance with §331.222 of this title.

§331.222. Conversion of Registered Wells to Class III Wells.

If a well registered under this subchapter is authorized under a Class III injection well area permit, the registration status for the well ceases and the well is subject to all applicable commission rules, including those regarding permitting, public notice, and hearing requirements. At such time a registered well is authorized under a Class III injection well area permit, the permittee shall submit a request to the executive director that the well be removed from the list of registered wells.

§331.223. Sharing of Data.

(a) After a person developing an application for a Class III injection well area permit has identified a permit boundary, that person shall determine if the permit boundary is within the area of a groundwater conservation district. If the proposed permit boundary is within the area of a groundwater conservation district, either wholly or in part, the person shall provide to the district:

(1) information regarding wells not recorded in the public record when such wells are encountered by that person during the development of the permit application. Information to be provided to the groundwater conservation district shall include the location and ownership of the well, and any

other available information for the well, including but not limited to depth, completion method, completion interval, water quality information, and lift method;

(2) a map with the locations of all wells that are recorded in the public record and that are inside the proposed permit area and within one-quarter mile of the proposed permit area;

(3) pre-mining water quality information collected from wells registered in accordance with §331.221 of this title (relating to Registration of Wells);

(4) the amount of water produced each month from each registered well; and

(5) a record of strata as described in §331.224 of this title (relating to Record of Strata) for each registered well, except for information considered confidential in accordance with Natural Resource Code, §131.048.

(b) After receipt of the final information described by subsection (a) of this section to perform standard quality and assurance procedures, the owner or operator of a registered well may not take more than 90 days to submit the information to the groundwater conservation district.

§331.224. Record of Strata.

The executive director may require a person receiving a Class III well permit or production area authorization to maintain and provide, upon request, complete and accurate records of the depth,

thickness, and character of the strata penetrated in drilling an injection well, monitoring well, or production well.

§331.225. Geophysical or Drilling Log.

If an existing well is to be converted to an injection well, monitoring well, or production well, the commission may require the applicant to provide a geophysical log or a drilling log of the existing well.