FIFTH FIVE-YEAR REVIEW REPORT FOR
FRENCH LIMITED SUPERFUND SITE
Harris County, Texas

August 2017

1988

2016

Prepared by

U.S. Environmental Protection Agency
Region 6
Dallas, Texas

FIFTH FIVE-YEAR REVIEW REPORT
FRENCH LIMITED SUPERFUND SITE
EPA ID#: TXD980514814
Harris County, Texas

This memorandum documents the U.S. Environmental Protection Agency's performance, determinations and approval of the French Limited Superfund site (Site) fifth five-year review under Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. Code Section 9621 (c), as provided in the attached fifth Five-Year Review Report.

Summary of the Fifth Five-Year Review Report

The Site is the location of a former sand mining operation and an industrial waste storage facility. The Site's remedy consisted of groundwater containment with a sheet pile wall; excavation, treatment and stabilization of contaminated soil and sludge; and a Technical Impracticability (TI) Waiver Zone (or TI Zone) for groundwater that cannot be cleaned up. Long-term response actions are ongoing. They include groundwater monitoring and maintenance. Institutional controls are not yet in place for the Site. The Site is not currently in use. There are no known exposures to contaminated media.

Environmental Indicators

Human Exposure Status: Current human exposure is under control
Contaminated Groundwater Status: Contaminated groundwater migration is under control
Site-Wide Ready for Anticipated Use: No

Actions Needed

The following actions must be taken for the remedy to be protective over the long term:

- Amend the 1990 Consent Decree in order to implement the TI Waiver groundwater remedy selected in the 2014 Record of Decision (ROD) Amendment.
- Revise the Institutional Controls Plan (ICP) once the TI Boundary is established.
- The lack of inward groundwater gradient and the fluctuating contaminant concentrations in wells near the Sheet Pile Wall (SPW) need to be evaluated and statistical analysis may need to be conducted as appropriate. The wells need to be closely monitored. If contaminants are found to be migrating, contingency measures need to be planned and implemented to mitigate contaminant migration, maintain plume stability, and control exposure outside the TI Boundary.

Determination

I have determined that the remedy for the French Limited Superfund site is protective in the short term. This Five-Year Review Report specifies the actions that need to be taken for the remedy to be protective over the long term.

Carl E. Edlund, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency Region 6

9/7/17
Date

CONCURRENCES

FIFTH FIVE-YEAR REVIEW REPORT
FRENCH LIMITED SUPERFUND SITE
EPA ID#: TXD980514814
Harris County, Texas

Raji Josiam
Remedial Project Manager

5/23/17
Date

Carlos A. Sanchez
Chief, Arkansas/Texas Section

5/18/17
Date

John C. Meyer
Chief, Superfund Remedial Branch

5/22/17
Date

Anne Foster
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8/22/17
Date

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8/23/17
Date

Pamela Phillips
Deputy Director, Superfund Division

9/7/17
Date

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ISSUES/RECOMMENDATIONS

FIFTH FIVE-YEAR REVIEW REPORT
FRENCH LIMITED SUPERFUND SITE
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Harris County, Texas

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): 1	**Issue Category:** Remedy Performance			
	Issue: TI Waiver was the selected remedy in the 2014 ROD Amendment. The TI waiver groundwater remedy has not yet been implemented since the 1990 Consent Decree has not been amended to reflect the requirements in the 2014 ROD Amendment.			
	Recommendation: Amend the 1990 Consent Decree in order to implement the TI Waiver groundwater remedy selected in the 2014 ROD Amendment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	EPA/Potentially Responsible Party	EPA	9/30/2018

OU(s): 1	**Issue Category**: Institutional Controls			
	Issue: Institutional Control Plan (ICP) for the Site was developed in June of 2013 but has not been implemented. This ICP needs to be revised based on the 2014 ROD Amendment and based on the need to restrict land uses at the lagoon parcel of the site and needs to be implemented.			
	Recommendation: Revise the ICP once the TI Boundary is established.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	EPA/Potentially Responsible Party	EPA/State	9/30/2021

OU(s): 1	**Issue Category:** Remedy Performance			
	Issue: Recent groundwater annual reports indicate an outward groundwater gradient across the sheet pile wall (SPW) instead of an inward groundwater that is needed to control off-site migration.			
	Recommendation: The lack of inward groundwater gradient and the fluctuating contaminant concentrations in wells near the SPW need to be evaluated and statistical analysis conducted as appropriate. The wells need to be closely monitored. If contaminants are found to be migrating, contingency measures need to be planned and implemented to mitigate contaminant migration, maintain plume stability, and control exposure outside the TI Boundary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	Potentially Responsible Party	EPA/State	9/30/2018

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
FLTG	French Limited Trust Group
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PCL	Protective Concentration Limit
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SPW	Sheet Pile Wall
TBA	Tertiary Butyl Alcohol
TCEQ	Texas Commission on Environmental Quality
TI	Technical Impracticability
TRRP	Texas Risk Reduction Program
UU/UE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the French Limited Superfund site (the Site). The triggering action for this statutory review is the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU), which is addressed in this FYR. OU1 addresses site soil, sludge and groundwater contamination.

The FYR was led by EPA remedial project manager (RPM) Raji Josiam. Participants included Marilyn Czimer Long from the Texas Commission on Environmental Quality (TCEQ), Paul Taylor from French Limited Trust Group, Inc., (FLTG), Fay Bourgeois and Rob Jaros from Environmental Resources Management (ERM), Dave Roberson from De Maximis, and Ryan Burdge and Kirby Webster from EPA contractor Skeo. The review began on 9/15/2016. A list of documents reviewed as part of this FYR is included in Appendix A.

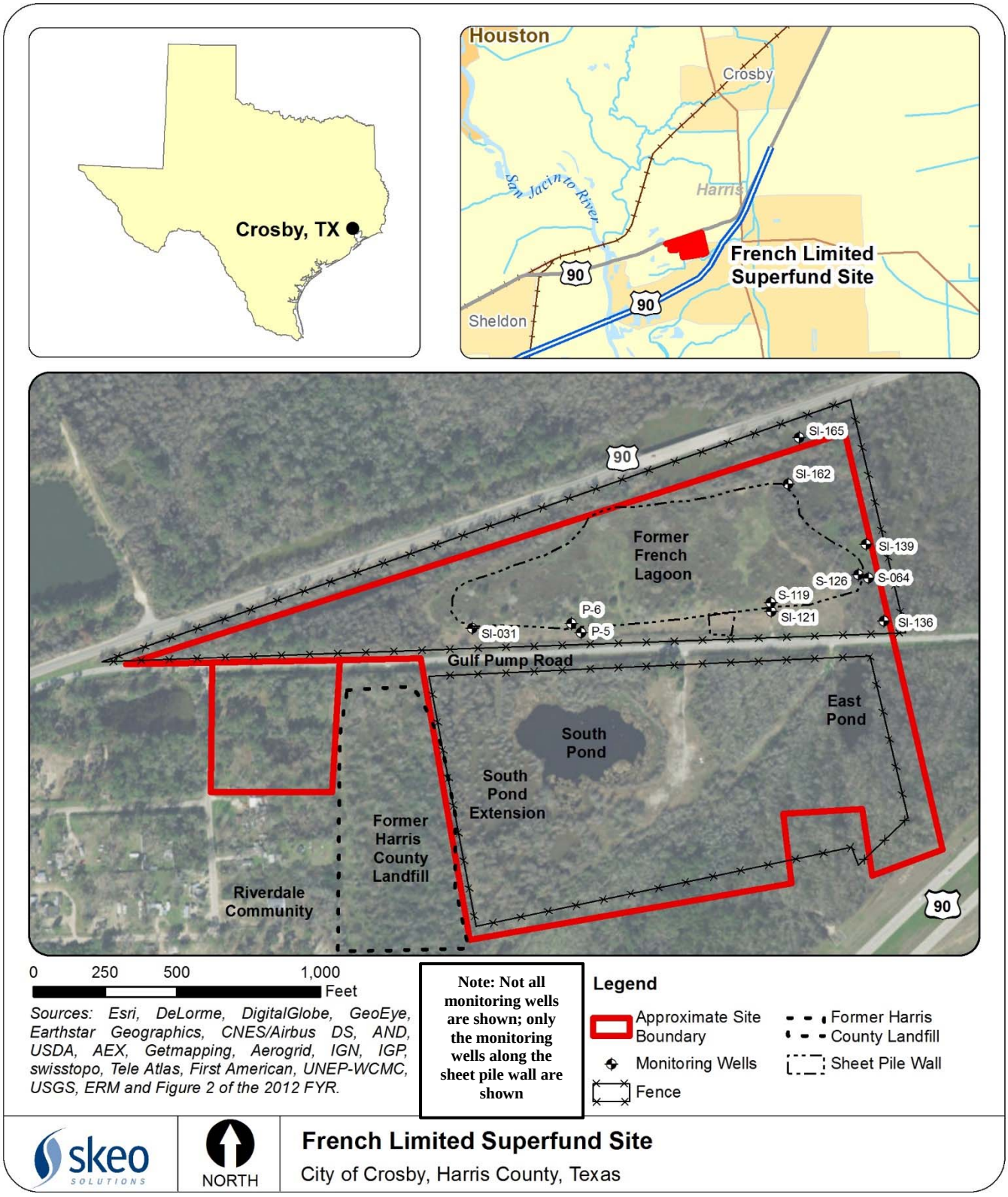
Site Background

The 22.5-acre Site is located in northeast Harris County, Texas, about two miles from Crosby, Texas (Figure 1). Appendix B includes the site chronology. In the 1950s and 1960s, the Site was used as a sand quarry. Sand was produced by hydraulic dredging, which resulted in the formation of an 8-acre lagoon. Between 1966 and 1972, the Texas Water Commission permitted French Limited, Inc. (FLI), the company that owned the property, to accept industrial waste material. The firm received an estimated 90 million gallons of chemical waste, transforming the sand pit (surrounded by a dike) into a waste lagoon.

Groundwater in the shallow aquifer (Upper Aquifer Unit) underneath the Site is heavily contaminated by the leaching action of organic wastes deposited in the main waste pit. The aquifer consists of two shallow groundwater bearing units. The S1 water bearing unit exists from about 15 feet below ground surface to about 30 feet below ground surface and the INT is from about 35 feet to 55 feet below ground surface. A second aquifer (S2) lies beneath the first, separated by approximately 70 feet of sediments consisting predominantly of clays. Underlying the two aquifers, separated by several hundred feet of clay, are the Chicot and Evangeline Aquifers, a primary drinking water source for metropolitan Houston. The Chicot and Evangeline Aquifers do not appear to be at any risk of future contamination. Groundwater flow direction is mainly toward the southwest in the Crosby area and is influenced by groundwater pumpage in the Houston-Galveston area and the resulting subsidence.

The Site is located in the less-developed eastern portion of Harris County. The surrounding area is primarily undeveloped and includes dense woods and swamps. A residential subdivision (the Riverdale community) is located immediately southwest of the Site. It is the only residential development near the Site. As of 2014, there are no drinking water wells within the proposed Technical Impracticability (TI) Boundary (see section II for more information). The Site is situated 1 mile east of the San Jacinto River, within the 100-year floodplain, and has flooded frequently in the past.

Figure 1 : **Site Vicinity Map**



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: French Limited		
EPA ID:TXD980514814		
Region: 6	**State:** Texas	**City/County:** Crosby/Harris
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Raji Josiam, with additional support provided by Skeo		
Author affiliation: EPA Region 6		
Review period: 9/15/2016 - 8/20/2017		
Date of site inspection: 11/2/2016		
Type of review: Statutory		
Review number: 5		
Triggering action date: 8/20/2012		
Due date *(five years after triggering action date)*: 8/20/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1973, after extensive public hearings and legal proceedings, the Texas Water Quality Board revoked the permit to receive industrial waste, and FLI was ordered to cease operations. As part of the settlement, FLI was ordered to remove all structures, tankage and process equipment. EPA added the Site to the National Priorities List (NPL) in 1983.

Site flooding in 1969, 1973, 1979 and 1983 resulted in releases from the lagoon. In 1979, a portion of the dike surrounding the waste pit was breached. Contaminated sludges were discharged into an adjacent slough. In 1982, EPA conducted an Immediate Removal Action. The dike was repaired and most discharged sludges were pumped back into the pit. The floating portion of the sludges was removed and disposed of in July 1983 during another EPA Immediate Removal Action.

Groundwater has been heavily contaminated by the leaching action of organic wastes deposited in the pit. Sludge and soil from the waste pit and adjacent slough include the following primary contaminants: polychlorinated biphenyls (PCBs), pentachlorophenol, organics, volatile organic compounds (VOCs), metals and arsenic.

In 1983, the FLTG was formed by the Site's potentially responsible parties (PRPs) to manage the site remediation program. The remedial investigation and feasibility study (RI/FS) took place between 1984 and 1986. Results of the RI and endangerment assessment indicated that remedial action was required to reduce the potential for public health exposure through:

- Direct contact with contaminated sludges and soils and surface water in the lagoon.
- Ingestion of contaminated aquatic species and plants in the lagoon.
- Consumption of and/or contact with contaminated groundwater.

Response Actions

EPA selected the Site's long-term remedy in the Site's 1988 Record of Decision (ROD). Remedial action objectives (RAOs) in the Site's 1988 ROD were:

- Reduce health hazards associated with direct contact of contaminated soils, sediments or sludges.
- Reduce contaminants in the upper aquifer to EPA drinking water standards and/or human health criteria (10^{-4} to 10^{-7} cancer risk range), *[updated in 2014 ROD Amendment – see below]*.
- Reduce impact of contaminated runoff to surface water quality criteria.
- Reduce migration of waste during flood events using surface water quality criteria for liquid waste.
- Reduce contamination in lower aquifer to EPA drinking water standards and/or human health criteria to 10^{-7} cancer risk range), *[updated in 2014 ROD Amendment – see below]*.
- Reduce human contact with contaminated surface water to surface water quality criteria.
- Reduce the potential of any adverse air discharge to Occupational Safety and Health Administration standards at the site boundary and federal ambient air standards.

The 1988 ROD remedy included the following major cleanup components:

- In-situ biodegradation of sludges and contaminated soils.
- Recovery and treatment of contaminated groundwater until modeling shows that a reduction in the concentration of volatile organics to a level which attains the 10^{-6} human health criteria can be achieved through natural attenuation in 10 years or less, *[updated in 2014 ROD Amendment – see below]*.
- Discharge of surface waters from the lagoon to the San Jacinto River, with treatment as necessary to meet surface water discharge criteria.
- Stabilization and on-site disposal of the treated residue.
- Lagoon backfilling to grade and conforming the site surface to promote drainage.
- Monitoring of the upper and lower aquifers for a period of 30 years, *[updated in 2014 ROD Amendment – see below]*.

Table 1 shows the direct contact criteria for sludges and contaminated soils described in Table 3 of the ROD.

Table 1: Direct Contact Criteria for Sludges and Contaminated Soils

Contaminant	Maximum Allowable Concentration (mg/kg)[a]
Benzo(a)pyrene	9
PCBs	23
VOCs	43
Arsenic	7
Benzene	14

Notes:

a. Values correspond to a 1 x 10^{-5} excess lifetime cancer risk factor. Method and data for calculation taken from "Endangerment Assessment for French Limited Site," CH2M Hill, April 1987, Table 3 of the 1988 ROD.

mg/kg = milligrams per kilogram

Following implementation of the 1988 ROD, and based on a review of the data obtained from site characterizations and continued discussions between EPA and FLTG, it was recognized that a technical impracticability (TI) waiver for the RAOs for groundwater constituents of concern was warranted. EPA approved the TI waiver for groundwater in the Site's September 2014 ROD Amendment (ROD Amendment). FLTG then prepared the May 2015 Technical Impracticability Evaluation for Ground Water Restoration for EPA. Implementation of the TI waiver will begin following the execution of an Amendment to the Site's Consent Decree.

The 2014 ROD Amendment amended groundwater components of the 1988 ROD. RAOs specified for groundwater include:

- Within the TI Zone
  - Contain the two groundwater containment plumes, associated with the upper (S1) and lower (INT) zones.
  - Prevent human exposure to contaminated groundwater above acceptable risk levels.
- Outside the TI Zone
  - Protect the groundwater from degradation by site contaminants.

The 2014 ROD Amendment selected the following remedy components:

- Waiver of the requirement to attain applicable or relevant and appropriate requirements (ARARs) for Contaminants of Concern (COCs) in the portions of the S1 and INT zones within TI Zone boundaries.
  - The ARARs for the Site ground water COCs are the federal Maximum Contaminant Levels (MCLs), which are the drinking water standards that will be waived within the TI Zone. The Texas Risk Reduction Program (TRRP) Tier I Ground Water Residential protective concentration limits (PCLs) will not apply within the TI Zone. All areas outside the TI Zone, must meet location, chemical, and action-specific ARARs for specific constituents in the ground water, and other criteria, advisory, and guidelines. The TRRP Tier I Ground Water Residential PCLs also must not be exceeded outside the TI Zone.
- Install additional monitoring wells and conduct short-term monitoring to verify the proposed TI Zone boundary.
- Conduct long-term monitoring of the two shallow groundwater zones to ensure that the plume is not expanding and to evaluate areas of increasing or decreasing contaminant concentrations within the TI Zone; install deep monitoring wells to ensure that contaminants have not migrated to the deep (S2) zone; and evaluate data periodically.
- Prevent further migration of the groundwater contaminant plumes, as restoration goals will not be achievable throughout the dissolved contaminant plumes.

    - In both the S1 and INT zones, natural processes inhibit groundwater movement. Highly contaminated shallow groundwater under the former lagoon will continue to be contained by a sheet pile wall (SPW) installed as part of the remediation of the lagoon. A hot spot of contaminated groundwater to the south side of the lagoon will also remain contained by an additional SPW installed in 1995. Continue monitoring the integrity of the SPW, used as a barrier for the potential migration of residual dense non-aqueous phase liquid and dissolved-phase COCs from the former lagoon, by measuring groundwater elevations in three nested monitoring wells on either side of the SPW.
- Prevent exposure to or migration of contaminated groundwater above acceptable risk levels by implementing institutional controls to restrict access to or use of groundwater within the TI Zone. Specific objectives of institutional control implementation are to:
    - Prevent the installation of water supply wells inside TI Zone boundaries that would create a vertical migration pathway between the upper contaminated S1 and INT zones and the lower zones (the C2 clay and the S2 groundwater zone).
    - Prevent the installation of a water supply well that would cause the contaminants to migrate outside of the TI Zone.
    - Prevent the installation of water supply wells inside TI Zone boundaries to prevent human exposure to contaminated groundwater;
- Performance of a statutory FYR every five years to ensure the remedy remains protective of human health and the environment.

Table 2: Groundwater COCs and Cleanup Goals

COC	Cleanup Goals[a] (mg/L)
1,1-Dichloroethane	NA
1,1-Dichloroethene	0.007
1,2-Dichloroethane	0.005
Benzene	0.005
Carbon Tetrachloride	0.005
Chloroform	0.08
Cis-1,2-Dichloroethene	0.07
Methylene Chloride	0.005
Tertiary Butyl Alcohol (TBA)	NA
Tetrachloroethene	0.005
Trans-1,2-Dichloroethene	0.1
Trichloroethene	0.005
Vinyl Chloride	0.002

Notes:
a. Table 1 in the 2014 ROD Amendment.
mg/L = milligrams per liter

Status of Implementation

The 1988 ROD called for construction a lagoon floodwall (steel SPW), lagoon bioremediation facilities and groundwater remediation.

Lagoon

In 1989, a wall of double-interlock, half-inch-thick, high-tensile-strength floodwall protective SPW was constructed around the French sludge lagoon, effectively deterring groundwater migration. In 1991, the biological treatment system was constructed in the lagoon. Biotreatment of the chemical sludges contained in the lagoon and within the SPW was conducted from 1992 to 1993. Aquifer remediation efforts targeted groundwater in the SI and INT groundwater intervals, which was remediated by flushing and in-situ bioremediation. Potable deep well water amended with nutrients and electron acceptors (oxygen and nitrate) was injected into affected groundwater zones and pumped water was treated in the wastewater facility prior to discharge to the San Jacinto River. Several groundwater "hot spots" on the south side of the lagoon SPW were identified as possibly impacted by residual dense non-aqueous phase liquid. One of these was enclosed with additional SPW in 1995. In 1996, filling and grading were completed on the lagoon, the lagoon SPW was cut off below grade, and the area was planted with vegetation.

Groundwater

From 1991 to 1995, pumping and treatment and in-situ remediation were used to remove the mass of groundwater COCs. Groundwater transport and bioattenuation modeling indicated that monitored natural attenuation (MNA) processes should achieve cleanup criteria approximately 10 years after active remediation. In 1995, the remediation system was shut down. MNA took place from 1995 to 2005. A review of sampling data collected from 1995 to 2005 demonstrated that MNA was not meeting groundwater RAOs in all areas.

Based on the review of groundwater monitoring, site characterization and contaminant mass removal data, EPA concluded that currently available remedial technologies cannot reliably or feasibly attain remedial goals for site groundwater within a reasonable period.

The 2014 ROD Amendment set forth the change in the groundwater remedy, including the waiver of certain requirements for groundwater cleanup. The 2014 Interim Draft Technical Impracticability Evaluation for Groundwater Restoration proposed the use of a monitoring well network to demonstrate the performance of the TI Zone (Figure C-1, Appendix C). Additional proposed monitoring wells to finalize the perimeter of the TI Zone will be installed when the Consent Decree is finalized. EPA and FLTG will determine the final TI Zone after analysis of data from the new wells.

Institutional Controls

Following the Site's second FYR in 2002, FLTG and the State of Texas acquired additional property surrounding the Site. The 55 acres of property include plumes in both the S1 and INT. See Table 3 and Figure 2.

The Institutional Control Plan (ICP), dated March 7, 2012 and revised July 2, 2013 (2013 ICP) was submitted by the FLTG, and verbally approved by the EPA during a November 21, 2013 project meeting hosted by FLTG. During subsequent discussions, it was mutually agreed by FLTG and EPA that implementation of the ICP would be performed following the review of the TI waiver. This will allow the components of the TI waiver to be included in the ICP actions.

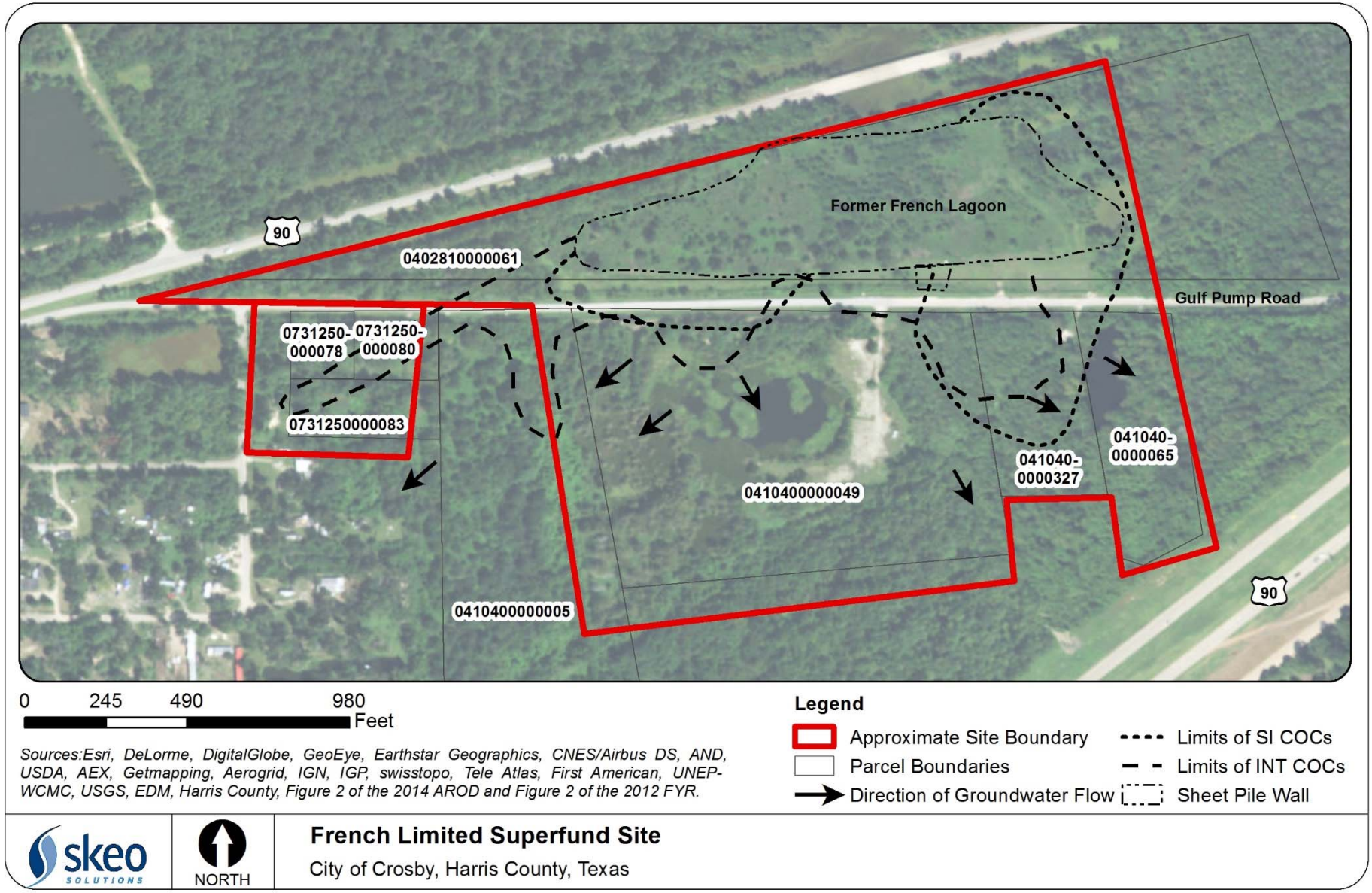
Table 3: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media, Engineered Controls, and Areas that Do Not Support UU/UE Based on Current Conditions	ICs Needed	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Lagoon Parcel	Yes	0402810000061	Restrict any activity that will compromise the SPW remedy or land use that would result in unacceptable exposure.	2013 ICP will be revised and ICs will be implemented after TI Zone[a] is established
Groundwater	Yes	TI Zone	Prevent the installation of water supply wells inside TI Zone boundaries that would create a vertical migration pathway between the upper contaminated S1 and INT zones and the lower zones (the C2 clay and the S2 groundwater zone). Prevent the installation of a water supply well that would cause the contaminants to migrate outside of the TI Zone. Prevent the installation of water supply wells inside TI Zone boundaries to prevent human exposure to contaminated groundwater.	2013 ICP will be revised and ICs will be implemented after TI Zone[a] is established

Notes:

a. TI Zone will be established after installation and monitoring of additional groundwater monitoring wells; additional monitoring wells will be installed once the Consent Decree Amendment is signed.

Figure 2: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation & Maintenance (O&M)

The FLTG's consultants perform site O&M, which consists of post-closure monitoring of the upper and lower aquifers as well as surficial maintenance of the Site. Surficial maintenance includes fence repair, fill replacement and regrading.

The 1996 Site Closure Report outlines the scope and procedure for Site long-term monitoring and includes monitoring requirements through 2024. As the consent decree is finalized an updated O&M plan is needed to reflect changes in remedy components, objectives, and monitoring needs for current site conditions.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 4: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	Based on the information available during the fourth five-year review, the French Limited Superfund Site has achieved remediation goals for the source control activities that included the lagoon floodwall and the lagoon bioremediation facilities. The source control remedy for the French Limited Superfund Site is currently protective of human health and the environment. The groundwater remedy has addressed immediate threats in the short-term, and is expected to be protective of human health and the environment in the long-term provided a modified groundwater remedy is identified, approved, and implemented, which addresses the continuing groundwater exceedances areas and achieves the RAOs. Continued O&M will ensure that the selected remedy continues to be protective. The only restrictions placed on the site are that the use of the upper and lower aquifers onsite is banned until contaminant concentrations have decreased to below the human health criteria or MCLs. Because the remedial action implemented at the French Limited Superfund Site is effective in the short-term, the overall remedy for the site continues to be protective of human health and the environment. The selected remedy will continue to be protective if the recommendations and follow-up actions identified in this five-year review are addressed.

Table 5: Status of Recommendations from the 2012 FYR

Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Several areas in the S1 and INT groundwater units have not achieved the groundwater RAOs specified in the 1988 ROD after performance of all response actions identified in the ROD. In addition, there have been detections of additional groundwater contaminants for which no cleanup levels were identified in the ROD.	Additional field investigations at the site are ongoing and an addendum to the Supplemental Feasibility Study Report has been developed to identify remedial alternatives which will achieve the RAOs. If appropriate, EPA will issue a ROD amendment which will identify modifications to the remedy selected for the site groundwater.	Completed	EPA signed an ROD Amendment for the Site in 2014 updating the groundwater remedy and documenting additional COCs.	9/30/2014
Institutional Control Plan – An Institutional Control Plan was to be developed (subject to EPA approval) for the site and associated surrounding properties. This plan has yet to be completed and/or implemented, but the submission of the Institutional Control Plan is anticipated within 90 days of the completion of this report. Verification is still necessary to show that institutional controls describing the site hazards and the limits on use of contaminated groundwater are in place for the site and associated surrounding properties.	The site-specific Institutional Control Plan needs to be completed in the near future and should be developed to discuss the implementation, monitoring, and maintenance of administrative controls to provide protection to the health and safety of the general public. The plan should also include the identification of access limits to the site (i.e., a figure of perimeter fencing including the location of gates). In addition, verification of institutional controls is needed on all impacted properties. This assures that appropriate use of limitations, such as zone and groundwater restrictions, and proprietary controls, such as easements, covenants, and deed notices that describe the site hazards and prohibit use of contaminated groundwater, are in place for the French Limited Superfund Site and associated surrounding properties.	Ongoing	The ICP, dated March 7, 2012 and revised July 2, 2013 was submitted by the FLTG, and verbally approved by the EPA during a November 21, 2013 project meeting hosted by FLTG. During subsequent discussions, it was mutually agreed by FLTG and EPA that implementation of the ICP would be performed following the review of the TI waiver. This will allow the components of the TI waiver to be included in the ICP actions.	-
Status of the six Riverdale wells – Previous reports identified that six water wells located within the Riverdale community west of the site had been converted into site monitoring wells and were owned by the FLTG. Based on inquiries made during the five-year review process, it appears that the previous information was not accurate and the actual status of the six wells is unknown with the following exceptions. One well (RD-1) appears to be	The status of the six Riverdale wells west of the site needs to be collected and verified. Information collected for each well should include current owner and usage, actual physical location, original purpose (i.e., water supply well, monitoring well, other), current status or condition (i.e., in use by a resident, plugged and abandoned, other), and when each well was last inspected and/or sampled.	Completed	On behalf of FLTG, ERM completed a well survey summarized in the 2014 Memo: Follow-up Actions for Fourth Five-Year Review. As of 2014, there are	5/5/2014

Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
located on the property owned by FLTG, although the condition of the well and its exact location is unknown. A second well (RD-2) located south of the FLTG property was replaced with a deep potable water well screened below the Beaumont clay (FLTG 1994). The report further identified that the residents who had previously used the RD-2 well were connected to the new deep well and the original RD-2 well was closed out. No other information is known concerning the RD-2 well. The locations and status of the remaining wells, RD-3 through RD-6, is unknown.			no drinking water wells within the TI Zone.	
Housekeeping conditions – The overall site conditions were good with some minor issues observed during the five-year review inspection. Some monitoring wells have been impacted by subsidence, therefore limiting access to the well or preventing proper closing/securing of the lid to the well casing. Portions of the fencing north and south of Gulf Pump Road are covered with vegetation and the integrity of the fence is becoming compromised. A top hinge on a secondary access gate to the south of Gulf Pump Road was observed to be damaged, potentially compromising the integrity of the gate. Soil cuttings (i.e., three 55-gallon drums) from a field effort conducted in 2010 are still staged on site and have yet to be disposed of. An unused well casing of unknown origin was identified during a utility search conducted in December 2011.	The minor issues observed during the five-year review inspection should be addressed and include repairs to monitoring wells, fence and gate repairs (e.g., removal of vegetation compromising the integrity of the fence, replacement of hinges and damaged fencing); proper disposal of investigation-derived wastes (i.e., soil cuttings); and plugging and abandonment of the well casing of unknown origin. Site maintenance is necessary to maintain integrity of the remedy so that protectiveness is not compromised.	Completed	PRP group completed site maintenance, drum removal and plugging and abandonment of well casing of unknown origin in 2013. Reported in the 2014 Memorandum from FLTG to EPA.	5/5/2014

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

EPA made a public notice available by a newspaper posting in the *Highlands Star Crosby Courier*, regularly published in Harris County, Texas, and generally circulated in Harris County, Texas, on 11/3/2016. It stated that the FYR was underway and invited the public to submit any comments to EPA and that the results of the review and the report will be made available at the Site's information repository, located at the Crosby Branch of the Harris County Public Library, 135 Hare Road, Crosby, Texas.

During the FYR process, EPA conducted interviews to document any perceived problems or successes with the remedy that has been implemented to date**.** The results of these interviews are summarized below. In addition, EPA called/mailed interview forms to twelve residents in nearby areas, and received one phone response summarized below as well. The interview forms of those who gave permission to be included in this Five Year Review Report are in Appendix I.

Interviewees feel that the remedy is operating as intended. There have been no effects of the Site on the surrounding community. The one resident who responded to questions via phone, does not live in the immediate vicinity of the Site, but is aware of the Site and has seen cleanup being conducted at the Site. The resident had not heard anything recently about the Site and suggests EPA reaches out and make people aware of the Site. The EPA will add the resident to the current mailing list for the Site and also evaluate and update the current mailing list to include others in the community. The EPA will mail out updates and/or publish notices for public meetings as needed. The TCEQ Project Manager, Marilyn Long, indicated that in general, the project has been acceptable and that the FLTG, the EPA, and the TCEQ have maintained good communication/coordination since the previous FYR. Marilyn Long indicated that implementation of the remedial action in support of the ROD Amendment is pending the final Consent Decree. In the meantime, FLTG continues to conduct the annual groundwater sampling events and O&M tasks as appropriate. FLTG's Paul Taylor stated that FLTG has a good working relationship with EPA. Paul Stefan with FLTG consultant ERM reported that groundwater monitoring results continue to demonstrate stable-to-decreasing concentrations for groundwater COCs. The Harris County Pollution Control Services representative acknowledged they are aware of the Site, but they do not feel well-informed regarding the Site's activities and remedial progress. They suggested EPA can convey site-related information by sending updates via email or mail outs, hosting public meetings, and by posting information on the EPA's website and at the local repository. They recommended EPA sample nearby wells, post the annual groundwater reports online, look into new groundwater remediation alternatives, make the public aware of the five-year review and send updates, at least annually, to local governments, involved parties, and the public. The EPA will include Harris County on updates regarding the Site via email and/or mail. The EPA will continue to keep the Site website updated and will also make Site documents including groundwater monitoring reports and five-year review report available to the public via the Site website. The link to the Site website is at www.epa.gov/superfund/french-ltd. Once the remedial action for groundwater based on the remedy selected in 2014 ROD Amendment is implemented, the EPA will continue to evaluate the performance of the remedy. If the monitoring data indicates in the future that the remedy is not performing as intended, the EPA and the FLTG will re-evaluate the remedy at that point in the future and consider other remedial alternatives as appropriate.

Data Review

This data review provides a summary of current groundwater monitoring.

Groundwater Monitoring

Groundwater monitoring is currently conducted to:

- Ensure that the SPW continues to effectively contain contaminated groundwater.
- Monitor the groundwater plume.

The 2014 ROD Amendment modified the groundwater remedy to include a TI waiver because of the impracticability of current technologies to clean up the groundwater. EPA is in the process of drafting an

amended Consent Decree for the PRPs to install additional groundwater monitoring wells to delineate the TI Zone. This data review section assesses the effectiveness of the SPW and status of the proposed TI Zone boundary.

Current monitoring includes all site COCs. The 2016 Annual Ground Water Monitoring Report shows a total of 95 monitoring wells were gauged and 83 monitoring wells were sampled for analysis of COCs. The 2016 Annual Ground Water Monitoring Report provides plume maps for the following four constituents in the S1 and INT aquifers because they are considered representative of the different COC classes and tend to be the most mobile, persistent and/or concentrated of the COCs.

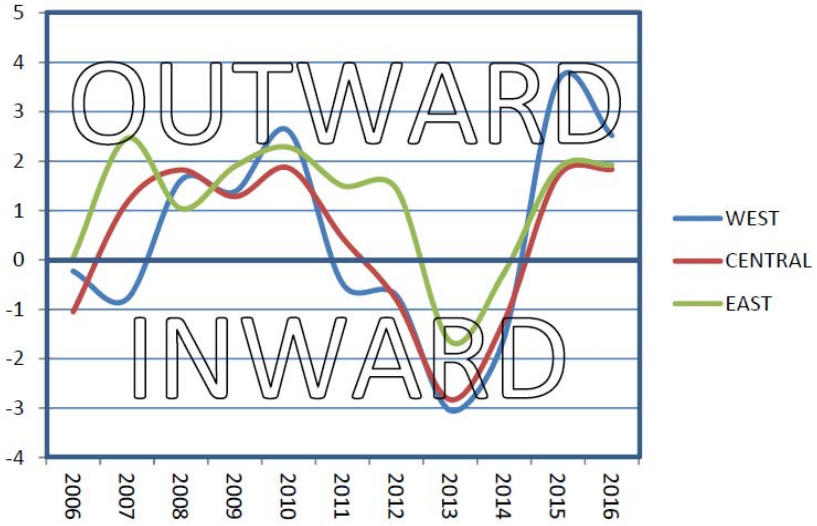
- 1,2-Dichloroethane
- Benzene
- Tertiary Butyl Alcohol (TBA)
- Vinyl Chloride

Gradient Across the SPW

Three pairs of S1 monitoring wells are located on both sides of the SPW surrounding the former lagoon. They are used to evaluate the apparent groundwater gradient across the SPW. The 1996 Site Closure Report includes a vegetation plan. The purposes of the plan were to restore the lagoon surface to its natural state before the sand-mining activity and to plant trees that can uptake groundwater to establish inward gradient control of the water inside the SPW. Site inspection participants observed trees on the surface of the former lagoon during the FYR site inspection.

ERM has measured groundwater elevations at the three well pairs since 2006 to evaluate the gradient across the SPW. Overall, the groundwater gradient has been potentially outward, with the exception of the period from 2011 to 2014 (Figure 3). For the most recent monitoring event in January 2016, groundwater elevations for the wells inside the SPW were reported to be approximately two feet higher than wells outside the SPW, indicating a potential outward gradient. The western and central well pairs have had the highest gradient difference since monitoring began in 2006. The 2016 Annual Groundwater Monitoring Report interpreted these data as "suggesting that infiltration has exceeded transpiration capacity resulting from a second year of unusually high seasonal rainfall."

Figure 3: SPW Gradient – 2006 to 2016[1]



The 2016 Annual Ground Water Monitoring Report indicates that a review of COC concentrations in wells from the three well pairs outside of the SPW (P-5, S1-121 and S1-064) does not suggest that elevated concentrations of

[1] Figure 2-3, 2016 Annual Ground Water Monitoring Report.

COCs from the former lagoon source area have migrated outside of the SPW in this area (see graphs in Appendix H). Table 6 shows TBA concentrations in select wells surrounding the SPW over the past five years, including the three wells used in the monitoring report and nearby wells. TBA is shown because of its persistence in the environment and its exceedance of cleanup goals (2.2 micrograms per liter [µg/L]). Current groundwater monitoring reports do not show a statistical analysis of contaminant concentrations over time to support the statement that concentrations outside of the SPW are not increasing. The lack of inward groundwater gradient and the fluctuating contaminant concentrations in wells near the SPW need to be evaluated and statistical analysis conducted as appropriate. See Figure 1 for well locations. All wells are located within the proposed TI Zone.

Table 6: TBA Concentrations (µg/L), 2012-2016

	Wells Used in the 2016 Monitoring Report to Confirm SPW Adequacy			**Outside SPW on SW End**	**East Plume Area**		**North Part of East Plume Area**	**Furthest Northeast Well**
	P-5	**S1-064**	**S1-121**	**S1-031**	**S1-136**	**S1-139**	**S1-162**	**S1-165**
2012	10.1	124	1.83	<0.05	1.62	45	50.5	0.086
2013	20	32	<0.1	0.52	11	24	130	<0.1
2014	19	150	1.5	0.45	10	39	70	0.069 J
2015	7.5	120	0.62	<0.1	7.1	37	65	0.1
2016	4.2	86	0.35	<0.1	4.5	35	70	0.22
Notes: J = approximate concentration; result is less than the lowest calibration standard. *Source*: 2012, 2013, 2014, 2015 and 2016 Annual Ground Water Monitoring Reports.								

Table 7: Groundwater Levels in Well Pairs (Feet Mean Sea Level), 2012-2016

	Inside SPW			**Outside SPW**		
	P-6	**SI-126**	**SI-119**	**P-5**	**SI-064**	**SI-121**
2012	9.35	11.1	10.34	10.07	9.66	11.15
2013	7.17	6.73	6.71	10.22	8.38	9.54
2014	8.95	8.8	8.92	10.53	9.06	10.16
2015	13.22	11.97	12.98	9.61	10.13	11.29
2016	11.55	11.45	12.07	9.03	9.53	10.24
Notes: *Source*: 2012, 2013, 2014, 2015 and 2016 Annual Ground Water Monitoring Reports.						

Figure 1 shows that the desired gradient across the SPW is not being achieved at all times. Table 7 shows increasing water heights inside of the SPW over the past five years. The data in Table 7 also indicate that groundwater levels have remained more stable outside of the SPW. COC concentrations have varied over the past five years in indicator wells and in some eastern plume wells. Plume variations need to be evaluated to determine if contingency actions need to be planned and implemented.

Groundwater Plume Monitoring

Because of the following site circumstances, EPA modified the remedy to include a TI waiver.

- Complex geology is trapping COCs in heterogeneous, low-permeability, interbedded fine-grained material (i.e., clay and silt), impairing the effectiveness of traditional as well as innovative groundwater remedies to remove mass and achieve RAOs.
- Slow, continual desorption and diffusion of contaminant mass from fine-grained sediments beneath the Site that was not effectively treated during the active remediation efforts is making it impractical for proven remedial technologies to restore the groundwater within a reasonable timeframe.

- EPA concluded that the in-situ decay potential of TBA, a prevalent and concentrated COC, was limited, requiring an engineered-based remedy to achieve RAOs.

Figure C-1 in Appendix C, shows the current locations of the plumes and the draft TI waiver boundary. EPA and FLTG are in the process of installing additional groundwater wells to delineate the plume and TI Zone boundaries. The 2016 groundwater monitoring data indicate no COC exceedances outside of the draft TI Zone boundary. Sampling of the proposed wells will provide further information necessary to determine if the draft TI Zone boundary is appropriate.

The next FYR will evaluate the appropriateness of the location of the TI Zone since the wells needed to further delineate the zone to the south have not yet been drilled.

Site Inspection

The site inspection took place on 11/2/2016. In attendance were EPA RPM Raji Josiam, Marilyn Czimer Long from TCEQ, Paul Taylor from FLTG, Fay Bourgeois and Rob Jaros from ERM, Dave Roberson from De Maximis, and Ryan Burdge and Kirby Webster from Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix D includes the site inspection checklist. Appendix F includes site inspection photos.

Site inspection participants convened on the southern portion of the Site, east of South Pond, for a health and safety briefing. The site contractor had recently mowed trails throughout the Site. The northern and southern portions of the Site have visible signage and locked gates. Fencing surrounds the Site where terrain allows. Some steep, wet areas of the Site are not fenced, though they are impassible because of wildlife, poisonous plants, deep water or steep slopes. Trespassing activity has not been observed on site.

Participants viewed the South Pond, where at least one alligator has been sighted. The eastern portion of the Site has tires distributed throughout the area from flood waters. All wells observed were locked and labeled. Participants observed the northern fenceline of the southern portion of the Site. Poison ivy was prevalent on site. A new drainage culvert was viewed; beaver barriers on either side of the culvert discourage beavers from damning the drainage flow.

Site inspection participants observed the northern portion of the Site where the underground SPW surrounds the former French Lagoon. The SPW is located between three sets of nested wells, which are closely monitored to ensure the remedy continues to protect human health and the environment. The clay cap has trees growing on it, intended to uptake groundwater from inside the SPW. Participants observed the eastern portion of the cap and the three most northern monitoring wells located in the East Slough. The area is very wet, with steep slopes up to Highway 90. Site topography has made installation of groundwater monitoring wells challenging.

Skeo staff, EPA and TCEQ visited the site repository, Crosby Branch Library, located at 135 Hare Street in Crosby. The site repository contains site-related documents.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The soil remedy is functioning as intended by decision documents. Contaminated sludges and soils were treated and stabilized on site within the lagoon/SPW area. The groundwater remedy is partially functioning as intended by decision documents. The SPW contains contaminated groundwater. Recent groundwater annual reports indicate an outward groundwater gradient across the SPW. The lack of inward groundwater gradient and

fluctuating contaminant concentrations in wells near the SPW need to be evaluated and closely monitored. Evaluations may need to include a statistical basis for assessing the variability of concentrations of COCs. Contingency measures may need to be planned and established if the negative gradient across the SPW is not maintained. The 2014 ROD Amendment TI waiver groundwater remedy has not yet been implemented. Once the additional monitoring wells are installed and the TI Zone is established, the remedy is expected to function as intended by decision documents.

O&M procedures are effective in maintaining the site grounds and monitoring the groundwater plume. The O&M plan would need to be updated once the TI Zone is established to include groundwater monitoring of additional wells planned to be installed.

The 2014 ROD Amendment required the implementation of institutional controls to restrict access to or use of groundwater within the TI Zone. The June 2013 ICP will need to be revised and ICs implemented after the TI Zone is established. The Consent Decree Amendment needs to be negotiated and finalized in order to establish the TI Zone.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection are still valid. Appendix G includes a review of cleanup goals. In groundwater, there is no change in cleanup goals outlined in the 2014 ROD Amendment. A comparison of sludge and soil cleanup goals to residential regional screening levels (RSLs) indicates that the benzo(a)pyrene and VOC cleanup goals slightly exceed EPA's acceptable risk range of 10^{-4} to 10^{-6} cancer risk range. The primary component of the selected remedy was in-situ biological treatment of the sludges and contaminated soils in the lagoon. The biomass generated during biological treatment process was stabilized in-place and the remaining lagoon volume backfilled with approximately 15 to 20 feet of clean soil. The surface was then graded to promote drainage away from the site. This portion of the Site is currently fenced or otherwise inaccessible and there are no observations of trespassers on site. The remedial goal in the 1988 ROD was based on an inadvertent ingestion under a residential scenario. Based on the actions taken as described above, inadvertent ingestion pathway of contaminated sludge and soil has been eliminated and the remedial action objective of reducing health hazards associated with direct contact of contaminated soils, sediments or sludges is still valid.

The Institutional Control Plan was developed in June 2013 but has not been implemented. The ICP will be revised and implemented once the TI Boundary is established based on the 2014 ROD Amendment, to ensure no unacceptable uses occur on the lagoon parcel of the Site. Vapor intrusion is not currently a concern because there are no structures present within 100 feet of the known groundwater plume. If this changes, the vapor intrusion pathway should be evaluated.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the FYR:

OU(s): 1	**Issue Category:** Remedy Performance			
	Issue: TI Waiver was the selected remedy in the 2014 ROD Amendment. The TI waiver groundwater remedy has not yet been implemented since the 1990 Consent Decree has not been amended to reflect the requirements in the 2014 ROD Amendment.			
	Recommendation: Amend the 1990 Consent Decree in order to implement the TI Waiver groundwater remedy selected in the 2014 ROD Amendment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	EPA/Potentially Responsible Party	EPA	9/30/2018

OU(s): 1	**Issue Category**: Institutional Controls			
	Issue: Institutional Control Plan (ICP) for the Site was developed in June of 2013 but has not been implemented. This ICP needs to be revised based on the 2014 ROD Amendment and based on the need to restrict land uses at the lagoon parcel of the site and needs to be implemented.			
	Recommendation: Revise the ICP once the TI Boundary is established.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	EPA/Potentially Responsible Party	EPA/State	9/30/2021

OU(s): 1	**Issue Category:** Remedy Performance			
	Issue: Recent groundwater annual reports indicate an outward groundwater gradient across the sheet pile wall (SPW) instead of an inward groundwater that is needed to control off-site migration.			
	Recommendation: The lack of inward groundwater gradient and the fluctuating contaminant concentrations in wells near the SPW need to be evaluated and statistical analysis conducted as appropriate. The wells need to be closely monitored. If contaminants are found to be migrating, contingency measures need to be planned and implemented to mitigate contaminant migration, maintain plume stability, and control exposure outside the TI Boundary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	Yes	Potentially Responsible Party	EPA/State	9/30/2018

OTHER FINDINGS

- Update Site O&M Plan to reflect current site conditions and needs once the Consent Decree is amended and the TI Boundary established.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at OU1 currently protects human health and the environment because there are currently no exposures to human health and the environment. However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness: • Amend the 1990 Consent Decree in order to implement the TI Waiver groundwater remedy selected in the 2014 ROD Amendment. • Revise the ICP once the TI Boundary is established. • The lack of inward groundwater gradient and the fluctuating contaminant concentrations in wells near the SPW need to be evaluated and statistical analysis may need to be conducted as appropriate. The wells need to be closely monitored. If contaminants are found to be migrating, contingency measures need to be planned and implemented to mitigate contaminant migration, maintain plume stability, and control exposure outside the TI Boundary.

VIII. NEXT REVIEW

The next FYR Report for the French Limited Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2012 Annual Ground Water Monitoring Report. French Limited Superfund Site. French Limited Task Group. Crosby, Texas. Prepared by ERM. July 10, 2012.

2013 Annual Ground Water Monitoring Report. French Limited Superfund Site. French Limited Task Group. Crosby, Texas. Prepared by ERM. July 2, 2013.

2013 Institutional Control Plan. French Limited Superfund Site. French Limited Task Group. Crosby, Texas. Prepared by ERM. Revised July 2, 2013.

2014 Annual Ground Water Monitoring Report. French Limited Superfund Site. French Limited Task Group. Crosby, Texas. Prepared by ERM. June 4, 2014.

2015 Annual Ground Water Monitoring Report. French Limited Superfund Site. French Limited Task Group. Crosby, TX. Prepared by ERM. July 24, 2015.

2016 Annual Ground Water Monitoring Report. French Limited Superfund Site. French Limited Task Group. Crosby, TX. Prepared by ERM. April 7, 2016.

Follow-up Actions for Fourth Five-Year Review. French Limited Superfund Site. Crosby, Harris County, Texas. Environmental Resources Management. May 5, 2014.

Fourth Five-Year Review Report for French Limited Superfund Site. Crosby, Harris County, Texas. EPA Region Dallas, Texas. August 2012.

Interim Draft Technical Impracticability Evaluation for Ground Water Restoration. French Limited Superfund Site. French Limited Task Group, Crosby, Texas. Environmental Resources Management. July 11, 2014.

Record of Decision Amendment. French Limited Superfund Site. Crosby, Harris County, Texas U.S. Environmental Protection Agency. Region 6. Superfund Division. Dallas, Texas. September 2014.

Site Closure Plan. French Limited Project. Crosby, Texas. Prepared by Southwestern Environmental Consulting, Inc. for United States Environmental Protection Agency Texas Natural Conservation Commission. January 4, 1996.

Superfund Record of Decision: French Limited, TX. EPA Region 6. March 1988.

APPENDIX B – SITE CHRONOLOGY

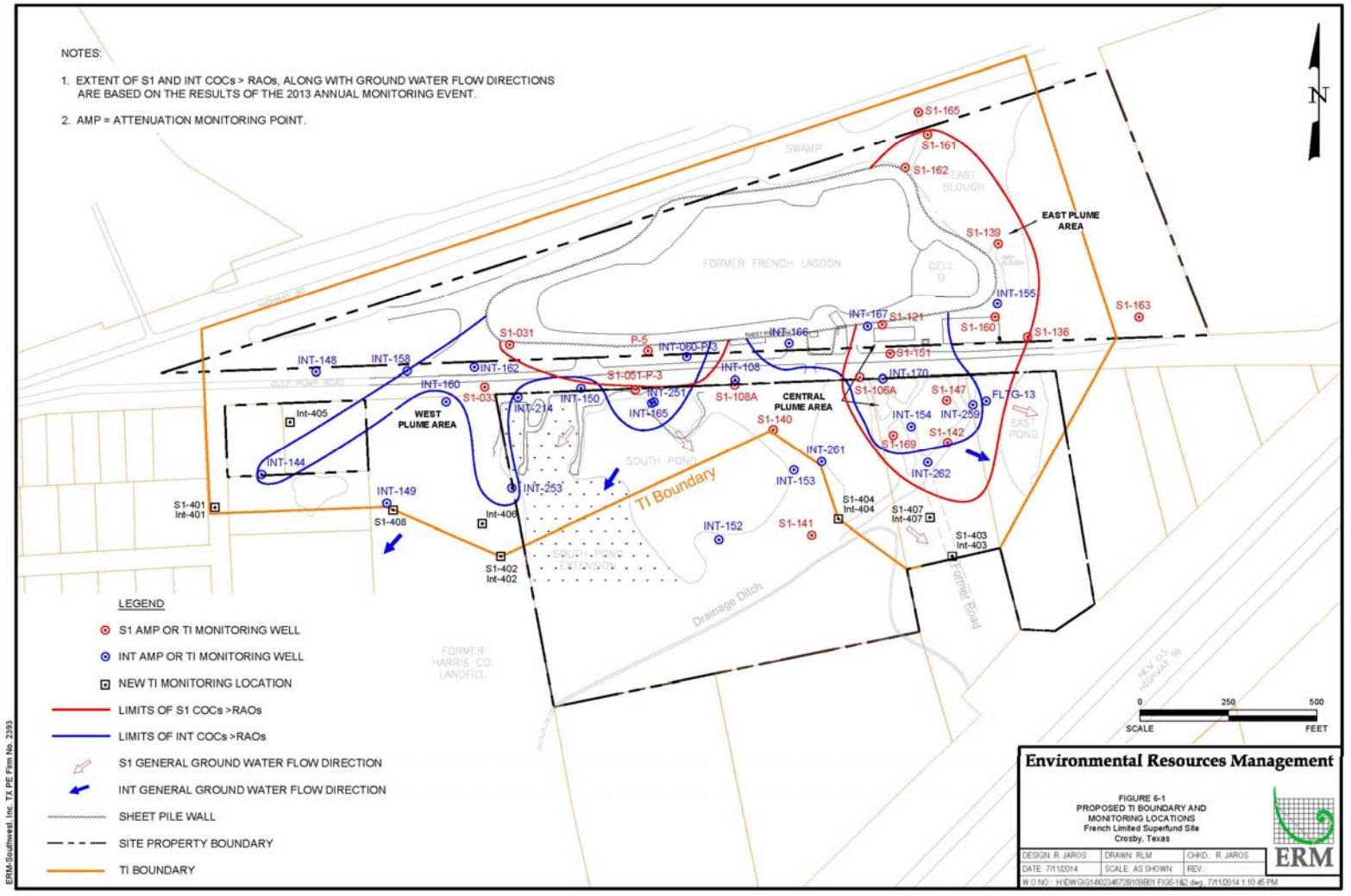
Table B-1: Site Chronology

Event	Date
Site closed to receiving wastes	1973
Site placed on NPL	September 8, 1983
EPA conducts RI/FS	1982-1984
PRP conducts supplemental RI/FS and pilot studies	1984-1987
ROD issued; in-situ bioremediation selected as remedy for lagoon; cleanup levels established for lagoon and groundwater	1988
Flood wall constructed around lagoon; EPA inspection of construction	1989
Lagoon construction and EPA inspection completed	November 1989
Lagoon facilities designed and constructed; aquifer facilities designed and constructed; EPA inspection of construction; construction completed	1989-1991
Consent Decree between EPA and PRP signed	1990
Lagoon bioremediation facilities, construction completed; aquifer remediation facilities, initial construction	December 1991
Lagoon bioremediation facilities, EPA inspection completed; aquifer remediation facilities, EPA inspection	January 1992
Lagoon bioremediation operation; EPA oversight and split sampling for remediation verification	1992-1993
Lagoon bioremediation facilities, start of operation	December 1993
EPA completed first FYR	1995
Vegetation plans implemented	1995-1999
Quarterly groundwater conducted	1995-1998
Monthly groundwater monitoring conducted	January – December 1995
Lagoon bioremediation certification of completion	May 1995
INT-11 dense non-aqueous phase liquid area cutoff wall installation and permeability certification report	August 1995
Natural attenuation modeling report	December 1995
Completion of aquifer remediation facilities (active treatment)	January 1996
Quarterly groundwater monitoring	January, April, July, October 1996
Site Remediation Report: Part B (aquifer) approval; active aquifer remediation certification of completion approval; Site Closure Plan approval	March 1996
Final Close-Out Report	July 1996
Natural Attenuation Modeling Progress Report	January 1997
Quarterly groundwater monitoring	January, April, July, October 1997
Semiannual groundwater monitoring	January, July 1998
Oxygen addition and focused pumping progress update	July 1998
Semiannual groundwater monitoring	January, July 1999
Semiannual groundwater monitoring	January, July 2000
Second FYR Report completed	March 2000
Semiannual groundwater monitoring	2000-2005
Annual groundwater monitoring	2006
Additional site characterization activities	2004-2006
First supplemental FS	2006
Third FYR Report completed	March 2007
Annual groundwater monitoring	2007-2010
Constructed Wetlands Treatability Study	December 2008
Second supplemental FS	September 2010
Final supplemental FS	February 2012
Fourth FYR Report completed	August 2012

Event	Date
Interim Draft Technical Impracticability Evaluation for Ground Water Restoration Report completed	July 2014
EPA ROD Amendment amended groundwater remedy	September 2014

APPENDIX C – SITE MAPS

Figure C-1: Draft TI Zone[2]



[2] Figure 6-1, 2014 Draft TI Zone

APPENDIX D – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: French Limited	**Date of Inspection:** 11/02/2016
Location and Region: Crosby, Texas 6	**EPA ID: TXD980514814**
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** Clear/85 degrees Fahrenheit

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other: _____
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency	Contact Name	Title	Date	Phone No.
_____	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency	Contact Name	Title	Date	Phone No.
_____	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency	Contact Name	Title	Date	Phone No.
_____	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency	Contact Name	Title	Date	Phone No.
_____	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency _____

Contact	Name	Title	Date	Phone No.
	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☒ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A

Remarks: _____

3.	**O&M and OSHA Training Records**	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

7.	**Groundwater Monitoring Records**	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A

☐ Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☒ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☒ N/A

Remarks: Institutional controls will be put in place after the 2014 ROD Amendment remedy is implemented.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads Damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☐ Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☐ Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☐ Cover properly established
	☐ No signs of stress	☒ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☐ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☐ Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☐ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☐ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		
B. Benches		☐ Applicable ☐ N/A	
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay

Remarks: _____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☐ No obstructions
   ☐ Location shown on site map Area extent: _____
   Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☐ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☒ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: Sampling nested wells on either side of wall.

☐ Performance not monitored

Frequency: Annually ☐ Evidence of breaching

Head differential: _____

Remarks: Indicates lack of an inward groundwater gradient.

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The soil and sediment remedy is effective and functioning as intended. Soil and sediment has been treated, contained and capped. The 2014 ROD Amendment describes a TI waiver as the selected groundwater

	remedy. It has not yet been implemented.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. Current O&M procedures are appropriate for Site protectiveness. The O&M plan would need to be updated once the TI Zone is established to include groundwater monitoring of wells to be installed..
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. The 2014 ROD Amendment remedy modification has not yet been implemented. Opportunities for optimization in groundwater monitoring tasks may be reviewed after implementation of the 2014 ROD Amendment.

APPENDIX E – PRESS NOTICE

French Limited Superfund Site
Public Notice
U. S. Environmental Protection Agency, Region 6

November 2016

The U.S. Environmental Protection Agency Region 6 (EPA) will be conducting the Fifth five-year review of remedy implementation and performance at the French Limited Superfund site (Site) in Crosby, Texas. Between 1950 and 1973, site uses included sand mining and industrial waste storage and disposal. Site facilities were permitted to accept industrial wastes from 1966 to 1971.

Site activities contaminated groundwater, surface water, soil and sludge with hazardous chemicals and heavy metals. The site-wide remedy included in-situ biodegradation of sludges and soils in a lagoon, stabilization of residues and on-site disposal, surface water discharge to the San Jacinto River after treatment, backfilling of lagoon and contouring, groundwater pump and treat, to prevent human exposure.

The five-year review will determine if the remedies are still protective of human health and the environment. The review is scheduled for completion in August 2017. The report will be made available to the public at the following local information repository:

Harris County Public Library, Crosby Branch
135 Hare Road
Crosby, Texas 77532
(281) 328-3535

Site status updates are available on the Internet at https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0602498

All media inquiries should be directed to the EPA Press Office at (214) 665-2200

For more information about the Site, contact:

Raji Josiam/Remedial Project Manager
(214) 665-8529
or 1-800-533-3508 (toll-free)
or by email at josiam.raji@epa.gov

Janetta Coats/Community Involvement Coordinator
(214) 665-7308
or 1-800-533-3508 (toll-free)
or by email at coats.janetta@epa.gov

APPENDIX F –REMEDIAL ACTION AND SITE INSPECTION PHOTOS

BEFORE – Photos from the Site Closure Plan, 1996

FIGURE 1.2
AERIAL PHOTOGRAPH
FRENCH PROJECT SITE
1988

French Lagoon prior to remediation, 1988

FIGURE 1.12
AERIAL PHOTOGRAPH
CELL E REMEDIATION
1992

French Lagoon during remediation, 1992

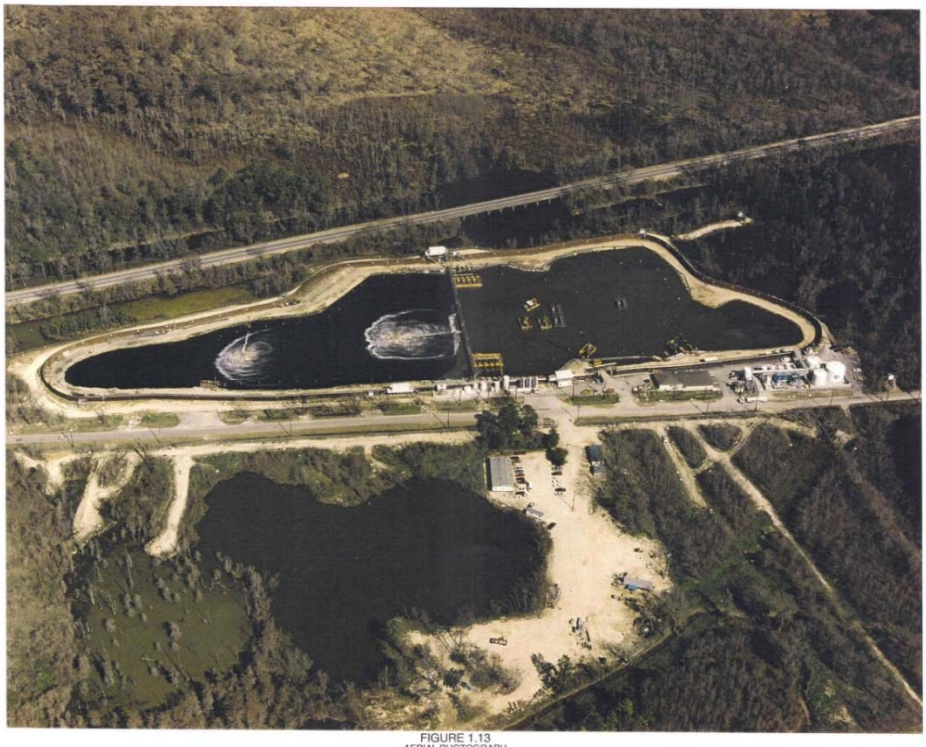


FIGURE 1.13
AERIAL PHOTOGRAPH
CELL F REMEDIATION
1993

French Lagoon during remediation, 1993

AFTER – Site Inspection Photos, November 2016

Superfund site sign, 2016

Locked gates and signs at entrances, 2016

South Pond, 2016

Locked and labeled groundwater monitoring well, 2016

Tires prevalent on eastern portion of the Site, 2016

New culvert placed with beaver barrier, 2016

Surface of cap on former French Lagoon, 2016

Nested wells on either side of steel SPW, 2016

Swampy northern portion of the Site, 2016

APPENDIX G – DETAILED ARARs AND TOXICITY REVIEW TABLES

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those chemical-specific ARARs that address the protectiveness of the remedy are reviewed.

Groundwater
The 1988 ROD and 2014 ROD AMENDMENT established groundwater ARARs. The 2014 ROD Amendment waived the ARARs for within the TI Zone. The ARARs are applicable outside of the TI Zone. Table G-1 compares chemical-specific ARARs from the ROD Amendment to 2017 MCLs.

Table G-1: Groundwater ARARs Review

COC	ROD and ROD Amendment Cleanup Goal (mg/L)[a]	2017 Standards (mg/L)[b]	Change
1,1-Dichloroethane[c]	NA	NA	NA
1,1-Dichloroethene	0.007	0.007	No change
1,2-Dichloroethane	0.005	0.005	No change
Benzene	0.005	0.005	No change
Carbon Tetrachloride	0.005	0.005	No change
Chloroform[c]	0.08	0.08	No change
Cis-1,2-Dichloroethene	0.07	0.07	No change
Methylene Chloride	0.005	0.005	No change
Tertiary-Butyl-Alchohol[d]	NA	NA	NA
Tetrachloroethene	0.005	0.005	No change
Trans-1,2-Dichloroethene	0.1	0.1	No change
Trichloroethene	0.005	0.005	No change
Vinyl Chloride	0.002	0.002	No change

Notes:

a. Table 1 of the 2014 ROD Amendment.

b. Federal Safe Drinking Water Act MCLs are available at: http://www.epa.gov/safewater/contaminants/index.html (accessed 9/20/2016).

c. There is no specific MCL for chloroform; however, MCL for TTHM from National Primary Drinking Water Regulations is 0.08 mg/L is used and information is available at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#Byproducts

d. Note that these values are based on the TRRP PCL Values. TRRP PCLs will not apply within the TI Zone. All areas outside the TI Zone, must meet location, chemical, and action-specific ARARs for specific constituents in the ground water, and other criteria, advisory, and guidelines. The TRRP Tier I Ground Water Residential PCLs also must not be exceeded outside the TI Zone.

mg/L = milligrams per liter

Sludges and Soils

The 1998 ROD indicated remedial goals for cleanup of sludges and soils. Table G-2 compares ROD cleanup goals to current residential regional screening levels (RSLs). As shown in Table G-2, the cleanup goals for benzo(a)pyrene and VOCs slightly exceeds EPA's acceptable cancer risk range of 1×10^{-4} to 1×10^{-6}.

Table G-2: Soil Regional Screening Level Evaluation

COC	1988 ROD Remedial Goal[a] (mg/kg)	EPA Residential RSL[b] (mg/kg)		Residential Risk Level	
		1×10^{-6} Risk	HQ = 1	Cancer Risk[c]	Noncancer HQ[d]
Sludges and Soils					
Benzo(a)pyrene	9	0.016	--	5.6×10^{-4}	--
PCBs[e]	23	0.23	--	1×10^{-4}	--
VOCs[f]	43	0.059	70	1.3×10^{-4}	0.6
Arsenic	7	0.68	35	1×10^{-4}	0.2
Benzene	14	1.2	82	1.2×10^{-5}	0.17

Notes:

a. Values correspond to a 1×10^{-5} excess lifetime cancer risk factor. Method and data for calculation taken from "Endangerment Assessment for French Limited Site," CH2M Hill, April 1987 (Table 3 in the 1988 ROD).

b. Current RSLs, dated May 2016, are available at http://www.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 10/3/2016).

c. Cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1×10^{-6} risk:

Cancer risk = (remedial goal ÷ cancer RSL) × 10^{-6}

d. The noncancer HQ was calculated using the following equation:

HQ = (remedial goal ÷ noncancer RSL)

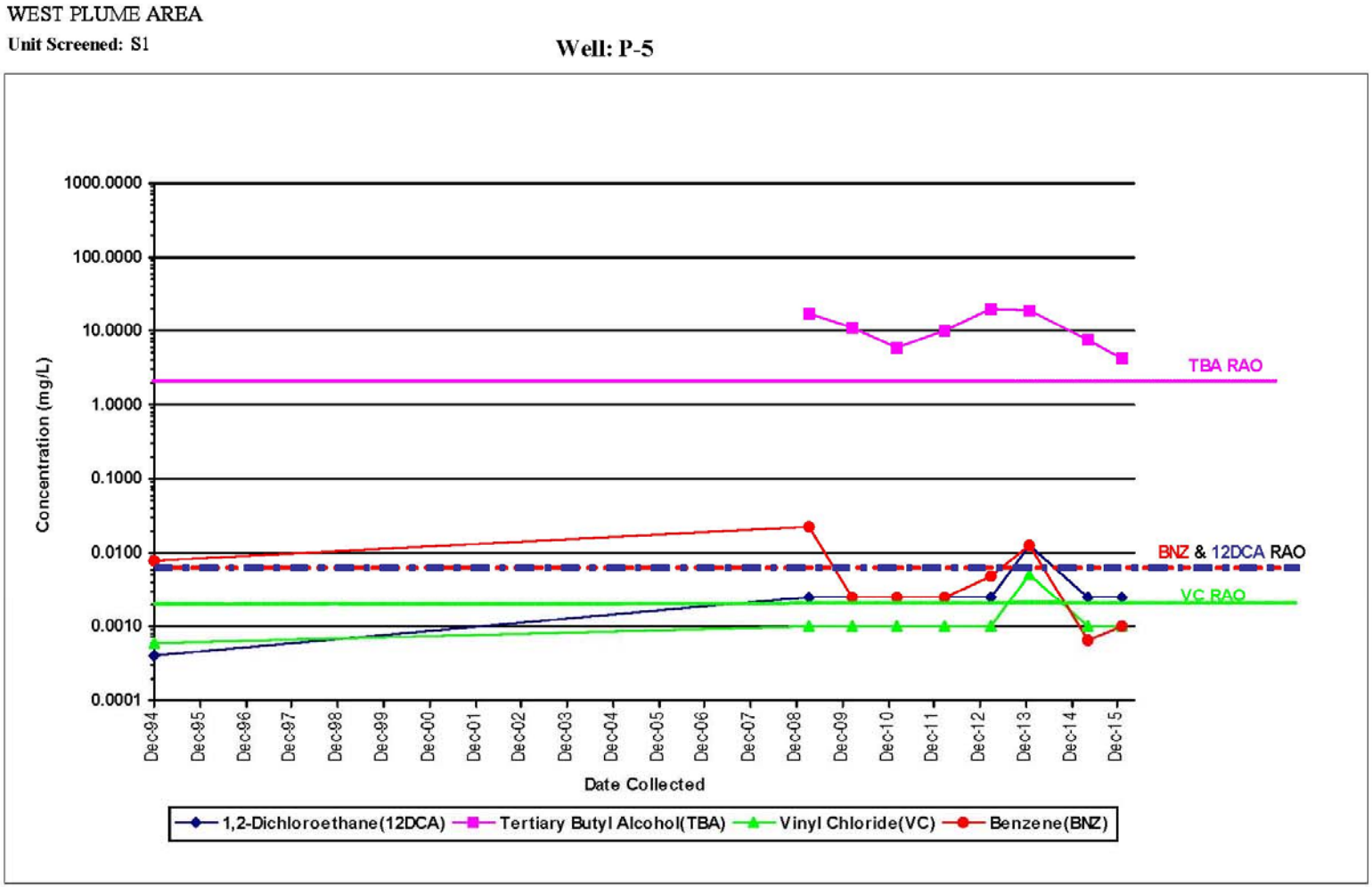
e. High Risk PCB value used as proxy for cleanup goal.

f. Vinyl chloride used as a proxy for the VOC cleanup goal because it is the most toxic of the chlorinated solvents found in site groundwater.

HQ = hazard quotient
mg/kg = milligrams per kilogram

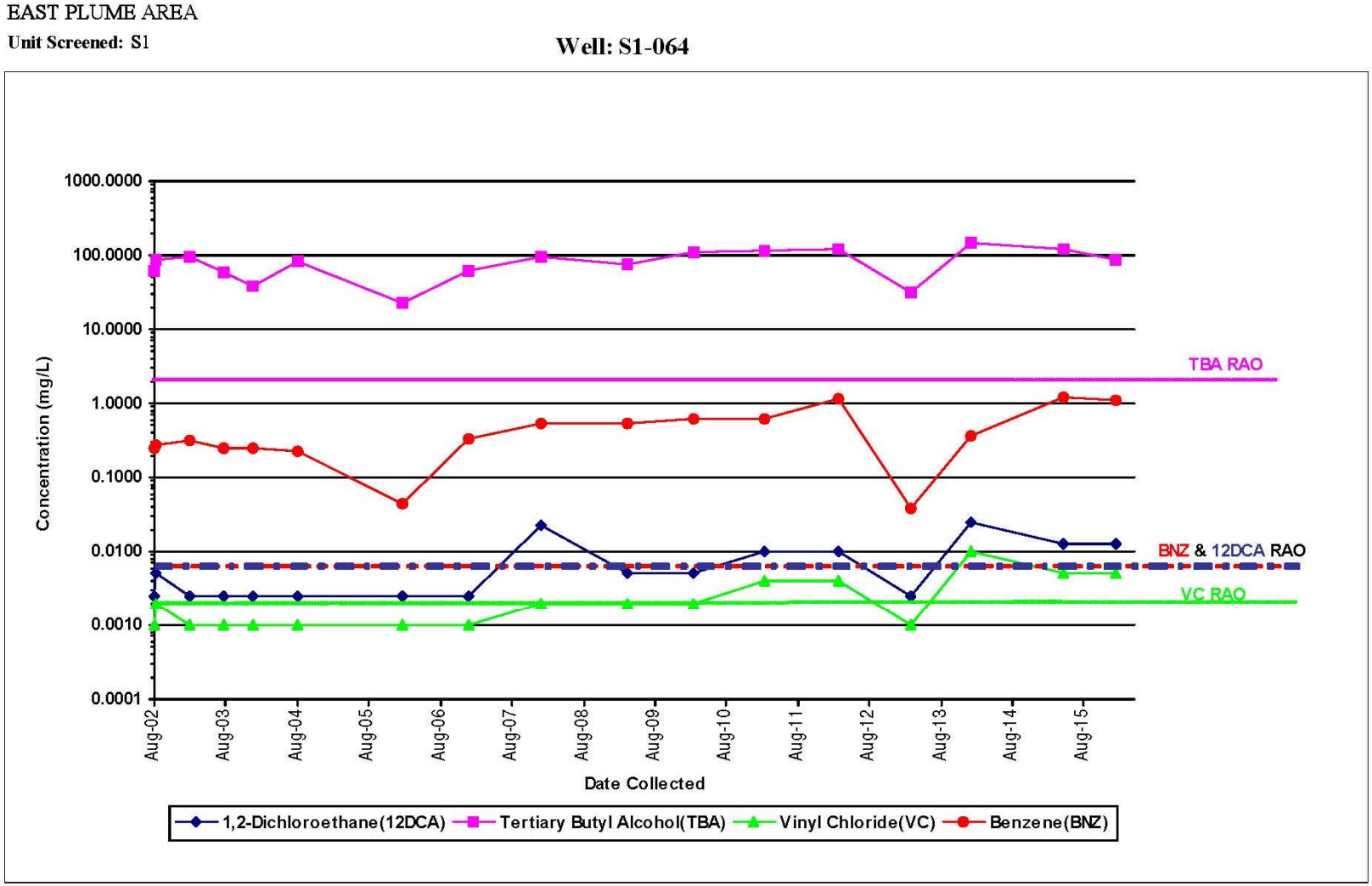
APPENDIX H – GROUNDWATER PROGRESS GRAPHS

Figure H-1: Select COCs in Well P-5 Over Time[3]



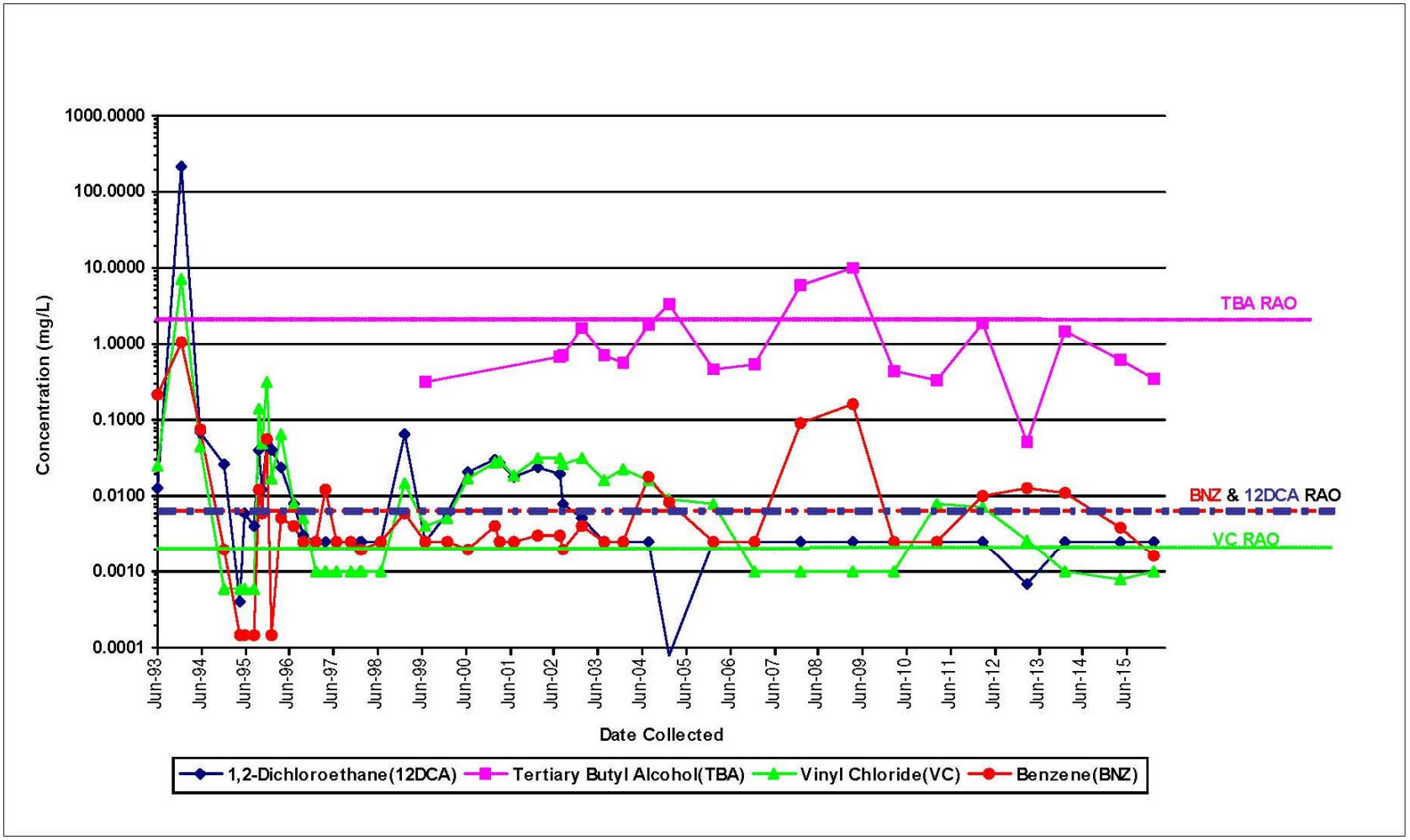
[3] 2016 Annual Ground Water Monitoring Report

Figure H-2: Select COCs in Well S1-064 Over Time[4]



[4] 2016 Annual Ground Water Monitoring Report

Figure H-3: Select COCs in Well SI-121 Over Time[5]



[5] 2016 Annual Ground Water Monitoring Report

APPENDIX I – INTERVIEW FORMS

French Limited Superfund Site **Five-Year Review Interview Form**

Site Name: French Limited **EPA ID No.:** TXD980514814

Subject Name: Paul Taylor **Affiliation:** FLTG, Inc. (Chairman)

Date: 01/11/2017

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: Potentially Responsible Parties (PRPs)

Do you give permission for the following to be included in the Five-Year Review Report and appendices, which becomes a public document (please initial) PJT

a. Your name? Yes PJT No_____

b. Your affiliation? Yes PJT No_____

c. Your responses? Yes PJT No_____

1. What is your overall impression of the remedial activities at the Site?
   I believe the FLTG is operating the O&M phase of the original remedy as required by the original Consent Decree in a timely and cost-effective manner.
2. What have been the effects of this Site on the surrounding community, if any?
   To date, I am not aware of any effects of the Site on the surrounding community.
3. What is your assessment of the current performance of the remedy in place at the Site?
   The original remedy that is in place today is (and has been) stable and controlled by natural processes.
4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?
   I am not aware of any complaints or inquiries from nearby residents concerning our activities on the implementation of the remedy.
5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?
   I believe that we have a good working relationship with the EPA RPM and that if Raji Josiam has new information and/or questions, she will contact me and ERM.
6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
   The FLTG is continuing to operate the original remedy put in place over 25 years ago. We continue to wait for approval from EPA to implement the new TI Waiver Demonstration approved by the Agencies at the Site.

French Limited Superfund Site **Five-Year Review Interview Form**

Site Name: French Limited **EPA ID No.:** TXD980514814

Subject Name: Marilyn Czimer Long **Affiliation:** TCEQ
Date: 01/17/2017

Interview Format (circle one): In Person Phone Mail Other: Email

Interview Category: State Agency

Do you give permission for the following to be included in the Five-Year Review Report and appendices, which becomes a public document (please initial) _____
a. Your name? Yes mcl No_____
b. Your affiliation? Yes mcl No_____
c. Your responses? Yes mcl No _____

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   In general, the project has been acceptable. The French Limited Task Group (FLTG), U.S. Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) have maintained good communication/coordination since the previous Five Year Review (FYR), the Proposed Plan and public meeting, Record of Decision (ROD) Amendment, and current Site tasks/phases. Implementation of Remedial Action (RA), in support of the ROD Amendment, is pending the final Consent Decree (CD). In the interim, FLTG has continued to conduct the annual groundwater sampling events and Operation & Maintenance (O&M) tasks (as appropriate).

2. What is your assessment of the current performance of the remedy in place at the Site?

   As stated in Comment #1 (above), the FLTG has continued to conduct groundwater sampling events and O&M tasks (as appropriate) pending the final CD.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   To my knowledge, the TCEQ has not received any notice(s) of comments/inquiries regarding site-related environmental issues. During the Proposed Plan public meeting (August 4, 2014) some residents did have questions about the site, site status, and groundwater. The TCEQ submitted comments to the EPA during the Proposed Plan public comment period (TCEQ letter dated 9/5/2014), and submitted comments/suggested edits to the EPA regarding the draft ROD Amendment (TCEQ email dated 9/15/2014).

4. Has your office conducted any site-related activities or communications in the past five years? *Yes.* If so, please describe the purpose and results of these activities.

I have visited the site and met with the previous EPA Remedial Project Manager (RPM) and FLTG representatives (i.e., site visits & Fourth Five Year Review) and the current EPA RPM and FLTG representatives on several occasions (site visit & the Fifth Five Year Review Site inspection conducted on November 2, 2016).

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

   To my knowledge there have not been changes to state law(s) that might affect the protectiveness of the Site's remedy. Note: The remedy, as specified in the ROD Amendment, is pending the final CD.

6. Are you comfortable with the status of the institutional controls at the Site?

   *Noncommittal at this time. An Institutional Control Plan (ICP), dated July 2, 2013 had been approved (*Note below). However, a revised ICP is pending, subsequent to the ROD Amendment and the final CD.*

   **Note: As stated in the ROD Amendment Responsiveness Summary (excerpts from the EPA Response): "The French Limited Task Group (FLTG) has prepared a revised ICP dated July 2, 2013, and the EPA, after consultation with the TCEQ, had approved this ICP."*
   "Once the ROD Amendment is approved by the EPA there will be a need for the approved ICP to be amended/revised...."

7. Are you aware of any changes in projected land use(s) at the Site?

   Yes. Since the Fourth Five Year Review (signed 8/20/2012), a tract of land located to the west/southwest of the Site was sold and a sand mining operation is active.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   O&M tasks are being conducted by the FLTG. As previously stated in Comment #1 (above), implementation of the selected remedy, as specified in the ROD Amendment (dated 9/2014), has not been initiated due to the pending final CD.

French Limited Superfund Site **Five-Year Review Interview Form**

Site Name: **French Limited** **EPA ID No.:** **TXD980514814**

Subject Name: **Paul Stefan** **Affiliation:** **Principal Partner for Environmental Resources Management (ERM), Consultant for FLTG, Inc.**

Date: **1/19/2017**

Interview Format (circle one): **In Person** **Phone** **Mail** **Other: EMAIL**

Interview Category: **O&M Contractor**

Do you give permission for the following to be included in the Five-Year Review Report and appendices, which becomes a public document (please initial) ___ERM_____
a. Your name? Yes __ERM_ No_____
b. Your affiliation? Yes __ERM_ No_____
c. Your responses? Yes __ERM_ No _____

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   The French Limited Site project is continuing in the remedy performance monitoring phase of the project. As such, the cleanup and reuse activities have already been performed long ago. The nature of the remedy is such that maintenance activities are relatively minor and the FLTG performs the groundwater monitoring, reporting, and maintenance activities in a manner that is consistent with the 1988 ROD, Consent Decree (CD) and subsequent agency correspondence. No gaps are apparent.

2. What is your assessment of the current performance of the remedy in place at the Site?

   The current remedy has been deemed protective of human health and the environment by the USEPA and TCEQ (together, the Agencies). ERM concurs with the Agencies' assessment.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

   The ground water monitoring results continue to demonstrate stable to decreasing concentrations for constituents of concern (COCs) in ground water. Some temporal fluctuations in COC concentrations are apparent within the historical range of values. No significant evidence of migration is apparent in the available data since the last Five Year Review.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

   The long-term remedy requires no continuous O&M presence at the Site. Triannual inspections are conducted typically in March, July and November of each year. ERM Staff have remained generally consistent since 2006 and administer the observation and reporting requirements regarding site security, well integrity, and the potential for vandalism and

trespass. The signage at the Site provides local residents and public safety officers the contact information for FLTG representatives, should incidents occur at the Site.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

   There have been no significant changes to the O&M regiment in the past five years.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

   No unexpected O&M difficulties have arisen. In the past five years, vehicle accidents along Gulf Pump Road or fallen trees from weather events have caused damage to the security fencing and/or gates. FLTG has responded with the necessary repairs to the Site infrastructure in a timely manner.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

   Yes. The optimization of O&M activities will be realized upon the implementation of the 2015 ROD Amendment following the Agency's completion of the CD. Cost savings will be estimated at that time once the full scope of the approval is understood.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

   None at this time. The FLTG directs the O&M activities at the Site in a manner that continues to be protective of human health and the environment.

French Limited Superfund Site — Five-Year Review Interview Form

Site Name: **French Limited** **EPA ID No.:** **TXD980514814**

Subject Name: **Bob Allen** **Affiliation:** **Harris County Pollution Control Services**

Date: **1/23/2017**

Interview Format (circle one): **In Person** **Phone** **Mail** **Other: Email**

Interview Category: **Local Government**

Do you give permission for the following to be included in the Five-Year Review Report and appendices, which becomes a public document (please initial) _____
a. Your name? Yes __x___ No_____
b. Your affiliation? Yes _x____ No_____
c. Your responses? Yes _x____ No _____

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   We are aware of the former environmental issues at the site. However we are not aware of recent cleanup activities.

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

   No. PCS files contain old and minimal information about the site. PCS has not received any updates about the site since the amendment to the proposed plan in 2014. The latest annual groundwater monitoring report posted on the EPA's website is from 2013. PCS is unaware of the current status of groundwater contamination on site and if the contamination possibly impacts nearby residential properties. The EPA can convey site-related information by sending updates via email or mail outs, hosting public meetings, and by postings information on the EPA's website and at the local repository.

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   PCS has not received reports or complaints of unusual or unexpected activities at the Site.

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy?

   No.

5. Are you aware of any changes in projected land use(s) at the Site?

   No.

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   PCS is unsure how well involved parties and surrounding neighbors have been kept informed of activities at the Site. The latest Fact Sheet about the site was published in 2014. No recent updates have

been posted since. The EPA can convey site-related information by sending updates via email or mail outs, hosting public meetings, and by postings information on the EPA's website.

7. Do you have any comments, suggestions or recommendations regarding the project?

PCS has the following recommendations:

- **The 2012 Five Year Review states that 6 wells, RD-1 through RD-6, located in the Riverdale Subdivision were converted into site monitoring wells and were owned by French Limited Task Group. It appears that this information was inaccurate and that the actual status of those wells is unknown. The 2012 report recommended that the status of those wells be verified to determine location, ownership, and condition. PCS could not find documentation indicating that this recommendation was executed. PCS recommends that the EPA ensure that these wells are verified and that routine sampling of nearby residential drinking water wells be conducted.**

- **The annual groundwater reports should be posted online and at the local repository.**

- **The EPA should look into new groundwater remediation alternatives that will effectively remediate the contaminated groundwater.**

- **The EPA should make the public aware that a 5-Year Review is being conducted. Once the 5-Year Review is complete, the EPA should share the issues and recommendations with the public.**

- **EPA should send site updates, at least annually, to local governments, involved parties, and the public.**