



TCEQ Regulatory Guidance

Remediation Division

RG-366/TRRP-14 March 2005

SUBJECT: **Screening Target Chemicals of Concern from PCL Development**

- Objective:** This document describes a stepwise process to screen target chemicals of concern from PCL development.
- Audience:** Regulated Community and Environmental Professionals
- References:** The regulatory citation for the Texas Risk Reduction Program (TRRP) rule provision that outlines how to screen COCs from the PCL development requirement is 30 TAC §350.71(k). The TRRP rule and preamble are on-line at www.tnrcc.state.tx.us/oprd/rules/indxpdf5.html. The TRRP rule, together with conforming changes to related rules, is contained in 30 Texas Administrative Code Chapter 350 and was published in the September 17, 1999, Texas Register (24 TexReg 7413-7944). Download Tier 1 PCL tables, toxicity factors and other TRRP information at www.tnrcc.state.tx.us/permitting/trrp.htm.
- Contact:** Corrective Action Section - 512/239-2343; Petroleum Storage Tank Section - 512/239/2200; Site Assessment & Management - 512/239-2120; Superfund Cleanup Section - 512/239-2425; Technical Support Section - 512/239-0310; Voluntary Cleanup Program - 512/239-5891.
For mailing addresses, refer to <http://www.tceq.state.tx.us/about/directory/>.

1.0 Introduction

The Texas Risk Reduction Program (TRRP) provides the process for addressing target chemicals of concern (COCs) released into the environment. Once the target COCs are determined for an affected or potentially affected property, conduct a property assessment to document the concentrations and locations of the target COCs in the environmental media. Consider the impact of the planned response action when defaulting to the set protective concentration levels (PCLs) (e.g., Tier 1 PCLs), and evaluate the net benefit to be gained from screening any of the COCs from PCL development in the environmental medium. For example, if the planned response action will address all of the COCs in the environmental medium, no benefit will be gained from screening any of those COCs prior to the response action. If the potential benefit warrants conducting the COC screening process, use this guidance to screen the analytical data for each COC in each environmental medium against the provisions set forth in §350.71(k). For COCs not meeting any of the conditions in §350.71(k), establish PCLs for the COC for the environmental medium and identify the critical PCL for the COC. If the critical PCL is exceeded, conduct a response action to achieve the requirements of Remedy Standard A or B (see the TCEQ guidance document *Application of Remedy Standards A and B*

The COC screening procedures described in this guidance document are optional. Before beginning the screening process, determine the net benefit of conducting the screening.

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(RG-366/TRRP-28) for an introduction to the remedy standards). If the COC meets any one of the §350.71(k) provisions, do not establish PCLs for the COC for that environmental medium.

As illustrated in Figure 1, screening COCs from PCL development is an optional, but important, step in the TRRP assessment process. Use the guidance in *Selecting Target COCs* (RG-366/TRRP-10) to select the COCs for which the property is to be assessed. Determine the assessment level for each COC in each environmental medium, and use the guidance in *Affected Property Assessment Planning* (RG-366/TRRP-6) to plan the property assessment to address human and ecological concerns. **Note:** If the Tier 1 Ecological Exclusion Criteria Checklist in §350.77 indicates a Tier 2 or 3 ecological risk assessment may be needed, consult the *Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas* (RG-263 (revised) December 2001) as it specifically discusses the required procedures and the available options for the ecological assessment. After planning is complete, conduct the property assessment using the guidance in *Affected Property Assessment Requirements* (RG-366/TRRP-12). Define the extent of each target COC in each medium to the COC's residential assessment level, and then use the screening process in §350.71(k) to determine if a COC can be screened from PCL development.

The term “residential” modifies the term “assessment level” to limit human health exposure pathway considerations to residential land use assumptions. Ecological considerations may need to be factored in when establishing the residential assessment level, as discussed in *Affected Property Assessment Requirements* (RG-366/TRRP-12). Commercial/industrial land use assumptions cannot be used when screening COCs.

This guidance discusses the conceptual design of §350.71(k) and describes a stepwise process for using the provisions in §350.71(k) to identify the target COCs eligible to be screened from PCL development. The stepwise process descriptions parallel the ordering of the rule provisions, i.e., §350.71(k)(1), then (2), and then (3). However, use the applicable provisions in §350.71(k) in any order to evaluate the COC during the screening process. Also, evaluate the COC under all applicable conditions before concluding PCLs are needed for the COC. For example, a detected COC might be eligible for screening under one or more of the §350.71(k)(2)(A), (B), (C), (D), or (E) conditions. **Note:** Once a COC meets one of the §350.71(k) conditions for an environmental medium, no further screening evaluation is needed for that COC in that medium.

Document the results of the screening process in the Affected Property Assessment Report (APAR). If all of the COCs in all sampled environmental media are screened from PCL development, submit an APAR to document that outcome. To request a “no further action” letter upon completion of the assessment, include a Response Action Completion Report (RACR) with the APAR. **Note:** As illustrated in the example entitled *Example Scenario for Continued COC Monitoring* in Attachment 1, the TCEQ may still require monitoring for COCs screened from PCL development, when warranted. Therefore, when screening a COC from PCL development, evaluate whether continued monitoring for the COC in the medium is warranted. Document the outcome of that evaluation in the APAR.

Document the technical justification used in concluding a COC screened from PCL development does not warrant continued monitoring.
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Many different issues, ranging from how the target COCs were determined to how the affected property assessment was conducted, must be considered when interpreting the assessment data. These considerations should take into account:

- the data gaps in the current or historical process or operational knowledge of chemicals handled at the facility;
- the sampling and analytical method strategies used to identify the target COCs and to conduct the assessment;

- potential conflicts between the level of required analytical performance and the actual analytical performance;
- the potential for analytical or field errors, such as laboratory or field contamination during sampling or sample handling;
- off-site release sources;
- background concentrations; and
- the potential for analytical or chemical "ghosts" (as described in Section 3.0 of this guidance).

The intent of §350.71(k) is:

- to “screen out” COCs definitively known or suspected to be associated with activities conducted at the on-site property **only when** those COCs meet the regulatory standards, e.g., the residential assessment levels. For example, tetrachloroethene from a dry cleaning facility using chlorinated solvents will only be screened from PCL development when the regulatory standards are met (e.g., residential assessment levels) in the environmental medium; and
- not to arbitrarily require a response action for COCs that are in fact not present in the environmental medium of interest or are not the result of activities conducted at the on-site property. Tetrachloroethene not associated with the facility or not released from the facility only needs to meet the requirements in §350.71(k).

The TCEQ’s intention with the §350.71(k) provisions is to provide the framework and conditions the person can apply to determine if PCL development is warranted for the COC. The provisions in §350.71(k) provide a consistent and defensible mechanism for distinguishing the target COCs that truly warrant PCL development, from all of the COCs for which analytical data were generated, i.e., the provisions in §350.71(k) were designed to screen from PCL development the:

- COCs considered to be analytical “ghosts” or analytical/sampling artifacts (unless specifically prohibited by the program area requirements),
- COCs attributable to releases not associated with activities conducted at the on-site property (unless specifically prohibited by the program area requirements),
- COCs having concentrations not exceeding the natural or anthropogenic background concentration, and
- target COCs clearly not present at concentrations greater than the residential assessment level.

Specifically, §350.71(k)(1) was designed to remove COCs from PCL development when it is clear the detected and nondetected results for the COC never exceeded the residential assessment levels.

The provisions in §350.71(k)(2) were designed to remove COCs from PCL development when:

- infrequent detection suggests the presence of the COC is an analytical or sampling artifact;
- based on laboratory and/or field blank sample data, the data usability reviewer concludes the presence of the COC is most likely attributable to laboratory or field contamination or cross contamination during sampling or sample handling activities;
- the detected concentrations are within the natural or anthropogenic background levels, or
- the on-site data indicate the release of the COCs was most likely not a result of on-site activities.

The provisions in 350.71(k)(3) were designed to evaluate:

- the nondetected results for COCs being screened under the §350.71(k)(2) provisions, and
- the COCs never detected in the environmental medium.

Specifically, the provision in §350.71(k)(3)(A) was designed for the target COCs known or suspected to be associated with activities conducted at the on-site property and any other COC meeting that provision. The provisions in §350.71(k)(3)(B) were designed for the COCs not known or anticipated to be associated with on-site activities.

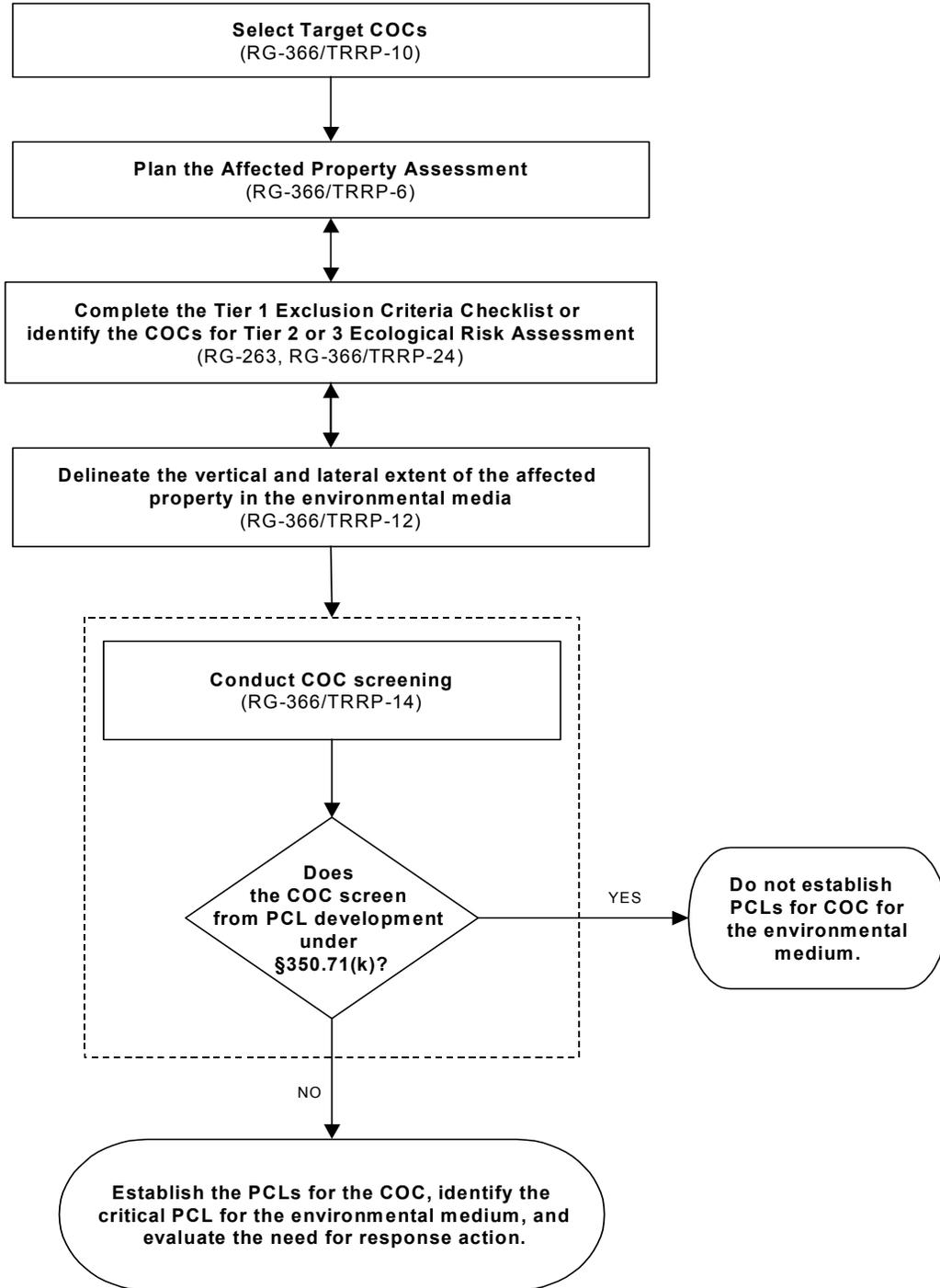


Figure 1. COC screening as part of the TRRP assessment process

2.0 Screening Process using §350.71(k)

Once the target COCs have been delineated to the residential assessment levels and after the data usability reviewer has reviewed the data, evaluate the analytical results for the target COCs for each environmental medium using the applicable screening provision(s). The environmental media for the purpose of screening COCs from PCL development are: surface soils, subsurface soils, groundwater, sediments, surface water, and air. Regardless of current land use, apply the residential assessment levels and residential land use assumptions during the screening process. Refer to the specific discussion entitled *Use of Residential Zones for Soils* in Attachment 1 for guidance on comparing soil COC concentrations to residential assessment levels.

The boxed text to the right describes important terms and concepts used in this guidance. A distinction is made between *COCs detected in the environmental medium* versus *COCs not detected in the environmental medium*, i.e., “detected COCs” versus “nondetected COCs,” respectively. A distinction is also made between *detected analytical results* and *nondetected analytical results*, i.e., measured/estimated concentrations for detected results versus sample quantitation limits for nondetected results (SQLs), respectively. **Note:** as used in §350.54(h) and in this guidance, the term “SQL” refers only to the values reported with a “less than” sign (i.e., “<”) or a “U” flag by the laboratory or the data reviewer for a nondetected result when the COC is not detected in a sample.

Figure 2.0 illustrates the following four-step procedure for sorting COCs prior to initiating the screening process under §350.71(k):

Step 1. Assign each sample to the environmental medium the sample is intended to represent based on the applicable exposure pathways, i.e., surface soils, subsurface soils, groundwater, sediment, or surface water. Note: if the Tier 1 ecological exclusion criteria in §350.77 are not met, each sample must also be assigned to the ecologically relevant environmental medium the sample is intended to represent based on the ecological exposure pathways

Important Terms and Concepts

MDL (method detection limit) – the lowest concentration at which the laboratory can detect the COC in a laboratory-fortified blank sample.

MQL (method quantitation limit) – the lowest concentration to which the laboratory can quantify a measurement with known accuracy and precision in a laboratory-fortified sample. The MQL is the lowest non-zero calibration standard in the laboratory’s initial calibration curve adjusted for volume or weight used for the standard.

SQL (sample quantitation limit) – the lowest concentration at which a COC could be detected in the environmental sample. The SQL is equal to the MDL adjusted for sample specific factors such as sample characteristics (e.g., percent moisture), cleanup/preparation procedures, and laboratory adjustments. The term “SQL,” as defined in §350.4, is a misnomer. It is not a quantitation limit; it is a detection limit and is analogous to the sample detection limit.

Detected COC – a COC present in some or all of the environmental samples. For detected COCs, the sampled population will be all detected results or be a mix of detected results in some samples and nondetected results in other samples from the environmental medium.

Nondetected COC – a COC not detect in any sample from the environmental medium. Sample results for nondetected COCs will be reported as less than the SQL, e.g., < 2.0 mg/L.

Detected analytical result – the concentration at which the laboratory could measure or estimate a COC present in an environmental sample.

Nondetected analytical result – reported by the laboratory as less than the SQL, e.g., < 2.0 mg/L, when the COC is not detected in an environmental sample.

For more information on the above terms, see *Reporting and Review of COC Concentration Data* (RG-366/TRRP-13).

Environmental Media – plural form of “medium” indicating more than one environmental matrix, e.g., surface soil and groundwater are two environmental media.

Environmental Medium – a single environmental matrix, e.g., surface soil is an environmental medium.

(i.e., soils, subsurface soils, surface water, sediment, and groundwater if known or suspected to be discharging into surface water).

Step 2. Segregate the COCs for each environmental medium into detected COCs and nondetected COCs as shown in Figure 2.0. This step is based solely on detections of the COCs. The magnitude of the reported results is considered in Step 3 below.

Step 3. For each environmental medium, segregate the detected COCs into those COCs with **all** measured concentrations and SQLs less than the residential assessment level and those COCs with one or more measured concentrations or SQLs greater than the residential assessment level. Segregate the nondetected COCs into those nondetected COCs with **all** SQLs less than the residential assessment levels and those nondetected COCs with one or more SQLs greater than the residential assessment levels.

These first three steps sort each COC into one of the following groups:

Group I COC: The COC is detected in at least one sample from the environmental medium, but all of the detected concentrations and SQLs are less than the residential assessment level in that medium.

Group II COC: The COC is detected in at least one sample from the environmental medium, and one or more of the detected concentrations or SQLs exceeds the residential assessment level in that medium.

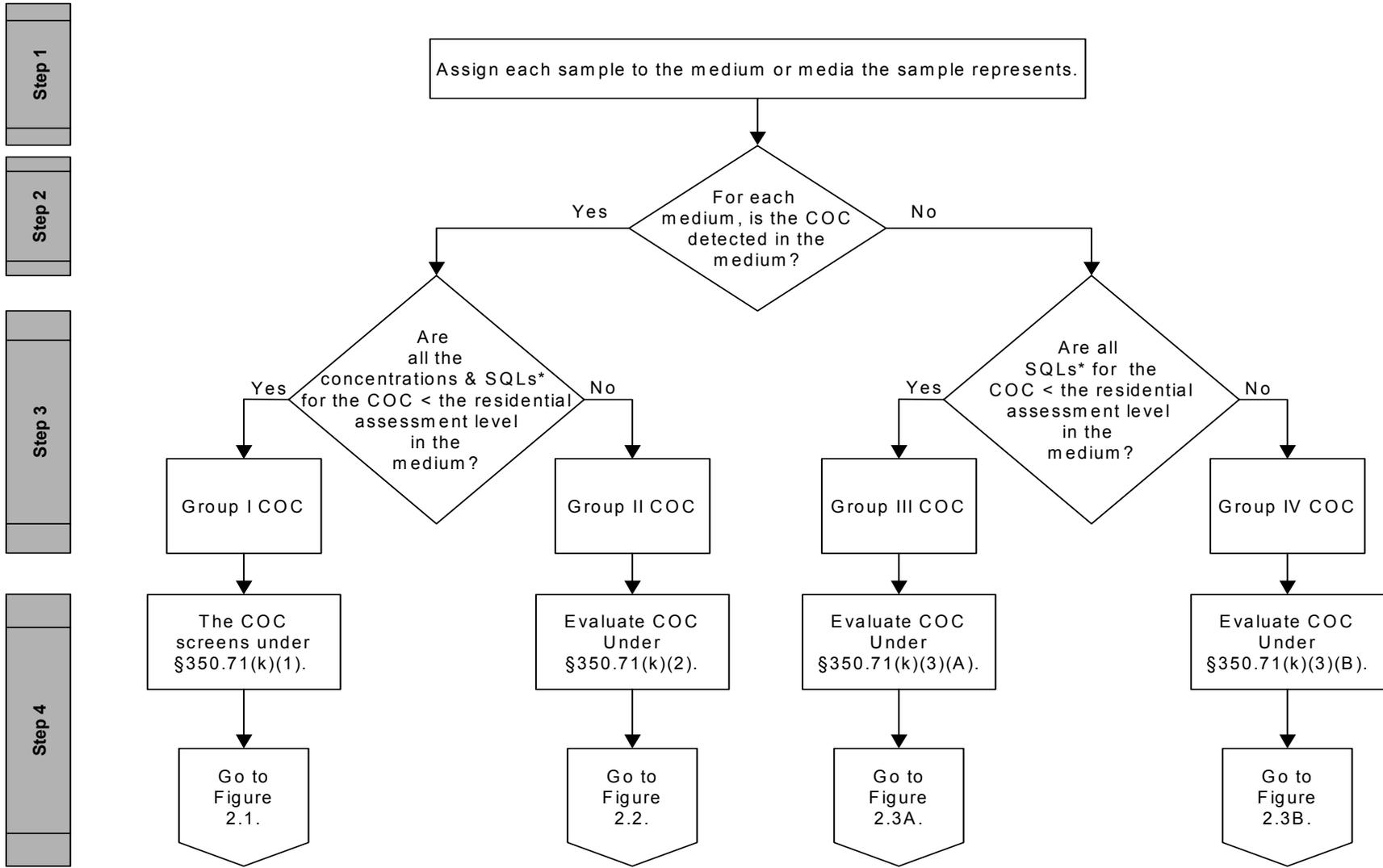
Group III COC: The COC is not detected in any of the samples collected from the environmental medium, and all SQLs for the COC are less than the residential assessment level in that medium.

Group IV COC: The COC is not detected in any of the samples collected from the environmental medium, but one or more of the SQLs is greater than the residential assessment level.

Step 4. Evaluate each COC in each environmental medium using the screening provision applicable to the group into which the COC was segregated. If the conditions in the provision are met, the COC can be screened from PCL development for the environmental medium evaluated. If the conditions are not met, evaluate the COC under other applicable provisions before concluding the COC requires PCL development. Table 1 defines:

- the COC groups,
- the initial rule provision for each group,
- the conditions the COC must meet under that provision to be screened from PCL development, and
- the figure and section of text in this guidance which outlines the screening process under that provision.

Note: During the screening process, the detected concentrations for the environmental medium and the SQLs (for the nondetected results) of the COC are compared to the residential assessment level. If the residential assessment level is less than the naturally occurring or anthropogenic background concentration, the representative background concentration becomes the residential assessment level. More information regarding representative background concentrations is available in the TCEQ guidance *Determining Representative Concentrations* (RG-366/TRRP-15). Also, see the rule definition of the term “background” in §350.4(a)(6) for more details to consider when using naturally occurring and anthropogenic background for the purposes of TRRP. If the method quantitation limit (MQL) of the standard available analytical method having the lowest MQL is greater than the residential assessment level, the MQL of that analytical method becomes the assessment level.



* SQLs for the nondetected results

Figure 2.0: The screening process using 350.71(k)

Table 1. Conditions for COC Screening

COC Groups in Each Environmental Medium		§350.71(k)	Conditions for COC Screening	Section & Figure
Detected COCs				
Group I	COC is detected in at least one sample in the environmental medium, but all detected concentrations and SQLs are less than the residential assessment level in that medium.	(1) *	In all other environmental media sampled, the detected concentrations and SQLs for the COC are less than the residential assessment level.	2.1
Group II	COC is detected in at least one sample in the environmental medium, and one or more of the detected concentrations or the SQLs is greater than the residential assessment level.	(2)	The SQLs for the nondetected results in the medium meet the conditions in §350.71(k)(3)(A) or (B), and the analytical data demonstrate one of the following conditions is met:	2.2
		(A)	The COC is detected in less than 5% of the samples and the TCEQ concurs no PCL is needed for the COC; or	2.2A
		(B) & (C)	The COC is present in an associated blank at concentrations similar to the concentrations detected in environmental samples and the COC is not anticipated to the present; or	2.2B 2.2C
		(D)	The COC does not exceed the background concentration; or	2.2D
		(E)	The release of the COC did not result from current or historical activities conducted at the on-site property.	2.2E
Nondetected COCs				
Group III	COC is not detected in any sample in the environmental medium, and the SQLs are less than the residential assessment level.	(3)(A)	All SQLs are less than the residential assessment level.	2.3A
Group IV	COC is not detected in any sample in the environmental medium, but one or more SQL is greater than the residential assessment level.	(3)(B)(i)	The appropriate method was used for the analysis; and	2.3B
		... (ii)	The COC is not associated with current or historical activities at the on-site property in any way; and	
		... (iii)	The SQLs for the COC in critical samples are less than the MQL; and	
		... (iv)	The COC is not a companion or daughter product of a known or suspected COC; and	
		... (v)	No companion or daughter products of the COC are detected; and	
		... (vi)	The analytical data and other evidence demonstrate the exposure potential is low.	

* Section §350.71(k)(1) is the only provision requiring the COC concentrations and the SQLs (for the nondetected results) to meet the residential assessment level in all sampled environmental media.

2.1 Screening Detected COCs under §350.71(k)(1)

Use rule provision in §350.71(k)(1) when the COC is detected in at least one sample in the environmental medium, and all detected concentrations and SQLs for the COC are less than the applicable residential assessment level in that medium and in **all** other sampled environmental media. As presented in Figure 2.1, no PCL needs to be established for the COC if all detected concentrations and SQLs for the COC in all of the sampled environmental media are less than the residential assessment level, i.e., the COC is a Group I COC for each medium sampled. The §350.71(k)(1) is the only provision requiring that the COC concentrations and the SQLs (for the nondetected results) meet the residential assessment level in **all** sampled environmental media. If the COC cannot be screened under this provision, evaluate the COC for the medium using the conditions in §350.71(k)(2) before concluding PCL development is needed.

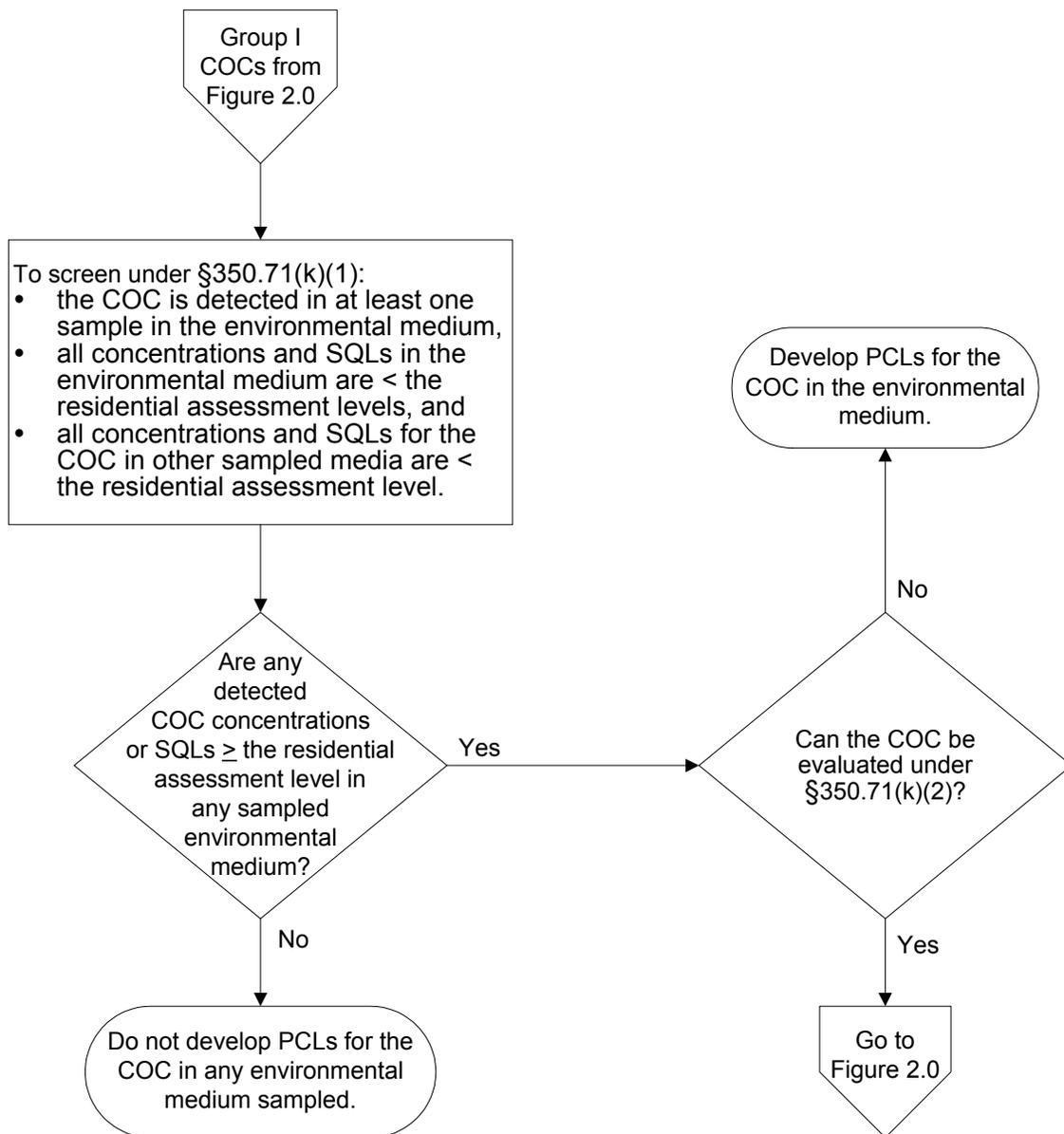


Figure 2.1. Screening under §350.71(k)(1)

2.2 Screening Detected COCs under §350.71(k)(2)

Use the rule provision in §350.71(k)(2) when:

- the COC is detected in one or more samples from the medium and one or more of the detected concentrations or SQLs is greater than the residential assessment level, i.e., a Group II COC, or
- the COC is detected but cannot be screened from PCL development under the provisions in §350.71(k)(1).

In order to successfully screen from PCL development, the COC must meet one of the conditions in §350.71(k)(2), **and** the SQLs of the nondetected results for the COC must meet one of the provisions in §350.71(k)(3), as discussed in Section 2.3.

Evaluate the COCs on a medium-by-medium basis; a COC can be screened from PCL development for one medium even though development of PCLs for the same COC in a different medium may be required. For example, a COC detected in groundwater may meet one of the conditions in §350.71(k)(2) and be screened from groundwater PCL development. The same COC may be detected in surface soils and not meet the screening conditions specified in §350.71(k)(1) or §350.71(k)(2). Therefore, development of surface soil PCLs (i.e., ^{Tot}Soil_{Comb} and ^{GW}Soil) would be required for the COC.

Note: The COC in the environmental medium can be evaluated using any of the provisions in §350.71(k)(2). For example, a COC might not screen from PCL development based on §350.71(k)(2)(A), but upon evaluation under §350.71(k)(2)(D), the COC will screen. Figure 2.2 presents an overview of the available options and the §350.71(k)(2) provision(s) most applicable for the COC. Figures 2.2A through 2.2E, and the associated text, present the detailed steps for each option to determine whether the COC meets the specific rule conditions in the environmental medium being evaluated.

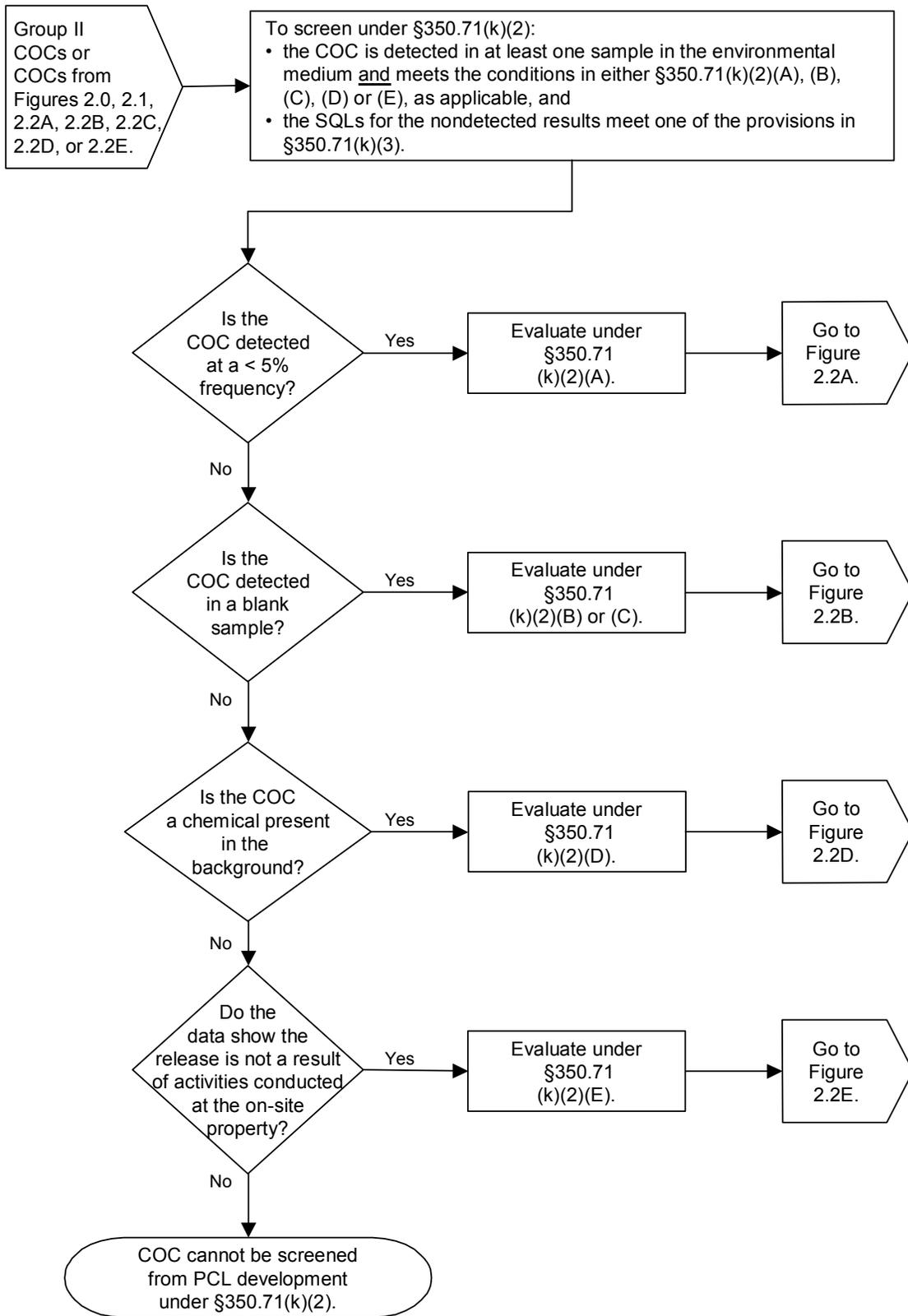


Figure 2.2. Screening Process Under 350.71(k)(2)

2.2A Screening Detected COCs Under §350.71(k)(2)(A)

Use the provisions in §350.71(k)(2)(A) when the COC is detected in *less than five percent* of the samples collected from the environmental medium and analyzed for the COC. This provision is commonly referred to as the “frequency of detection” provision for screening COCs from PCL development. Figure 2.2A outlines the steps to determine if the COC in the environmental medium meets §350.71(k)(2)(A).

Use this provision when:

- more than 20 samples are collected from the environmental medium, and
- the COC is detected in at least one sample from the environmental medium.

Note: If attempting to screen a COC detected in the groundwater or soil and the COC is known or suspected to be associated with current or historical activities conducted at the on-site property, give particular attention to each of the factors listed in the §350.71(k)(2)(A)(iii) condition. Provide the technically defensible justification used to conclude the COC can be screened and specifically identify and discuss any uncertainty associated with that conclusion. If no uncertainty is identified, make a statement to that effect. The TCEQ will critically review that demonstration. One of the TCEQ’s primary missions is to protect groundwater resources. As expressed at §350.37(k), in the absence of a groundwater protective concentration level exceedance (PCLE) zone within Class 1, 2, or 3 groundwater, the on-site point of exposure (POE) for the groundwater ingestion pathway is throughout the uppermost groundwater-bearing unit. To hold true to its mission, the TCEQ will be hesitant to agree that a COC known or suspected to be associated with current or historical activities conducted at the on-site property **and** detected in groundwater or soils can screen from PCL development using this §350.71(k)(2)(A) provision. The §350.71(k)(2)(A) provision was designed primarily to deal with analytical artifacts, e.g., COCs not attributable to the site but reported as detected in the laboratory reports.

The frequency of detection is calculated by dividing the total number of times the COC is detected in the environmental medium by the total number of representative samples collected from the medium and analyzed for the COC. The formula for calculating the frequency of detections is

$$\% \text{ Frequency of detections} = \frac{X_D(100)}{X_T}$$

Where; X_D = the number of detected results for the COC in the environmental medium
 X_T = the total number of samples collected from the environmental medium and analyzed for the COC

Under §350.71(k)(2)(A)(iii), the TCEQ may require the development of PCLs for a COC meeting the conditions in §350.71(k)(2)(A)(i) and (ii), based upon:

- the concentration and distribution of the COC in the environmental media,
- the completeness in the information regarding the source or potential source of the COC at the on-site property,
- the complete or reasonably anticipated to be complete exposure pathway(s),
- the completeness in the knowledge of on-site operations,
- the toxicity, fate and transport characteristics of the COC and of the on-site property, and
- the daughter/companion relationship of the COC to other COCs.

Develop PCLs for the COC in the environmental medium if:

- the COC is detected in less than 5% of the samples analyzed for the COC in the environmental medium, but the SQLs for the COC do not meet the conditions of §350.71(k)(3); or
- the SQLs for the nondetected results meet the conditions in §350.71(k)(3), but the COC is detected in 5% or more of the samples from the environmental medium; or
- as discussed above, the COC in the environmental medium warrants development of a PCL.

Do not develop PCLs for the COC in the environmental medium if:

- the COC is detected in less than 5% of the 20 or more samples analyzed for the COC and the SQLs for the COC meet the conditions of §350.71(k)(3), and
- the COC in the environmental medium does not warrant development of a PCL.

To document a COC can be successfully screened from PCL development under §350.71(k)(2)(A), the APAR must include:

- a map of the sample locations with concentration distributions to demonstrate the sampled locations represent environmental conditions of the on-site property;
- the justification and supporting data for concluding the source(s) of COCs at the on-site property is fully identified and characterized;
- the justification for concluding the information regarding the types and locations of activities associated with the property are known or defined;
- the toxicity, fate, and transport assumptions used to conclude PCLs are not warranted for the COC;
- a discussion regarding the potential chemical or biochemical degradation chemicals (e.g., ultraviolet degradation or metabolic degradation, respectively) to anticipate if the COC were left in place,
- the rationale and assumptions used to conclude the COC does not warrant the development of PCLs, and
- the uncertainty associated with that conclusion.

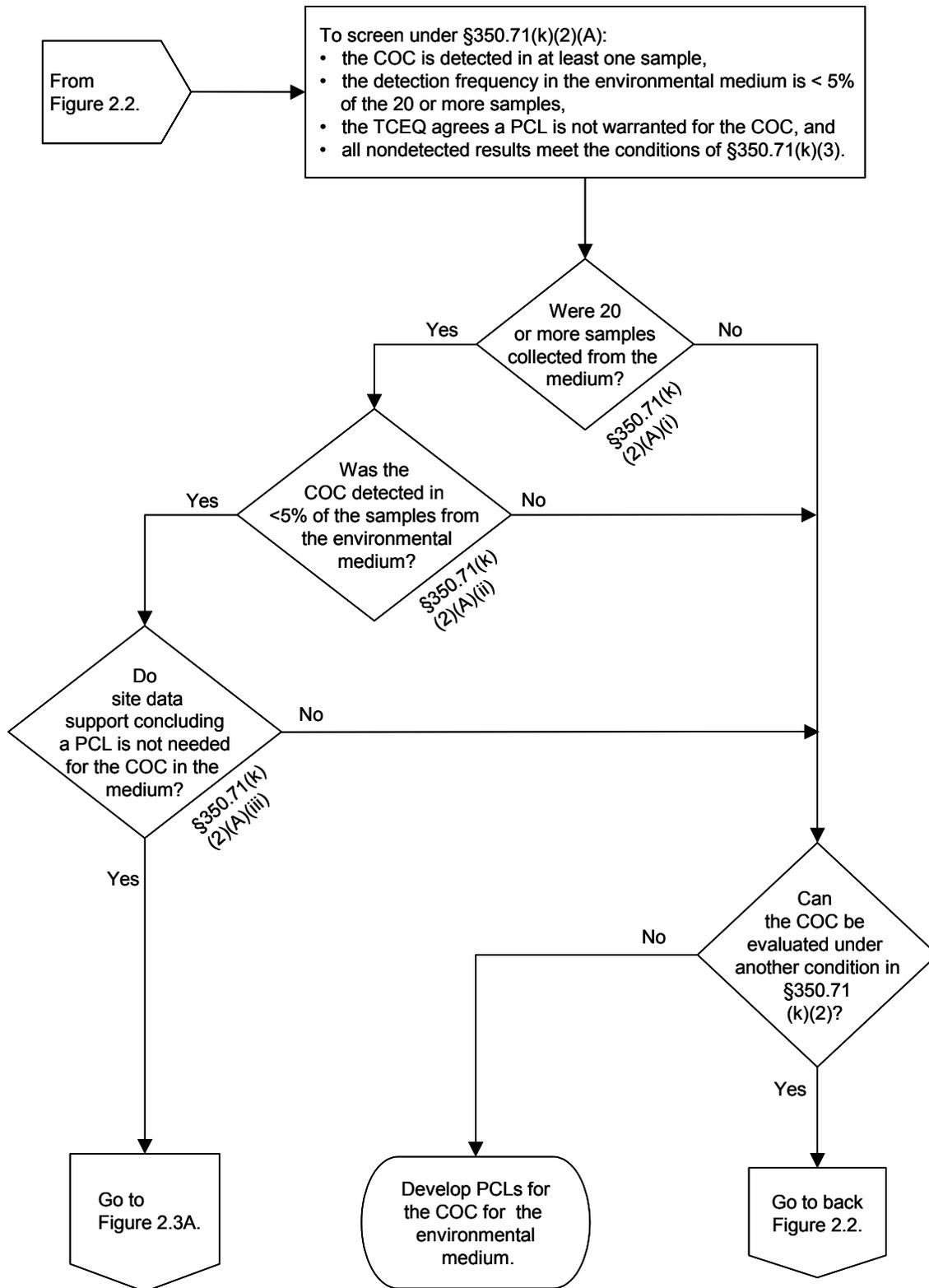


Figure 2.2A. Detailed screening steps under §350.71(k)(2)(A)

2.2B Screening Detected COCs Under §350.71(k)(2)(B)

This provision of §350.71(k)(2)(B) is applicable only to the common laboratory contaminants listed in Table 2 below. The COC must be detected in an associated blank sample in order for this screening provision to apply. Figure 2.2B outlines the steps for determining if a COC can be screened under this provision. **Note:** Even if the COC is a common laboratory contaminant, the COC **cannot** be screened under this provision if the COC is in any way associated with current or historical activities conducted on or at the on-site property, including as a chemical companion or daughter product.

Table 2. Common Laboratory Contaminants

Contaminant	CAS #	Contaminant	CAS #
Acetone	67-64-1	Butylbenzyl phthalate	85-68-7
2-Butanone (Methyl ethyl ketone)	78-93-3	Diethyl phthalate	84-66-2
Methylene chloride	75-09-2	Dimethyl phthalate	131-11-3
Toluene	108-88-3	Di-n-butyl phthalate	84-74-2
Bis(2-ethylhexyl)phthalate	117-81-7	Di-n-octylphthalate	117-84-0

Following the guidance in *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13), the data usability reviewer will have applied the “ten times” factor to the data as allowed under this screening provision and will have qualified the data in the data summary tables accordingly. When evaluating a COC under this screening provision, use the data summary tables to determine if the COC is detected in any sample from the environmental medium. If all of the data entries in the data summary table for the COC are assigned a “U” or a “less than” value, e.g., <2.0 ug/L, then the COC is not detected based on the data usability review.

Develop PCLs for the COC if:

- the data summary table documents the COC is detected in the environmental medium after the data usability review has been completed, or
- one or more of the SQLs does not meet the provisions in §350.71(k)(3).

Do not develop PCLs for the COC if:

- the data summary table documents the COC is not detected in the environmental medium after the data usability review has been completed, and the SQLs meet the provisions in §350.71(k)(3).

Note: If any of the identified common laboratory contaminants are COCs known or suspected to be associated with the property, evaluate the laboratory’s historical performance for the COC in blank samples and discuss with the laboratory prior to submitting environmental samples to that laboratory. The laboratory should not be expected to have all blank samples completely free of these chemicals, but an evaluation of the extent to which the laboratory is successful in keeping the blank samples as free as possible from laboratory contamination may be helpful.

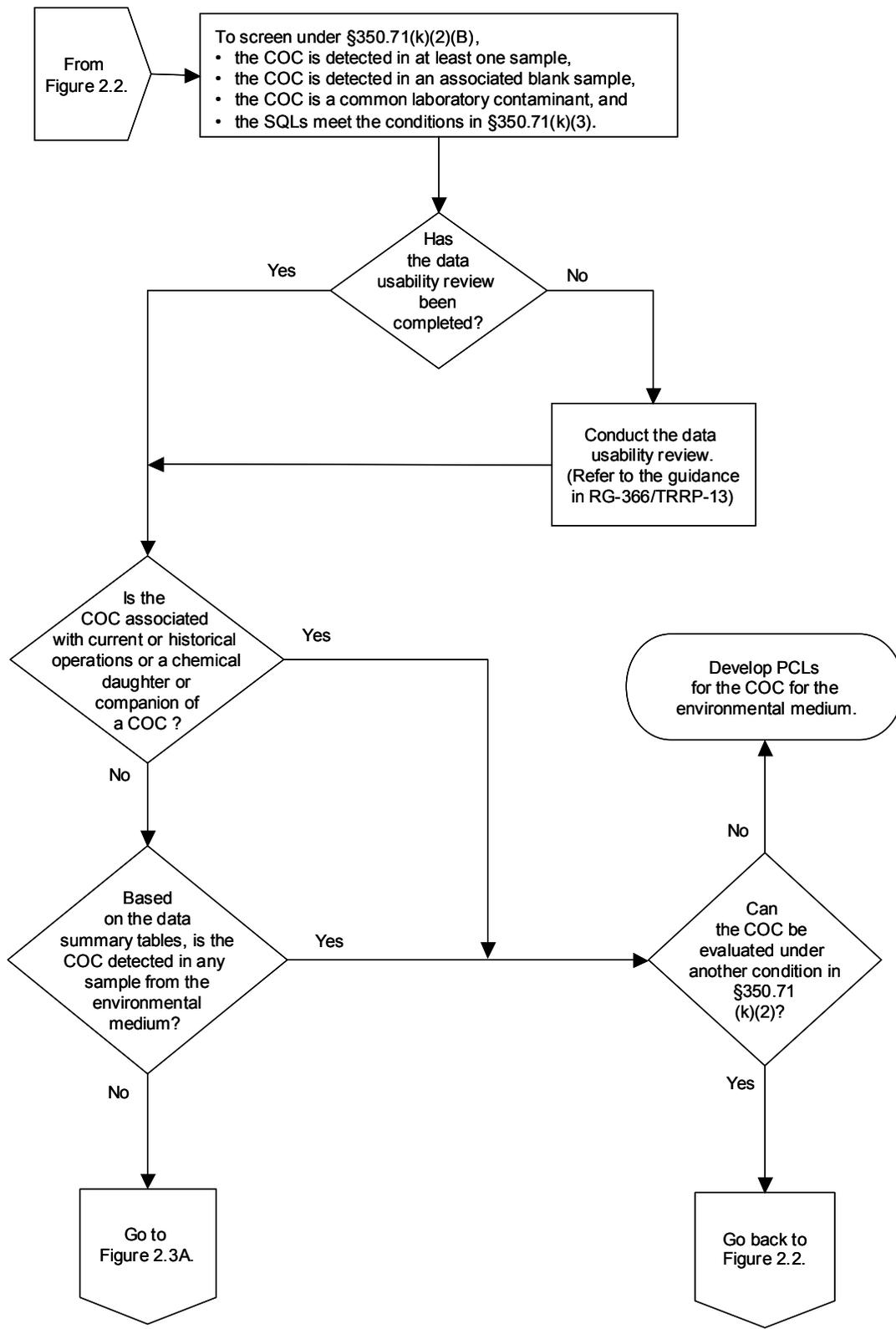


Figure 2.2B. Detailed screening steps under §350.71(k)(2)(B)

2.2C Screening Detected COCs Under §350.71(k)(2)(C)

Use the conditions of §350.71(k)(2)(C) for screening when the detected COC is found in one or more associated blank samples, but the COC is not one of the common laboratory contaminants listed above in Table 2. **Note:** If the COC is known or suspected to be associated with current or historical activities conducted at the on-site property, the COC **cannot** be screened from PCL development using this rule provision. If the COC is not suspected of being associated with the property in any way, including not as a chemical companion or daughter product, and is detected in an associated blank sample, the presence of the COC cannot be solely attributed to the sample from the environmental medium. Figure 2.2C outlines the steps for determining if a COC can be screened under this provision.

Following the guidance in *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13), the data usability reviewer will have applied the “five times” factor to the data as allowed under this screening provision and will have qualified the data in the data summary tables accordingly. When evaluating a COC under this screening provision, use the data summary tables to determine if the COC is detected in any sample from the environmental medium. If all of the data entries in the data summary table for the COC are assigned a “U” or a “less than” value, e.g., <2.0 ug/L, then the COC is not detected based on the data usability review.

Develop PCLs for the COC if:

- the data summary table documents the COC is detected in the environmental medium after the data usability review has been completed, or
- one or more of the SQLs does not meet the provisions in §350.71(k)(3).

Do not develop PCLs for the COC if:

- the data summary table documents the COC is not detected in the environmental medium after the data usability review has been completed, and the SQLs meet the provisions in §350.71(k)(3).

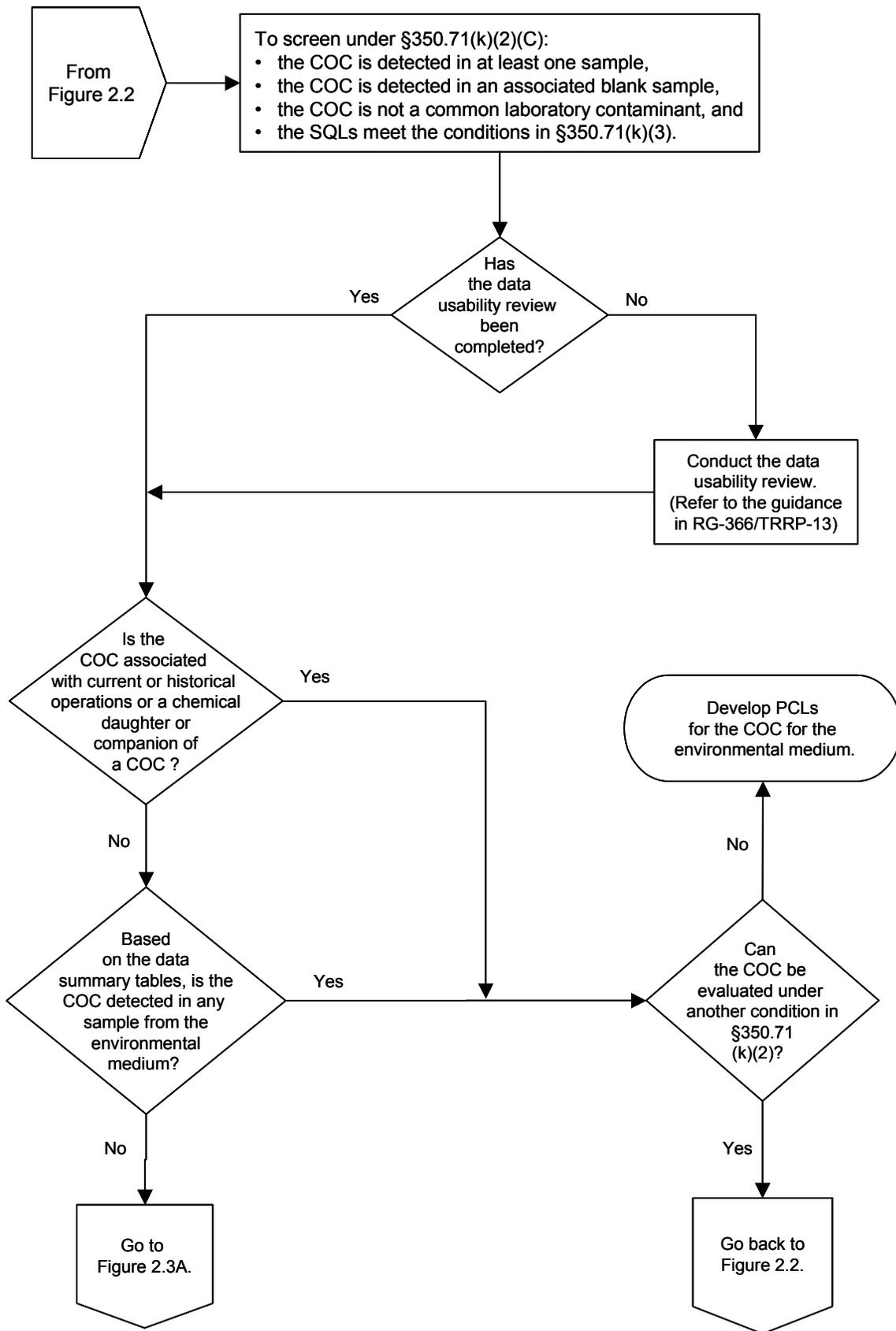


Figure 2.2C. Detailed screening steps under §350.71(k)(2)(C)

2.2D Screening Detected COCs Under §350.71(k)(2)(D)

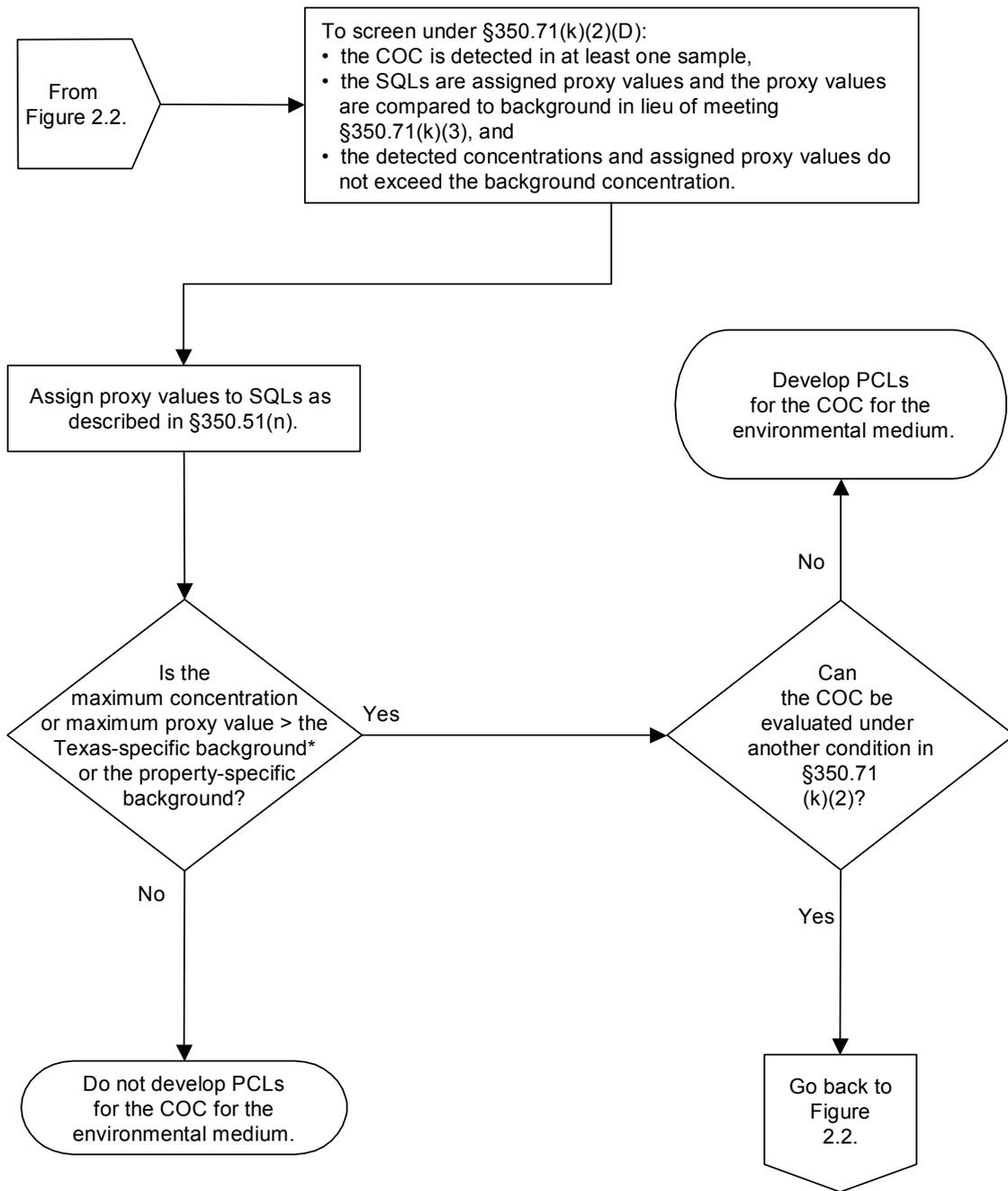
Use the provision of §350.71(k)(2)(D) when the detected COC is a component present in the environmental background. More information regarding the process for estimating background is presented in *Determining Representative Concentrations* (RG-366/TRRP-15). Also, refer to the definition of the term “background” in the TRRP rule under §350.4(a)(6) for more detail regarding the use of naturally occurring or anthropogenic background.

Under this provision, proxy values are assigned to the nondetected results prior to evaluation. Under §350.51(n), a proxy value is assigned for nondetected results based on the distribution data for the COC. If the nearby concentrations indicate the COC is likely to be present at concentrations near to but below the SQL, assign the proxy value equal to the SQL. If the nearby data indicate the COC is expected to be at concentrations much lower than the SQL, professional judgment can be used to assign $\frac{1}{2}$ the SQL as a proxy value. Figure 2.2D outlines the steps for determining if the COC can be screened under this provision.

Develop PCLs for the COC in the environmental medium if the maximum detected result or the maximum proxy value for the COC exceeds the established background concentrations.

Do not develop PCLs for the COC in the environmental medium if no detected results and no proxy values exceed the established background concentration.

Note: The data set will not contain any SQLs, i.e., less than values or “U” qualified values, once the proxy values are assigned to the SQLs for the COC. Therefore, the COC data set evaluated under this screening provision will not contain any SQLs, i.e., nondetected results, to screen against the §350.71(k)(3) provisions.



*Default published background values only available for select metals in soils.

Figure 2.2D. Detailed screening steps under §350.71(k)(2)(D)

2.2E Screening Detected COCs Under §350.71(k)(2)(E)

Use the provision in §350.71(k)(2)(E) when the COC is detected in the environmental medium, but the release of that COC is not the result of current or historical activities conducted at the on-site property, and the program area does not require the COC to be addressed. Figure 2.2E outlines the steps to determine if the COC can be screened using this provision. To demonstrate these conditions have been met, discuss the specific data and sample points used to conclude no release of that COC has occurred, and provide justification based on:

- the concentration and distribution of the COC in the environmental medium,
- source area information,
- consideration of chemical companion and daughter products, and
- knowledge of on-site historical operations.

Keep in mind, in some situations, the Voluntary Cleanup Program and the Superfund Program areas may not allow the COCs to screen from PCL development even though the COCs did not originate from the property under investigation.

Develop PCLs if the available data and information fail to demonstrate the release of the COC is not the result of activities conducted at the on-site property.

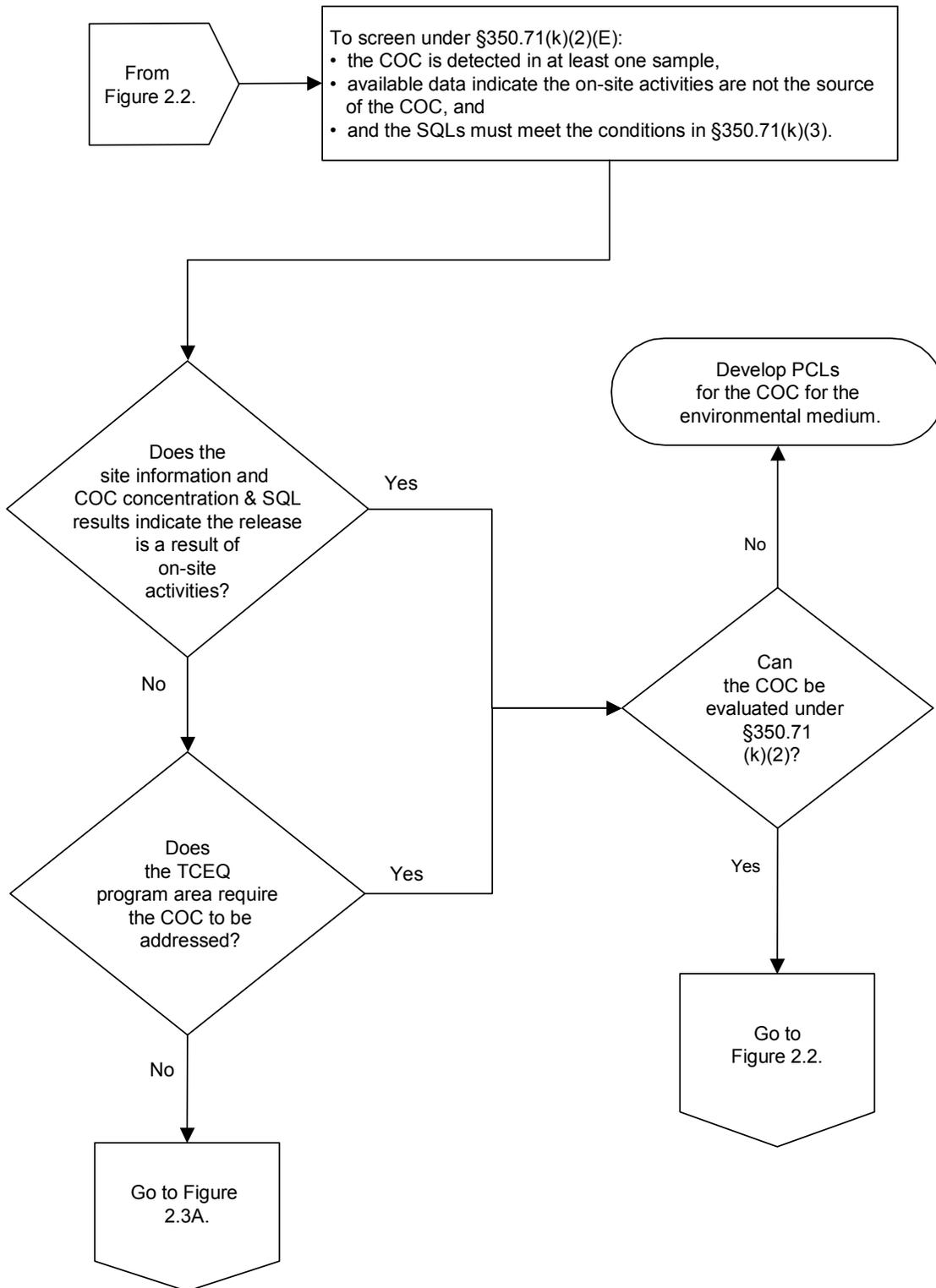


Figure 2.2E. Detailed screening steps under §350.71(k)(2)(E)

2.3 Screening COCs under §350.71(k)(3)

The rule provisions in §350.71(k)(3) are applicable to:

- COCs not detected in any samples from an environmental medium, or
- the nondetected results for a COC being evaluated under the provisions in §350.71(k)(2).

In laying out the §350.71(k)(3) provisions, the agency anticipated the assessment data would include the analytical results generated from broad-spectrum analytical methods, such as SW846-8260 and 8270. Since the broad-spectrum methods analyze for many chemicals, the assessment data would include detected and nondetected results for target COCs as well as detected and nondetected results for the other chemicals amenable to that type of analysis, i.e., analytical artifacts or chemicals not associated with the on-site property under assessment. If the analytical artifact is never detected, the chemical is considered a chemical “ghost,” i.e., the chemical:

- is never detected at the on-site property under assessment, **and**
- is not known or suspected to be associated with current or historical activities conducted at the on-site property under assessment, **and**
- is not chemically related through daughter, companion, or parental relationships with target COCs or other chemicals detected in the environmental medium, **and**
- has SQLs exceeding the residential assessment levels.

The nondetected results for the target COCs must meet the provisions in §350.71(k)(3)(A), whether a broad-spectrum method is used or not. However, the chemical “ghosts” can be screened under either §350.71(k)(3)(A) or (B). Therefore, the nondetected results can exceed the residential assessment level and the MQL can be greater than the residential assessment level for a “ghost,” but the “ghost” may still screen from PCL development if the provisions in §350.71(k)(3)(B) are met. The provisions in §350.71(k)(3)(B) were specifically designed to remove from PCL development the COCs not known or suspected to be associated with the on-site property under assessment based upon a weight-of-evidence demonstration in meeting the conditions of the §350.71(k)(3)(B) provision.

2.3A Screening COCs Under §350.71(k)(3)(A)

The rule provision §350.71(k)(3)(A) is applicable to all target COCs, to COCs not detected in an environmental medium, and to the nondetected results (i.e., the SQLs) of detected COCs as required under §350.71(k)(2). Figure 2.3A outlines the process used to evaluate COCs under this provision.

Note: Use this provision to evaluate the SQLs for all COCs known or anticipated to be associated with activities conducted at the on-site property and for all COCs if the TCEQ program area prohibits the use of §350.71(k)(3)(B) for certain projects or sites. As illustrated in Figure 2.3A, target COCs cannot be evaluated under §350.71(k)(3)(B).

Develop PCLs for the COC if any SQL is greater than the residential assessment level or determine if the COC can be evaluated under §350.71(k)(3)(B).

Do not develop PCLs for the COC if all of the SQLs in the samples collected from that environmental medium are less than the residential assessment level.

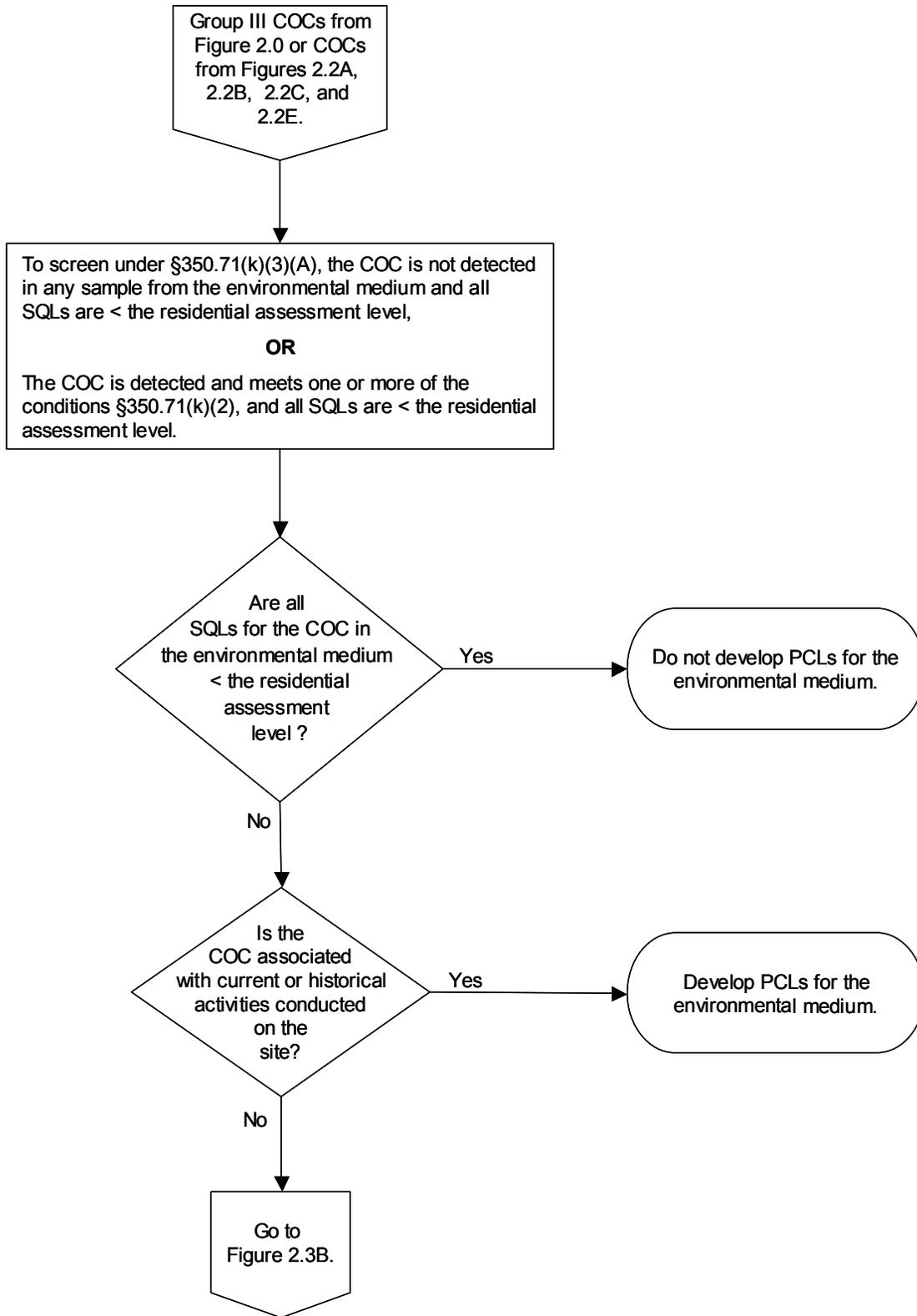


Figure 2.3A. Detailed screening steps under §350.71(k)(3)(A)

2.3B Screening COCs Under §350.71(k)(3)(B)

To use this provision, the COC must meet **all** of the conditions specified in §350.71(k)(3)(B) to screen from PCL development. Each of the conditions is discussed in detail below, and Figure 2.3B illustrates the process for evaluating COCs under this provision. If the chemical is a “ghost” as discussed in Section 2.3, determine if the weight of the evidence justifies screening the chemical from PCL development when some of the SQLs are greater than the residential assessment level. Document the rationale used.

Note: All of the §350.71(k)(3)(B) conditions must be met. If the COC is associated in any way with current or historical activities conducted on the on-site property, or if the COC is a chemical parent, daughter, or companion product to a target COC, the COC cannot be screened from PCL development using this rule provision.

The analytical method used must be appropriate for the intended use of the data [§350.71(k)(3)(B)(i)]. If the data for a COC was generated to answer the question: “What chemicals are detected in the environmental medium other than the known or suspected target COCs?”, then an analytical method capable of providing a “broad-spectrum” view of chemicals in the medium would have been appropriate to answer that question. Broad-spectrum methods include such analytical methods as SW846-8260 or SW846-8270 or chemical class methods. These broad-spectrum methods provide a wide chemical scan of a sample and are helpful in identifying chemicals detected. However, these broad-spectrum methods are not always capable of achieving MQLs low enough to meet the residential assessment levels for some compounds. Under this condition, if the data were generated using a method appropriate for answering the question as to what chemicals other than known or suspected COCs are present at the site, the method is appropriate. An example entitled *Example Scenario When an Analytical Method is Appropriate under §350.71(k)(3)(B)(i)* is provided in Attachment 1.

The COC is not anticipated to be present at the affected [on-site] property [§350.71(k)(3)(B)(ii)]. The COC is not a COC known or suspected to be associated with current or historical activities or operations conducted at the property based on site information such as:

- source area information and historical analytical data for the site;
- knowledge of on-site historical and current operations and of chemicals associated with standard industry practices related to the processes conducted at the on-site property; and
- fate and transport characteristics of the COC.

The SQLs of the COC in critical samples are less than the MQL of the analytical method used [§350.71(k)(3)(B)(iii)]. Interpret this condition to read “The SQLs of the COC in critical samples are less than the higher of the residential assessment level or the MQL of the analytical method used.” Because the SQL is a function of the method detection limit (MDL), it is reasonable to anticipate the SQL will be less than the MQL in samples having little or no interference. The term “critical sample” is discussed in *Reporting and Review of COC Concentration Data* (RG-366/TRRP-13). If an appropriate method has been used to gain a “broad-spectrum” perspective of the chemicals present in the sample, the MQL of that method becomes the value against which the data are compared under this provision, provided the other conditions of this §350.71(k)(3)(B) are met.

The COC is not a companion or daughter product of a parent COC [§350.71(k)(3)(B)(iv)]. The COC does not have a chemical relationship with any target COC known or suspected to be associated with the current or historical activities or operations conducted at the on-site property. For example, if the release was from a degreasing unit at the site and trichloroethene (TCE) was the only degreasing solvent used, TCE would be a COC. Because TCE degrades to 1,2-dichloroethenes (1,2-DCEs) and vinyl chloride in groundwater under most groundwater conditions, the 1,2-DCEs and vinyl chloride would not meet this screening condition, because they are daughter products of TCE. Additionally, 1,4-dioxane is

used as a preservative for chlorinated solvents and may be a companion to TCE. Therefore, 1,4-dioxane would not meet this screening condition. Another example would be a release from a gasoline storage tank. Benzene, toluene, ethyl benzene, and the xylenes would be indicator COCs for the gasoline. The oxygenate methyl-*tert*-butyl-ether (MTBE) is commonly added to gasoline. Therefore, the MTBE would be considered a companion to the BTEX and would not meet this screening condition. Additionally, *tert*-butyl alcohol would not meet this screening condition because it is a daughter chemical produced in the degradation of MTBE in groundwater.

No companion or daughter products to this parent COC are detected [§350.71(k)(3)(B)(v)]. The COC is not a chemical parent to any detected COC at the on-site property. For example, if pentachlorophenol is not detected at the affected property but the other polychlorinated phenols are detected at the on-site property, then pentachlorophenol would not meet this screening condition. Chlorinated phenols are chemical daughter products generated during degradation of pentachlorophenol in the environment. If the site history and knowledge of the process conducted at the on-site property are complete and the COC under evaluation would not be anticipated based on that information, make a demonstration the COC meets this condition. Include in that demonstration a discussion regarding both the degradation and companion relationships between the target COCs, the detected COCs, and the COC under evaluation.

Without considering physical or institutional controls, the potential human health or ecological exposure to the COC is low [§350.71(k)(3)(B)(vi)]. This condition requires professional judgment in considering the likelihood of the exposure to the COC. The professional judgment must be based on the conditions as the facility currently exists and the:

- use and conditions of the affected property, e.g., the site is active, the site has restricted access, or the affected property is not readily accessible, such as being located beneath an existing cover,
- type of environmental media into which the release occurred and the nature of the source area,
- fate and transport characteristics of the COC,
- nature and quality of the groundwater threatened or affected by the release,
- current and probable future local use of the groundwater and surface water, and
- proximity of current and future potential receptors.

Use the weight of the evidence to document the likelihood of human health and ecological exposure by considering all of the aspects of potential exposure while applying appropriate weight to the different aspects based on site settings.

An example of low exposure potential would be:

- the site is active and the affected property is readily accessible,
- the COC has very low mobility in soil and the groundwater is deep,
- the groundwater use is documented in wells in proximity to the site, but no shallow groundwater-bearing unit is present;
- site geology precludes reasonably anticipated instances of exposure via direct contact or vapors at ground surface, and
- no surface water is reasonably anticipated to be affected or threatened.

Note: For a COC meeting all of the conditions but the §350.71(k)(3)(B)(vi) condition, i.e., the exposure potential is not low, the response action can be limited to making the exposure potential low for that COC, unless expressly prohibited by the requirements of the TCEQ program area, i.e., the Superfund program or the Voluntary Cleanup Program.

Develop PCLs for the COC if either the COC or the on-site property does not meet all of these conditions in §350.71(k)(3)(B) as discussed above. Do not develop PCLs for the COC if the COC and the on-site property meet all of these conditions in §350.71(k)(3)(B) as discussed above.

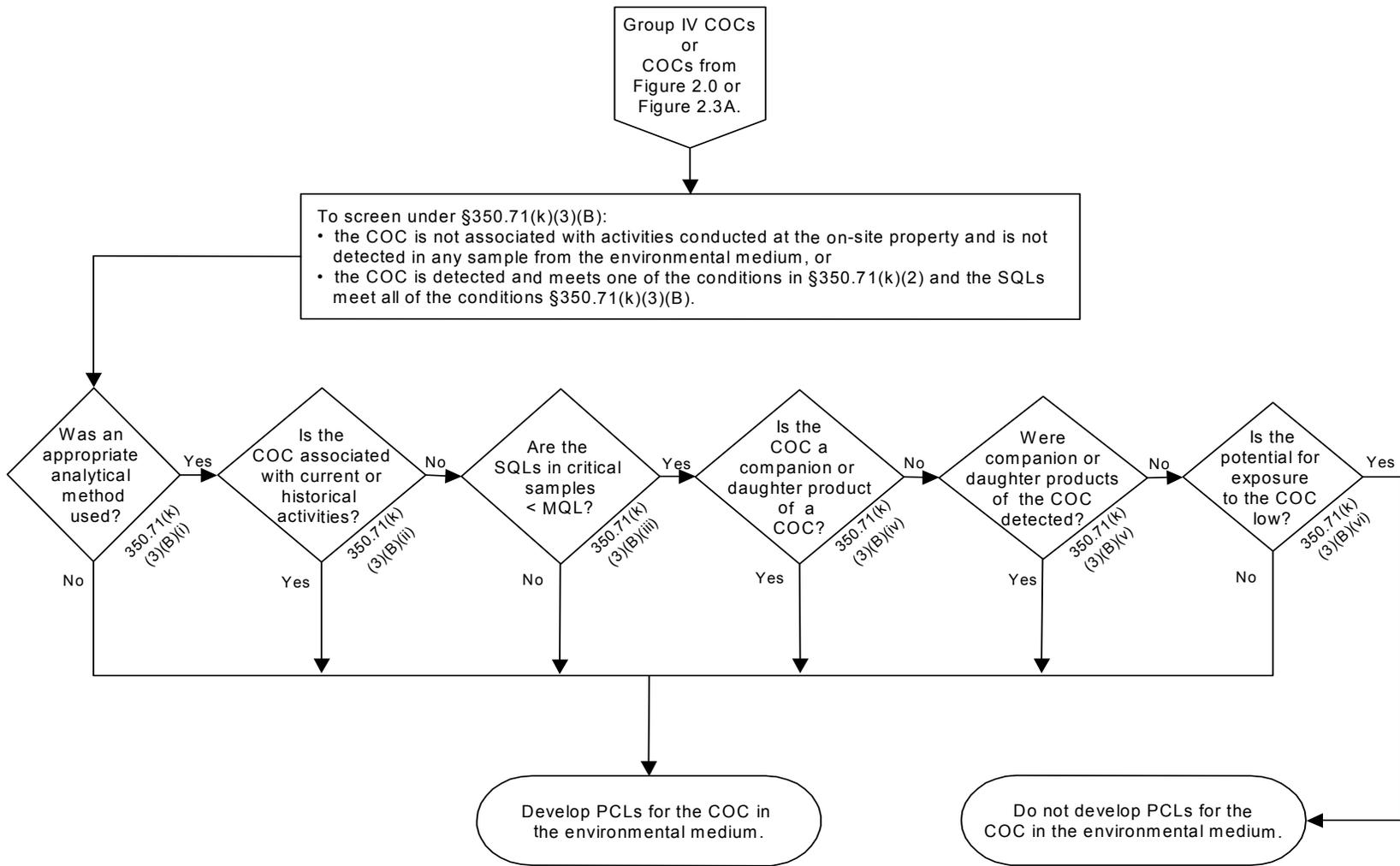


Figure 2.3B. Detail screening steps under §350.71(k)(3)(B)

Attachment 1

Example Scenario for Continued COC Monitoring

Continued monitoring of a COC might be required under certain circumstances. For example, at a site undergoing assessment, the target COCs are:

- tetrachloroethene or perchloroethylene (PCE),
- trichloroethene (TCE),
- *cis*-1, 2-dichloroethene (daughter product of PCE and TCE),
- *trans*-1, 2-dichloroethene (daughter product of PCE and TCE),
- vinyl chloride (daughter product of PCE and TCE), and
- 1,4-dioxane (companion chemical).

The assessment data demonstrate vinyl chloride and 1,4-dioxane screen from PCL development, and PCLs only need to be developed for tetrachloroethene, trichloroethene, and the 1,2-dichloroethenes. In this example, vinyl chloride is screened from PCL development under §350.71(k)(3)(A) because currently it is not detected in the groundwater and all of the SQLs are less than the groundwater residential assessment level for vinyl chloride. The 1,4-dioxane was detected in the groundwater but can be screened from PCL development under §350.71(k)(1) because all of the detected results and the SQLs in the groundwater and all other sampled media are less than residential assessment levels for 1,4-dioxane. Even though no PCLs are needed for the vinyl chloride, continued monitoring for vinyl chloride may be necessary, because, until successfully remediated, the parent COCs tetrachloroethene, trichloroethene, and the dichloroethenes serve as a potential source of vinyl chloride in the groundwater. Even though detected in the groundwater, the 1,4-dioxane does not warrant continued monitoring, because as a stabilizer used in chlorinated solvents, it is a companion chemical. Its concentration over time will not increase due to the chemical or microbial degradation of the other COCs in the groundwater, and the assessment data demonstrate the surface and subsurface soils are protective of groundwater for 1,4-dioxane.

Another example when monitoring of a COC may be required is as follows: Benzene is detected in soil greater than the residential assessment level and cannot be screened from PCL development using §350.71(k)(2). The person must develop soil PCLs for benzene. At the same time and at the same property, benzene is not detected in the groundwater, and benzene in the groundwater can be screened from PCL development under §350.71(3)(A), because all of the SQLs are less than the groundwater residential assessment level for benzene at this point in time. Considering the potential for exposure to the groundwater based on property conditions, continued monitoring of the groundwater for benzene might be required to verify the effectiveness of the soil response action and to ensure benzene did not migrate to the groundwater at unacceptable levels prior to the response action being completed.

Use of Residential Zones for Soils

As stated earlier in Section 2.0, regardless of current land use, apply the residential assessment levels and residential land use assumptions during the screening process. Consider the depth of soil samples when comparing COC concentrations and nondetected results (i.e., SQLs) in the environmental medium to residential assessment level.

For human health exposure considerations,

- surface soils are from zero to 15 feet or to bedrock or to the top of a groundwater-bearing unit; whichever is encountered first, and
- subsurface soils are soils greater than 15 feet to bedrock or the top of the first groundwater-bearing unit; whichever is encountered first.

For ecological exposure considerations,

- surface soils are soils between zero to six inches, and
- subsurface soils are soils between six inches and five feet.

For example, even when the current land use is commercial/industrial, compare soil samples collected at 13 feet to the surface soil residential assessment levels to determine if a PCL is needed for human health considerations. If the assessment must address ecological concerns, this soil sample collected at 13 feet would not be considered in the ecological assessment, because it is at a depth of greater than five feet.

Use the current land use assumptions when establishing PCLs for the COC in the environmental medium. Then, compare the soil concentrations to the critical PCL applicable to the depth from which the sample was collected to determine if PCL exceedance zones exist in the soil for the COC. For example, if the current site land use is commercial/industrial, develop the PCLs for the COC using commercial/industrial land use assumptions. Once those PCLs are established and the critical PCL is identified for each medium, compare the assessment data to the critical PCL to determine if a response action is needed in the medium for the COC. Referring back to the example where the assessment soil sample was collected at 13 feet and because commercial/industrial subsurface soils are all soils at depths greater than 5 feet, compare the concentration of the COC in that sample to the critical commercial/industrial PCL established for subsurface soils to determine if a response action is needed.

Example Scenario When an Analytical Method is Appropriate Under §350.71(K)(3)(B)(i)

The person in this example compiles the available current and historical information and identifies the chlorinated benzenes, i.e., mono- through hexa-chlorinated benzenes, as target COCs. The TCEQ program area requires an initial use of broad-spectrum analytical methods, e.g., SW846-8260 and 8270 for volatile organic chemicals and semi-volatile organic chemicals, respectively, to confirm the accuracy of the initial COC list. No semi-volatile or volatile organic chemicals, other than the chlorinated benzenes, were detected using the broad chemical scan methods. The person determined none of the nondetected chemicals were in any way associated with the property. The analytical method was appropriate for the intended use of confirming the accuracy of the initial COC list. Therefore, even though the MQLs for some of those nondetected chemicals are greater than the respective residential assessment levels, the analytical method was appropriate for the intended use of the data and meets the provisions of §350.71(k)(3)(B)(i). However, if the MQL of the broad-spectrum method is greater than the residential assessment level for any of the chlorinated benzenes identified as COCs for the property, that method cannot be used to demonstrate the extent of those chlorinated benzenes in the environmental medium and cannot be used to demonstrate those chlorinated benzenes can be screened from PCL development. This constraint on which analytical method should be used is based on the §350.54(e)(3) rule provision requiring the person to use an analytical method capable of achieving an MQL equal to or less than the level of required performance, e.g., the residential assessment level, for target the COC.