TCEQ REGULATORY GUIDANCE
Remediation Division
RG-366/TRRP-10 ● Revised September 2008

Selecting Target Chemicals of Concern

Overview of This Publication

Objectives: This document summarizes a process for the selection of target chemicals of concern.

Audience: Regulated Community and Environmental Professionals

References: The regulatory citation for the Texas Risk Reduction Program (TRRP) Rule is Title 30 Texas Administrative Code (TAC) Chapter 350.

The TRRP Rule, together with conforming changes to related rules, is contained in 30 TAC Chapter 350, and was initially published in the September 17, 1999, Texas Register (24 TexReg 7413-7944). The rule was amended in 2007 (effective March 19, 2007; 32 TexReg 1526-1579).

Find links for the TRRP rule and preamble, Tier 1 PCL tables, and other TRRP information at: <www.tceq.state.tx.us/remediation/trrp/>

TRRP guidance documents undergo periodic revision and are subject to change. Referenced TRRP guidance documents may be in development. Links to current versions are at: <www.tceq.state.tx.us/remediation/trrp/guidance.html>.

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Introduction

This guidance document is designed to help the person determine the appropriate chemicals of concern (COCs) for analysis of environmental media when responding to the Texas Risk Reduction Program (TRRP) rule of 30 TAC Chapter 350. The TRRP rule does not specify what COCs must be evaluated for a specific situation, but relies upon the various regulatory programs to specify program- or project-specific COCs by means of permit or order provisions, federal or state regulations, or existing guidelines and protocols. This document will guide the person through the process of selecting target COCs within the general context of the requirements of the various applicable regulatory programs. Additionally, this guidance is available to the regulatory programs for use in developing provisions in permits, orders, etc., relating to target COCs.

Narrowing the Focus

As part of project planning, the person must decide which chemicals, out of the thousands that exist, that should be analyzed. **Chemicals** are substances that have a defined chemical composition, including

compounds and elements. **Chemicals of Concern (COCs)** are those chemicals potentially subject to TRRP. The TRRP rule defines COC in §350.4(a)(11) as "any chemical that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity." The definition then cites examples of substances that, depending on the program area, may be included as COCs, such as "solid waste," "industrial solid waste," "municipal solid waste," "hazardous waste," "hazardous constituents," "constituents," "pollutant," "regulated substances," "petroleum product," and "other substances." Some of these substances include in their definitions lists of discrete chemicals that can be readily designated as COCs; others are defined broadly and require more information such as chemical analysis to identify individual chemicals. **Target COCs** are those COCs that are known or are reasonably anticipated to be associated with historical or current activities for a specific project and are the focus of the investigation. Using the criteria of this guidance, the person selects or designates the target COCs, which become or are part of the list of analytes for chemical analysis of environmental samples. **Analytes** are those chemicals that are evaluated using analytical methods. Thus, during analysis a target COC is also an analyte, however, analysis does not necessarily make an analyte a target COC.

Target COC Selection—Two Approaches

There are two basic ways to select target COCs which this guidance will describe as end-members of a range of possibilities. In the "method-based" approach, the person utilizes analytical methods that can test for a number of analytes ("broad-spectrum methods") without first selecting target COCs. EPA SW-846 Methods 8260, 8270, and 6010 or 6020 (which are used to determine volatile organics, semivolatile organics, and metals, respectively), are examples of "broad-spectrum methods" since they can be used for groups of analytes. This "method-based" approach, though relatively easy to initiate, entails extra effort and documentation at the end of the assessment in deciding, through a process called "screening," which COCs are retained or deleted from further action. The screening criteria are specified in §350.71(k) and are discussed in detail in TCEQ guidance document *Screening Target COCs from PCL Development* (RG-366/TRRP-14).

The main emphasis of this guidance will be on the "information-based" approach wherein target COCs may be designated based on appropriate information without prior analyses being performed. The objective is to use information to "zero in" on the target COCs. The easiest example to visualize would be a specific list of target COCs as required by a statute, permit, order, or program-specific regulation or directive. However, typically a combination of information and professional judgment is needed to more accurately tailor the target COC list to match the site-specific operations, history and project objectives. Effort is placed on using appropriate information and professional judgment upfront with

minimal screening on the back end. In practice, the person will likely use elements of both approaches. Utilizing broad spectrum methods with more analytes than target COCs may be more cost effective than customized analysis and reporting. Some information will be available for a site through due diligence efforts but data gaps might exist that initially preclude identifying a complete target COC list. This guidance describes the reasonable efforts necessary to identify the target COC list in the absence of sufficient information.

Relationship with Other TRRP Guidance

Figure 1 depicts the relationship between selecting target COCs and screening target COCs, as well as other TRRP assessment steps and the associated TRRP guidance documents. This document details the process for selecting target COCs that become the focus of the assessment. Although the target COC selection step is depicted as preceding the other steps in the sequence, some portions of the other steps may occur in parallel with this step or in an iterative manner as new information warrants. COC screening, documented at the end of the affected property assessment, determines which target COCs require the development of critical Protective Concentration Levels (PCLs). The target COCs that are retained for critical PCL development are the ones used to determine PCL exceedance zones. This document reserves the word "screening" for the application of the §350.71(k) criteria and the words "selecting" or "designating" when referring to choosing target COCs.

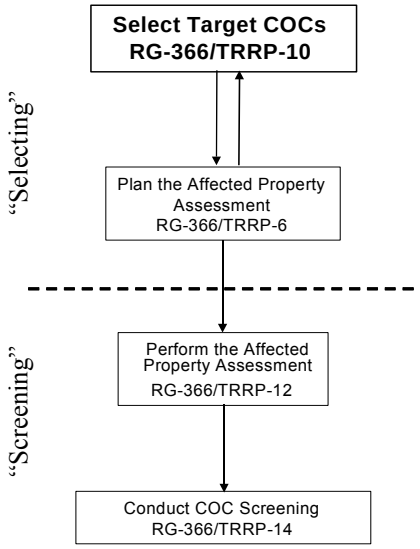

Figure 1. Relationship of Selecting Target COCs and Screening Target COCs

Target COC Selection Process

In general, it is best to begin the target COC selection process during the initial planning for the project, such as an affected property assessment. The objective of this process is development of a list of target COCs tailored to the project, thus enabling the person to start with a reasonable COC list that represents the situation. The target COC selection process, depicted in Figure 2, consists of eight steps.

During the target COC selection process, there are mechanisms that can be used to determine or change the designation of a chemical as it moves through the process. These mechanisms are: permit, order or program requirements; project objectives; professional judgment; analytical data; and screening through §350.71(k). Likewise, the designation of the

chemical dictates certain actions that are required during this process. Detailed descriptions of the process steps follow.

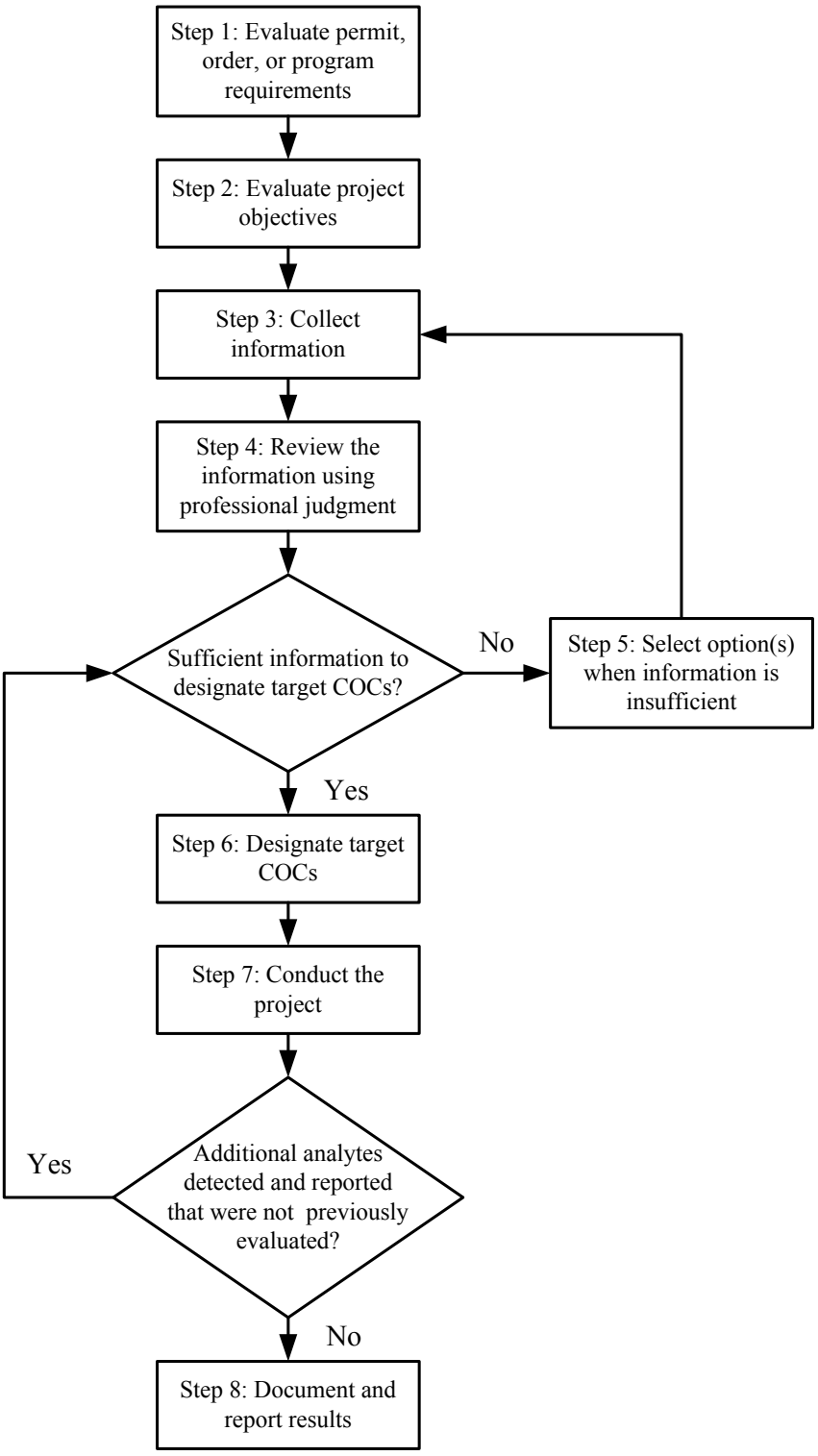

Figure 2. Flowchart of Target COC Selection Process

Step 1: Evaluate Permit, Order or Program Requirements

TCEQ Permit, Order or Program Requirements are specified by the TCEQ program implementing TRRP, which may include but are not limited to:

- Requirements for broad-spectrum analytical methods;
- Requirements for specific analytical methods or specific analyte lists based on the industry type under investigation;
- Requirements for specific "regulatory lists" such as RCRA 40 CFR Part 261 Appendix VIII Hazardous Constituent list or 40 CFR Part 264 Appendix IX Groundwater Monitoring List, the federal Superfund Target Compound List or Target Analyte List, or the Priority Pollutant List; and
- Other permit or order requirements.

These requirements may indicate which chemicals, analytes, or COCs may become target COCs. If a permit or order is applicable to the TRRP project, determine if it specifies the target COCs or analytical methodologies with a list of analytes. If so, document the target COCs or analytical methodologies, and follow the provisions of the permit or order. If a permit or order does not apply or provide specifications, determine if the program area specifies target COCs or analytes by way of regulations or directives. Analytes may derive from various lists of chemicals; example lists are noted in Table 1 below. Chemicals on such regulatory lists do not necessarily become target COCs without a project-specific evaluation.

Table 1 identifies the major regulatory programs that utilize the TRRP rule and associated example COC lists that serve as starting points for identifying target COCs. The table indicates that most programs allow application of the target COC selection process (described herein) to modify the associated program list(s) in order to develop target COCs specific to a project.

A final note about example lists: one should not consider the Tier 1 PCL Tables as a default list of all target COCs applicable to any project. Conversely, the absence of a listing on the Tier 1 PCL Tables does not mean a chemical cannot be a target COC for a project. TCEQ guidance document *Tier 1 PCL Tables* (RG-366/TRRP-23) provides additional information regarding the proper use of those tables.

Further evaluation may be necessary if:

- No permit, order or program requirements exist;
- The permit, order or program does not specify target COCs or analytes based on project-specific rationale;
- Only analytical methods (with or without accompanying analyte lists) are specified; or

Table 1. Major Regulatory Programs and Example COC Lists

Program [1]	Function	Example COC Lists	Citation	Modification Allowed? [2]
Industrial Solid Waste	Corrective Action	Hazardous Constituents	40 CFR Part 261 Appendix VIII; 40 CFR Part 264 Appendix IX	Yes
Underground & Aboveground Storage Tanks	PST release sites	PST Constituents [3]	TCEQ RG-411, Table 1	No
Underground & Aboveground Storage Tanks	Other release sites	Regulated Substances	Texas Water Code §26.342 and 30 TAC §334.2	Yes
Dry Cleaners	Dry cleaner release sites	Dry Cleaning Solvents	TxH&SC §374.001(8) [4]	Yes
Superfund	Site Discovery or Cleanup	Hazardous Substances	40 CFR §302.4, Table 302.4	Yes
Municipal Solid Waste	Corrective Action	Assessment Constituents	40 CFR Part 258 Appendix II	Yes
Voluntary Cleanup	Corrective Action Liability Release	One or more of the above	One or more of the above	Yes

Notes: CFR = Code of Federal Regulations; PST = Petroleum Storage Tank; RG = Regulatory Guidance; TAC = Texas Administrative Code; TxH&SC = Texas Health and Safety Code.

1 Not all regulatory programs that utilize the TRRP rule are listed here. Refer to TCEQ guidance document *TRRP Applicability and Grandfathering* (RG-366/TRRP-2 Revised) for a full listing of programs.

2 A "Yes" or "No" in this column indicates whether the person can modify the program's example list of COCs based on the process detailed in this guidance document.

3 The PST constituents listed in Table 1 of RG-411 are a subset of Regulated Substances. Follow the instructions within that table to determine target COCs.

4 This citation provides a definition for dry-cleaning substances. While some substances (e.g., tetrachloroethene) as listed are discrete analytes, others (e.g., hydrocarbon solvents) are a mixture of substances.

- Only regulatory lists of chemicals (e.g. RCRA 40 CFR Part 261 Appendix VIII or Part 264 Appendix IX) are specified.

In other words, if no project-specific evaluation in selecting the target COCs and analytes has occurred, such an evaluation should be conducted, as described under Steps 2–4 below.

Step 2: Evaluate Project Objectives

Start with the end result in mind; knowing the scope of the TRRP project can affect the selection of target COCs. The scope of the project can range from sampling stained soil to a facility-wide assessment. The efforts to which the person must go to develop the target COC list are directly related to the project objectives, which in turn derive from the objectives of the TCEQ program under which the project is conducted. "Sufficient" efforts in one situation may be "insufficient" in another. For example, the PST Program's requirements for target COC selection of a gasoline fuel release at a service station would not be sufficient for a facility-wide

assessment at a petroleum refinery where many more chemicals are involved in making a range of products.

In some cases a program directive may define the target COC list. A prime example of this is the PST Program where the target COC list for various types of petroleum products is defined in "PST Program Action and Screening Levels" in Table 1 of TCEQ Regulatory Guidance: *Investigation and Reporting Releases from Petroleum Storage Tanks (PSTs)* (RG-411).

There may be more than one objective under a TCEQ program. For instance, in the Corrective Action program, closure of an individual waste management unit and its associated release, which could be commingled with releases from other sources, may be possible while continuing to assess the area or site-wide contamination under other assessments (a conditional approval by the program may be appropriate). In other situations, the entire property may be under assessment. In the VCP and Superfund programs, the project objective is generally evaluation of the entire property regardless of the source of the contamination.

Note: These example project objectives are not intended to be limiting. Other project objectives as allowed under TRRP can include demonstrations showing that contamination originates from other potential sources, or that a suspected release is consistent with background concentrations.

Step 3: Collect Information

Conduct a thorough search for information that will help determine the target COC list. In addition to the above steps, the target COC list can be developed based on current and historical operations, chemical release information, knowledge of chemical processes and activities, applicable industry-specific lists, information from similar sites or nearby potential sources, chemical information and analytical data. The completeness of available information determines the level of effort needed to select target COCs. In some cases without complete information it may be necessary to take additional actions. For example, VCP or Superfund projects typically need a more comprehensive gathering and review of pertinent information. The more effort put into gathering and reviewing the available information, the more "on target" the outcome will be. The number of COCs on the target COC list depends upon the specific project objectives, number and complexity of chemical-related processes and operations conducted on site, and the completeness of the documentation. With appropriate documentation, it may be possible to narrow the field of COCs to one target COC in a simple situation, such as a closure of a tank that held only a single chemical.

The level of effort required in collecting "sufficient" information for conducting the project is described in various sources. There are two noteworthy documents that may also provide general guidance for

developing the target COC list for a project. The American Society for Testing and Materials (ASTM) outlines the standard practice for acquiring environmental assessment information in *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E1527).* The ASTM E1527 Phase I assessment guidance includes four components: records review; site reconnaissance; interviews; and reports. Portions of each of these components contain guidance on evaluating location and records information that can be helpful in developing a target COC list for a project. Additionally, EPA has issued a rule in 40 CFR Part 312 titled *Standards and Practices for All Appropriate Inquiries* that provides general guidance for gathering information.

For clarity, the types of information that may be useful in developing the target COC and analyte lists are discussed in detail below. The information obtained should be evaluated using professional judgment as described under Step 4.

Current and Historical Operations

For purposes of selecting target COCs, as opposed to classifying land use in accordance with §350.52, evaluate how the current and historical operations (e.g., refinery, dry cleaner, gasoline station, etc.) may have used chemicals through time. Those project-specific chemicals that meet the TRRP definition of COC should be included initially as target COCs, subject to further evaluation in subsequent steps.

Aerial photographs, property records, zoning and land use records, and Sanborn fire insurance maps or maps from other historical sources may provide useful information concerning the operations that occurred at the subject location. Information obtained from the site reconnaissance including observations on alternate sources, uses of adjacent properties and topography may also prove useful. Interviews conducted with current and past owners and occupants, nearby property owners, and local government officials (e.g. fire or police departments) are potential sources of additional information.

Chemical Release Information

If a release has occurred, COCs known or reasonably anticipated to be associated with the release are considered target COCs. For example, for a release from a tank or pipeline, COCs that were known or reasonably anticipated to have been stored in that tank or transferred in the pipeline are target COCs.

Knowledge of Chemical Processes and Activities (Current and Historical)

Knowing the types of chemical processes and activities conducted in the past, or being conducted as part of current operations, can help further refine the list of target COCs. A petroleum refinery likely has had more than one process built and operated on the same spot over time: cracking,

distillation, alkylation, blending, etc. In addition to the final products, other chemicals are used with these processes and need to be identified. Available information which should be evaluated includes, but is not limited to: company records; engineering and environmental reports; process information such as reactants, solvents, catalysts, intermediates, products including blends and additives, by-products, and chemicals in waste streams; waste handling, storage and disposal records; as well as analytical data. Chemical product shipping and receiving invoices may also provide important information concerning the types of chemicals associated with the site.

Applicable Industry-Specific Lists

A number of publications are available that identify chemicals or classes of chemicals associated with specific industries or chemical processes (see Attachment A). Information from these sources can be viewed as useful starting points for identifying target COCs. Chemicals could be added to or deleted from such lists to produce a target COC list, depending on other information relevant to a particular project. Such lists can also be useful tools for evaluating the completeness of a final target COC list. However, generalized industry lists are not intended to supplant project-specific information.

Similar Operations or Nearby Potential Sources

Chemical and analytical information from file searches for similar operations or nearby potential sources may prove useful in selecting target COCs in the event of commingled releases of the same or different chemicals. Note that §350.51(i) of the TRRP rule suggests identifying properties within 0.25 mile for which information such as this has been submitted to the TCEQ.

Chemical Information

In some cases the chemical and environmental literature may provide valuable information that can be used in designating target COCs. For instance, Manufacturer Safety Data Sheets (MSDSs), or fate and transport information may be useful. Based on such chemical information, certain chemicals may be identified as potential companion or daughter chemicals to target COCs.

Analytical Data

Analytical data are an obviously useful category of information for developing the target COC list. Useful data may have been collected before, or after, the project became subject to TRRP. Data from previous environmental investigations, monitoring data, or data from samples collected during routine operations, may provide useful information for the identification of analytes or selection of target COCs.

Step 4: Review the Information Using Professional Judgment

Professional judgment is used throughout the TRRP process, from selecting target COCs, analyzing chemicals, evaluating the analytical data, defining the PCL exceedance zone, all the way through the response action decisions. For the purposes of this guidance, professional judgment can be defined as anything that leads the person or the TCEQ to make an informed decision to either include or exclude a COC from the list of analytes or target COCs for a project. It is used in collecting and reviewing project and chemical information on a weight-of-evidence approach to designate analytes and target COCs. Conduct the professional judgment review on the available information from an informed perspective, by utilizing general knowledge of the fate and transport of COCs, the industry type and other situational information described in the preceding steps.

In cases where sufficient requirements or evidence exist, collecting additional analytical data may be unnecessary to designate a target COC list for a project. Professional judgment, combined with institutional knowledge (the accumulated wealth of information based on experience), may dictate that a COC, or a class of COCs, is realistically a target COC for a project. Common examples include tetrachloroethene for a dry-cleaning facility project; polycyclic aromatic hydrocarbons (PAHs) and pentachlorophenol for a wood treating facility project; lead for a battery manufacturing facility; and PAHs for many refinery projects.

Professional judgment may also be used to tailor the list of COCs associated with a specific release. Some chemicals that are initially considered for target COC designation based on generalized information, such as literature sources listed in Attachment A, can be dropped from final designation based on more compelling site-specific information of the types described in Step 3. For example, a list of chemicals for a particular industry might include multiple processes within that industry. However, the target COCs selected for a particular project, such as a waste tank closure, could be limited, based on knowledge of the particular process(es) from which the wastes are generated or types of materials handled.

Using professional judgment to identify information gaps:

In addition, professional judgment may be used to identify gaps in information for a particular project. Project information may be considered “insufficient” if pertinent information related to the project decisions is limited or missing, such as:

- Data gaps exist or information is missing in historical or current records, engineering reports or summaries, and associated data; or
- The historical record is based primarily on hearsay rather than documented information from persons who are or were responsible for the activities at the site; or

- Information is limited to visual observations; or
- In the absence of other current or historical information, analytical data are non-existent or are not sufficient to support a decision.

Information for the selection of target COCs is seldom "complete" in the sense that an unbroken chain of information is available on the complete history of every COC that is present or potentially present. However, this information is seldom completely absent. Some information is generally available, even for abandoned Superfund sites, which can lead the person to adequately determine the target COC and analyte lists, or to take further actions as described in Step 5 below. Clues are invariably present: the industry type from which the contamination originated is known, or the general process used at the location can be inferred from similar operations or industries.

Professional judgment related to daughter and companion chemicals:

Daughter products and companion chemicals may be present in the environment as a result of a release of target COCs. Daughter products (also known as degradation products) are those chemicals generated during the degradation of the parent chemical by biological or chemical processes (e.g., ethylbenzene degrades to styrene). Companion chemicals are chemicals that are frequently associated with the target COC primarily due to the chemical process(s) used to produce the target COC, or the addition of the companion chemical to the product containing the COCs (e.g., MTBE, or historically, lead in gasoline).

Evaluate the target COC list to determine if any daughter/companion chemicals should be included as target COCs. At a minimum, the potential daughter/companion chemical would need to meet the definition of COC in §350.4(a)(11) of TRRP (not merely meet the definition of a "daughter" or "companion" chemical), to be included as a target COC. Reasonableness should be used in designating daughter/companion chemicals as target COCs. Refer to Attachment B for a detailed discussion regarding when daughter/companion chemicals should be included on a target COC list for a particular project and points to consider when exercising reasonableness.

Using professional judgment to exclude detected analytes from inclusion as target COCs:

There are situations allowed in the TRRP rule where, even though an analyte is detected at a site, it need not be designated as a target COC and considered further. In addition to the situation that the analyte does not meet the definition of a COC provided in TRRP, some justifications for excluding a detected analyte might be:

- The detection is a clerical or analytical error, supported by appropriate documentation;
- The analyte will be addressed under a different affected property assessment or planned response action;

- The TRRP rule does not apply to the analyte or the program area does not require it to be addressed. See the October 21, 2003, TCEQ guidance "Determining Which Releases are Subject to TRRP," which states, "Release determinations do not apply to situations where materials or products are used as intended, such as lawful application of chemical pesticides and agricultural chemicals, paved parking lots or roads, or treated utility poles and railroad ties";
- The COC is one for which it is not necessary to develop a PCL. See the October 9, 2001, TCEQ Interoffice Memorandum "Evaluation of Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, Sodium, and Phosphorus through Soil Ingestion." Note, however, the need for protection of ecological receptors or the need to address aesthetic issues could still require designation as a target COC;
- The COC did not result from activity at the project location based on appropriate evidence to include, at a minimum, concentration and distribution in media as determined in previous assessments, source area information, and knowledge of historical operations;
- The COC is present at concentrations that do not exceed anthropogenic background; or
- The COC is present at concentrations that do not exceed site-specific or Texas Specific Soil Background Concentration (§350.54(m)).

Note that the designation of "anthropogenic background" or "background" must be demonstrated through a proper assessment in accordance with TCEQ guidance document *Affected Property Assessment Requirements* (RG-366/TRRP-12) and evaluated in accordance with the methods described in TCEQ guidance document *Representative Concentrations* (RG-366/TRRP-15).

This step specifies that the person applies professional judgment to determine the appropriateness of the target COC list on the basis of the evidence and information gathered, primarily during the project planning process. Recognizing that there can be limitations to available information, a decision made using professional judgment should result in enough certainty, without need for absolute proof, to move the TRRP project forward. However, if information is not sufficient, several options are available to fill the gaps as described next in Step 5 or in response to iterations of the target COC selection process described in Step 7.

Step 5: Select Option(s) When Information Is "Insufficient"

There are several options to help fill information or data gaps. These options as discussed below primarily involve collection of additional analytical data and include: collecting initial samples; use of "broad-spectrum" analytical methods; and performing Tentatively Identified Compounds (TICs) searches. In many cases a combination of these options will be most efficient.

Option 1—Collect Initial Samples

The target COC selection process includes the option to conduct chemical analysis of samples to use in developing a specific target COC list. These samples are termed "initial" because they are collected early in the project before the target COC list is finalized. Initial samples can be the release confirmation samples, such as samples collected during a Phase II due-diligence investigation, or they could be collected for the expressed purpose of helping to identify the target COCs. The most likely source or release areas may be the best location for initial samples.

Because these samples are collected with the intent of finalizing the target COC list, use "broad-spectrum" analytical methods (discussed in more detail below) to include the largest possible number of analytes. Alternatively, if there is some knowledge of the chemical processes or operations, analyze for only certain relevant classes of COCs in an attempt to fill the information gaps (e.g., analyze for chlorinated solvents, PAHs, pesticides, herbicides, explosives, dioxins, etc., as appropriate). The results of these chemical analyses can then be used to supplement available information to designate target COCs for the project. The non-detection of a COC in an initial sample can, but does not necessarily, exclude that COC from becoming a target COC. If the COC is known or is reasonably expected to be associated with site activities, or the program requires it, the COC remains a target COC even if initial sampling shows no detection.

In order to also use these sample results for the TRRP project, the data quality must be suitable for the intended use of the data. See §350.54(e)(3) and TCEQ guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13) regarding data quality assurance. Initial samples with COCs detected not only can confirm the target COC list but can also be used to help define the extent of affected property if the concentration exceeds the assessment level. If these samples are to be used to demonstrate a target COC is not detected in media or does not result in affected property, the maximum sample detection limits (SDLs) and maximum measured concentrations, respectively, must be less than the applicable assessment levels.

Option 2—Use Broad-spectrum Analytical Methods

In some situations, due to insufficient site-specific information, the only recourse may be to analyze for longer lists of chemicals to designate target COCs or to conduct the assessment. The sources of these lists include the TCEQ program area, references of standard industry lists, U.S. EPA guidance (e.g. "Guidance on Data Usability in Risk Assessment") or subsets of the RCRA 40 CFR Part 261 Appendix VIII or Part 264 Appendix IX lists. These lists may also include classes of chemicals (e.g., PAHs,

Consider These Limitations:

- Analyte lists vary among laboratories
- Some MQLs might exceed assessment levels
- Method analyte list becomes the target COC list.

pesticides or herbicides). The use of broad-spectrum analytical methods is the most cost-effective procedure to obtain data for longer lists of chemicals.

Broad-spectrum gas chromatography/mass spectrometry (GC/MS) methods are frequently used for environmental investigations due to their definitive identification capabilities and, in many cases, the broad range of analytes that can be determined by a particular method. As previously mentioned, SW-846 Methods 8260 (volatile organics), 8270 (semivolatile organics), and 6010/6020 (metals) are examples of what may be called "broad-spectrum" analytical methods. Like many analytical chemistry methods, these methods determine the presence and concentration of specific analytes for which the instruments have been specifically calibrated using authentic (traceable) chemical standards.

The term "broad-spectrum" as used here should not be construed to mean that "all" possible chemicals are indeed assessed in any one analysis. For instance, a given laboratory will report a subset (e.g., typically 100 to 125 analytes) of the approximately 245 analytes that are amenable to the GC/MS methods 8260 and 8270. In contrast, laboratories will report only six to 15 analytes for certain GC methods such as SW-846 Method 8021, which has 70 analytes listed. To get more information from a broad spectrum analysis, particularly for initial samples, request the laboratory to report the results of all the analytes that are part of the calibration list, not just the ones on the laboratory's routine report. Another important aspect of these analytical methods is that analyte lists differ from one laboratory to the next. Therefore it is important to be aware of and make allowances for the different analyte lists that are used by the laboratories.

With the above in mind, these "broad-spectrum" analytical methods can be used for lists of analytes to identify which target COCs are present for a particular project and for conducting the assessment, when appropriate. In some cases, due to the absence of information on the COC handling and subsequent distribution in the environment, it may not be possible to adequately develop the target COC list for a project based on a limited number of initial samples utilizing broad-spectrum analyses. In such cases, continued analysis of assessment samples by broad-spectrum analytical methods may be necessary.

Option 3—Perform Tentatively Identified Compound (TIC) Search

When using Option 2, broad spectrum GC/MS methods, for identifying target COCs, request the laboratory to also provide tentative identification and estimated quantification for chemicals present in project samples but not included in the laboratory's list of calibrated analytes. This option, referred to as a tentatively identified compound (TIC) search, involves the laboratory's review of the chromatograms peaks representing analytical responses made by chemicals present in the sample but not included in the laboratory's list of calibrated analytes. When reporting the TIC data, the laboratory will provide the analytical results for all the chemicals on

the laboratory's calibration list and the qualitative results for the chemicals tentatively identified as present in the sample. In the case of a project with a properly developed target COC list, TIC searches generally will not be necessary, such as for the following situations:

- The nature of the release is well defined, such as when a known product has leaked from a tank; or
- The release occurred from a process with a program-defined target COC list, such as a gasoline station or a dry cleaner; or
- The target COC list is well supported by existing historical information or analytical data, or both; or
- The exposure potential is low because the land use is currently commercial/industrial and will remain so, the site will continue to be regulated under an operating permit, and the release is not reasonably expected to affect an off-site property.

Conversely, for projects where initial sampling is being performed to help develop the target COC list, TIC searches may provide additional information. By working with the analytical laboratory, plan ahead for any TIC search to support the development of the target COC list. TIC searches can be performed at any time, but should be performed when **all** of the following conditions apply:

- Excessive dilution of analytes, resulting in elevated SDLs of target COCs, occurs during sample analyses due to the presence of non-target or unidentified chemicals;
- The release is not commingled with another known on-site or off-site release or is not part of another response action that could account for the presence of non-target or unidentified chemicals;
- Data are lacking to positively rule out commingling with nontarget or unidentified chemicals from an un
- known upgradient or off-site release (e.g., no upgradient samples);
- The planned remedy is passive (e.g., monitored natural attenuation) without means of preventing future exposure (e.g., no institutional control will be filed to prohibit groundwater use); and
- The target COC list was based on insufficient information, as described by the procedures of this guidance.

Note that according to §350.54(i), the executive director shall require persons to perform confirmation analysis for TICs when reasonably appropriate. Anticipate performing confirmation analysis as part of the planning process should the project meet the above conditions. Refer to Attachment C for a discussion regarding TIC confirmation analysis, as well as additional topics on TICs.

Step 6: Designate Target COCs

If a permit, order or program requirement dictates a target COC and/or analyte list that is applicable and appropriate for the TRRP project (refer to Step 1), further efforts in identifying target COCs for the project are not necessary. Document the target COCs from this list and proceed.

If the permit, order or program requirements do not fully meet project-specific needs, or do not specify individual target COCs or analytes, additional steps (e.g., Steps 2–5 above) may be appropriate and necessary to identify and designate target COCs. Once sufficient information is obtained, designate and document the target COCs which become the focus of the project.

Note that the various steps of the target COC selection process can be repeated, as necessary, until sufficient information has been compiled to develop the target COC list. Figure 2 shows that iterations can occur in response to additional information resulting from the options available at Step 5, or during the assessment as shown after Step 7, if additional analytes are detected that have not been previously evaluated with the target COC selection process.

Step 7: Conduct the Project

Following completion of the target COC and analyte lists, collect environmental samples for the project. For a TRRP affected property assessment, choose sample locations as described in TCEQ guidance document *Affected Property Assessment Requirements* (RG-366/TRRP-12) and other relevant technical guidance. Because the TRRP process is iterative and dynamic, the target COC and analyte lists may be adjusted during the TRRP assessment. For instance, analytical results for some samples collected at critical locations may suggest that a target COC is not, in fact, present. If based on sufficient numbers of samples in sufficient locations, analytical data of appropriate quality and performance collected during initial stages of the assessment may obviate the need for additional chemical analyses for that target COC in later stages of the assessment. The chemical maintains its designation as a target COC but it can be dropped from the analyte list. Additional COCs may also be discovered through analytical data as the assessment progresses. Evaluate this new information with the target COC selection process to determine if the newly detected analytes must be designated as target COCs for the project. Likewise, analysis of a sufficient number of appropriately located samples may justify a different suite of analytes, such as a subset of the original analyte list or the use of "indicator COCs" which might be the most toxic, or mobile, or widespread of the target COCs. Verify that the requirements of the TRRP rule are met at the end of the assessment if "indicator COCs" are used.

Step 8: Document and Report Results

Reporting Results of the Target COC Selection to the TCEQ

Include the results of, and rationale used in, the selection of the target COCs and justification for excluding certain COCs from the target COC list, in the Affected Property Assessment Report (TCEQ Form 10325/APAR). Use the current version of the APAR standardized format to identify and document the target COCs. If the project meets the conditions of the October 21, 2003, TCEQ guidance "Determining Which Releases are Subject to TRRP," the target COC selection documentation can be incorporated in a letter report (e.g., no prescribed format). Include the following documentation for either the selection of target COCs or exclusion of COCs: brief site history; description of operations; a description of COCs handled; a justification of excluding certain COCs from the target COC list; and any analytical results from utilizing the Step 5 options (e.g., initial samples, broad-spectrum methods, TIC searches) or other assessment data used to substantiate the selection of target COCs. The documentation of the COCs handled may range from a generic statement (e.g, dry cleaner facility handling tetrachloroethene or fueling facility selling gasoline and diesel) to more complex descriptions of various processes in a chemical manufacturing facility.

Analytical Results Reported from the Laboratory

To help ensure accurate analysis and reporting of the target COCs, provide the laboratory with the list of analytes to be tested and reported for each sample. Include the Chemical Abstracts Service Registry Number (CAS, CAS#, or CASRN) for each COC to avoid any confusion. This specificity can be important because not all laboratories report the same analytes for a given analytical method. By establishing the list of analytes with the laboratory prior to sample analysis, the laboratory should then provide a report containing analytical results for that exact list of analytes. The information-based approach for target COC selection is a way to limit the number of analytes needed for a project and investigated during the TRRP assessment. Provided that the target COC list, derived with appropriate information, is complete, instruct the laboratory to analyze and report, at a minimum, the specified analytes, even though the laboratory may be calibrated for many more analytes for a particular method. Conversely, requesting only methods (e.g., "run 8260 and 8270") can result in laboratory reports with additional analytes that were not designated as target COCs. In accordance with §350.54(h), report all analytical results provided by the laboratory, whether target COCs or not. It is important to note here that the designation of the COC, as analyte or target COC, has consequences in how that COC is treated by the screening criteria of §350.71(k). Detected analytes which have been designated as target COCs always remain target COCs but might be screened from further evaluation by using the criteria in §350.71(k)(1)-(3). Non-detected analytes that are not designated as target COCs can be screened using the criteria in §350.71(k)(4). Document the results of the screening process in

the APAR. For additional guidance on COC screening, refer to TCEQ guidance document *Screening Target COCs from PCL Development* (RG-366/TRRP-14).

Other Considerations

Presented below are several other topics to consider when incorporating the target COC list into overall planning for the TRRP assessment.

Assessment Sampling and Analysis

The target COC list includes the chemicals the person is responsible for addressing during the assessment. Not every target COC requires analysis in each sample provided risk conservative assumptions are maintained during the assessment.

TPH and Target COCs

"Total petroleum hydrocarbons" (TPH) is a term used to represent the complex mixture of hydrocarbon chemicals found in crude and refined oil products, such as gasoline, diesel, and hydraulic fluids. TPH can be considered a target COC for an assessment. The analysis for TPH can be used for assessment purposes to determine the extent of a hydrocarbon plume in a medium. TPH cannot be used to conclude individual target COCs are not present in the hydrocarbon mixture. High levels of TPH can interfere with the analysis for individual hydrocarbon target COCs, such as benzene and polycyclic aromatic hydrocarbons (PAHs) and result in elevated sample detection limits (SDLs) for the individual hydrocarbon target COCs. If the SDLs for the hydrocarbon target COCs exceed the level of required performance, specify analytical methods using detectors less sensitive to the hydrocarbons present in TPH for analyzing the hydrocarbon target COCs. Such method detectors include photo-ionization detectors (PIDs) and ultraviolet/fluorescence detectors.

Attachment A: References and Citations

General References:

American Society for Testing and Materials (ASTM). *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM Designation E1527)

Basta, Nicholas. *Shreves Chemical Process Industries Handbook,* 5th Edition. McGraw-Hill Publishers, 1998.

Büchel, Karl Heinz, Hans-Heinrich Moretto, Peter Woditsch. *Industrial Inorganic Chemistry.* John Wiley and Sons, 2000.

Comyns, Alan. *Encyclopedic Dictionary of Named Processes in Chemical Technology,* Second Edition. CRC Press, 1999.

Howard, Phillip. *Handbook of Environmental Fate and Exposure Data for Organic Chemicals* (7 volumes). Lewis Publishers, 1989–1997.

Kirk, R. and Othmer, D. *Kirk-Othmer Encyclopedia of Chemical Technology,* 4th Edition. John Wiley and Sons, 2001.

Meyers, Robert. *Handbook of Petroleum Refining Processes.* McGraw-Hill Publishers, 1997. ISBN:0070417962.

Shineldecker, Chris L. *Handbook of Environmental Contaminants: A Guide for Site Assessment* (1992).

Regulatory Publications:

Federal rule (final) for 40 CFR Part 312—Standards and Practices for All Appropriate Inquiries. See Federal Register: November 1, 2005 (Volume 70, Number 210 Pages 66070–66113).

Texas Commission on Environmental Quality. (TCEQ). Investigating and Reporting Releases from Petroleum Storage Tanks (PSTs), RG-411 (most current version).

U. S. Environmental Protection Agency. (USEPA):

- Guidance for Data Usability in Risk Assessment (Part A). April 1992, Publication 9285.7-09A, Appendix II.
- Technical Approaches to Characterizing and Cleaning Up Automotive Repair Sites Under the Brownfields Initiative, EPA/625/R-98/008. February, 1999.
- Technical Approaches to Characterizing and Cleaning Up Iron and Steel Mill Sites Under the Brownfields Initiative, EPA/625/R-98/007. December 1998.
- Technical Approaches to Characterizing and Cleaning Up Metal Finishing Sites Under the Brownfields Initiative, EPA/625/R-98/006. March, 1999.
- Technical Approaches to Characterizing and Cleaning up Automotive Recycling Brownfields: Site Profile, EPA/625/R-02/001. January, 2002.
- Technical Approaches to Characterizing and Redeveloping Brownfields Sites: Municipal Landfills and Illegal Dumps, Site Profile, EPA/625/R-02/002. January, 2002.

Web Sites:

U.S. EPA's series of "Sector Notebooks" which are made for numerous industries. A full list can be found at <www.clu-in.org/products/toolkit99/pages/siteassess.htm> or <www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/>. These notebooks provide general information on chemicals used by the various industries. Examples from the 33 documents available include such industry sectors as:

- "Profile of the Petroleum Refining Industry" EPA 310-R-95-013

- "Profile of the Agricultural, Chemical, Pesticide, and Fertilizer Industry" EPA 310-R-00-003

U.S. EPA Region 3 Industry Profile Fact Sheets provide general descriptions of site conditions and contaminants commonly found at selected industrial sites, including descriptions of processes conducted, raw materials, and suggested parameters for analysis. A full list of 30 fact sheets can be found at <www.epa.gov/reg3hwmd/bfs/regional/industry/>

TOXNET-Hazardous Substance Data Base with information on use and manufacture of chemicals and degradation: <toxnet.nlm.nih.gov>, select HSDB, and enter the chemical

Chemical database with physical property data and 2D chemical structures (including an index of other chemical-related sites): <chembiofinder.cambridgesoft.com/>

Guide to Contaminants Found at Contaminated Industrial Properties:<www.ehso.com/contaminants.htm> This site, prepared by Environment, Health and Safety Online, provides a short table of general contaminant types found at many of the same industries described in the EPA Region 3 Industry Profile Fact Sheets.

University of Minnesota Biocatalysis/Biodegradation database: <umbbd.msi.umn.edu/>. This site provides useful information on daughter products resulting from microbial biocatalytic reactions and biodegradation pathways.

Attachment B: Daughter Products and Companion Chemicals

Introduction

Daughter products and companion chemicals may be present in the environment as a result of a release of target COCs. Evaluate the target COC list to determine if any daughter or companion chemicals should be included as target COCs. Reasonableness should be used in designating daughter/companion chemicals as target COCs. Daughter products of COCs are specifically included in the TRRP definition of COC in §350.4(a)(11). Daughter and companion chemicals are discussed in §350.71(k) in three ways:

- Daughter and companion chemicals are considered when evaluating the likelihood that parent COCs are present during the operations history review in Step 3;
- The parent COCs may have to remain on the target COC list if the daughter or companion chemicals are detected; and
- Daughter or companion chemicals of parent target COCs must remain under consideration.

Daughter Products

A daughter product is one of any number of transformation products (typically considered degradation products) that are formed as a result of the chemical or biological transformation or radioactive decay of a chemical. Daughter products can be produced by either natural or engineered attenuation of the parent chemical. These transformations can occur under ambient temperature and pressure as well as from the action of ultraviolet light or pH on the parent chemical.

Biological transformations can occur when parent chemicals are degraded via microbial metabolic pathways. Bacteria can be part of the natural environment or can be introduced by humans, either by accident or design. The degradation pathways can be either aerobic or anaerobic processes depending upon the microbial organism and the ambient conditions. Some examples of aerobic biological transformations include:

- Ethylbenzene → styrene
- Methyl tert-butyl ether (MTBE) → tert-butanol
- Acrylonitrile → acrylamide → acrylic acid

Some examples of anaerobic biological transformations include:

- Tetrachloroethene → trichloroethene → 1,2-dichloroethene → vinyl chloride

- Carbon tetrachloride → chloroform → dichloromethane → chloromethane
- Ethylbenzene → 1-phenethyl alcohol → acetophenone

Companion Chemicals

Companion chemicals are chemicals related to the target COC primarily based on the chemical process(es) used to produce the target COC, or in other ways associated with the intended target COC. Examples of companion products include:

- Impurities or byproducts of an industrial process (e.g., heptachlor in the synthesis of chlordane, tert-butanol in the synthesis of propylene oxide from propylene, or dioxins and furans in the synthesis of pentachlorophenol and chlorinated herbicides);
- An intermediate in the industrial process (e.g., vinyl chloride in the production of 1,2-dichloroethane);
- Components of a mixture (e.g., the commonly found mixture of benzene, ethylbenzene, toluene and xylenes);
- Common additives to commercial products (e.g., MTBE in gasoline, or 1,4-dioxane in chlorinated solvents).
- Catalysts used in the production of commercial products.

Information Sources for a Daughter/Companion Chemical Search

It is advisable to obtain an understanding of the degradation products of parent chemicals prior to expending a great deal of time and effort pursuing them. In some circumstances it may be necessary to evaluate the potential chemical transformation products of parent COCs through literature review. Attachment A provides a list of references for more information on degradation pathways and transformations, as well as manufacturing or chemical processes. Alternatively, TCEQ program areas may be consulted for additional information. In some cases, it may be necessary to analyze for daughter/companion chemicals in a few specifically chosen samples.

When to Pursue Daughter/Companion Chemicals

There are large numbers of daughter/companion chemicals that represent relatively low risk (considering their toxicity, concentration, persistence and mobility), or that are simply innocuous. At a minimum, the potential daughter/companion chemical would need to meet the definition of COC in §350.4(a)(11) of TRRP (not merely meet the definition of a “daughter” or “companion” chemical), to be included as a target COC.

Consider adding daughter/companion chemicals as target COCs when one or more of the following apply:

- Chemical and/or physical parameters of the daughter/companion chemicals indicate they are sufficiently persistent, toxic and mobile that they should be included as target COCs.
- For daughter products: they are generated from reasonably anticipated transformation pathways based on site-specific conditions.
- For companion chemicals: there is a reasonable likelihood that the companion is present when target COCs are known or reasonably anticipated to be present.
- For both, the anticipated remedy for the target COCs will not also render the daughter/companion chemicals protective (e.g., some treatment processes or monitored natural attenuation might not work effectively on daughter/companion chemicals whereas removal or physical controls would be protective).

The likelihood of a daughter/companion chemical to be present is dependent upon the source of the release and the associated chemical processes. For example, pure *para*-xylene used as a reactant in a process to make a product will most likely not have the other xylene isomers as companion chemicals. However, a process producing one of the xylene isomers may also produce the other xylene isomers as chemical by-products of the process. The presence of daughter products depends primarily on the chemical class and reactivity of the parent COC. Some reactive chemicals are known to readily produce daughter products. For example, some polychlorinated chemicals easily degrade to lower chlorinated species while other polychlorinated chemicals degrade very slowly.

When to Limit the Pursuit of Daughter/Companion Chemicals

The evaluation to determine whether daughter/companion chemicals should be included as target COCs should be limited to:

- COCs included in the Tier 1 PCL tables;
- Any COCs specified by the applicable regulatory program; or
- Any COC that otherwise warrants being included as a daughter/companion chemical as identified by the Remediation Division in memoranda or guidance.

These criteria sufficiently limit the list of potential daughter/companion chemicals to be addressed, but do not identify specific daughter or companion chemicals that should be pursued.

In most cases, daughter products are not an important consideration for spills that are being addressed under the "spill rule" (30 TAC Chapter 327, "Spill Prevention and Control"). In this situation, the spill material and associated contaminated media must be remediated within 180 days. This deadline typically minimizes the likelihood that daughter products will form to any appreciable concentration (with some exceptions). If the response to the spill becomes subject to TRRP, this guidance could apply.

Attachment C: Tentatively Identified Compounds

Tentatively Identified Compounds (TICs) are defined in Step 5 of the Target COC Selection Process section of this document. This attachment deals with the subjects of selecting samples for TIC search, using the results of a TIC search, when and how to confirm TICs, and reporting the results of TIC searches to the TCEQ. The procedures to be followed by the laboratory for analysis, assessment, and reporting of TICs to the person are described in TCEQ guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13). Chemicals reported from TIC searches are tentatively identified and the concentration results are estimated. TIC searches are of limited value unless confirmed by the analysis of standards of the tentatively identified compound. The goal of the TIC search and of selecting the TIC sample location is to identify COCs that would otherwise be missed. The concern here is that the COC, if it remains undiscovered and unaddressed, would represent an unacceptable risk. In order for the TIC to represent such a risk, it would have to be:

- Sufficiently wide-spread;
- Not located within areas that will be adequately addressed for other target COCs; and
- Of sufficient toxicity and concentration to represent an unacceptable risk.

In order for this risk to be identified by a TIC search, the TIC would have to:

- Be amenable to GC/MS TIC analysis;
- Be confirmable by calibrated compound analyses;
- Be of sufficient concentration at the locations sampled to be discovered by TIC search; and
- Have sufficient toxicological information available such that a PCL can be developed.

Selecting Samples for TIC Search

The TIC search will typically occur during initial sampling to help develop the target COC list. Base the sampling locations for TIC searches on information such as site history, site characterization, and visual observation. Collect samples from potentially affected areas such that additional target COCs will be discovered if present, but do not collect samples from areas that are so highly contaminated that TIC information would be excessively complicated, or samples would require extensive dilutions. Both of these latter situations can render the TIC search meaningless. Therefore, carefully consider sample locations for TIC searches. If an area will obviously require remediation of some sort, such

as a visible source area, TIC searches are not warranted. On the other hand, TIC searches are also unwarranted in likely unaffected areas.

The number of samples to be selected for TIC searches will depend on the aerial extent of the release and other site-specific factors. The laboratory may also be able to perform TIC analyses from archived GC/MS data from earlier sample events. Two mechanisms for selecting samples to undergo TIC search are to review (1) the chromatograms of selected samples, or (2) the sample detection limits (SDLs) of GC/MS analytes. Samples with elevated SDLs for calibrated analytes caused by dilution due to the presence of organic compounds (potentially either calibrated or non-calibrated compounds) may be candidates for TIC search. However, the presence of identified or anticipated multi-component mixtures (e.g., gasoline, TPH, or PCBs) that elevate SDLs should not trigger a TIC search.

Using the Results of a TIC Search

TIC searches *cannot* be used to confirm the absence of target COCs (e.g., COCs known or reasonably anticipated to be associated with the project can not be deleted from the target COC list based on TIC results). It is inappropriate to compare the estimated TIC concentrations to PCLs. In order for the results of TIC searches to be usable for TRRP purposes, the TIC results must be confirmed through calibrated analysis.

When to Confirm TICs

Review the TIC search results to assess if any of the TICs need to be confirmed by analyzing additional samples or the existing extract using a calibration curve that includes the TICs as calibrated analytes. Consistent with the Preamble to TRRP, the TCEQ intends to limit confirmation of TICs to:

- Organic COCs amenable to GC/MS analyses;
- COCs included in the Tier 1 PCL tables; and
- Any COCs specified by the applicable regulatory program (e.g., 40 CFR Part 264 Appendix IX) or
- Any specific COC that otherwise warrants confirmation as identified by the Remediation Division in memoranda or guidance.

Therefore, review the TIC search results to identify which reported TICs meet the above criteria. Only those COCs which meet the criteria above are potential candidates for TIC confirmation analysis. Confirmation analyses for TICs may not be warranted when:

- The TIC is not associated with activities at the site;
- The TCEQ program area does not require the person to address the TIC;
- The TIC will be addressed as part of another planned response activity; or

- The TIC, if unaddressed, would not represent an unacceptable risk.

How to Perform Confirmation Analysis for TICs

In order to analyze those TICs that require confirmation, select an appropriate analytical method. In some instances, a method other than a GC/MS method might be appropriate for confirmation. For example, if a chlorinated pesticide was tentatively identified in a TIC search, a gas chromatographic method might be selected due to its greater sensitivity. An additional sample may need to be collected for confirmation analyses if the holding time for the extraction or analysis of the original sample has been exceeded.

A TIC, if confirmed by calibrated analyses, should be evaluated for designation as a target COC (i.e., on flowchart in Figure 2, go from Step 5 back to Step 3 and finish the selection process). If so designated, handle the new target COC as other target COCs, as described in this and other TRRP guidance. However, confirmation analyses for TICs are not expected to meet all of the QA/QC requirements of TRRP. Refer to TCEQ guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13). Depending on the laboratory's experience with the new target COC, the laboratory may or may not have established QA/QC criteria such as method detection limits (MDL), detectability check sample results, or precision and accuracy control limits. As the laboratory becomes more experienced with analysis of the new target COC during the TRRP project, it is expected that these QA/QC criteria would be developed and future analyses will comply with the TRRP QA/QC requirements.

Reporting the Results of TIC Searches to the TCEQ

Report the TIC search results and any corresponding confirmation results in the APAR. List the TICs that were not confirmed and report the reasons why confirmation analysis was not performed (e.g., the chemicals did not meet the criteria for confirmation listed above).

Summary

There are a number of steps involved and numerous site-, sample- and chemical-specific conditions that must be met in order for TIC searches to provide useful information for Step 5 of the target COC selection process. These steps and conditions are summarized below:

1. Determine need for TIC search due to insufficient information to develop target COC list;
2. Select samples for TIC search;
3. Perform GC/MS analysis and TIC library search;
4. Review TIC search results;
5. Determine whether or not to confirm TICs as calibrated analytes;
6. Confirm identification and concentration of TICs with analysis as calibrated COCs; and
7. Evaluate confirmed TICs for designation as target COCs using the process detailed in this guidance and respond as appropriate.