



Texas Commission on Environmental Quality
Texas Risk Reduction Program

Instructions for Completing an Affected Property Assessment Report

Purpose

The purpose of this document is to provide a standard format for the Affected Property Assessment Report (APAR).

Regulatory Citation

30 TAC §350.91

Abbreviations and Acronyms

BAF – bioaccumulation factor
BCF – bioconcentration factor
BSAFs - biota-sediment accumulation factors
bgs – below ground surface
CAPM – corrective action project manager
CAS No. – Chemical Abstract Service registry number
C/I – commercial/industrial
COC - chemical of concern
CP – compliance plan
DCRP – Dry Cleaner Remediation Program
DNAPL – dense non-aqueous phase liquids
DUS – data usability summary
eco - ecological
EPA – Environmental Protection Agency
ft. – feet
GW – groundwater
GWBU – groundwater-bearing unit
HW – hazardous waste
ID – identification
LNAPL – light non-aqueous phase liquids
LPST – leaking petroleum storage tank
MC - mail code for TCEQ mail routing
MCL – maximum contaminant level
MDL – method detection limit
mg/kg – milligrams per kilogram
mg/L – milligrams per liter
MQL – method quantitation limit
MSD – municipal settings designation
MSW – municipal solid waste
MW – monitor well
NAF – natural attenuation factor
NAICS - North American Industry Classification System
NAPL – non-aqueous phase liquids
ND – not detected/nondetect

NFA – no further action
NOR – notice of registration
NOV – notice of violation
OSHA - Occupational Safety and Health Administration
PCBs – polychlorinated biphenyls
PCL – protective concentration level
PCLE – protective concentration level exceedance
POE – point of exposure
PST – Petroleum Storage Tank
QA/QC - quality assurance/quality control
RAL – residential assessment level
RBEL – risk-based exposure limit
RCAS – registered corrective action specialist
RCRA – Resource Conservation and Recovery Act
sed - sediment
SLERA – screening-level ecological risk assessment
SOP – standard operating procedure
SQL - sample quantitation limit
SSERA – site-specific ecological risk assessment
STEERS - State of Texas Environmental Electronic Reporting System
SVOCs – semi-volatile organic compounds
SW – surface water
SWMU - solid waste management unit
SWR - solid waste registration
TAC - Texas Administrative Code
TDS – total dissolved solids
TPDES – Texas Pollutant Discharge Elimination System
TSCA – Toxic Substances Control Act
TRRP – Texas Risk Reduction Program
USGS - United States Geological Survey
VOCs – volatile organic compounds
VCP – Voluntary Cleanup Program

General Instructions

When is an APAR required?

An APAR is required when a person is addressing a release of COCs under 30 TAC Chapter 350, the Texas Risk Reduction Program (TRRP). The requirement for an APAR may not be applicable to:

- A release of COCs that is regulated under 30 TAC Chapter 327 (relating to Spill Prevention and Control) unless the response action can not be completed within 180 days or the person chooses to respond to the spill under TRRP;
- A release of COCs that is regulated under a rule, permit or enforcement order with other reporting requirements;
- Unit closures when no release is documented (refer to *TRRP Compatibility with RCRA* (RG-366/TRRP-3) for guidance on closure requirements);
- A release that is not subject to TRRP pursuant to the criteria described in the October 21, 2003 TCEQ document *Determining Which Releases are Subject to TRRP* available at <http://www.tnrcc.state.tx.us/permitting/trrp.htm>; or
- Areas that are approved Facility Operations Areas (FOA) under Subchapter G, Chapter 350.

What is the purpose of the APAR?

The purpose of the APAR is to document all relevant affected property information to identify all release sources and COCs, determine the extent of all COCs, identify all transport/exposure pathways, and to determine if any response actions are necessary. All data collected as part of the assessment should be reported. Justify conclusions with supporting documentation. Refer to the definition of affected property in §350.4(a)(1) and the requirements of §350.91(b). Do not limit the information to just the data gathered in the latest round of assessment or field work. Text, data, results, and conclusions must take into account all information that is known about the affected property. Refer to the TRRP rule and applicable guidance documents for requirements and information on assessments.

The APAR is organized into a standardized format to expedite TCEQ review, to help guide the person in providing all pertinent information, and minimize the need for additional assessment or notices of deficiencies.

When do I submit the APAR?

Submit the APAR upon completion of the assessment. Discuss extenuating circumstances that prevent the completion of the assessment with the TCEQ project manager or program before submitting an incomplete APAR.

How do I submit the APAR?

Submit the signed and sealed APAR to the applicable TCEQ program area in the Austin central office and submit a copy of the transmittal letter to the appropriate TCEQ region office. Check with the program area or the applicable permit or order as to the number of copies to submit. Find the mailing address and phone number for each region office at <http://www.tceq.state.tx.us/about/directory/region/reglist.html>. The address for the central office is:

TCEQ, [specify program area], MC-____, P.O. Box 13087, Austin, Texas 78711-3087

How do I obtain more information?

Information on the Texas Risk Reduction Program is available at <http://www.tnrcc.state.tx.us/permitting/trrp.htm>. The APAR instructions are not a guidance document and do not provide the information needed to conduct an assessment. Read the TRRP rule, applicable TRRP guidance documents, and other information on the TRRP web page prior to conducting the assessment. The TRRP guidance documents (RG-366 series) include:

TRRP-1	Introduction to the Texas Risk Reduction Program
TRRP-2	TRRP Applicability and Grandfathering (revised December 2003)
TRRP-3	TRRP Compatibility with RCRA
TRRP-4	Comparison of 30 TAC 335 and 30 TAC 350: Points to Consider in Making the Shift
TRRP-4A	Comparison of 30 TAC 334 and 30 TAC 350: Regulation of LPST Sites under TRRP
TRRP-6	Planning and Assessment Surveys
TRRP-7	Land Use Classification
TRRP-8	Groundwater Classification
TRRP-10	Selecting Target Chemicals of Concern
TRRP-11	Data Needs for Tiered PCL Development
TRRP-12	Affected Property Assessment Requirements
TRRP-12A	NAPL Assessment
TRRP-13	Review and Reporting of COC Concentration Data
TRRP-14	Screening Target Chemicals of Concern from PCL Development
TRRP-15	Determining Representative Concentrations
TRRP-16	Institutional Controls
TRRP-17	Notification Requirements
TRRP-18	Risk Levels, Hazard Indices, and Cumulative Adjustments
TRRP-19	Toxicity Factors and Chemical/Physical Parameters
TRRP-21	Human Health Points of Exposure
TRRP-22	Tiered Development of Human Health PCLs
TRRP-23	Tier 1 PCL Tables
TRRP-24	Determining PCLs for Surface Water and Sediment Companion documents: Sediment PCL table Surface Water RBELs tables
TRRP-25	Critical PCLs
TRRP-26	Application of Tier 1 and 2 NAF Models
TRRP-27	Development of Human Health PCLs for Total Petroleum Hydrocarbon Mixtures
TRRP-28	Application of Remedy Standards A and B
TRRP-29	Soil and Groundwater Response Objectives
TRRP-30	Compliance Sampling and Monitoring
TRRP-31	Evaluating Remedy Effectiveness
TRRP-32	Risk-Based NAPL Management
TRRP-33	Monitored Natural Attenuation Demonstrations
TRRP-34	Facility Operations Areas
RG-263	Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas

In the future, check the TRRP guidance and forms web page <http://www.tnrcc.state.tx.us/permitting/remed/techsupp/guidance.htm> for documents not available at the time of this printing.

Address questions regarding the affected property to the program area that is handling your case. Phone numbers and mail codes (MC) for the TCEQ programs are listed below.

Corrective Action Section	512/239-2343 MC-127
Municipal Solid Waste Permits	512/239-2334 MC-124
Petroleum Storage Tank / Responsible Party Remediation Section	512/239-2200 MC-137
Site Assessment and Management	512/239-2120 MC-136
Superfund Cleanup Section	512/239-2486 MC-143
Voluntary Cleanup Section	512/239-5891 MC-221

How do I complete the APAR?

Download an electronic version of the APAR from the TRRP guidance and forms web page at <http://www.tnrc.state.tx.us/permitting/remed/techsupp/guidance.htm>. This APAR format is a text-based report along with tables and figures to represent data in the most suitable way possible. Follow these instructions to ensure that all applicable information is included in the report and reduce potential deficiencies. Submit the Table of Contents as a checklist for report completeness, cover page, professional signatures and seals page, executive summary, conclusions, chronology, specialized submittal checklist, and Sections 1 through 4 in every report. Submit Sections 5 through 13 and related appendices as applicable to the affected property discussed in the report. Place the provided tables within the text-based report. Do not submit a section, table, or appendix that does not apply to the affected property. **Do not include the instructions in the submitted report.**

Report Organization and Formatting

Provide, at a minimum, the requested information in a text-based report supported by the specified tables and figures. Add additional discussions as necessary to explain site-specific situations. Arrange the sections, tables, figures, and appendices in the order specified in the APAR Table of Contents and include the section and subsection titles as headings in the report. Print as much of the report as possible on double-sided paper, particularly the text and laboratory reports. Some figures, tables, and appendices do not have prescribed formats. Place tabs in the bound report to clearly identify each major section included in the report.

Reporting Multiple Affected Properties in One APAR

An assessment may include activities on more than one affected property. Submit a separate report for each affected property, or include more than one affected property in one report. When submitting a report on more than one affected property, repeat the executive summary, figures, and tables, along with the appropriate text sections. Clearly identify the affected properties to which the information applies.

Documentation and References

Support data with references and documentation. Unsubstantiated information may be considered invalid. Explain assumptions made and how those assumptions are either conservative or appropriate for the affected property. Clearly label and include references in Appendix 16.

Maps and Figures

All maps and cross sections must be drawn to scale and must be legible. Use of 8.5 x 11-inch or 11 x 17-inch paper is encouraged. Minimize the use of oversized paper unless necessary. Determine a scale and paper size that is appropriate for the information required and ensure that the data are legible. Center the affected property on each map as appropriate to illustrate the required information. Label relevant site features such as roads, intersections, property boundaries, landmarks, water bodies, etc. to orient the reader. Always include a legend that identifies the symbols used in the maps and figures, a north arrow, fraction and bar scales (including vertical scale for cross sections), and map source.

For affected properties with multiple COCs, a group of related COCs may be presented in a logical manner on one map as long as the information remains legible. One COC may be used to represent a group of COCs that exhibit the same chemical and physical properties and originated from the same source, as long as the lateral and vertical extent of the representative COC is greater than the other COCs in the group. Be sure to identify which COCs are represented.

Use color as appropriate in maps, tables, and figures, but make sure that the information is still legible when photocopied in grayscale.

Tables

Review the instructions for each table to determine the information required. Format the tables as prescribed in this document. Add additional related information to the tables or provide additional tables if needed. If a format is not prescribed, arrange the table to best illustrate the data. If there are exposure pathways applicable to the affected property other than those listed in the assessment level tables (Sections 4 and 5) and critical PCL tables (Sections 6, 7, 11, and 12), add columns to the tables as necessary to include the additional exposure pathways in the evaluation. Highlight the concentrations and SQLs that exceed the residential assessment level or the critical PCL as applicable to the table.

Use the chemical names as listed in the Tier 1 PCL tables and use those names throughout the report. Do not use abbreviations for COC names (e.g., perc). Use the most recent Tier 1 PCL tables for PCLs and other information. Provide the CAS number for each COC not listed in the Tier 1 tables. List the COCs into chemical classes or by analysis type, such as metals, VOCs, SVOCs, pesticides, and PCBs. Clearly identify the affected property to which the table applies and include appropriate units of measure for the data.

If the result was non-detect (do not write "ND") or not quantifiable, specify the concentration as less than the maximum SQL value for that sample (for example, <0.01 mg/kg). Include in the data summary tables the data qualifiers or flags assigned during the data review and identified in the Data Usability Summary (DUS) (see *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13)).

Complete the prescribed tables provided here by typing in the table's cells. A separate APAR Tables file is also provided at the TRRP guidance and forms web page (<http://www.tnrcc.state.tx.us/permitting/remed/techsupp/guidance.htm>) with the tables formatted with checkboxes and dropdown lists.

Photographs

Provide photographs in Sections 2 and 6 as requested. Submit other photographs in Appendix 13 as needed. If submittal of the requested photographs is a concern for Homeland Security, state such fact in the requested sections and do not submit the requested photographs.

APAR Table of Contents

Submit the Table of Contents to indicate the sections, figures, and tables included in the report.

Cover Page

Submit the Cover Page to provide identifying information on the affected property and the person. Specify the primary program identification (ID) number assigned to the on-site property by the program area to which the APAR is being submitted (this is not the Customer Reference number (CN) or the Regulated Entity number (RN) as used on the agency's core data form). If the primary program ID number is not known, contact the appropriate program area to obtain that number before submitting this report.

On-Site Property Information

Provide information regarding the physical location of the on-site property. Specify the complete street address, including the street predirectional, which is the compass direction of the street address that occurs before the street name (example: *North*), and the street postdirectional, which is the compass direction of the street address that occurs after the street name (example: *West*). Specify the county code and the TCEQ Region in which the affected property is located (refer to the list of county codes and TCEQ Region numbers at the end of the instructions). Specify the nearest street intersection or location

description. For example, a location description may be: “On FM 1055, 1 mile south of the intersection of FM 1055 and US Highway 57” or “On Main Street at the northwest corner of Main Street and Oak Street.” Specify in decimal degrees the latitude and longitude near the center of the on-site property. Refer to the TCEQ document *Attribute Standards for TCEQ Geographic Locational Data* and the TCEQ policies 8.11 and 8.12, available on the agency’s web page at <http://www.tnrcc.state.tx.us/gis/gisplcy.html>.

Contact Person for On-Site Property Information and Acknowledgment

Provide information about the person performing the response action (not the consultant). Refer to the definition of “person” in §350.4. The person should review the acknowledgment carefully and must sign and date the report. The consultant is not allowed to sign this report for the person.

Professional Signatures and Seals

A professional geoscientist (P.G.), or a professional engineer (P.E.) when allowed by law, must sign and seal the APAR on the Professional Signatures and Seals page. See the Texas State Board of Professional Geoscientists’ web page at <http://www.tbpg.state.tx.us/> for information on geoscientist registration and requirements for sealing reports that contain geoscience. Refer to the Remediation Division’s policy on returning unsealed reports at <http://www.tnrcc.state.tx.us/permitting/trrp.htm>.

Leaking PST sites must also be signed (seal not required) by a registered Corrective Action Specialist (RCAS) and Corrective Action Project Manager (CAPM). Note that the RCAS/CAPM signatures are required *only* for LPST sites, and the Professional Geoscientist and RCAS/CAPMs can be the same person. Professional Engineers and Professional Geoscientists may sign in place of RCAS/CAPMs if they have applied for this reciprocal arrangement and have been approved by the TCEQ.

Executive Summary

Provide the information requested to summarize the major points of the report.

Conclusions

Use this section to discuss the conclusions of the assessment. Summarize the results of the assessment, activities conducted to date, and discuss in general the plan of action based on the assessment results.

Chronology

Attach a chronology, listed in chronological order beginning with the most recent activity, of events associated with this assessment and previous abatement, assessment, and remedial activities conducted at the affected property. Include the date of actions taken and a brief description of release abatement activities, assessment activities, and response actions conducted.

Specialized Submittals Checklist

The purpose of this form is to identify, up front, specific information included in the APAR which may potentially require the TCEQ project manager to involve other agency resources to complete the review. Identifying such submittals helps the TCEQ expedite the review process.

County Codes and TCEQ Region Numbers

County	County Code	Region No.	County	Code	Reg No.	County	Code	Reg No.	County	Code	Reg No.	County	Code	Reg. No.	County	Code	Reg No.
Anderson	1	5	Comal	46	13	Grayson	91	4	Kinney	136	16	Orange	181	10	Tom Green	226	8
Andrews	2	7	Comanche	47	3	Gregg	92	5	Kleberg	137	14	Palo Pinto	182	4	Travis	227	11
Angelina	3	10	Concho	48	8	Grimes	93	9	Knox	138	3	Panola	183	5	Trinity	228	10
Aransas	4	14	Cooke	49	4	Guadalupe	94	13	Lamar	139	5	Parker	184	4	Tyler	229	10
Archer	5	3	Coryell	50	9	Hale	95	2	Lamb	140	2	Parmer	185	1	Upshur	230	5
Armstrong	6	1	Cottle	51	3	Hall	96	1	Lampasas	141	9	Pecos	186	7	Upton	231	7
Atascosa	7	13	Crane	52	7	Hamilton	97	9	La Salle	142	16	Polk	187	10	Uvalde	232	13
Austin	8	12	Crockett	53	8	Hansford	98	1	Lavaca	143	14	Potter	188	1	Val Verde	233	16
Bailey	9	2	Crosby	54	2	Hardeman	99	3	Lee	144	11	Presidio	189	6	Van Zandt	234	5
Bandera	10	13	Culberson	55	6	Hardin	100	10	Leon	145	9	Rains	190	5	Victoria	235	14
Bastrop	11	11	Dallam	56	1	Harris	101	12	Liberty	146	12	Randall	191	1	Walker	236	12
Baylor	12	3	Dallas	57	4	Harrison	102	5	Limestone	147	9	Reagan	192	8	Waller	237	12
Bee	13	14	Dawson	58	7	Hartley	103	1	Lipscomb	148	1	Real	193	13	Ward	238	7
Bell	14	9	Deaf Smith	59	1	Haskell	104	3	Live Oak	149	14	Red River	194	5	Washington	239	9
Bexar	15	13	Delta	60	5	Hays	105	11	Llano	150	11	Reeves	195	7	Webb	240	16
Blanco	16	11	Denton	61	4	Hemphill	106	1	Loving	151	7	Refugio	196	14	Wharton	241	12
Borden	17	7	DeWitt	62	14	Henderson	107	5	Lubbock	152	2	Roberts	197	1	Wheeler	242	1
Bosque	18	9	Dickens	63	2	Hidalgo	108	15	Lynn	153	2	Robertson	198	9	Wichita	243	3
Bowie	19	5	Dimmit	64	16	Hill	109	9	McCulloch	154	8	Rockwall	199	4	Wilbarger	244	3
Brazoria	20	12	Donley	65	1	Hockley	110	2	McLennan	155	9	Runnels	200	3	Willacy	245	15
Brazos	21	9	Duval	66	16	Hood	111	4	McMullen	156	16	Rusk	201	5	Williamson	246	11
Brewster	22	6	Eastland	67	3	Hopkins	112	5	Madison	157	9	Sabine	202	10	Wilson	247	13
Briscoe	23	1	Ector	68	7	Houston	113	10	Marion	158	5	San Augustine	203	10	Winkler	248	7
Brooks	24	15	Edwards	69	13	Howard	114	7	Martin	159	7	San Jacinto	204	10	Wise	249	4
Brown	25	3	Ellis	70	4	Hudspeth	115	6	Mason	160	8	San Patricio	205	14	Wood	250	5
Burleson	26	9	El Paso	71	6	Hunt	116	4	Matagorda	161	12	San Saba	206	9	Yoakum	251	2
Burnet	27	11	Erath	72	4	Hutchinson	117	1	Maverick	162	16	Schleicher	207	8	Young	252	3
Caldwell	28	11	Falls	73	9	Irion	118	8	Medina	163	13	Scurry	208	3	Zapata	253	16
Calhoun	29	14	Fannin	74	4	Jack	119	3	Menard	164	8	Shackelford	209	3	Zavala	254	16
Callahan	30	3	Fayette	75	11	Jackson	120	14	Midland	165	7	Shelby	210	10			
Cameron	31	15	Fisher	76	3	Jasper	121	10	Milam	166	9	Sherman	211	1			
Camp	32	5	Floyd	77	2	Jeff Davis	122	6	Mills	167	9	Smith	212	5			
Carson	33	1	Foard	78	3	Jefferson	123	10	Mitchell	168	3	Somervell	213	4			
Cass	34	5	Fort Bend	79	12	Jim Hogg	124	15	Montague	169	3	Starr	214	15			
Castro	35	1	Franklin	80	5	Jim Wells	125	14	Montgomery	170	12	Stephens	215	3			
Chambers	36	12	Freestone	81	9	Johnson	126	4	Moore	171	1	Sterling	216	8			
Cherokee	37	5	Frio	82	13	Jones	127	3	Morris	172	5	Stonewall	217	3			
Childress	38	1	Gaines	83	7	Karnes	128	13	Motley	173	2	Sutton	218	8			
Clay	39	3	Galveston	84	12	Kaufman	129	4	Nacogdoches	174	10	Swisher	219	1			
Cochran	40	2	Garza	85	2	Kendall	130	13	Navarro	175	4	Tarrant	220	4			
Coke	41	8	Gillespie	86	13	Kenedy	131	15	Newton	176	10	Taylor	221	3			
Coleman	42	3	Glasscock	87	7	Kent	132	3	Nolan	177	3	Terrell	222	7			
Collin	43	4	Goliad	88	14	Kerr	133	13	Nueces	178	14	Terry	223	2			
Collingsworth	44	1	Gonzales	89	14	Kimble	134	8	Ochiltree	179	1	Throckmorton	224	3			
Colorado	45	12	Gray	90	1	King	135	2	Oldham	180	1	Titus	225	5			

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Figure 6B - Photographs*	

¹ Items marked with an asterisk do not have prescribed formats (for example, laboratory reports).

	Check if included
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Cover Page

Program ID No. (primary): _____ Report date: _____
TCEQ Region No.: _____ MSD Certificate No.: _____
Additional Program ID Numbers.: _____ SWR/Facility ID No.: _____ PST Facility ID No.: _____
DCRP ID No.: _____ VCP ID No.: _____ LPST ID No.: _____
MSW Tracking No.: _____ HW Permit/CP No.: _____ Enforcement ID No.: _____
Other ID Nos.: _____

Reason for submittal (check all that apply):
☐ Initial submittal
☐ Revision

Notice of Deficiency Letter
Permit/Compliance Plan
Voluntary response

Enforcement/Agreed order
Directive/NOV letter
Other: _____

On-Site Property Information

On-Site Property (Facility) Name: _____
Street no. _____ Pre dir: _____ Street name: _____ Street type: _____ Post dir: _____
City: _____ County: _____ County Code _____ Zip _____
Nearest street intersection and location description: _____

Latitude: Decimal Degrees (indicate one) North _____
Longitude: Decimal Degrees (indicate one) West _____

Contact Person for On-Site Property Information and Acknowledgment

Company Name or Person: _____
Contact Name: _____ Title: _____
Mailing Address: _____
City: _____ State: _____ Zip: _____ Phone: _____
Email: _____ Fax: _____
Person is: ___ property owner ___ property manager ___ potential purchaser ___ tenant ___ operator
other _____

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of administrative, civil, or criminal penalties.

Signature of Person _____ Name (print): _____ Date: _____

Consultant Contact Person

Consultant Company Name: _____
Contact Person: _____ Title: _____
Mailing Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ E-mail address _____

Professional Signatures and Seals

Professional Geoscientist

Professional Geoscientist

Geoscientist License number

Expiration date

Signature

Date _____

Telephone number

FAX number

E-mail

Professional Engineer

Professional Engineer

P.E. License number

Expiration date

Signature

Date _____

Telephone number

FAX number

E-mail

Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)

For LPST sites only.

Registered Corrective Action Specialist

RCAS Registration number

Expiration date

Signature

Date _____

Corrective Action Project Manager

CAPM Registration number

Expiration date

Signature

Date

Telephone number

FAX number

E-mail

Seals, as applicable:

Executive Summary

Environmental Media	Actual or Probable Exposures On-Site?		Actual or Probable Exposures Off-Site?		Have notifications for actual or probable exposures been completed? (§350.55(e))		
	Yes	No	Yes	No	Yes	No	N/A
Soil							
Groundwater							
Sediment							
Surface Water							

Is there, or has there been, an affected or potentially affected water well? ___ Yes ___ No

If yes, what is the well used for? _____

Actual land use: On-site: ___ Res ___ C/I Off-site affected property: ___ Res ___ C/I ___ N/A

Land use for critical PCL determination: On-site: ___ Res ___ C/I Off-site affected property: ___ Res ___ C/I ___ N/A

Did the affected property pass the Tier 1 ecological exclusion criteria checklist? ___ Yes ___ No

Affected groundwater-bearing unit(s) (in order from depth below ground surface), or uppermost groundwater-bearing unit if none affected

Unit No.	Name	Depth below ground surface (ft)	Resource Classification (1, 2, or 3)
1			
2			
3			

Assessment

Environmental Media		Assessment Levels Exceeded?						Affected property defined to RAL?			Is COC extent stable or expanding?	General classes of COCs (VOCs SVOCs, metals, etc.)
		On-Site?			Off-Site?							
		Yes	No	Not sampled	Yes	No	Not sampled	Yes	No	N/A		
Soil	Surface											
	Subsurface											
Groundwater												
Sediment												
Surface Water												

NAPL Occurrence Matrix

		NAPL Occurrence	Description
NAPL in vadose zone		No NAPL in vadose zone	There is no direct or indirect evidence of NAPL in the vadose zone
		NAPL in/on soil	NAPL detected in or on unsaturated, unconsolidated clay-, silt-, sand-, and/or gravel-dominated soils
		NAPL in fractured clay	NAPL detected in fractures of unsaturated fine-grained soils
		NAPL in fractured or porous rock	NAPL detected in unsaturated lithologic material
		NAPL in karst	NAPL detected in karst environment
NAPL at capillary fringe		No NAPL at capillary fringe	There is no direct or indirect evidence of NAPL at the capillary fringe
		NAPL at capillary fringe	NAPL detected at vadose-saturated zone transition, capillary fringe (in contact with water table)
NAPL in saturated zone		No NAPL in saturated zone	There is no direct or indirect evidence of NAPL in the saturated zone
		NAPL in soil	NAPL detected in saturated unconsolidated clay-, silt-, sand-, and/or gravel-dominated soils
		NAPL in fractured clay	NAPL detected in fractures of saturated fine-grained soil or other double-porosity sediments
		NAPL in saturated fractured or porous rock	NAPL detected in saturated lithologic material
		NAPL in saturated karst	NAPL detected in karst environment within the saturated zone
NAPL in surface water or sediment		No NAPL in surface water or sediment	There is no direct or indirect evidence of NAPL in surface water or sediments
		NAPL in surface water	NAPL detected in surface water at exceedance concentration levels or visual observation
		NAPL in sediments	NAPL detected in sediments at exceedance concentration levels or visual observation via migration pathway or a direct release

Remedy Decision

Environmental Media		Critical PCL exceeded on-site?			Critical PCL exceeded off-site?			PCLE zones defined?			General class (VOCs, SVOCs, metals, etc.) of COCs requiring remedy
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	
Soil	Surface										
	Subsurface										
Groundwater											
Sediment											
Surface Water											

NAPL Triggers

NAPL Response Action Triggers		Description of Triggers
	No NAPL response action triggers	No NAPL triggers have been observed in any assessment zones (vadose, capillary fringe and saturated), nor in surface water or sediments
	NAPL vapor accumulation is explosive	NAPL vapors accumulate in buildings, utility and other conduits, other existing structures, or within anticipated construction areas at levels that are potentially explosive ($\geq 25\%$ LEL)
	NAPL zone expanding	NAPL zone is observed to be expanding using time-series data
	Mobile NAPL in vadose zone	NAPL zone is observably mobile, or is theoretically mobile based on COC concentrations and residual saturation
	NAPL creating an aesthetic impact or causing nuisance condition	NAPL is responsible for objectionable characteristics (e.g., taste, odor, color, etc.) resulting in making a natural resource or soil unfit for intended use
	NAPL in contact with Class 1 groundwater	NAPL has come in actual contact with saturated zone or capillary fringe of a Class 1 GWBU
	NAPL in contact with Class 2 or 3 groundwater	NAPL has come in actual contact with saturated zone or capillary fringe of a Class 2 or Class 3 GWBU
	NAPL in contact with surface water	Liquid containing COC concentrations that exceed the aqueous solubility in contact with surface water via various migration pathways or direct release to surface water
	NAPL in or on sediments	Liquid containing COC concentrations that exceed the aqueous solubility impact surface water sediments via migration pathway or a direct release

Conclusions and Recommendations

Use this section to summarize the major activities conducted, results, and conclusions of the assessment and to briefly discuss the recommended response actions.

Assessment Results

Discuss the conclusions of the assessment. Identify the affected environmental media, and identify the media for which a response action is necessary or for which a response action has already been completed. Describe the affected or potentially affected receptors.

NAPL Discussion

Discuss the conclusions of the NAPL assessment. Describe the presence or absence of NAPL in environmental media based on direct and indirect evidence. If there is direct or indirect evidence of NAPL, discuss the response action trigger applicable to the affected property. Refer to *Risk-Based NAPL Management* (RG-366/TRRP-32) and *NAPL Assessment* (RG-366/TRRP-12A) for information on NAPL management and assessment, respectively.

Response Actions and Recommendations

Describe response actions completed or underway. In order to focus direction and provide context to the assessment results, discuss general (not detailed) recommended response actions or other activities that could influence site conditions or that relate to the release and resulting contamination to be conducted at the affected property. If known, specify if planning a Remedy Standard A or Remedy Standard B.

Figure A - Affected Property and PCLE Zone Map

Use this map to illustrate the overall affected property and the overall PCLE zone. Illustrate the maximum extent of the affected property in environmental media, and illustrate in a different manner the maximum extent of the PCLE zone for environmental media. Identify areas where NAPL is present based on direct or indirect evidence. Sampling locations are not required to be provided on this map.

Specialized Submittals Checklist

_____ Check here if no specialized submittals in this report

	If included, specify section or appendix
Ecological Risk Assessment	
Reasoned justification, expedited stream evaluation, Tier 2 or 3 ecological risk assessment, and/or proposal for ecological services analysis	
Statistics	
Calculated site-specific background concentrations	
Used alternate statistical methods to determine proxy values for non-detected results (§350.51(n))	
Calculated representative concentrations (§350.79(2)) for remedy decision	
Analytical Issues	
Used SQL for assessment or critical PCL instead of the MQL (§350.51(d)(1)) or PCL (§350.79)	
The MQL of the analytical method exceeds assessment levels/critical PCLs (§350.54(e)(3))	
Human Health/Toxicology	
Variance to exposure factors approved by TCEQ Executive Director ¹ (§350.74(j)(2))	
Developed PCLs based on alternate exposure areas	
Evaluated non-standard exposure pathway (e.g., agricultural, contact recreation, etc)	
Combined exposure pathways across media for simultaneously exposed populations (§350.71(j))	
Adjusted PCLs due to residual saturation, cumulative risk, hazard index, aesthetic concerns, or theoretical soil vapor	
Utilized non-default human health RBELs to calculate PCLs (includes use of non-default parameters, toxicity factors not published in rule, etc.) (§350.51(l), §350.73, §350.74)	
Calculated Tier 2 or 3 RBELs/PCLs or TSCA levels for polychlorinated biphenyls, or calculated Tier 2 or 3 RBELs/PCLs for cadmium, lead, dibenzo-p-dioxins, dibenzofurans, and/or polycyclic aromatic hydrocarbons	
Calculated Tier 1, 2, or 3 total petroleum hydrocarbon (TPH) PCLs	
Developed sediment/surface water human health RBELs and PCLs	
Fate and Transport	
Used or developed groundwater to surface water dilution factors	
Calculated Tier 2 PCL	
Calculated Tier 3 PCL	
Groundwater Issues	
Conducted aquifer test, classified Class 3 groundwater, or determined non-groundwater bearing unit (saturated soil)	

¹ Prior approval by Executive Director is required.

Section 1 Property Information

Use this section to describe the environmental setting, the geology/hydrogeology of the area, general operational history for the property, the affected property, and sources of releases.

Section 1.1 Physical Location

Property Location and Land Use

Identify the name of the facility and the physical address or location of the property. Provide the name of the property owner, the size of the on-site property and the general land use of the surrounding area.

Topography

Describe how the topography affects COC distribution at the affected property. Discuss ground slope direction and grade, water bodies, and other significant topographic features. Identify whether the site is within the 100-year floodplain.

Weather

Discuss the effect of recent extreme weather conditions, such as droughts or floods, and seasonal variations on COC transport and distribution.

Section 1.2 Affected Property and Sources of Release

History and Operations

Describe past, current, and if known, planned future operations at the on-site property back to initial commercial or industrial development, including times it may have been vacant. For each different use of the property, include a description of the type of business or facility and associated NAICS codes, the dates of operation, description of business process and/or the primary products used, stored, or manufactured, and wastes generated, stored, or disposed on-site.

Project Overview

Identify the affected property(ies) included in this report. For each affected property, discuss why the investigation was conducted and describe the events that led up to the initiation of the assessment. Describe when and how the release occurred, how the release was discovered, and previous assessment, abatement, and response actions taken at the affected property.

If other on-site sources are contributing to this affected property but are being addressed under a separate assessment, briefly describe the nature of the release and how it is being addressed.

If the subject property is a VCP site, discuss the potential sources of COCs identified during the required Phase I environmental site assessment. Discuss potential contribution of COCs from off-site source(s) and briefly describe the off-site facilities that could be a source of COCs at the affected property, including the type of potential source and type of COCs.

Section 1.3 Geology/Hydrogeology

Describe the regional geology and hydrogeology from the ground surface to the base of the principal regional water supply aquifer, or the most significant groundwater-bearing unit in use near or at the affected property, whichever is deeper. Discuss the significant formations, aquifers,

aquitards, and structural influences. Relate the regional geology/hydrogeology to the geology and hydrogeology of the affected property.

Characterize and describe in detail the site-specific geologic and associated hydrogeologic conditions of the affected property. Describe characteristics which might affect COC transport such as geochemical and geotechnical parameters or geologic features which might serve as preferential pathways or as impedances for horizontal or vertical COC migration. For each unsaturated zone, saturated zone that is not a groundwater-bearing unit, and each groundwater-bearing unit, describe the thickness and the thickness variability across the affected property.

Include the aquifer/formation name, the average depth to groundwater, magnitude and duration of static water level fluctuations, groundwater flow direction and hydraulic conductivity, and chemical properties of the water as known (total dissolved solids [TDS], sulfates, nitrates, pH, etc). Discuss how the characteristics of each groundwater-bearing unit compare to regional characteristics and explain the differences.

Table 1A - Sources of Release

List the sources (for example: landfill, tank, impoundment) being addressed under this assessment which are contributing COCs to each affected property. Use the inputs from the list provided below to complete Table 1A. For each source, provide the type of source, applicable NOR unit or SWMU numbers, substances of potential concern, the size of the source (capacity, area, or volume as applicable), and specify the status of the release source. Indicate whether a release from the source has been confirmed, provide the method of release discovery, and the date the release was discovered. Include the date if the status is “closed.”

Inputs list for Table 1A (do not include this list in the report)

Column 1	Column 2	Column 3	Column 4
Types of Potential Sources	Substances of Potential Concern	Status of Source	Method of Release Discovery
Container	Acid solution	Active	Site assessment
Container storage area	Adhesives/epoxy	Inactive	Spill incident
Landfills	Caustic solution	Abandoned	NAPL discovery
Piping/distribution system	Dioxins/furans	Closed - specify date closed	Water well impact
Spills	Explosives	Other (specify)	Vapor impact
Sump	Fertilizer		Surface water/sediment impact
Surface impoundments/ponds/lagoons	Halogenated hydrocarbons		Release detection equipment
Tanks	Lacquer/varnish		Other (specify)
Wash/repair areas	Metals		
Waste piles	Paint/ink/dyes		
Waste treatment unit	Paint thinner		
Waste water treatment unit	PCBs		
Other (specify)	Pesticide (herbicide, insecticide)		
	Petroleum Hydrocarbons (specify): gasoline, aviation gas, jet fuel (type), diesel, lube oil, hydraulic oil, used oil, etc.		
	Radionuclides		
	Wood preservatives		
	Other (specify)		

Table 1A. Sources of Release (see input values on preceding page)

Affected property name/number ¹	Name of potential source ² (supplied by the person)	Type of potential source (select from Column 1 on Inputs list)	NOR unit or SWMU number, if applicable	Substances of potential concern (select from Column 2 on Inputs list)	Size of source (capacity, area, or volume)	Status of source (select from Column 3 on Inputs list)		Was a release from this source confirmed? (if yes, indicate the discovery method from Column 4 on Inputs list, and date release was discovered)			
						Status ³ :	If closed or other, list date closed or explain:	No	Yes	Discovery method	Date

¹ The name or number is an identification of the affected property assigned by the person. Continue using the name or number identification throughout this report and all other correspondence on the affected property.

² The potential source is the source of the release. The person determines the name given to the potential source. Examples: northwest tank farm, Main Street landfill, etc.

³ Specify whether the source status is active, inactive, abandoned, closed, or specify another status as appropriate.

Table 1B - Potential Off-Site Sources

Complete this table for VCP sites or when alleging contribution from an off-site source. List the off-site facilities (for example, RCRA, PST, LPST, MSW, state and federal superfund sites, and other facility or site) in the vicinity of the affected property that could be a source of COCs at the affected property. For potential off-site sources, specify the name of the facility or site, the physical address, the regulatory identification number, the type of operation/business, and the years of operation (if known).

Table 1B. Potential Off-Site Sources

Affected property name/number	Off-site facility/site name	Physical address	Regulatory ID number	Type of operation/business	Years of operation (if known)	COCs

Figure 1A - On-Site Property Map

Include a map that illustrates the relevant physical features of the on-site property and immediately adjacent areas. Indicate the locations of legal property boundaries, the locations of areas assessed for this report, land uses, buildings and other structures, roads (include at least one labeled intersection), surface drainage, surface water bodies, and water supply wells.

Figure 1B - Affected Property Map

Use this map to illustrate detailed features of each area assessed for this report. This map may suffice for Figure 1B when the scale of the map is adequate to illustrate the necessary physical features of the affected property. Keep in mind however that the affected property may extend across one or more legal property boundaries.

For each area assessed, illustrate relevant features such as the affected property, buildings and other structures, adjacent roads, potential sources and known release areas listed in Tables 1B and 1C, type of surface cover, subsurface utilities, surface drainage, surface water bodies, boring and monitor well locations, sampling locations, cross section lines, and water supply wells.

Figure 1C - Regional Geologic Map

Include an 8 ½ by 11 cutout of the original or a color copy of a published regional geologic map. Center the on-site property on the map, and identify the location of the on-site property. The map scale should be no less than 1:250,000 (as in the Bureau of Economic Geology's Geologic Atlas maps). If available, use the Bureau of Economic Geology's Geologic Quadrangle maps.

Figure 1D - Regional Geologic Cross Section(s)

Include at least one published geologic cross section (color copy) that illustrates the regional stratigraphy of the area from the surface to the base of the principal regional water supply aquifer or the most significant groundwater-bearing unit in use, whichever is deeper. Label formations, aquitards, and minor and major aquifers. Sources for regional cross sections and stratigraphic columns include, among others, the Bureau of Economic Geology, the Texas Water Development Board, and local geological societies. Indicate the source for the published cross sections in Appendix 16.

Provide a continuous stratigraphic section (not a boring log) from existing literature that describes the regional geologic framework from the surface to the base of the principal regional water supply aquifer (or the most significant groundwater-bearing unit in use near or at the affected property, whichever is deeper). Identify significant formations and aquifers. Use written descriptions and standard symbols to illustrate the lithologies of each formation. Identify and describe the principal formations, aquifers, and aquitards. Indicate the source for the published cross sections in Appendix 16.

Section 2 Exposure Pathways and Groundwater Resource Classification

Use this section to discuss the actions taken to identify the presence or lack of receptors and the results of the receptor surveys. Completion of these surveys may require considerable research. Reference the primary sources of information (this is not the company who conducts the well search) used in this research in Appendix 16. Note that the survey radii required by §350.51(i) are relative to the affected property, not legal real property boundaries.

Section 2.1 Source(s) of Potable Water for On-Site Property and Affected Off-Site Properties

Identify the source(s) of potable water for each real property within the affected property. Provide the name of the supplier, utility district or well owner, and the distance and direction of the potable water source from the affected property. If the source of potable water is a water well, identify the groundwater production zone and the total well depth. Taking into account the distance to the affected property, the production zone of the water well(s), surface completions, and pumping rates, discuss the potential for impact from affected groundwater. If the potable water source is a surface water body, identify the name of the surface water and segment number if available. Clearly identify the location of the water supply source (well(s) or intake structure(s)) in Figures 2A and 2C when the scale of the map is appropriate to show the locations of the sources.

If groundwater is affected, list the real properties within the 500-foot field receptor survey radius that are not connected to a public water supply.

Identify existing institutional controls (for example, local ordinances or deed restrictions) or certified Municipal Settings Designation (MSD) applicable to the affected property that prevent or restrict the installation of water wells. Provide a copy of the ordinance, deed restriction, and/or a copy of the MSD certificate and a map that illustrates the boundary of the MSD and the affected property in Appendix 4.

Section 2.2 Field Receptor Survey

Provide documentation of the performance of the 500-ft field receptor survey as measured from the boundary of the affected property. Provide a detailed discussion of the actions taken and the specific receptors addressed in the survey. Discuss how the survey was conducted, who conducted the survey, and document the sources of information including the names of people interviewed and the real properties examined.

Section 2.3 Records Survey

Use this section to provide documentation of the performance of a survey of records on receptors available within one-half mile radius of the affected property (this may include both on-site and off-site properties). List the specific primary sources of information used in the records survey (not the company who conducted the search), including individuals and personal interviews, companies, agencies such as the Texas Water Development Board, Texas Department of Licensing and Registration, and TCEQ, published documents, databases, groundwater

conservation districts, groundwater subsidence districts, and other records of wells. Provide copies of the records survey results in Appendix 5, including copies of water well records, copies of pages from published documents, database reports, and documentation of other results.

Provide a list of sources of information used to complete this section of the report in Appendix 16, and clearly identify the text to which the reference applies.

Section 2.4 Receptor Survey Results

Discuss the results of the receptor surveys and records surveys and identify potential receptors. Include a detailed discussion of the extent of the field receptor survey, observations of the general land use in the area, descriptions of the topography of the surveyed area as it applies to drainage to surface water, the results of the survey, and identify potential receptors noted in the 500-ft field survey. Discuss the presence or lack of intermittent or perennial surface water bodies, drainage ditches, water wells, water meters, water tanks and/or pump houses, windmills, cisterns, and other items that suggest the presence of potential receptors. If the affected property overlies a major or minor aquifer or if there are populated areas within one-half mile with no public water supply, and no water wells were identified in the records survey, explain how the survey was adequate to identify the water wells within the survey area.

Discuss relevant information about potential receptors that relates to the likelihood of the receptor to become affected or serve as an avenue of COC migration. Taking into account the distance to the water well(s), the production zone of the water well(s), surface completions, and pumping rates, discuss the potential connection between affected saturated zones and the water wells and the potential for impact from affected groundwater.

Discuss the depth and flow regime of surface water bodies/drainage ditches, location and status of identified wells, presence of buildings within or near the footprint of the affected property, and a discussion of specific land use or areas of potential ecological concern which result or might result in a completed human health or ecological exposure pathway.

Section 2.5 Groundwater Resource Classification

Identify the groundwater resource classification (Class 1, 2 or 3) of each affected or potentially affected groundwater-bearing unit. For information on groundwater classification, refer to *Groundwater Classification* (RG-366/TRRP-8). Describe in detail the criteria upon which the groundwater-bearing unit is classified. Provide site-specific documentation, such as results of aquifer tests, recharge observations during the development of monitor wells, analysis of total dissolved solids (TDS), and/or groundwater resource classification at surrounding sites in Appendix 7 to support the classification of each groundwater-bearing unit. If supporting documentation was submitted previously to the TCEQ under a separate cover, provide the date and title of the report.

Section 2.6 Exposure Pathways

Describe current or previous immediate threats of exposure or actual exposure at the affected property. Describe actions taken to identify the threat of exposure or actual exposure, efforts to mitigate the exposure, and describe the actions that will be done to prevent further exposure.

Explain how the potential exposure scenarios were identified. Explain which exposure pathways

were evaluated and why. If the exposure pathways listed in §350.71(c) or other possible exposure pathways were determined to be incomplete as allowed by rule, provide the data and documentation that support this conclusion, explain how the data were derived, and explain how it was determined that the exposure pathway is incomplete.

Describe factors that affect potential exposures, including the type and extent of surface cover, proximity to surface water bodies and drainages, types and concentrations of COCs, COC migration patterns from both the ground surface and underground, presence of water wells, surface water intakes, usage of nearby surface water, interconnectedness of groundwater and surface water, and other site-specific situations regarding exposure pathways.

Table 2A - Water Well Summary

Complete this table if water wells are identified in either the 500-ft receptor survey or the one-half mile records survey. Provide the information available on the water wells identified in the survey radius. Include wells found from the sources of information. Highlight the threatened or affected wells.

Table 2A. Water Well Summary

Well no. / designation	Well owner's name of record	Distance from affected property (ft.)	Screened interval/open interval (ft)	Cemented interval (ft)	Completion type	Total depth	Date drilled	Producing formation	Current water use ¹	Current status ²	Data source ³
Downgradient Wells											
Cross-gradient Wells											
Upgradient Wells											

¹ Current water use: Dom - domestic; PS - public supply/municipal; Ind - industrial; Comm - commercial; Irr - irrigation; Liv - livestock

² Current status: Act - active; Ab - abandoned/not in use; SB - standby/backup; P&A - plugged and abandoned

³ Indicate the specific primary source of well information.

Table 2B - Affected Water Well Summary

List the threatened or affected water wells from Table 2A in this table. Provide the owner's name, telephone number, property address, and name of tenant or easement holder. Document the sources of information used to obtain this information in Appendix 16.

Table 2B. Threatened and Affected Water Well Summary

Well number/ designation	Current owner and phone number	Property address and/or legal description ¹	Tenants and/or easement holders ²	Samples collected		Do COC concentrations exceed Tier 1 GW ^{GW} GW ^{Inq} PCLs?	
				Yes	No	Yes	No

¹ Provide the address of the property containing the threatened or affected well. If the property does not have an address or if property plot maps are provided, include the legal description of the property (i.e., lot and block numbers, appraisal district reference numbers, etc.)

² If samples were collected on property not owned by the person and results exceed Tier 1 PCLs, provide the names of tenants and/or easement holders.

Table 2C - Complete or Reasonably Anticipated to be Complete Exposure Pathways

Use this table to indicate the complete or reasonably anticipated to be complete exposure pathways by checking the applicable pathways based on the media affected by COCs and the potential for migration of COCs. The shaded boxes are those pathways considered complete per the TRRP rule. If a shaded box is not checked, explain in Section 2.6 why the pathway is not complete.

Table 2C. Complete or Reasonably Anticipated to be Complete Exposure Pathways

Exposure pathway	Surface soil ¹	Subsurface soil ²	Groundwater	Surface water/ sediment
Tot ³ SoilComb		NA	NA	NA
Air ³ SoilInh-V	NA			
GW ³ SoilIng or GW ³ SoilClass3				
GW ³ GWIng or GW ³ GWClass3	NA	NA		
Air ³ GWInh-V				
SW ³ GW				
Sed ³ GW				
SW ³ SW or Sed ³ Sed			NA	
Other (specify) ⁴				

Figure 2A - Potential Receptors Map

Provide a map of appropriate scale identifying and depicting the location of the potential receptors (surface water bodies, water wells, areas of ecological concern, etc.) identified within at least a 500-foot radius of the affected property. Include receptors located outside the 500-foot radius if they are potentially threatened by the release. Depict the receptors in relation to the sampling locations for the associated affected media. Clearly depict the boundary of the 500-foot field survey area. Illustrate the general land use (residential or commercial/industrial) for properties within the survey area.

Figure 2B - Field Survey Photographs

Provide original or high-resolution color copies of photographs that depict observations made during the 500-ft field survey, explain the survey actions taken, and document the presence or absence of receptors. Clearly label the photographs with a description of the subject and photographer's vantage point and direction of view. Provide a map that shows the location and view direction of the photographer.

Figure 2C - Water Well Map

Include a color copy of a USGS 7.5 minute topographic map illustrating the locations of the registered and unregistered water wells, including those located during the 500-foot field survey and within one-half mile radius of the groundwater affected above the residential assessment level. Portray and label the wells on the map with the well number and illustrate the affected property location and the one-half mile search radius on the map.

¹ Residential: soils from 0-15 feet deep, or to bedrock or groundwater-bearing unit if shallower.

Commercial/industrial: soils from 0-5 feet deep, or to bedrock or groundwater-bearing unit if shallower.

² The vadose zone beneath the surface soil extending to the groundwater-bearing unit, and including unsaturated zones between stratified groundwater-bearing units.

³ Residential: Air³SoilInh-Vp + Soil³SoilIng + Soil³SoilDerm + Veg³SoilIng

Commercial/industrial: Air³SoilInh-Vp + Soil³SoilIng + Soil³SoilDerm

⁴ If other exposure pathways are identified here, include those pathways in the derivation of assessment levels and evaluation of critical PCLs.

Attachment 2A - Tier 1 Ecological Exclusion Criteria Checklist

Complete this checklist for each affected property. Refer to Chapter 307, Texas Surface Water Quality Standards, *Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas* (RG-263 revised, and future updates), and *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24) for the definition of surface water, surface water types, uses, basin numbers, and state-designated stream segment numbers. The person and the preparer must sign this checklist.

Attachment 2B - Tier 1 Ecological Exclusion Criteria Supporting Documentation

As required in the Tier 1 Ecological Exclusion Criteria Checklist, attach a brief statement (not to exceed 1 page) summarizing the information provided in Attachment 2A. Include in this summary sufficient information to verify that the affected property meets or does not meet the exclusion criteria. Also include in this attachment photographs and correspondence with wildlife management agencies used to complete the checklist. Include a topographic map and/or aerial photo to depict the affected property and surrounding area.

Attachment 2A. Tier 1 Exclusion Criteria Checklist

PART I. Affected Property Identification and Background Information

1) Provide a description of the specific area of the response action and the nature of the release. Include estimated acreage of the affected property and the facility property, and a description of the type of facility and/or operation associated with the affected property. Also describe the location of the affected property with respect to the facility property boundaries and public roadways.

Attach available USGS topographic maps and/or aerial or other affected property photographs to this form to depict the affected property and surrounding area. Indicate attachments:

____ Topo map ____ Aerial photo ____ Other (specify) _____

2) Identify environmental media known or suspected to contain chemicals of concern (COCs) at the present time. Check all that apply:

Known/Suspected COC Location	Based on sampling data?	
____ Soil <5 ft below ground surface	____ Yes	____ No
____ Soil >5 ft below ground surface	____ Yes	____ No
____ Groundwater	____ Yes	____ No
____ Surface Water/Sediments	____ Yes	____ No

Explain (previously submitted information may be referenced):

3) Provide the information below for the nearest surface water body which has become or has the potential to become impacted from migrating COCs via surface water runoff, air deposition, groundwater seepage, etc. Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities that are:

- Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

The nearest surface water body is _____ feet/miles from the affected property and is named:

The water body is best described as a:

____ freshwater stream:
 ____ perennial (has water all year)
 ____ intermittent (dries up completely for at least 1 week a year)
 ____ intermittent with perennial pools
____ freshwater swamp/marsh/wetland
____ saltwater or brackish marsh/swamp/wetland
____ reservoir, lake, or pond; approximate surface acres _____
____ drainage ditch
____ tidal stream ____ bay ____ estuary
____ other; specify _____

Is the water body listed as a State classified segment in Appendix C of the current Texas Surface Water Quality Standards; §§307.1 - 307.10?

☐ Yes Segment # _____ Use Classification: _____
☐ No

If the water body is not a State classified segment, identify the first downstream classified segment.

Name: _____

Segment #: _____

Use Classification: _____

As necessary, provide further description of surface waters in the vicinity of the affected property:

PART II. Exclusion Criteria and Supportive Information

Subpart A. Surface Water/Sediment Exposure

1) Regarding the affected property where a response action is being pursued under the TRRP, have COCs migrated and resulted in a release or imminent threat of release to either surface waters or to their associated sediments via surface water runoff, air deposition, groundwater seepage, etc.? Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

- a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

☐ Yes ☐ No

Explain:

If the answer is yes to Subpart A above, the affected property does not meet the exclusion criteria. However, complete the remainder of Part II to determine if there is a complete and/or significant soil exposure pathway, then complete PART III - Qualitative Summary and Certification. If the answer is No, go to Subpart B.

Subpart B. Affected Property Setting

In answering “Yes” to the following question, it is understood that the affected property is not attractive to wildlife or livestock, including threatened or endangered species (i.e., the affected property does not serve as valuable habitat, foraging area, or refuge for ecological communities). (May require consultation with wildlife management agencies.)

- 1) Is the affected property wholly contained within contiguous land characterized by: pavement, buildings, landscaped area, functioning cap, roadways, equipment storage area, manufacturing or process area, other surface cover or structure, or otherwise disturbed ground?

_____ Yes _____ No

Explain:

--

If the answer to Subpart B above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subparts C and D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart B above is No, go to Subpart C.

Subpart C. Soil Exposure

- 1) Are COCs which are in the soil of the affected property solely below the first 5 feet beneath ground surface **or** does the affected property have a physical barrier present to prevent exposure of receptors to COCs in surface soil?

_____ Yes _____ No

Explain:

--

If the answer to Subpart C above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subpart D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart C above is No, proceed to Subpart D.

Subpart D. *De Minimis* Land Area

In answering “Yes” to the question below, it is understood that all of the following conditions apply:

- The affected property is not known to serve as habitat, foraging area, or refuge to threatened/endangered or otherwise protected species. (Will likely require consultation with wildlife management agencies.)
- Similar but unimpacted habitat exists within a half-mile radius.
- The affected property is not known to be located within one-quarter mile of sensitive environmental areas (e.g., rookeries, wildlife management areas, preserves). (Will likely require consultation with wildlife management agencies.)
- There is no reason to suspect that the COCs associated with the affected property will migrate such that the affected property will become larger than one acre.

- 1) Using human health protective concentration levels as a basis to determine the extent of the COCs, does the affected property consist of one acre or less and does it meet all of the conditions above?

_____ Yes _____ No

Explain how conditions are met/not met:

If the answer to Subpart D above is Yes, then no further ecological evaluation is needed at this affected property, assuming the answer to Subpart A was No. Complete PART III - Qualitative Summary and Certification. If the answer to Subpart D above is No, proceed to Tier 2 or 3 or comparable ERA.

PART III. Qualitative Summary and Certification (complete in all cases.)

Attach a brief statement (not to exceed 1 page) summarizing the information you have provided in this form. This summary should include sufficient information to verify that the affected property meets or does not meet the exclusion criteria. The person should make the initial decision regarding the need for further ecological evaluation (i.e., Tier 2 or 3) based upon the results of this checklist. After review, TCEQ will make a final determination on the need for further assessment. **Note that the person has the continuing obligation to re-enter the ERA process if changing circumstances result in the affected property not meeting the Tier 1 exclusion criteria.**

Completed by _____ (Typed/Printed Name)
_____ (Title)
_____ (Date)

I believe that the information submitted is true, accurate, and complete, to the best of my knowledge.
_____ (Typed/Printed Name of Person)
_____ (Title of Person)
_____ (Signature of Person)
_____ (Date Signed)

Section 3 Assessment Strategy

Use this section to discuss the rationale for the assessment and identify remaining data gaps.

Section 3.1 General Assessment Issues

Environmental Media Assessed

Identify the environmental media assessed and describe the method used to determine which media to sample. Relate the media assessed to the identified exposure pathways. Explain the methods used to evaluate whether an underlying groundwater-bearing unit is affected. If a medium was not assessed or if a complete or reasonably anticipated to be complete exposure pathway identified in Table 2C was not evaluated, explain why and how it was determined that the medium did not need to be assessed.

Target COCs

Provide a list of the target COCs that are the basis for analysis of samples. If the complete list of chemicals in an analytical method was used as the target COC list, specify the analytical method number instead of listing each COC separately. Describe how the target COCs were identified, discuss whether the target COCs differ by medium, and if so, why. Relate the target COCs to the types of materials, wastes, and products historically located in the area assessed and reference this discussion to the information in Tables 1A and if applicable, Table 1B. If there are target COCs for which analysis was not conducted, identify those COCs and discuss the reasons why analysis was not conducted. Refer to *Selecting Target Chemicals of Concern* (RG-366/TRRP-10) for additional guidance.

Background

If a site-specific background study was conducted, describe how representative site-specific background concentrations were determined for each environmental medium, as applicable. Explain the rationale for the sampling locations and depths. Provide information to support the determination that areas from which the samples were collected have not been impacted by industrial activities. If background is anthropogenic, explain the potential source(s) of the COCs measured.

Section 3.2 Assessment Strategy

General Assessment Approach

For each medium assessed, explain the assessment strategy. Identify how sampling locations were determined in relation to available history and data in the area being assessed. Describe the intended use of critical samples (refer to Section 1 in *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13) for the definition of critical samples). If field screening was conducted, explain how the field screening results were used. Explain how the sampling and analytical methods met the sampling objectives. If there is no affected property and/or no PCLE zone, explain how the assessment was adequate to make that determination.

Describe how the layout, infrastructure, and logistics modified or limited the assessment. Identify how the assessment compensated for these logistical issues.

Sampling Approach

Explain how the sampling locations and methods are the most optimal to detect COCs, as well as the direct or indirect evidence of NAPL, based on the type of COC, the physical and chemical properties of NAPL and COCs, the stratigraphy and geology of the area, the type and location of receptors, and the expected migration pathways of the COCs.

Surface Water and Sediment Assessment

Describe the method(s) used to determine whether the surface water body and/or sediments are threatened or affected. Include and justify the distance surveyed based on site-specific conditions such as fate and transport of the COCs, the geology and hydrogeology in the area, topography of the area, and other factors that may determine the potential for impact. Explain how the groundwater assessment took into account the potential impacts to surface water or sediment. If surface water or sediment was assessed, discuss whether the surface water body is a gaining and/or losing water body in the impact area and whether the surface water is hydrologically connected to groundwater. Discuss tidal effects or hydraulic effects and how this was taken into account when conducting surface water or sediment sampling. Provide the flow rate and/or velocity at the time of sampling.

Miscellaneous

Describe the rationale for the assessment of miscellaneous items not included in the discussion of other environmental media, such as: geophysical investigations (seismic surveys, ground-penetrating radar surveys, and resistivity surveys), wipe samples, waste sampling, system components decontamination, concrete slab sampling, biota sampling (flora or fauna), food sampling, etc. Provide the results of the assessment in Appendix 11.

Utilities

Describe the method(s) used to investigate whether an underground utility is threatened, affected, or is a potential migration pathway. Identify the underground utilities located within the affected property that may be threatened, affected, or that may serve as a migration pathway. Provide justification for concluding that those utilities present within the affected property but not listed in Table 3A are not preferential pathways for migration. Include in the discussion relevant site-specific factors regarding this potential migration pathway, such as fate and transport of the specific COCs, soil and rock types, permeability contrasts between the utility backfill and native geology, utility type, location, and construction, and other factors that may affect the migration of COCs.

Assessment Methods

Identify and describe the sampling method(s) used (drilling, hand auger, push probe, excavation, etc.) for critical samples, the method of sample collection and preservation, how NAPL was investigated (techniques to identify and evaluate NAPL occurrence and properties), and sample handling procedures. Discuss the site-specific reasons for choosing the sample collection and handling method(s). If a dedicated sampling device was not used for each monitor well, describe the decontamination procedures.

If water samples were filtered, specify the pore size and type of filter, describe how the samples were filtered, and justify the use of filtering.

Explain atypical procedures used or problems encountered, and describe deviations from procedures specified in standard operating procedures (SOPs) included in Appendix 14.

Explain how atmospheric conditions affected the sampling protocol, instrument calibrations, and other aspects of the ambient air assessment.

Provide a general description of the well development and purging method(s) followed during the assessment or provide an SOP in Appendix 14. Specify deviations from the SOP. Describe in this section or the SOP the water quality stabilization parameters (pH, temperature, etc.), the purge rate and/or amount purged, a description of the purging devices, and the decontamination procedures for the equipment. If water wells were also sampled, include a discussion of how these wells were purged and sampled, if different from the monitor wells. Include the well development and purging data in Appendix 3.

For surface water and sediment sample collection, specify the sample method and sampling equipment (e.g., direct grab, dredge device, core sampling device, Van Dorn sampler). For dissolved metals in surface water, describe the filter size and filtering procedure, sample handling procedures and preservatives. If sediment pore water samples were collected, describe the sample collection methodology. Describe the field measurements (e.g., temperature, dissolved oxygen) and significant field observations (e.g., unusual flow conditions, water appearance, sheens, odors, turbidity, biological activity, watershed activities such as dredging or construction).

Data Quality

Describe the rationale for selecting each of the laboratory or field analysis methods used. If an MQL was used as the assessment level or critical PCL, provide documentation that the standard available analytical method selected provides the lowest possible MQL for that COC.

If applicable, describe the types of field analysis equipment used and the frequency and procedures for calibration.

Table 3A - Underground Utilities

Identify the underground utilities within or immediately adjacent to the affected property that are threatened or affected or those that may be, or are known, preferential migration pathways. List the utility type (e.g., sanitary sewer, water line, etc), the construction material (e.g., clay, concrete, etc) and backfill material (native soil, gravel, etc), the approximate depth at which the utility line is buried, and the name of the company responsible for the utility line. Indicate if the utility line is a potential pathway for COC migration and if the utility line itself is impacted.

Table 3A. Underground Utilities

Utility type	Construction material	Backfill material	Approx. depth (ft)	Utility company name	Potential migration pathway?		Affected?	
					Yes	No	Yes	No

Section 4 Soil Assessment

Use this section to discuss the results of the surface and subsurface soil assessment and the nature and extent of NAPL and COCs in soil. For this discussion, the term soil includes the vadose zones, capillary fringe, and saturated zones that are not groundwater-bearing units. Refer to *Affected Property Assessment Requirements* (RG-366/TRRP-12) for guidance on assessment levels and *NAPL Assessment* (RG-366/TRRP-12A) for information on determining the nature and extent of NAPL.

Section 4.1 Derivation of Assessment Levels

Discuss the human health and ecological exposure pathways considered for the determination of the residential assessment level in surface and subsurface soil. Refer to the definition of assessment level in the rule at §350.4(3). The determination of the residential assessment level includes consideration of the applicable human health and ecological PCLs, the MQL, and background. Identify the presence or absence of human and ecological receptors, the POEs for each receptor, and the exposure pathway for each receptor. Describe, if applicable, the site-specific scenarios that change the assessment level for a COC based on the presence or absence of a receptor or potential exposure pathway. Complete Section 11 as applicable, and include the calculations, equations, and supporting documentation for Tier 2 or 3 ^{GW}Soil PCLs in Appendix 9.

If applicable, discuss the use of multiple residential assessment levels for the same COC in the same soil zone due to differing background COC concentrations (natural or anthropogenic) based on changes in lithology or geochemistry, or when COCs are from off-site sources, and explain how it was determined that the assessment levels differ within the same media. Repeat Table 4A as necessary to document the differing assessment levels.

Section 4.2 Nature and Extent of COCs and NAPL in Soil

Discuss the nature and extent of NAPL and COCs in surface and subsurface soils, including those soils beneath affected groundwater-bearing units, if applicable. Identify and discuss the critical sampling locations used to delineate the horizontal and vertical extent of each COC. Relate the distribution of NAPL and COCs to the source(s) of release and the locations of human and ecological receptors. If there is direct or indirect evidence of NAPL in soil, describe the nature and extent of NAPL, including the distribution, composition, and other pertinent characteristics and observations.

If a groundwater assessment has not been conducted, explain how it was determined that groundwater is not affected. Discuss how the vertical limit of COCs in soil was determined, and include a discussion and a table or a list of the COC concentration (MQLs or background concentrations) used to define the vertical limit of COCs in soil.

When claiming evidence of groundwater protectiveness using §350.75(i)(7)(C), provide a complete justification here and include the supporting documentation in Appendix 9.

Provide a short discussion if declaring the entire soil column as a PCLE zone in accordance with §350.51(d), in lieu of delineating COCs vertically.

Discuss modifications made to the assessment when existing physical controls will be used in a Remedy Standard B response action (see §350.51(a) and §350.71(d)).

Table 4A - Surface Soil Residential Assessment Levels with no Ecological Component

Use this table to summarize the residential assessment level for each COC analyzed in surface soils in areas where human health PCLs apply and to compare the residential assessment level to the higher of the maximum COC concentration or the maximum SQL to determine if the residential assessment level has been exceeded. For each COC, highlight the value that is the residential assessment level and highlight the maximum concentration if it exceeds the residential assessment level. Add columns as necessary to include applicable exposure pathways. If a Tier 2 or Tier 3 ^{GW} Soil PCL was used as the residential assessment level, include supporting documentation in Appendix 9.

Table 4A. Surface Soil Residential Assessment Levels for Human Health Exposure Pathways

COC	Source area size (acres)	^{Tot} Soil _{Comb} PCL (mg/kg)	^{GW} Soil PCL		MQL (mg/kg)	Back-ground (mg/kg)	Maximum concentration			
			(mg/kg)	Tier			Sample ID	Sample depth	Sample date	Conc (mg/kg)

Table 4B - Surface Soil Residential Assessment Levels with Ecological Component

Use this table to summarize the residential assessment level for each COC analyzed in surface soils in areas where human health and ecological concerns apply and to compare the residential assessment level to the maximum COC concentration to determine if the residential assessment level has been exceeded. If a PCL has not been developed under an ecological risk assessment, provide the basis for the value used. Complete this table for each COC analyzed. For each COC, highlight the value that is the residential assessment level and highlight the maximum concentration if it exceeds the assessment level.

Table 4B. Surface Soil Residential Assessment Levels with Ecological Component

COC	Human health PCL ¹ (mg/kg)	Ecological PCL (0 to 0.5 ft)		Ecological PCL (0.5 to 5 ft)		MQL (mg/kg)	Back-ground (mg/kg)	Maximum concentration in areas of ecological concern			
		(mg/kg)	Basis ²	(mg/kg)	Basis ²			Sample ID	Sample depth	Sample date	Conc (mg/kg)

¹ List the lower of ^{Tot}Soil_{Comb} and ^{GW}Soil values from Table 4A.

² Specify the basis of the ecological PCL (benchmark, MQL, background, Tier 2 PCL, or Tier 3 PCL).

Table 4C - Subsurface Soil Residential Assessment Levels

The purpose of this table is to illustrate the residential assessment levels for each COC analyzed in subsurface soils and to compare the residential assessment level to the maximum COC concentration to determine if the residential assessment level has been exceeded. Complete this table for each target COC. Highlight the value that is the residential assessment level for each COC and highlight the maximum concentration if it exceeds the assessment level. Add columns as necessary to include other applicable exposure pathways. If a Tier 2 or Tier 3 ^{GW}Soil PCL was used as the residential assessment level, include supporting documentation in Appendix 9.

Table 4C. Subsurface Soil Residential Assessment Levels

COC	Source area size (acres)	^{Air} Soil _{inh-v} PCL (mg/kg)	^{GW} Soil PCL		MQL (mg/kg)	Back-ground (mg/kg)	Maximum concentration			
			(mg/kg)	Tier			Sample ID	Sample depth	Sample date	Conc (mg/kg)

Table 4D - Soil Data Summary

The purpose of this table is to summarize the analytical results for soil and illustrate which samples exceed the residential assessment level, the critical PCL, or both. Do not split the table into surface soil samples and subsurface soil samples. Include the following for each COC:

- sample ID name/number,
- boring number,
- sample date,
- sample depth,
- COC name,
- residential assessment level,
- critical PCL, and
- COC concentration.

Use mg/kg as the units for the concentrations.

If the result was not detected, report the result as less than the SQL (for example, “<0.01 mg/kg”). Do not use acronyms such as “ND” for non-detected results.

Highlight:

- concentrations that exceed the residential assessment level, and
 - SQLs (non-detected results) that exceed the residential assessment level,
- and highlight in a different manner:
- concentrations that exceed the critical PCL, and
 - SQLs (non-detected results) that exceed the critical PCL.

Table 4E - Soil Geochemical/Geotechnical Data Summary

Provide summary tables of geochemical or geotechnical analyses results. Include in the tables the sample ID number, boring number, sample date, sample depth, parameter analyzed, analytical method, and

analytical result. Include data qualifiers and identify the data qualifiers. Report non-detected results as less than the SQL, where applicable.

Figure 4A - Surface Soil COC Concentration Maps

The purposes of these maps are to illustrate the distribution of COCs and NAPL in surface soils (0-15 ft. bgs), demonstrate the extent of COCs in surface soils has been delineated in accordance with the rule, and identify source areas. When the residential assessment level for a COC is exceeded, provide a map for that COC which illustrates the extent of the affected property in surface soil. Include the locations of the borings and surface soil samples, excavated areas, buildings and other structures, potential sources and known release areas, the maximum COC concentration detected at each location, and the depth at which the maximum concentration was detected in surface soils. Clearly label the isoconcentration contour line representing the residential assessment level. In order to avoid duplicating maps in Figure 11A, when the land use for purpose of PCL development is residential, depict the PCLE zones on these maps and omit Figure 11A.

Additional maps or graphs may be submitted to illustrate the changes in COC concentrations and distribution over time.

Figure 4B - Subsurface Soil COC Concentration Maps

The purposes of these maps are to illustrate the distribution of COCs and NAPL in subsurface soils (>15 ft. bgs), demonstrate the extent of COCs in subsurface soils has been delineated in accordance with the rule, and identify source areas. When the residential assessment level for a COC is exceeded, provide a map for that COC which illustrates the extent of the affected property in subsurface soil. Include the locations of the borings and subsurface soil samples, excavated areas, buildings and other structures, potential sources and known release areas, the maximum COC concentration detected at each location, and the depth at which the maximum concentration was detected in subsurface soils. Clearly label the isoconcentration contour line representing the residential assessment level. In order to avoid duplicating maps in Figure 11B, when the land use for purpose of PCL development is residential, depict the PCLE zones on these maps and omit Figure 11B.

Figure 4C - Cross Sections

The purpose of the cross sections is to illustrate the subsurface geology and hydrogeology, the horizontal and vertical distribution of COCs, the affected soils, and the potential for future migration. Construct the cross section using the actual ground surface elevations at each of the boring locations. Indicate the cross section lines on the map in Figure 1B or provide an index map on the cross section.

Construct cross sections to represent the subsurface stratigraphy and extent of COCs using at least three representative points. Construct a minimum of two cross sections perpendicular to each other through the source area and affected property unless the characteristics (geology, COC distribution, etc) are homogeneous and can be adequately illustrated with one cross section. For affected properties with monitor wells, construct one cross section approximately down the primary axis of COC transport and one approximately perpendicular to COC transport direction.

Include the following for the cross sections:

- boring or monitor well identification numbers,
- interpolated stratigraphy between each boring/monitor well from the ground surface to the maximum depth assessed,
- groundwater-bearing units and aquitards,
- sample locations,
- areas exceeding the residential assessment levels for each media,

- areas exceeding the critical PCL for each medium (may be shown here or in cross sections in Section 11),
- COC concentrations at critical sampling points,
- areas exceeding the higher of background or MQL if a groundwater assessment has not been conducted,
- distribution of NAPL,
- potentiometric surface or water table based on static groundwater level in each monitor well,
- monitor well screened intervals,
- structural features or other migration pathways,
- excavated areas,
- subsurface conduits, underground utilities, and
- compass directions of the cross sections.

Section 5 Groundwater Assessment

Use this section to discuss the results of the assessment of each groundwater-bearing unit including the nature and extent of COCs. Refer to *Affected Property Assessment Requirements* (RG-366/TRRP-12) for guidance on assessment levels and *NAPL Assessment* (RG-366/TRRP-12A) for information on determining the nature and extent of NAPL.

Section 5.1 Derivation of Assessment Levels

Discuss how the residential assessment levels were determined for each COC in each groundwater-bearing unit. Identify the presence or absence of human or ecological receptors, the POEs for each receptor, and the exposure pathways for each receptor. Describe, if applicable, the site-specific scenarios that change the assessment level for a COC based on the presence or absence of a receptor or potential exposure pathway, including at or near the groundwater-surface water interface when considering the ^{SW}GW or ^{Sed}GW pathway.

Section 5.2 Nature and Extent of COCs and NAPL in Groundwater

Discuss the nature and extent of NAPL and COCs in each groundwater-bearing unit. Explain how groundwater was assessed near surface water bodies and describe the results of the investigation to evaluate the groundwater-to-surface water and groundwater-to-sediment pathways. Identify and discuss the critical sampling locations used to delineate the extent of each COC. If there is direct or indirect evidence of NAPL in groundwater, describe the nature and extent of NAPL, including the distribution, measured thickness, composition, and other pertinent characteristics and observations. Relate the distribution of NAPL and COCs to the source(s) of release and human and ecological receptors. Identify the “driver” COCs in groundwater, and explain why these COCs are of particular concern or how they can be used to represent the affected groundwater.

Demonstrate that the vertical assessment of NAPL and COCs in groundwater was completed by documenting that COC concentrations in a deeper groundwater-bearing unit are less than the residential assessment level. Alternatively, demonstrate that vertical migration to a lower groundwater-bearing unit is not probable considering COC properties and hydrogeologic conditions.

Discuss modifications made to the assessment when existing physical controls will be used in a Remedy Standard B response action (see §350.51(a), §350.71(d), and §350.33 (f)(2)).

Table 5A - Groundwater Residential Assessment Levels

The purpose of this table is to summarize the residential assessment level for each COC analyzed in groundwater and to compare the residential assessment level to the higher of the maximum COC concentration or maximum SQL to determine if the residential assessment level has been exceeded. Add columns as necessary to indicate other applicable exposure pathways. For each COC, highlight the value that is the residential assessment level and highlight the maximum concentration if it exceeds the residential assessment level. Repeat the table for each groundwater-bearing unit.

Table 5A. Groundwater Residential Assessment Levels

COC	GW ¹ GW ² GW ³ (mg/L)	Air ¹ GW ¹ Inh-V		SW ¹ GW ¹ (mg/L)	Sed ¹ GW ¹ (mg/L)	MQL (mg/L)	Back- ground (mg/L)	Maximum concentration			
		(mg/L)	Source area size (acres)					Sample ID	Sample depth (ft)	Sample date	Conc (mg/L)

Table 5B - Groundwater Data Summary

The purpose of this table is to summarize the analytical results for groundwater and illustrate which samples exceed the residential assessment level, the critical PCL, or both. Include the following for each COC:

- sample ID name/number,
- monitor well number,
- sample date,
- sample depth,
- COC name,
- residential assessment level,
- critical PCL, and
- COC concentration.

Use mg/L as the units for the concentrations.

If the result was not detected, report the result as less than the SQL (for example, "<0.01 mg/L"). Do not use acronyms such as "ND" for non-detected results.

Highlight:

- concentrations that exceed the residential assessment level, and
 - SQLs (non-detected results) that exceed the residential assessment level,
- and highlight in a different manner:
- concentrations that exceed the critical PCL, and
 - SQLs (non-detected results) that exceed the critical PCL.

¹ PCLs for these pathways are not applicable to all sites. Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24) to determine when to calculate a PCL for this pathway.

Table 5C - Groundwater Geochemical Data Summary

Provide summary tables of the results for geochemical analyses. Include the sample ID number or monitor well number, sample date, parameter analyzed, analytical method, and analytical result. If the result was nondetect, specify the SQL for that parameter (do not write “ND”). Repeat the table for each groundwater-bearing unit.

Table 5D - Groundwater Measurements

Provide a summary table of the monitor well and water well gauging data. Include in the table: measured depth to groundwater, measurement date, groundwater elevation in relation to mean sea level, top of casing and/or ground surface elevations (specify measuring point), corrected water level and well screen interval, and measured NAPL thickness if applicable. Organize the table with the results for each monitor well or water well listed in date order (oldest first). If measurable LNAPL is present, provide the specific gravity of the LNAPL and the equation used to calculate the corrected groundwater elevation.

Figure 5A - Groundwater Gradient Map

Provide a groundwater gradient map for each groundwater-bearing unit, drawn to scale, illustrating the monitoring wells and other groundwater measuring points, groundwater surface elevation relative to sea level, labeled groundwater elevation contours, and groundwater flow direction. If groundwater elevation data were collected at several times and the groundwater flow magnitude or direction has changed over time, submit a sufficient number of maps to illustrate these changes.

Figure 5B - Groundwater COC Concentration Maps

When the residential assessment level for a COC is exceeded in a groundwater-bearing unit, provide a map for that COC to illustrate the distribution of the COC and NAPL if applicable, that includes the following:

- the extent of the COC in groundwater delineated to residential assessment levels,
- potential source areas and known release areas,
- locations of the monitor wells and other sampling points,
- buildings and other structures,
- excavated areas,
- the maximum COC concentration detected at each location representative of current conditions and the depth at which the maximum concentration was detected,
- isoconcentration contours, including the isoconcentration contour line representing the residential assessment level, and a contour of the 1% solubility limit for the COC (indirect evidence of NAPL), if applicable, and
- areas of direct evidence of NAPL associated with the COC.

In order to avoid duplicating maps, when the land use for the purpose of PCL development is residential, depict the PCLE zones on these maps and omit Figure 12A.

When sufficient time series data are available, also construct maps for significant COCs to illustrate the changes in COC concentrations and distribution over time. Also include graphs of COC concentrations over time and COC concentrations over distance.

If there is direct or indirect evidence of LNAPL, provide a separate map that illustrates the largest extent of LNAPL, including measured LNAPL and areas where there is indirect evidence of LNAPL. Label each sampling point with either the measured LNAPL thickness or the concentration that indirectly indicates the presence of LNAPL.

If there is direct or indirect evidence of DNAPL, provide a map that illustrates the largest extent of measured DNAPL and areas where there is indirect evidence of DNAPL. Label each sampling point, with either the measured DNAPL thickness or the concentration that indirectly indicates the presence of DNAPL. If DNAPL is detected or suspected, provide a structure contour map for the top of the aquiclude or base of saturated zone as appropriate.

Figure 5C - Groundwater Geochemistry Maps

Provide maps as necessary to effectively illustrate the distribution of groundwater geochemistry (for example, sulfate, nitrate, total dissolved solids) when such information is collected. Illustrate on the maps the sampling points, geochemical values, isoconcentration contours as appropriate to accurately depict the data in each media, sample depth intervals, and relevant surface and subsurface features.

When sufficient time series data are available, also construct maps for significant geochemical data to illustrate the changes in geochemistry and distribution over time.

Figure 5D - Cross Section Groundwater-to-Surface Water Pathway

If there is a complete or reasonably anticipated to be complete exposure pathway from groundwater to surface water, provide at least one cross section illustrating the subsurface conditions where the groundwater is in contact with surface water. Illustrate the depth to groundwater, the boundary of the surface water body, surface water depth and sediment thickness, monitor well completion details, groundwater, surface water, and sediment sampling points, and other information necessary to illustrate these conditions. Include an index map showing the cross section location in relation to surface features and the affected property.

Section 6 Surface Water Assessment and Critical PCL Development

Complete this section for each surface water body that is threatened, affected, sampled, or if the groundwater-to-surface water pathway is complete or reasonably anticipated to be complete. The purpose of this section is to describe and provide sufficient documentation to support the applicable water quality criteria, RBELs for human health and aquatic life, and critical PCLs for each surface water body. Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24) and *Affected Property Assessment Requirements* (RG-366/TRRP-12) for guidance.

Section 6.1 Type of Surface Water and Applicable Water Quality Criteria

Provide a general description of the physical characteristics of the surface water body and, as applicable, additional water bodies downstream to the first perennial water body. Include the name of the surface water body, the nature of the bed, depth of water column, whether the surface water body is a gaining and/or losing water body, and relevant field observations. Identify if the water body or the nearest classified segment downstream of the affected property is on the Clean Water Act §303(d) list. If so, identify the specific chemicals or other parameters which are listed as impairing the nearest classified segment at or downstream of the affected property. Identify the segment number and name (e.g., 0601; Neches River Tidal) of the first classified segment at or downstream of the surface water body. If the surface water body is a classified segment, indicate this.

Discuss and provide supporting documentation for the following for each surface water body:

- I. Category
 - A. Classified (provide the segment number) or
 - B. Unclassified
 - 1) tidal,
 - 2) lake, or
 - 3) stream, river, or ditch (provide stream flow information if relevant)
 - i) perennial,
 - ii) intermittent, or
 - iii) intermittent with pools.
- II. Use(s) (designated, observed, or presumed)
 - A. Recreation (contact or non-contact)
 - B. Aquatic life (exceptional, high, intermediate, or limited where the water body is indicated in Appendix A or D of the Texas Surface Water Quality Standards)
 - C. Domestic water supply (public or aquifer protection), and/or
 - D. Other
- III. Criteria
 - A. Human health, and/or
 - 1) sustainable or incidental fishery, and/or
 - 2) public drinking water supply
 - B. Aquatic life
 - 1) freshwater or saltwater; and
 - 2) acute and/or chronic

If the surface water body is not classified as a drinking water source but is used for recreational purposes (designated or observed), discuss the potential exposure for humans wading or swimming in the surface water. If applicable, provide the rationale for eliminating these recreational pathways.

Section 6.2 Surface Water Risk-Based Exposure Levels (RBELs) for Human Health and Aquatic Life Protection

Discuss how the RBELs for aquatic life and human health protection were developed for each surface water body. Include the calculations and supporting data in Appendix 9. If a Texas standard does not exist for a COC and a pre-approved value is not posted on the TRRP web site, provide the following:

- For human health, discuss the method used to develop each RBEL and the rationale for the bioconcentration factor (BCF) or bioaccumulation factor (BAF) and reference dose or cancer slope factor used to derive the RBEL.
- For aquatic life, provide the mechanism used to derive a RBEL and the rationale for the aquatic organism and associated LC₅₀ used to derive the RBEL. Discuss the information used to determine if the COC is persistent or bioaccumulative.
- For the non-default parameters, provide the rationale for the value used in the development of the RBEL.

For human health pathways not addressed by the surface water RBEL (incidental ingestion and dermal contact), discuss the pathways evaluated, the pathway-specific exposure parameters used to develop the RBEL, and the equations used.

For releases of petroleum fuel contaminated waters, discuss the applicability of and demonstrate compliance with, the discharge criteria for the TPDES general permit in addition to the applicable human health and aquatic life protection RBELs.

If applicable, discuss the rationale for and the method used to modify the surface water RBEL based on aesthetics, nutrients, and/or adverse toxic effects.

If applicable, provide the derivation of a RBEL for salinity, chlorides, sulfates, total dissolved solids, and/or pH.

Section 6.3 Nature and Extent of COCs in Surface Water

Describe the results of the assessment for each surface water body. If a PCL has not been developed for ecological receptors, discuss the value used as the assessment level (MQL, background, benchmark, or human health PCL). Discuss how the extent of NAPL and COCs was determined and how the assessment identified the affected surface water. Include a discussion of the COCs detected, presence or absence of LNAPL and/or DNAPL based on direct and/or indirect evidence, and the potential source(s) of the release associated with each COC. Describe the potential migration pathways (e.g., groundwater, air emissions, man-made conduits, storm water drainage and related outfalls, etc.) from the source area to the surface water body. If applicable, discuss how background concentrations were determined and include the calculations in Appendix 8. Identify critical samples used to delineate the extent of COCs and determine if remedial actions are necessary.

Section 6.4 Critical PCL for Surface Water

Discuss the comparison of ecological PCLs developed in the ecological risk assessment with the RBELs determined for human health and aquatic life. Explain how the critical PCL and associated exposure pathway for each COC was determined.

If applicable, provide a discussion of the PCL adjustment to address a more conservative RBEL or PCL for the affected downstream water body.

Table 6A - Surface Water Critical PCLs

Repeat this table for each affected surface water body. The purpose of this table is to identify the critical PCLs and those that have been exceeded. List the COCs that were targeted for assessment. For each COC, list the lowest MQL, the background concentration (if calculated), the maximum detected or representative concentration, ecological PCLs determined in an ecological risk assessment, surface water RBELs for aquatic life and human health, and surface water PCLs protective of human health (incidental ingestion, dermal contact, fish and shellfish uptake), where appropriate. If an ecological PCL was not developed under an ecological risk assessment, identify the value (benchmark, background, MQL, or human health PCL) used as the assessment level. For each COC, highlight the value that is the critical PCL and highlight the maximum or representative concentration if it exceeds the critical PCL.

Table 6A. Surface Water Critical PCLs

COC	Background (mg/L)	MQL (mg/L)	Human Health ¹ (^{SW} SW _{HH})				Aquatic Life and Ecological ² (^{SW} SW _{eco})			^{SW} SW petroleum fuel discharges ³ (mg/L)	Conc (mg/L)	
					Contact recreation		Acute (mg/L)	Chronic (mg/L)	Wildlife receptors (mg/L)		Max	Rep ⁴
			Water and fish (mg/L)	Fish only (mg/L)	Incidental ingestion (mg/L)	Dermal contact (mg/L)						

¹ ^{SW}SW_{HH} – Surface water PCL protective of human health.

² ^{SW}SW_{eco} – Surface water PCL protective of aquatic life and wildlife ecological receptors. If a PCL was not developed under an ecological risk assessment, provide the value used (benchmark, MQL, background, or human health PCL), as appropriate.

³ ^{SW}SW – Surface water PCL for discharge of petroleum fuel contaminated water. See Section 3.4 of *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24).

⁴ Document the development of representative concentrations in Appendix 8.

Table 6B - Surface Water Data Summary

The purpose of this table is to summarize the analytical results (COC, geochemical, NAPL, and conventional parameters) for surface water and highlight which concentrations exceed the critical PCL. Include the following for each COC:

- sample ID name/number,
- sample date,
- sample depth,
- COC name, and
- COC concentration.

Use mg/L as the units for the concentrations.

If the result was nondetect, report the result as less than the SQL (for example, “<0.01 mg/L”). Do not use acronyms such as “ND” for non-detected results.

Highlight the:

- concentrations that exceed the critical PCL, and
- SQLs (non-detected results) that exceed the critical PCL.

Figure 6A - Surface Water PCLE Zone Map

The purpose of this map is to illustrate the distribution of COCs in surface water. Provide a map that effectively illustrates the distribution of COCs and NAPL, geochemical and geotechnical parameters, and conventional parameters in each surface water body that was sampled. Highlight the samples that exceed the critical PCL or illustrate the PCL zone. Include the sampling points, depth intervals, and associated concentrations in surface water as well as groundwater near the surface water. Label the location of each surface water body, and identify the name, segment number, flow direction, and relevant surface and subsurface features of each surface water body. If applicable, illustrate the area of NAPL which requires a response action.

Figure 6B - Photographs

If not provided in Figure 2B, provide color original or high-resolution color copies of photographs to document field observations and the physical characteristics of the surface water body. Clearly label the photographs with a description of the subject and photographer’s view. Provide a map that shows the location and view direction of the photographer.

Section 7 Sediment Assessment and Critical PCL Development

Complete this section for sediment threatened, affected, and/or sampled, or if the groundwater-to-sediment pathway is complete or reasonably anticipated to be complete. The purpose of this section is to describe and provide sufficient documentation to support the sediment RBELs for human health and the critical PCLs for sediment based on human and ecological receptors. Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24) for guidance.

Section 7.1 Type of Sediment and Applicable Criteria

Provide a general description of the sediment (soils, sand, organic matter, minerals or other material that have accumulated on the bottom of each surface water body) based on visual observations. Include the thickness of the sediment column (if known), depth of aerobic zone, texture, color, observations of biota, and odors. Provide a general discussion of the depth of the water column anticipated during times of contact recreation in the water body.

Provide a discussion of the potential for direct human exposure due to wading or swimming, or indirect exposure from ingestion of shellfish and fish. If applicable, provide the rationale for eliminating the human health exposure pathways.

Section 7.2 Sediment Risk-based Exposure Levels (RBELs) for Human Health

Discuss the development of RBELs protective of human health. If a pre-approved value from the TRRP web site was not used, provide the rationale, exposure assumptions, and non-default parameter values used in the development of these RBELs. Provide a discussion of literature-derived or measured water body-specific biota-sediment accumulation factors (BSAFs) used for sediment to fish/shellfish (to human) pathway, as appropriate. Include the calculations and supporting data in Appendix 9.

Section 7.3 Nature and Extent of COCs in Sediment

Describe the results of the sediment assessment. If an ecological PCL was not developed under an ecological risk assessment, provide a discussion of the value (benchmark, MQL, background, or human health PCL) used as the assessment level. Discuss how the extent of LNAPL and COCs was determined and how the assessment identified the affected sediment. Include a discussion of the COCs detected, presence or absence of LNAPL and/or DNAPL, and potential source(s) of the release associated with each COC. If applicable, discuss how background concentrations were determined and include the calculations in Appendix 8.

Identify critical samples that were used to delineate the extent of COCs and determine if remediation activities are warranted.

Section 7.4 Critical PCL for Sediment

Discuss the comparison of ecological PCLs developed in the Ecological Risk Assessment with the RBELs determined for human health. Explain how the critical PCL and associated exposure pathway for each COC was determined.

Table 7A - Sediment Critical PCLs

Repeat this table for the affected sediment in each water body. The purpose of this table is to identify the critical PCLs that have been exceeded. List the COCs that were targeted for assessment. For each COC, list the lowest MQL, the background concentration (if determined), the maximum detected or representative concentration, ecological PCLs determined in the ecological risk assessment, and sediment PCLs protective of human health (including incidental ingestion, dermal contact, fish and shellfish uptake), where appropriate. For each COC, highlight the value that is the critical PCL and highlight the maximum or representative concentration if it exceeds the critical PCL.

Table 7A. Sediment Critical PCLs

COC	MQL (mg/kg)	Background (mg/kg)	Human Health (^{Sed} SED _{HH}) ¹			Ecological (^{Sed} SED _{Eco}) ²		Conc (mg/kg)	
			Contact recreation		Ingestion of impacted fish/shellfish (mg/kg)	Benthics (mg/kg)	Wildlife receptors/fish (mg/kg)	Max	Rep ³
			Incidental ingestion (mg/kg)	Dermal contact (mg/kg)					

Table 7B - Sediment Data Summary

The purpose of this table is to summarize the analytical results (COC, geochemical, NAPL, and conventional parameters) for sediment and highlight which concentrations exceed the critical PCL.

Include the following for each COC:

- sample ID name/number,
- sample date,
- sample depth,
- COC name,
- critical PCL, and
- COC concentration.

Use mg/kg as the units for the concentrations.

If the result was nondetect, report the result as less than the SQL (for example, “<0.01 mg/kg”). Do not use acronyms such as “ND” for non-detected results.

Highlight the:

- concentrations that exceed the critical PCL, and
- SQLs (non-detected results) that exceed the critical PCL.

¹ ^{Sed}SED_{HH} – Sediment PCL protective of human health.

² ^{Sed}SED_{Eco} – Sediment PCL protective of ecological receptors. If a PCL was not developed under an ecological risk assessment, provide the value (benchmark, background, MQL, or human health PCL) used, as appropriate.

³ Document the development of representative concentrations in Appendix 8.

Figure 7A - Sediment PCLE Zone Map

The purpose of this map is to illustrate the distribution of COCs in sediment. For each COC assessed, provide a map(s) that effectively illustrates the distribution of COCs, geochemical and geotechnical parameters, LNAPL and/or DNAPL, and conventional parameters in the sediment that was sampled. Identify the areas where the water column depth overlying the sediment is less than 2 meters (6.56 feet) during times of contact recreation in the water body. Highlight the samples that exceed the critical PCL or illustrate the PCLE zone. Include the sediment sampling locations, sample depth intervals, water body names, segment numbers, COC concentrations, surface water flow direction, and relevant surface and subsurface features. Also provide the sampling locations for other media that may be potential sources for COCs in the sediment. If applicable, illustrate the area of NAPL which requires a response action.

Section 8 Air Assessment and Critical PCL Development

Section 8.1 Risk-Based Exposure Levels

Describe how the air RBELs were derived for outdoor air. Include the calculations and supporting data in Appendix 9. Provide the method used to determine site-specific values for non-default parameters. If an occupational inhalation criteria was used as the RBEL:

- demonstrate that a health and safety plan is in place,
- describe how the health and safety plan ensures compliance with the RBEL, and
- describe the plan for monitoring COC concentrations in air and the actions that will be taken if the RBEL is exceeded.

Section 8.2 Nature and Extent of COCs in Air

Discuss the assessment results from screening or sampling ambient air either outside, or in or around underground utility lines. Describe the nature and extent of COCs, and measures taken to mitigate the impact. Discuss the distribution of COCs relative to the source(s) and potential receptors.

Table 8A - Outdoor Air Data Summary

The purpose of this table is to summarize the analytical results (COC and conventional parameters) for air and illustrate which samples exceed the critical PCL. Include the following for each COC:

- sample ID name/number,
- sample date,
- sample height,
- COC name,
- critical PCL, and
- COC concentration.

Use parts per million by volume (ppmv) as the units for the concentrations.

If the result was nondetect, report the result as less than the SQL (for example, “<0.01 ppmv”). Do not use acronyms such as “ND” for non-detected results.

Highlight the:

- concentrations that exceed the critical PCL, and
- SQLs (non-detected results) that exceed the critical PCL.

Figure 8A - Outdoor Air COC Concentration Maps

Use these maps to illustrate the distribution of COCs in outdoor air and to illustrate areas that exceed the critical PCLs. Provide map(s) drawn to scale depicting the outdoor air (including particulate and subsurface utilities) sampling points, relevant surface and subsurface features, and COC concentrations. When sufficient time series data are available, also construct maps for significant COCs using previous sampling dates to illustrate concentration changes over time. Include a lateral view of the sampling area, as needed, to effectively illustrate the vertical distribution of sampling points.

Section 9 Ecological Risk Assessment

Complete this section when the affected property fails the Tier 1 Ecological Exclusion Criteria Checklist (Attachment 2A). There is not a standard format for this section since each affected property is unique. Submit a reasoned justification, an expedited stream evaluation, proposal for an ecological services analysis, and/or a Tier 2 or Tier 3 risk assessment. Refer to the TCEQ *Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas* (RG-263) December 2001 and future updates for the required information. The TCEQ may request additional copies of the APAR when this section is completed.

Reasoned Justification

Provide a reasoned justification for terminating the ecological risk assessment. Briefly describe the planned response action for affected soil that is designed to address human health exposure and how the response action coincidentally addresses ecological exposure as well.

Expedited Stream Evaluation

Demonstrate that the surface water body is an intermittent stream without perennial pools. Provide an evaluation of the setting and habitat (or lack thereof), verification that the stream meets acute water quality criteria, and discuss the likelihood of ecological receptors being present. Discuss and demonstrate the potential for downstream impacts where the setting is more conducive to aquatic life or wildlife, including verification that the maximum COC concentrations downstream are below the greater of background or ecological benchmarks, as appropriate, and that bioaccumulative COCs must be below background. Provide photographs of the intermittent stream, the surrounding area, the downstream area, and the sampling locations.

Tier 2 Screening Level Ecological Risk Assessment (SLERA)

Required information for the SLERA can be found in RG-263. If applicable, provide a copy of the SLERA in this section.

Tier 3 Site-Specific Ecological Risk Assessment (SSERA)

Required information for the SSERA can be found in RG-263. If applicable, provide a copy of the SSERA in this section.

Proposal for Ecological Services Analysis

Use this section to provide a proposal for an ecological services analysis.

Section 10 COC Screening

Use this section to document the rationale used to screen COCs from critical PCL development based on criteria outlined in §350.71(k). **Do not complete this section of the report if critical PCLs were developed for all COCs.** Include only those COCs that meet the screening criterion. Refer to *Screening Target Chemicals of Concern from PCL Development* (RG-366/TRRP-14).

Section 10.1 Frequency of Detection

For each COC screened from critical PCL development in accordance with the three criteria in §350.71(k)(2)(A), identify the total number of samples analyzed in the environmental medium and identify the frequency the COC was detected above the method quantitation limit. Provide clear justification why development of a critical PCL is not warranted to protect human health and the environment. Include in this justification a discussion of the concentration and distribution of the COC in environmental media, source area data, knowledge of on-site historical operations, COC and affected property characteristics, and companion and daughter product relationships.

Section 10.2 Lab Contaminant or Blank Contaminant

For each COC screened from critical PCL development under §350.71(k)(2)(B) and (C), demonstrate the COC was detected in an analytical blank. Explain why the COC is not anticipated to be present at the affected property based on knowledge of historical operations, including consideration of companion and daughter products. For common lab contaminants, demonstrate the maximum COC concentration detected in the environmental medium does not exceed 10 times the maximum amount detected in an associated blank. For COCs that are not common laboratory contaminants, demonstrate the concentration detected in each sample for that medium does not exceed 5 times the maximum amount detected in an associated blank.

Section 10.3 COC Not Sourced On-Site

For each COC screened under (§350.71(k)(2)(E), provide evidence that the detected COC did not result from activity at the on-site property. Discuss the concentration and distribution of the COC in environmental media, source area information, consideration of companion and daughter products, and knowledge of on-site historical operations that prove the COC did not originate from an on-site release. Attach to the end of this section additional documentation supporting this screening criteria.

Section 10.4 Appropriate Sample Quantitation Limits

If the SQLs in one or more samples exceed the residential assessment level and the COC was screened from critical PCL development, document that this criteria (§350.71(k)(3)(B)) has been met by including a discussion and appropriate demonstration that:

- an appropriate analytical method was used;
- the COC is not anticipated to be present at the site, based on source area information, knowledge of on-site historical operations, characteristics of the COC and affected property;
- the SQLs in critical samples are below the MQL,
- the COC is not a companion or daughter product for a parent COC that cannot be

- screened from critical PCL development,
- no companion or daughter products to the parent COC are detected, and
- the exposure potential is low based on the nature of the source area, the nature of the COC, the use and conditions of the affected property, the nature of the groundwater, local water use, proximity to potential receptors, and other appropriate site-specific factors affecting potential exposure to the COC should it be present.

Section 10.5 Screened COCs Expected to be Present Dropped from Future Sampling

Identify the screened COCs that will be dropped from future sampling events. Justify why the COC is not expected to be present in the environmental medium in the future. Discuss whether the screened COC is a daughter or degradation product of a COC, whether the COC could not be screened from another media, whether the compound partitions readily to a certain medium, and whether sufficient data has been collected to verify analytical results.

Table 10A - COC Screening Summary Table

Use this table to summarize the criteria under which a COC was screened from critical PCL development. Include in this table only COCs that meet one or more of the screening criteria. List the COC. In the column(s) for the applicable criteria, list each medium (soil 0-15 ft., soil >15 ft., groundwater (gw), surface water (sw), or sediment (sed)) to which the screening criteria apply for that COC. If the COC meets the criteria in Column 2, enter the medium/media in which the COC was detected and leave the remaining columns blank. If the COC meets the criteria in Columns 3 through 8, any nondetected results must also meet §350.71(k)(3)(A) or §350.71(k)(3)(B). Enter the medium in Column 9 or 10 to indicate which rule requirement is met. Refer to the footnotes to identify which of the criteria require additional justification, and provide that justification and the supporting documentation in the text.

This table is used only to report the results of COC screening, and is not designed to perform the COC screening. Refer to the TRRP rule (§350.71(k)) and the guidance in *Screening Target Chemicals of Concern from PCL Development* (RG-366/TRRP-14) for instructions on how to screen COCs.

Table 10A. COC Screening Summary Table

1	2	3	4	5	6	7	8	SQL Justifications	
								9	10
COC	All detected concentrations and SQLs < residential assessment level in all sampled media §350.71(k)(1)	COC not detected in any sample in the medium §350.71(k)(3)	Frequency of detects <5% of the ≥20 samples in this medium ¹ §350.71(k)(2)(A)(i) through (iii)	Common lab contaminant ² §350.71(k)(2)(B)	Blank contaminant ² §350.71(k)(2)(C)	Max conc < background §350.71(k)(2)(D)	COC not sourced on-site ³ §350.71(k)(2)(E)	All SQLs < RAL §350.71(k)(3)(A)	SQL > RAL but justified ⁴ §350.71(k)(3)(B)

¹ Provide in the text justification that a critical PCL is not warranted based on the criteria specified in §350.71(k)(2)(A)(iii).

² Provide in the text justification that the COC is not anticipated to be present at the site (see §350.71(k)(2)(B) or (C)).

³ Provide in the text justification that the COC is not from an on-site source (see §350.71(k)(2)(E)).

⁴ Provide in the text justification that all requirements of §350.71(k)(3)(B) are met.

Section 11 Soil Critical PCL Development

Use this section of the report to document the development of Tier 2 or 3 soil PCLs and complete the soil critical PCL evaluation for those COCs not screened from PCL development.

Section 11.1 Tier 2 or 3 PCL Development and Non-Default Parameters

Tier 2 and 3 Development

Describe the development of the Tier 2 or 3 soil RBELs and PCLs. Provide a brief discussion of the equations and/or models used to calculate the RBELs and PCLs for the surface and/or subsurface soils. For Tier 3, provide the rationale for selecting the model used and demonstrate the model is appropriate. Repeat calculations, discussions, tables and figures for off-site properties as needed to describe the development of different PCLs. If the model has been calibrated or a sensitivity analysis has been performed, provide a discussion of the methods and results of these evaluations.

Non-Default Affected Property Parameters

Provide a discussion of non-default parameters used to calculate soil RBELs and/or Tier 2 or 3 PCLs. Explain how the parameters were measured or estimated and justify why these parameters are appropriate for the affected property. If only one measurement of the parameter was made, explain how that value is representative of conditions throughout the affected property and/or how it conservatively estimates the range of conditions present.

Provide references in Appendix 16 for literature values used and explain how the values are appropriate for the affected property. Provide the equations and default and non-default parameters used, the calculations, and the results of calculations in Appendix 9. Submit verification that the TCEQ Executive Director has approved a variance from default exposure factors for average time (AT.w), exposure duration (ED.w), or exposure frequency (EF.w) in accordance with §350.74(j)(2).

Section 11.2 Soil PCL Adjustments

Discuss the evaluation of residual saturation, cumulative risk, hazard index, and/or theoretical soil vapor calculations used to adjust PCLs and discuss the logic and methods used to make the adjustments. If there are ten or more COCs in one medium, and a risk level and hazard check is not done in Appendix 9, explain why the risk level and hazard check is not necessary. Document the PCL adjustments using the tables provided in Appendix 9. Refer to *Risk Levels, Hazard Indices, and Cumulative Adjustments* (RG-366/TRRP-18) and *Tiered Development of Human Health PCLs* (RG-366/TRRP-22) for guidance.

If aesthetics are an issue, discuss the aesthetics issue and explain in general how the situation will be corrected.

Section 11.3 Soil Critical PCLs

Provide a discussion of how the critical PCLs, including ecological PCLs, for surface and subsurface soils were developed for each COC. Identify the human and ecological potential receptors and associated exposure pathways. Describe, if applicable, the site-specific scenarios where the exposure pathways and critical PCLs vary due to different receptors or POEs.

Table 11A - Surface Soil Critical PCLs (On-Site/Off-Site)

Use this table to perform a soil critical PCL evaluation for exposure pathways for those COCs in the surface soil which were not screened from PCL development in Section 10. Add columns as needed to include the applicable human health and ecological exposure pathways. List each COC, and its maximum or representative concentration, to compare to its critical PCL to determine if a remedy is required. For each COC, highlight the value that is the critical PCL, and highlight the maximum concentrations that exceed the critical PCL.

Table 11A. Surface Soil Critical PCLs

Date of the Tier 1 PCL tables used in the determination of PCLs: _____

On-Site Surface Soil Critical PCLs

Land use for purpose of critical PCL development: ____ Residential ____ Commercial/industrial

COC	Tot ¹ Soil _{Comb} PCL			GW ¹ Soil ¹ PCL			Ecological PCL		MQL (mg/kg)	Back- ground (mg/kg)	SW ² Soil ² (mg/kg)	Sed ² Soil ² (mg/kg)	Conc (mg/kg)		Remedy or NFA
	(mg/kg)	Tier	Source area size (acres)	(mg/kg)	Tier	Source area size (acres)	0-0.5 ft. (mg/kg)	0.5-5 ft. (mg/kg)					Max	Rep ³	

Off-Site Surface Soil Critical PCLs

Land use for purpose of critical PCL development:⁴ ____ Residential ____ Commercial/industrial

COC	Tot ¹ Soil _{Comb} PCL			GW ¹ Soil ¹ PCL			Ecological PCL		MQL (mg/kg)	Back- ground (mg/kg)	SW ² Soil ² (mg/kg)	Sed ² Soil ² (mg/kg)	Conc (mg/kg)		Remedy or NFA
	(mg/kg)	Tier	Source area size (acres)	(mg/kg)	Tier	Source area size (acres)	0-0.5 ft. (mg/kg)	0.5-5 ft. (mg/kg)					Max	Rep ³	

¹ GW¹Soil includes GW¹Soil_{Ing}, GW¹Soil_{Class3}, Air¹GW-Soil_{Inh-V}, and GW¹Soil for secondary MCLs, as applicable.

² Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24) to determine if a PCL is required to be developed for this pathway.

³ Provide justifications and calculations for use of representative concentrations in Appendix 8.

⁴ Repeat the table if needed for different off-site land uses.

Table 11B - Subsurface Soil Critical PCLs (On-Site/Off-Site)

Use this table to perform a soil critical PCL evaluation for exposure pathways for those COCs in the subsurface soil which were not screened out in Section 10. List each COC, with its maximum concentration compared to its critical PCL to determine if a remedy is required. Add columns as needed to include the applicable human health and ecological exposure pathways. For each COC, highlight the value that is the critical PCL, and highlight the maximum concentrations that exceed the critical PCL.

Table 11B. Subsurface Soil Critical PCLs

Date of the Tier 1 PCL tables used in the determination of PCLs: _____

On-Site Subsurface Soil Critical PCLs

Land use for purpose of critical PCL development: _____ Residential _____ Commercial/industrial

COC	Air Soil _{Inh-v} PCL			GW Soil ¹ PCL			MQL (mg/kg)	Background (mg/kg)	Max conc (mg/kg)	Remedy or NFA
	(mg/kg)	Tier	Source area size (acres)	(mg/kg)	Tier	Source area size (acres)				

Off-Site Subsurface Soil Critical PCLs

Land use for purpose of PCL development²: _____ Residential _____ Commercial/industrial

COC	Air Soil _{Inh-v} PCL			GW Soil ¹ PCL			MQL (mg/kg)	Background (mg/kg)	Max conc (mg/kg)	Remedy or NFA
	(mg/kg)	Tier	Source area size (acres)	(mg/kg)	Tier	Source area size (acres)				

¹ GW Soil includes GW Soil_{Ing}, GW Soil_{Class3}, Air GW-Soil_{Inh-v}, and GW Soil for secondary MCLs, as applicable.

² Repeat the table if needed for differing off-site land uses.

Figure 11A - Surface Soil PCLE Zone Maps

The purpose of these maps is to illustrate the distribution of NAPL and COCs in surface soils and clearly identify the areas in soil that exceed the critical PCL (PCLE zones). In order to avoid duplicate maps, when the land use for purpose of critical PCL development is residential, use Figure 4A to depict the surface soil PCLE zones. If the land use is commercial/industrial, provide surface soil PCLE zone maps here. Include in the maps the soil sampling points and maximum COC concentrations with corresponding sample depths at each sampling point, relevant surface and subsurface features, and isoconcentration contour(s) representing the critical PCL values. Label the contour lines with the critical PCL values and include critical PCL values in the legend. If exposure areas are used to determine if a remedy is required, illustrate those exposure areas over the area enclosed by the critical PCL contour line and highlight those exposure areas which fail. As long as the information is legible, several COCs may be grouped on one map.

Figure 11B - Subsurface Soil PCLE Zone Maps

The purpose of these maps is to illustrate the distribution of NAPL and COCs in subsurface soils and clearly identify the areas in soil that exceed the critical PCL (PCLE zones). In order to avoid duplicate maps, when the land use for purpose of critical PCL development is residential, use Figure 4B to depict the subsurface soil PCLE zones. If the land use is commercial/industrial, provide PCLE zone maps here. Include in the maps the soil sampling points, maximum COC concentrations with corresponding sample depths at each sampling point, relevant surface and subsurface features, and isoconcentration contour(s) representing the critical PCL value. Label the contour lines with the critical PCL values and include the critical PCL values in the legend. As long as the information is legible, several COCs may be grouped on one map.

Figure 11C – Cross Sections of the PCLE Zone

If the cross sections provided in Figure 4C do not depict the surface and subsurface soil PCLE zone(s), then present the PCLE zone cross section here. Construct a minimum of two cross sections using at least 3 representative points perpendicular to each other through the most contaminated or widest portion of the PCLE zone. For affected properties with monitor wells, construct one cross section approximately parallel to the COC transport direction and one approximately perpendicular to COC transport direction. Illustrate affected property stratigraphy using the boring logs through the total depth of the borings/monitor wells or water well if used in the cross section. Indicate the cross section lines on the map(s) in Figures 11A and 11B, or Figures 4A and 4B, as applicable. Submit additional cross sections as needed to effectively portray subsurface conditions.

Include the following for the cross sections:

- \$ boring or monitor well identification numbers,
- \$ interpolated stratigraphy and groundwater-bearing units between each boring/monitor well from ground surface to maximum depth assessed,
- \$ groundwater-bearing units and aquitards,
- \$ sample locations,
- \$ areas exceeding the critical PCL (PCLE zone) for each media (soils - surface, subsurface, and groundwater - each groundwater-bearing unit, surface water, sediment),
- \$ COC concentrations at critical sampling points,
- \$ the distribution of NAPL,
- \$ potentiometric level surface or water table based on static groundwater level in each monitor well,
- \$ monitor well screened intervals,
- \$ structural features or other migration pathways,
- \$ subsurface conduits, underground utilities, and
- \$ compass directions of the cross sections.

Section 12 Groundwater Critical PCL Development

Use this section of the report to document the development of Tier 2 or 3 groundwater PCLs and complete the groundwater critical PCL evaluation for those COCs not screened from PCL development. Repeat the subsections and tables as necessary for each groundwater-bearing unit.

Section 12.1 Tier 2 or 3 PCL Development and Non-Default Parameters

Tier 2 and 3 Development

Describe the development of the Tier 2 or 3 groundwater RBELs and PCLs. Provide a brief discussion of the equations and/or models used to calculate the RBELs and PCLs. For Tier 3, provide the rationale for selecting the model used and demonstrate that the model is appropriate. Repeat calculations, discussions, tables, and figures for off-site properties as needed to describe the development of different PCLs. If the model has been calibrated or a sensitivity analysis has been performed, provide a discussion of the methods and results of these evaluations.

Non-Default Affected Property Parameters

Provide a discussion of non-default parameters used to calculate Tier 2 or 3 groundwater RBELs and PCLs. Explain how the parameters were measured or estimated, and justify why these parameters are appropriate for the affected property. If only one measurement of the parameter was made, explain how that value is representative of conditions throughout the affected property and/or how that the value conservatively estimates the range of conditions present. Provide references in Appendix 16 for literature values used and explain how the values are appropriate for the affected property.

Provide the equations and default and non-default parameters used, the calculations, and the results of calculations in Appendix 9. Submit verification that the TCEQ Executive Director has approved a variance from default exposure factors for average time (AT.w), exposure duration (ED.w), or exposure frequency (EF.w) in accordance with §350.74(j)(2).

Groundwater to Surface Water Dilution Factors

Discuss how the surface water dilution factor was established. Describe how site-specific base flow conditions for groundwater and the 7Q2 conditions for the receiving water body were determined. Provide justification for the parameters utilized in the calculations or models. Provide the equations, input parameters, and/or models in Appendix 9. Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24).

Section 12.2 Groundwater PCL Adjustments

Discuss the evaluation of cumulative risk or hazard index to determine the need to adjust PCLs and discuss the logic and methods used to make the adjustments. Provide documentation of the PCL adjustments using the tables provided in Appendix 9. If there are ten or more COCs in one medium, and a risk level and hazard check is not done in Appendix 9, explain why the risk level and hazard check is not necessary. Refer to *Risk Levels, Hazard Indices, and Cumulative Adjustments* (RG-366/TRRP-18) and *Tiered Development of Human Health PCLs* (RG-366/TRRP-22) for guidance.

If aesthetics are an issue, discuss the situation and explain how the situation will be corrected.

Section 12.3 Groundwater Critical PCLs

Provide a discussion of how the critical PCL for groundwater was developed for each COC. Identify the potential receptors (human and ecological) and the associated exposure pathway. Describe, if applicable, the site-specific scenarios where the exposure pathways and critical PCLs vary due to different receptors or POEs.

Table 12A - Groundwater Critical PCLs - Full Plume POE

Use this table to perform a groundwater critical PCL evaluation applicable to the points of exposure throughout the affected groundwater. List each COC with its maximum concentration to compare to its critical PCL to determine if a remedy is required. For each COC, highlight the value that is the critical PCL and highlight the maximum concentration that exceeds the critical PCL. If representative concentrations were developed as allowed in *Determining Representative Concentrations* (RG-366/TRRP-15), provide justifications and calculations in Appendix 8. If groundwater discharges to surface water, complete Tables 12B, 12C, and 12D to determine the groundwater critical PCL applicable only to the POEs at the groundwater to surface water interface.

Table 12A. Groundwater Critical PCLs – Full Plume POE

Groundwater-bearing unit: _____

Repeat table for each applicable groundwater-bearing unit.

Date of the Tier 1 PCL tables used in the determination of PCLs: _____

On-Site Groundwater Critical PCLs

Land use for purpose of PCL development: _____ Residential _____ Commercial/industrial

COC	GW _{ing} PCL		Air GW _{inh-v} PCL		Ecological PCL for groundwater ¹		MQL (mg/L)	Background (mg/L)	Conc (mg/L)		Remedy or NFA
	(mg/L)	Tier	(mg/L)	Tier	(mg/L)	Tier			Max	Rep ²	

Off-Site Groundwater Critical PCLs

Land use for purpose of PCL development³: _____ Residential _____ Commercial/industrial

COC	GW _{ing} PCL		Air GW _{inh-v} PCL		Ecological PCL for groundwater ¹		MQL (mg/L)	Background (mg/L)	Conc (mg/L)		Remedy or NFA
	(mg/L)	Tier	(mg/L)	Tier	(mg/L)	Tier			Max	Rep ²	

¹ This pathway is applicable for direct contact with groundwater, such as cave invertebrates or salamanders.

² Provide justifications and calculations for use of representative concentration in Appendix 8.

³ Repeat the table if needed for different off-site land uses.

Table 12B - Groundwater-to-Surface Water PCLs

Complete this table when the groundwater-to-surface water pathway is complete or reasonably anticipated to be complete (note: also complete Section 6). Use this table to summarize the groundwater-to-surface water PCLs calculated to protect human health and ecological receptors. Include the surface water critical PCL from Table 6A and the groundwater-to-surface water dilution factor used in cross-media PCL calculations, if applicable. Repeat the table for each applicable groundwater-bearing unit.

Table 12B. Groundwater-to-Surface Water PCLs

Groundwater-bearing unit: _____

COC	SW critical PCL (mg/L) ¹	Groundwater-to-surface water dilution factor	^{SW} GW critical PCL ² (mg/L)

Table 12C - Groundwater-to-Sediment PCLs

Complete this table when the groundwater-to-sediment exposure pathway is complete or reasonably anticipated to be complete (also complete Section 7). Use this table to summarize the groundwater-to-sediment PCLs calculated to protect human health and ecological receptors. Include the sediment critical PCL from Table 7A and the surface water mixing factor for the affected property, if applicable. Refer to *Determining PCLs for Surface Water and Sediment* (RG-366/TRRP-24). Repeat the table for each applicable groundwater-bearing unit.

Table 12C. Groundwater-to-Sediment PCLs

Groundwater-bearing unit: _____

COC	Sed critical PCL (mg/kg) ³	Surface water mixing factor ⁴	K _{sed-w} (mg/L-gw/mg/kg-sed)	^{Sed} GW critical PCL ⁵ (mg/L)

¹ From Table 6A.

² Equals results of Table 12B second column divided by the value in the third column.

³ From Table 7A.

⁴ Default is 1.

⁵ Equals product of Table 12C columns 2, 3, and 4.

Table 12D - Groundwater Critical PCL Evaluation - Surface Water/Sediment Discharge POE

Use this table to perform a groundwater critical PCL evaluation applicable to the POEs located at the groundwater-to-surface water interface. In order to complete this evaluation, compare the critical PCLs determined for groundwater (Table 12A), groundwater-to-surface water (Table 12B), and groundwater-to-sediment (Table 12C). The lesser of these PCLs is the critical PCL for the POEs at the groundwater-to-surface water interface. Highlight the maximum or representative concentration that exceeds the critical PCL. Repeat the table for each applicable groundwater-bearing unit.

Table 12D. Groundwater Critical PCL Evaluation - Surface Water/Sediment Discharge POE

Groundwater-bearing unit: _____

COC	GW Critical PCL ¹ (mg/L)	SW GW critical PCL ² (mg/L)	Sed GW critical PCL ³ (mg/L)	Critical PCL for GW-SW POE ⁴ (mg/L)	Conc at GW-SW POE (mg/L)		At GW-SW POE, remedy or NFA?
					Max	Rep ⁵	

Figure 12A - Groundwater PCLE Zone Map

The purpose of these maps is to illustrate the distribution of NAPL and COCs in groundwater and clearly identify the areas in groundwater that exceed the critical PCL (PCLE zones). In order to avoid duplicate maps, when the land use for purpose of critical PCL development is residential, depict the PCLE zones on the groundwater COC concentration maps in Figure 5B. If the land use is commercial/industrial, provide PCLE zone maps here. Include in the maps the groundwater sampling points, maximum COC concentrations or measured NAPL thickness at each sampling point, relevant surface and subsurface features, and isoconcentration contour(s) representing the critical PCL value. Label the contour line with the critical PCL value and include the critical PCL value in the legend. As long as the information is legible, several COCs may be grouped on one map.

¹ From Table 12A, on-site or off-site, whichever is appropriate for this POE.

² From Table 12B

³ From Table 12C

⁴ Lowest of the values in the three previous columns.

⁵ Provide justifications and calculations for use of representative concentrations in Appendix 9.

Section 13 Notifications

The purpose of this section is to describe the notifications that have been completed or will be completed under §350.55. Refer to *Notification Requirements* (RG-366/TRRP-17) for guidance on the conditions that require notice.

Section 13.1 Notification of Actual or Probable Exposure

Provide a summary of the notifications made to people who are actually or probably exposed to COCs. Describe data collected which indicated that a notification was necessary, explain the exposure situation, and discuss the content of the notifications. Provide copies of the notification letters in Appendix 1. For notifications that have not yet been completed, explain problems that have arisen during the notification process and provide a time frame and method in which the parties will be notified.

Section 13.2 Other Notifications

Describe other situations that require notice to property owners and/or easement holders/franchisees under §350.55. Describe data collected that indicated that a notification was necessary and discuss the content of the notifications. Provide a notarized statement that notifications were completed in Appendix 1. For notifications that have not yet been completed, explain problems that have arisen during the notification process and provide a time frame and method by which the parties will be notified.

Table 13A - Notification Summary

Use this table to identify the real properties for which notification is required. Assign each real property an ID that is then used on Figure 13A to distinguish property locations. In the Reason for Notification column, specify if notification was required for an actual or probable exposure or another situation that prompted notification. If actual or probable exposure necessitates the notification of tenants/lessees or other persons related to the property usage, provide a list of the persons, their mailing addresses, and telephone numbers with Table 13A and identify the property which with they are associated.

Table 13A. Notification Summary

Property ID	Property owner name	Physical property address, city, zip	Property owner mailing address, city, state, zip	Property owner phone no.	Contact name, mailing address, city, state, zip (if different from owner)	Reason for notification

Figure 13A - Notification Map

Include a large-scale map that illustrates the locations of the properties, including rights of way and easements, that require notification. Label each property with the property ID assigned in Table 13A. Illustrate the legal property boundary and the relevant affected property boundary as defined by the assessment levels. To eliminate this figure, this information may be presented in Figure 1A or 1B if the scale is appropriate.

Appendices

Appendix 1 Notifications

Provide copies of notification to affected landowner(s) or other entities requiring notification. Document that the required notices have been completed by providing a notarized statement of such fact including the names and addresses of persons receiving direct notice, such as mail, personal contact, public meeting, fliers, etc. Refer to *Notification Requirements* (RG-366/TRRP-17) for guidance.

Appendix 2 Boring Logs and Monitor Well Completion Details

For each boring drilled or monitor well installed during the assessment, provide a soil boring log with monitor well completion details if applicable. Include in the boring log:

- elevation of ground surface referenced to mean sea level,
- soil description and classification,
- moisture content,
- depth at which groundwater was encountered while drilling,
- visual confirmation of NAPL, such as staining,
- identification of groundwater-bearing units and saturated zones,
- field-screening results and field-screening sample locations,
- sample locations submitted for laboratory analyses,
- depth markings,
- sample type (Shelby tube, split spoon, etc.),
- boring diameter,
- date drilled,
- name of the person who logged the well, and
- drilling method.

Include in the monitor well completion details:

- elevation of top and bottom of casing referenced to mean sea level,
- static water level and date measured (referenced from both depth below ground surface and mean sea level),
- screened interval and slot size,
- casing interval and diameter,
- sand pack grain size and interval,
- date(s) of installation,
- cement and grout interval.

If the assessment was conducted solely by excavation, indicate such and provide lithologic descriptions and the other information requested to the extent appropriate.

Appendix 3 Monitor Well Development and Purging Data

Submit monitor well development and purging data in a table or provide in photocopies of field notes that specify water quality stabilization parameters, turbidity measurements, water-level measurements while purging, flow rates, and the other parameters measured during well development and purging.

Appendix 4 Registration and Institutional Controls

Include in this appendix copies of the Industrial and Solid Waste Notice of Registration (NOR), MSD documentation (a copy of the ordinance, deed restriction, and a copy of the MSD certificate and a map that illustrates the boundary of the MSD and the affected property), and/or existing institutional controls restricting well installation or other uses of the property.

Appendix 5 Water Well Records

Include a copy of the State Well Report and companion documents (water quality analysis, undesirable water reports, etc) completed by the driller for each water well identified in the receptor surveys. Also include in this appendix other documentation on the water wells, including information from state agency databases and records, published reports (particularly those by the Texas Water Development Board and Bureau of Economic Geology), records from groundwater conservation districts or subsidence districts, and records from other entities with information on the water well(s). Document the presence or absence of water wells and the primary sources of information researched to come to this conclusion.

Appendix 6 Monitor Well Records

Provide a copy of the State Well Report completed by the driller for each installed monitor well. For information on completing State Well Reports, contact the Texas Department of Licensing and Regulation at 800-803-9202 or 512-463-6599 or <http://www.tdlr.state.tx.us>.

Appendix 7 Aquifer Testing Data

For the aquifer tests performed on each groundwater-bearing unit, provide a narrative description of the work performed and the conclusions drawn. Identify the monitor wells used and provide an analysis of the field data, governing equations, sample calculations, assumptions, limitations in the collection of data, and justification for choosing the test method based on the site conditions. Provide a table of field measurements and input parameters such as transmissivity, hydraulic conductivity, storage coefficient of the aquifer, optimum sustainable groundwater pumping rate, and groundwater capture zone/radius of influence. Also provide a graph of well plots showing time of drawdown/buildup (or recovery for a slug test). Refer to the appropriate figure(s) which illustrate the locations of wells utilized.

Appendix 8 Statistics Data Tables and Calculations

Use this appendix to document data and statistical calculations used to determine site-specific background or representative concentrations of COCs in the following situations:

1. for calculating the site-specific background value, used as the residential assessment level or the critical PCL, for direct comparison to the individual samples from the assessed environmental medium data, as provided in §350.51(l) and §350.79(1);
2. for calculating a representative concentration (the upper confidence limit (UCL)) from the sample data from the environmental medium within an exposure area for statistical comparison to the critical PCL, or an alternative statistical method which meets the performance criteria required in §350.79(2)(A); or
3. for statistically comparing the environmental medium data set within an exposure area to the site-specific background data set, meeting the performance criteria required in §350.79(2)(B).

When applicable, include a map of exposure areas and provide justification for the placement and size of the exposure areas. Provide full documentation of the statistical comparisons including, but not limited to, the name and description of the statistical method(s) used and a list of statistical parameters and assumptions. Provide tables that, at a minimum, contain the following for each media: COC or parameter type, concentration, sample depth or interval, total number of samples used in the statistical calculation, and the statistical value calculated. Non-detect analytical results should be assigned a proxy value in accordance with §350.51(n). Either provide a map illustrating the sample locations used in the statistical calculations, or reference the appropriate figure in this report in which those samples have been specifically denoted.

Appendix 9 Development of Non-Default RBELs and PCLs

Include in this appendix the equations, calculations, detailed explanations beyond that provided in other sections, justification, input parameters, results, and supporting documentation associated with the

development of non-default RBELs and Tier 2 and 3 PCLs. Refer to *Tiered Development of Human Health PCLs* (RG-366/TRRP-22). Also include in this appendix the information on development of TPH PCLs (refer to *Development of Human Health PCLs for Total Petroleum Hydrocarbon Mixtures* (RG-366/TRRP-27). Be sure to clearly label the information to adequately identify the COC, the input parameters, the model used, and the tier under which the evaluation was conducted. Document the applicability of non-default input parameters with lab reports, calculations, maps, or other justification. If PCLs have been adjusted due to cumulative risk/hazard level, aesthetic concerns, residual soil saturation, or theoretical soil vapor calculations, complete the appropriate tables and discuss the logic and methods used to make the adjustments. Support non-default input parameters and development of Tier 2 and 3 PCLs with complete documentation and justification. Unsubstantiated information will be considered invalid. Exposure factors that cannot be varied are listed in §350.74. Include verification that the TCEQ Executive Director has approved a variance from default exposure factors.

For convenience, Tier 2 tables are provided in this appendix. Use the tables only as necessary. Repeat the tables as necessary to document PCL development for different media, and for differing PCLs on-site and off-site. If Tier 3 PCLs were calculated, develop tables to document the inputs. If a Tier 2 dilution factor was calculated, provide maps and cross sections, if not referenced elsewhere in the report, to illustrate the location and measurements for deriving the inputs.

Appendix 9 Tables

COC Chemical/Physical Parameters and Toxicity Factors

Use these two tables only when a parameter was changed from that listed in rule or guidance. If a parameter different from that listed in rule or guidance was not used, do not submit this table. Provide in this appendix the associated supporting documentation. See *Toxicity Factors and Chemical/Physical Parameters* (RG-36/TRRP-19) for more information.

Properties for many COCs are listed in the Chemical/Physical Properties table in the Tier 1 PCL tables available on the TRRP web page. Use this table to list ONLY those COCs that are not included in the rule or web page or those COCs for which the person changed the value from a Tier 1 default. Only complete the portions that apply to these particular COCs. Note that values for shaded columns may not be changed from values listed in the rule. Include the calculations in this appendix and document the sources of information for those properties changed in accordance with §350.73(e). Do not complete this table for those COCs where the properties are the same as those listed in Figure 30 TAC 350.73(e) or in the chemical/physical properties table available from <http://www.tnrc.state.tx.us/permitting/trrp.htm>.

COC	Physical state	Type	M.W. (g/mole)	H' (cm ³ -H ₂ O/cm ³ -air)	LogK _{oc}	LogK _d	D _{air} (cm ² /s)	D _{wat} (cm ² /s)	Solubility (mg/l)	Vapor pressure (mm Hg)	Log K _{ow}	Br _{Abg} (g soil/g D.W.)	Br _{Bg} (g soil/g D.W.)

Physical state	s - solid at 20°C; l - liquid at 20°C; g - gaseous at 20°C;	K _d	Soil-water partition coefficient (cm ³ -H ₂ O/g-Soil)
Type	O: organic; I: inorganic; M: metal; OA: organic acid	D _{air}	Diffusion coefficient in air (cm ² /s)
M.W.	Molecular weight (g/mole)	D _{wat}	Diffusion coefficient in water (cm ² /s)
H'	Dimensionless Henry's Law Constant H' = H x 41.57 at 20°C (cm ³ -H ₂ O/cm ³ -air)	K _{ow}	Octanol-water partition coefficient (cm ³ -H ₂ O/cm ³ -Octanol)
H	Henry's Law Constant (atm-m ³ /mole)	Br _{Abg}	Soil-to-above ground plant biotransfer factor (g soil/g plant tissue dry weight)
K _{oc}	Soil organic carbon-water partition coefficient (cm ³ -H ₂ O/g-Carbon)	Br _{Bg}	Soil-to-below ground plant biotransfer factor (g soil/g plant tissue dry weight)

List the COCs not included in the Toxicity Factors Table. Do not complete this table if the toxicity factors are the same as those in the Toxicity Factors Table as provided in the Tier 1 PCL tables at <http://www.tnrc.state.tx.us/permitting/trrp.htm>. Note that the toxicity factors must be provided by the TCEQ before use.

Provide the date of the toxicity factors table used: _____

COC	Reference concentration RfC ¹ (mg/m ³)	Oral reference dose RfD _o (mg/kg-day)	Dermal reference dose RfD _d (mg/kg-day)	Dermal slope factor SF _d (mg/kg day)	Oral slope factor SF _o (mg/kg day)	Inhalation unit risk factor URF (μg/m ³)	Relative bioavailability factor RBAF (unitless)	Dermal absorption fraction ABS _d ² (unitless)	Gastrointestinal absorption fraction ABS _{GI} (unitless)

¹ When no RfC or URF is available, use the most current TCEQ Chronic Remediation-Specific Effects Screening Level value as the RfC.

² It is not necessary to calculate a soil dermal contact RBEL for COCs with a vapor pressure in mm HG ≥ 1.

Surface Soil - ^{Tot}Soil_{Comb}

Tier 2 Evaluation

Use these tables to document the derivation of Tier 2 ^{Tot}Soil_{Comb} PCLs. Show the calculations in this appendix.

Specify if table is for on-site or off-site property _____ On-site _____ Off-site
 Off-site land use(s) for purpose of PCL development¹: _____ Residential _____ Commercial/industrial

	Soil bulk density ρ_b (g/cm ³)	Total porosity θ_T (cm ³ /cm ³)	Volumetric water content θ_{ws} (cm ³ /cm ³)	Volumetric air content θ_{as} (cm ³ /cm ³)	Fraction organic carbon foc (g/g)	Garden soil fraction organic carbon foc (g/g)	Fraction vegetative cover V	Wind speed U_m (m/s)	Equivalent threshold value of windspeed U_t (m/s)	Function dependent on (U_t/U_m) F(x)	Averaging time AT.w (years)	Exposure duration ED.w (years)	Exposure frequency EF.w (days/yr)
Tier 1 defaults	1.67	0.37	0.16	0.21	0.008	0.008	0.50	4.80	11.32	0.224	25	25	250
Tier 2 values													

COC	Source area size (acres)	Affected soil thickness d _s (cm)	Q/C	VFss	PEF	Carcinogenic						Noncarcinogenic						Tot Soil Comb PCL (mg/kg)
						Air	Soil	Soil	AbgVeg	BgVeg	PCL	Air	Soil	Soil	AbgVeg	BgVeg	PCL	
				(mg/m ³ /mg/kg)	RBEL	RBEL	RBEL	RBEL	RBEL	PCL	RBEL	RBEL	RBEL	RBEL	RBEL	PCL		
						Inh-c	Ing-c	Derm-c	Ing-c	Ing-c		Inh-nc	Ing-nc	Derm-nc	Ing-nc	Ing-nc		

¹ Repeat the table if needed for different off-site land uses.

Surface and Subsurface Soil - ^{GW}Soil

Tier 2 Evaluation

Specify media to which tables apply _____ Surface soil _____ Subsurface soil

Specify if table is for on-site or off-site property _____ On-site _____ Off-site
 Off-site land use(s) for purpose of PCL development¹: _____ Residential _____ Commercial/industrial

	Soil bulk density ρ_b (g/cm ³)	Volumetric water content θ_{ws} (cm ³ /cm ³)	Volumetric air content θ_{as} (cm ³ /cm ³)	Fraction organic carbon foc (g/g)	Groundwater Darcy velocity U_{gw} (cm/year)	Aquifer thickness b_{gw} (m)	Ground-water gradient i (m/m)	Hydraulic conductivity K (m/day)	Average annual precipitation P (cm/yr)	Net infiltration rate I_f (cm/yr)	Saturated hydraulic conductivity of vadose zone soils K_{vs} (cm/s)
Tier 1 defaults	1.67	0.16	0.21	0.002	NA	NA	NA	NA	NA	NA	NA
Tier 2 values											

COC	Critical GW PCL (from Table 12A)		Affected soil thickness L_1 (cm)	Depth from top of affected soil to gw table L_2 (cm)	Source area width parallel to gw flow W_s (m)	GW mixing zone thickness δ_{gw} (m)	Soil-leachate partition factor K_{sw} (mg/L/mg/kg)	Lateral dilution factor LDF	^{GW} Soil PCL (mg/kg)
	(mg/L)	pathway ²							

¹ Repeat the table if needed for different off-site land uses.

² Specify the pathway for the critical groundwater PCL (^{GW}GW_{Ing}, ^{GW}GW_{Class3}, ^{Air}GW_{Inh-V}, ecological PCL (eco), ^{SW}GW, etc.)

Subsurface Soil – ^{Air}Soil_{Inh-V}
Tier 2 Evaluation

Specify if table is for on-site or off-site property _____ On-site _____ Off-site
 Off-site land use(s) for purpose of PCL development¹: _____ Residential _____ Commercial/industrial

	Soil bulk density ρ_b (g/cm ³)	Total porosity θ_T (cm ³ /cm ³)	Volumetric water content θ_{ws} (cm ³ /cm ³)	Volumetric air content θ_{as} (cm ³ /cm ³)	Averaging time ² AT.w (years)	Exposure duration ² ED.w (years)	Exposure frequency ² EF.w (days/yr)
Tier 1 defaults	1.67	0.37	0.16	0.21	25	25	250
Tier 2 values							

COC	Source area size (acres)	Affected soil thickness d _s (cm)	Q/C	K _d (cm ³ -water/g-soil)	VF _{ss} (mg/m ³ /mg/kg)	Carcinogenic		Noncarcinogenic		^{Air} Soil _{Inh-V} PCL (mg/kg)
						^{Air} RBEL _{Inh-c}	PCL	^{Air} RBEL _{Inh-nc}	PCL	

¹ Repeat the table if needed for different off-site land uses.

² Prior approval from the TCEQ Executive Director is required for the variance (see §350.74(j)(2)).

Theoretical Soil Saturation Limit (C_{sat})

Use these tables to determine a property-specific theoretical soil saturation limit in order to demonstrate the volatilization pathways are not applicable for a particular COC. See §350.75(i)(8) for applicability. Support non-default parameters by providing supporting documentation, the equation, and calculations in this appendix.

Specify media to which tables apply ☐ Surface soil ☐ Subsurface soil

	Volumetric water content in vadose soils θ_{ws} (cm ³ /cm ³)	Volumetric air content in vadose soils θ_{as} (cm ³ /cm ³)	Fraction organic carbon in soil/gw F_{oc} (g/g)	Soil bulk density ρ_b (g/cm ³)
Tier 1	0.16	0.21	0.002	1.67
Tier 2				

COC	Aqueous solubility of pure COC S (mg/L)	Henry's Law Constant (air-water partition coefficient) H'	Soil-water partition coefficient K_d (cm ³ /g)	Organic carbon partition coefficient K_{oc} (cm ³ /g)	C_{sat} PCL (mg/kg)

Residual Soil Saturation Limit

Use these tables to determine the presence of NAPL and estimate the concentration of an organic COC at which NAPL becomes mobile. See §350.75(i)(9) for applicability. **Support non-default parameters by documentation and explanation.** Support non-default parameters by providing supporting documentation, the equation, and calculations in this appendix.

Specify media to which tables apply ☐ Surface soil ☐ Subsurface soil

	Residual saturation Res_{sat} (cm ³ /cm ³)	Total soil porosity θ (cm ³ /cm ³)	Density of NAPL ρ_{NAPL} (g/cm ³)	Soil bulk density ρ_b (g/cm ³)
Tier 1	0.04514 ¹	0.37	1	1.67
Tier 2				

COC	Soil _{Res} PCL (mg/kg)

¹ The value listed in the rule is in error.

Risk Level and Hazard Check

Specify media to which table applies ____ Surface soil ____ Subsurface soil ____ Groundwater

Use this table to document the adjustment of a PCL based on cumulative risk. Repeat this table for each complete or reasonably anticipated to be complete exposure pathway in the medium for which there are 10 or more carcinogens or 10 or more noncarcinogens acting through a single exposure pathway. When adjusting the $PCL_{Soil_{Comb}}^{Tot}$ PCL using exposure areas, specify the exposure area to which the adjustment applies. Do not use this table for $^{GW}Soil$, $^{GW}GW_{Class3}$, or ^{SW}GW .

Complete this form for both the carcinogenic and noncarcinogenic effects for each COC for each human health exposure pathway using PCLs calculated at chosen tier. For example, for a given exposure pathway, if a Tier 1 PCL is calculated for COC "X," a Tier 2 PCL is calculated for COC "Y," and a Tier 3 PCL is calculated for COC "Z," those PCLs are included in the table together and are not segregated by tier. This is a precursor to establishing critical PCLs. If a PCL was not established because of lack of an applicable toxicity factor, input "NA" for the COC in the applicable column. For TPH, complete only the noncarcinogenic portion and do not handle concurrently with the other non-TPH COCs. TPH is treated in isolation. See TCEQ guidance document *Risk Levels and Hazard Indices* (RG-366/TRRP-18) for specific information on cumulative adjustments and *Development of Human Health PCLs for Total Petroleum Hydrocarbon Mixtures* (RG-366/TRRP-27) for TPH.

COC`	Carcinogenic Endpoint			Non-Carcinogenic Endpoint		
	PCL _i -adj	PCL _i (mg/kg or mg/L)	PCL _i -adj/PCL _i (ratio)	PCL _i -adj	PCL _i (mg/kg or mg/L)	PCL _i -adj/PCL _i (ratio)
Cumulative Risk Level (RL):				Hazard Index (HI):		

Groundwater Non-Default Affected Property Parameters

Name(s) of groundwater-bearing unit(s): _____

COC-Specific Affected Property Parameters

COC	Cross sectional area of air emissions source A (m ²)	Length of air emissions source parallel to wind direction L (m)

Affected Property Parameters

Term	Affected property parameters	Tier 1 defaults	Value used for Tier 2/3
GW pH	Measured groundwater pH	NA	
σ_y	Transverse air dispersion coefficient (m) (dispersion estimates based on the Pasquill-Gifford system adopted by U.S. Public Health Service, Turner, 1970, <i>EPA Workbook of Atmospheric Dispersion Estimates</i> ; see Cooper & Alley, 1994, <i>Air Pollution Control</i>)	NA	
σ_z	Vertical air dispersion coefficient (m) (dispersion estimates based on the Pasquill-Gifford system adopted by U.S. Public Health Service, Turner, 1970, <i>EPA Workbook of Atmospheric Dispersion Estimates</i> ; see Cooper & Alley, 1994, <i>Air Pollution Control</i>)	NA	
Q	Air volumetric flow through mixing zone (m ³ /s)	NA	

Groundwater – ^{GW}GW_{Ing}¹ or ^{GW}GW_{Class3}¹ and ^{Air}GW_{Inh-v}

Groundwater-bearing unit: _____ Repeat tables for each groundwater-bearing unit.

Specify if table is for on-site or off-site property _____ On-site _____ Off-site

Off-site land use(s) for purpose of PCL development²: _____ Residential _____ Commercial/industrial

Tier 2 Evaluation

	Total porosity (vadose zone) θ_T (cm ³ /cm ³)	Volumetric water content (vadose zone) θ_{ws} (cm ³ /cm ³)	Volumetric air content of vadose zone soils θ_{ws} (cm ³ /cm ³)	Volumetric water content (capillary fringe) θ_{wcap} (cm ³ /cm ³)	Volumetric air content (capillary fringe) θ_{acap} (cm ³ /cm ³)	Vadose zone thickness h_v (cm)	Capillary fringe thickness h_{cap} (cm)	Depth to gw L_{gw} (cm)	Average windspeed U_{air} (cm/sec)	Ambient air mixing zone height δ_{air} (cm)	Averaging time ³ AT.w (years)	Exposure duration ⁵⁸ ED.w (years)	Exposure frequency ⁵⁸ EF.w (days/yr)
Tier 1 defaults	0.370	0.16	0.21	0.333	0.037	300	5	305	240	200	25	25	250
Tier 2 values													

COC	Source area width W_g (cm)	VF _{wamg} (mg/m ³ /mg/L)	Carcinogenic				Noncarcinogenic				MCL, MCL2 or EPA ⁴	^{GW} GW _{Ing} or ^{GW} GW _{Class3} PCL		^{Air} GW _{Inh-v} PCL	
			^{GW} RBEL _{Ing} or ^{GW} RBEL _{Class3}	PCL	^{GW} RBEL _{Inh}	PCL	^{GW} RBEL _{Ing} or ^{GW} RBEL _{Class3}	PCL	^{GW} RBEL _{Inh}	PCL		(mg/L)	>S ⁵	(mg/L)	>S

¹ Only applies for COCs for commercial/industrial land use without an MCL and those for which a variance under §350.74(j)(2) is obtained.

² Repeat the table if needed for different off-site land uses.

³ Prior approval from TCEQ Executive Director for the variance is required (§350.74(j)(2)).

⁴ Specify whether the PCL is based on the MCL, secondary MCL, or other EPA value.

⁵ Specify if PCL exceeds the aqueous solubility limit.

Groundwater - ^{SW}GW and ^{Sed}GW

Provide a map that illustrates how the input parameters were measured or determined.

Groundwater-bearing unit: _____

Repeat tables for each affected GWBU discharging to surface water.

Surface water body: _____

Parameter Selection for Tier 2 Dilution Factor Models

Term	Description	Defaults	Value Used
7Q2 flow rate	Seven-day low-flow occurring on average every two years (cm/s)	NA	
U_{gw}	Groundwater Darcy velocity (cm/yr)	NA	
K	Hydraulic conductivity (cm/s)	NA	
i	Lateral hydraulic flow gradient (cm/cm)	NA	
δ_p	Thickness of affected groundwater (cm) in excess of the ^{SW} RBEL or the SW_{eco}^1	NA	
δ_{pi}	Thickness of affected groundwater in excess of ^{SW} RBEL discharging to surface water stream ¹ (cm)	NA	
L_m	Influent width of groundwater PCLE zone at point of discharge to surface water ¹ (cm)	NA	
Q_{lgw}	Average influent flow of affected groundwater to surface water ¹ (cm ³ /s)	NA	
V_{sw}	Average surface water velocity in groundwater discharge mixing area (cm/s)	lake: 0.5 cm/s tidal water: 1 cm/s large river (>100 cfs): $3.5 \times (7Q2)^{0.5}$ cm/s	
W_{sw}	Distance from the shore extending into the surface water body through which affected groundwater discharges through sediment into surface water ¹ (cm)	NA	
h_{sw}	Depth of surface water mixing area above the affected groundwater discharge to surface water (cm)	30	
Q_{sw}	Flow of surface water through the surface water mixing area - 7Q2 flow for a stream with $7Q2 \leq 100$ cfs or mixing area flow for other water body (cm ³ /s)	NA	
ρ_{sed}	Sediment bulk density (g/cm ³)	1.67	
θ_T	Total sediment porosity (cm ³ /cm ³)	0.37	
foc	Fraction organic carbon in sediment (g/g)	0.01	
K_{sed-w}	Sediment-groundwater partition coefficient (mg/L/mg/kg)	NA	
SWMF	Surface water mixing factor	1	

COC	^{SW} RBEL or SW_{eco} (mg/L)	DF	^{SW} GW (mg/L)	Tier

COC	Sediment RBEL	k_d	k_{oc}	^{Sed} GW (mg/L)	Tier

¹ This value may be determined for each COC if desired. If so, attach separate table listing the value used for each COC.

Appendix 10 Laboratory Data Packages and Data Usability Summary

Use this appendix to provide lab reports and supporting information. Print lab reports double-sided and also include with the report a CD with the lab reports in pdf format. Submit one data usability summary for all the data (field and laboratory) used in this APAR. Report data in conformance with the TCEQ guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13). For each laboratory data package submitted with the APAR, provide a signed laboratory data package cover page (LDGP) and the items listed on the LDGP. The LDGP form is provided in Appendix A of *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13).

Appendix 11 Miscellaneous Assessment

Include the results of assessment or sampling activities that are not included in the media sections. This section may be used to describe geophysical investigations such as seismic surveys, ground-penetrating radar surveys, and resistivity surveys; wipe samples; waste sampling (other than for waste classification purposes); concrete slab sampling; biota sampling (flora or fauna); food sampling; and other topics applicable to the assessment. Include tables and figures as necessary to summarize and illustrate assessment results.

Appendix 12 Waste Characterization and Disposition Documentation

Use this appendix to document waste characterization and disposition of wastes associated with an assessment or remediation, including investigation derived waste and other wastes generated during field activities. Describe the wastes generated and the results from the completed waste classification and disposal/treatment activities. Supporting documentation may include written documentation and process knowledge. Provide copies of waste characterization sample analytical data packages.

Appendix 13 Photographic Documentation

If not provided elsewhere, include relevant dated and oriented photographs depicting the affected property and field activities (e.g., potential source areas, surrounding properties, abatement activities, etc.).

Appendix 14 Standard Operating Procedures

Use this appendix to provide copies of the standard operating procedures followed during field activities (for example, sampling methods, drilling methods).

Appendix 15 OSHA Health and Safety Plan (§350.74(b)(1))

Use this appendix only for documentation supporting the use of an available eight-hour time weighted average occupational inhalation criteria as the air inhalation RBEL. Provide documentation of the health and safety plan, a certification that the plan is followed, and the demonstration that offsite receptors are protected per §350.74(b)(1).

Appendix 16 Reference List

In order to document the sources of information included in this report, provide a complete list of references, including personal communications, reports, books, published and unpublished documents, databases, maps, and other sources of information used in this report. Specify for each reference, as applicable, the author, date, title of the article, book, periodical, or report, publisher, date of publication, issue information (edition, volume, issue number, date); page reference, and URL. Specify for database references the source of the database, the name of the database, and the date the information was acquired. Include for personal communication references the name of the person contacted, the date of contact, and the method of contact (phone, letter, etc). Clearly identify each item in the report that has a reference in this appendix using either superscript numbers or author-date citation (for example, Adams 1999). List references in the order in which they appear. Note that unsubstantiated information may be considered invalid.