

**Second Five-Year Review Report  
for the French Limited Superfund Site**

**Crosby, Harris County, Texas**

**February 2002**

**EPA ID #TXD 980514814**

**Prepared By:**

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**Region 6**

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<b>Five-Year Review Summary Form</b>		
<b>SITE IDENTIFICATION</b>		
<b>Site name (from WasteLAN):</b> French Limited Site		
<b>EPA ID (from WasteLAN):</b>		
<b>Region:</b> EPA Region 6	<b>State:</b> TX	<b>City/County:</b> Crosby/Harris County
<b>SITE STATUS</b>		
<b>NPL Status:</b> <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify):		
<b>Remediation status (choose all that apply):</b> <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
<b>Multiple OUs?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>Construction completion date:</b> 1995	
<b>Has site been put into reuse?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<b>REVIEW STATUS</b>		
<b>Reviewing agency:</b> <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency:		
<b>Author:</b> Ernest Franke		
<b>Review period:</b> January 1995 to January 2001		
<b>Date(s) of site inspection:</b> Yearly		
<b>Type of review:</b> <input checked="" type="checkbox"/> Statutory <div style="margin-left: 40px;"><input type="checkbox"/> Policy</div> <div style="margin-left: 40px;"><input type="checkbox"/> Post-SARA    <input type="checkbox"/> Pre-SARA    <input type="checkbox"/> NPL-Removal only</div> <div style="margin-left: 40px;"><input type="checkbox"/> Non-NPL Remedial Action Site    <input type="checkbox"/> NPL State/Tribe-lead</div> <div style="margin-left: 40px;"><input type="checkbox"/> Regional Discretion</div>		
<b>Review number:</b> <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify):		
<b>Triggering action:</b>		
<input type="checkbox"/> Actual RA Onsite Construction at OU# _____ <input type="checkbox"/> Actual RA Start at OU# _____		
<input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Recommendation of Previous Five-Year Review Report		
<input type="checkbox"/> Other (specify):		
<b>Triggering action date (from WasteLAN):</b> December 1994		

**Due date (five years after triggering action date):** December 1999

### Five-Year Review Summary Form

**Deficiencies:**

- Localized areas in SI and INT units not currently achieving compliance and monitoring results indicate compliance standards may not be achieved within the remaining five-year monitoring period.
- The planting of trees within the sheet pile wall to lower the onsite ground water gradient on site has not been totally successful.

**Recommendations and Follow-up Actions:**

Based on the review of the groundwater monitoring data, several areas in both the SI and INT unit are not achieving compliance standards (Figure ES-1) and indications from the monitoring results to date show that compliance standards may not be achieved within the remaining five year monitoring period. The actions needed to help achieve compliance standards in these areas include the following:

- Continued groundwater monitoring of the site
- Additional source characterization in S1-123, INT-106, INT-130/130R, INT-26, INT-134, INT-135, INT-144, and INT-217
- Continued monitoring of the gradient inside and outside the sheet pile wall
- Initiate additional remedial actions as necessary to achieve compliance

**Protectiveness Statement(s):**

The remedy for Source Control at the French Limited Site is operating as designed and is protective of human health and the environment. The groundwater at the compliance boundary is not currently achieving compliance standards and based on groundwater monitoring data, there are areas that may not achieve compliance standards at the end of the monitoring period without the additional actions described in this Second Five-Year Review. The groundwater remedy is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

**Other Comments:** None.

## Executive Summary

The United States Environmental Protection Agency (EPA), Region 6 conducted a second five-year review of the remedial actions implemented at the French Limited Site in Crosby, Texas. The review was conducted in March 2000, and this report documents the results of the review and findings as follows:

- The Source Control remedy is currently protective of human and environmental health.
- Although not an immediate threat to human health or environment, portions of the SI and INT groundwater units may not meet compliance criteria at the end of the progress monitoring in 2005. Monitoring and further characterization of these areas is needed. Additional remedial actions may be necessary to achieve the compliance criteria.
- Measures implemented to direct the onsite groundwater gradient within the sheet pile wall have not been totally successful. Gradient is somewhat erratic and undefined based on recent water levels. The action recommended at this time is continued monitoring of the gradient inside and outside the sheet pile wall.

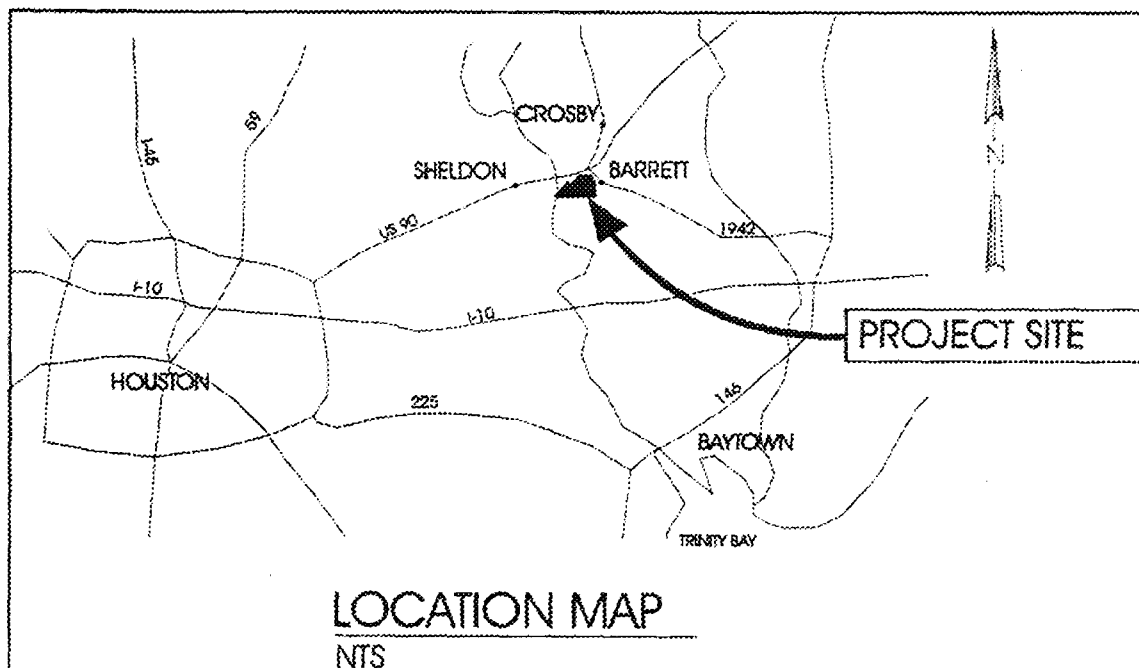
This report is based on the December 1999 draft guidance and the final Comprehensive Five-Year Review Guidance, date June 2001, and provides the following information:

- Site chronology and background
- Status of the remedial actions
- Data analysis of groundwater monitoring being performed at the site
- Discussion on the protectiveness of the remedial actions in place

Portions of this report contain data supplied by FLTG, Inc., and its contractors Applied Hydrology Associates, Inc., and Remedial Operations Group. FLTG and CH2M HILL, Inc., EPA's French Limited Site Oversight Contractor, contributed to the preparation of this report.

## I. Introduction

The United States Environmental Protection Agency (USEPA), Region 6 conducted a second five-year review of the remedial actions implemented at the French Limited Site in Crosby, Texas (see location map below). The review was conducted in February 2001, and this report documents the results of the review.



The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of the five-year review are documented in reports. The five-year review reports identify deficiencies, if any, found during the review and provide recommendations to address them.

EPA Region 6 conducted this five-year review pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9621(c); the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Code of Federal Regulations Title 40, Part 300.430(f)(4)(ii); and EPA's Office of Solid Waste and Emergency Response (OSWER) Directives 9355.7-02 (May 23, 1991), 9355.7-02A, and 9355.7-03A. A five-year review ensures that the remedial action remains protective of public health and the environment and is functional as designed. This review was required by statute because the remedial action selected results in hazardous substances, pollutants or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure.



This is the second five-year review for the French Limited Site. The triggering action for this statutory review was July 10, 1989 (as shown in EPA WasteLAN database). The first five-year review was completed in December, 1994.

This five-year review includes a summary of the following:

- Site Chronology
- Background
- Remedial Actions
- Five-Year Review Process and Findings
- Summary of Areas of Concern and Actions Needed
- Discussion on the protectiveness of the remedial actions in place

## II. Site Chronology

A site chronology, beginning with the operational years of the facility up to December 1994, is provided in the first five-year review report for the French Limited Site. The following events summarized in Table 1 have occurred since the first five-year review in 1994.

**TABLE 1**  
**Continuing Chronology of Site Events**

Event	Date
2nd Five-Year Review Period (1995-1999)	
Vegetation Plan Implemented	1995 - 1999
Monthly Groundwater Monitoring	January – December 1995
Lagoon Certification of Completion	May 1995
INT-11 DNAPL Area Cutoff Wall Installation and Permeability Certification Report	August 1995
Natural Attenuation Modeling Report	December 1995
Quarterly Groundwater Monitoring	January, April, July, October 1996
Site Remediation Report: Part B (Aquifer) Approval	March 1996
Active Aquifer Remediation Certification of Completion Approval	March 1996
Site Closure Plan Approval	March 1996
Final Close-Out Report	July 1996
Quarterly Groundwater Monitoring	January, April, July, October 1997
Natural Attenuation Modeling Progress Report	January 1997
Oxygen Addition and Focused Pumping Progress Update	July 1998
Semi-Annual Groundwater Monitoring	January, July 1998
Semi-Annual Groundwater Monitoring	January, July 1999

TABLE 1  
Continuing Chronology of Site Events

Event	Date
Semi-Annual Groundwater Monitoring Current	January, July 2000
Monitoring for Post Closure Requirements and Natural Attenuation Progress	1996 – 2005 (anticipated)
Semi-Annual Groundwater Monitoring 2 <sup>nd</sup> Five-Year Review Finalized	January, July 2000 February 2002

### III. Background

Site background information including physical characteristics of the site, land and resource use, history of contamination, initial response, and contaminants is included in the *First Five-Year Review* and the *Final Site Closure Plan*. The following is a brief summary of the site background.

#### Site History and Use

The French Limited Site is a 22.5-acre tract of land located adjacent to U.S. Highway 90 in eastern Harris County, Texas, about 20 miles northeast of Houston. The site is in the flood plain of the San Jacinto River. During the period of 1966 through 1971, the site was permitted by the State of Texas to accept industrial waste materials. Approximately 80 million gallons of liquid waste, generated by Houston area responsible parties, was disposed in the main waste lagoon creating 300,000 cubic yards of contaminated sludge and soils. Some neutralization was done in 1971 and 1972. The site was closed to receiving wastes in 1973.

#### Interim Corrective Actions Implemented

A flood event in 1982 caused the dike surrounding the waste pit to overtop and breach. Contaminated sludges overflowed into an adjacent slough. An Emergency Removal Action by the EPA during 1982 repaired the dike, and a majority of the discharged sludges were pumped back into the pit. In July 1983, the floating portion of the sludges was removed and disposed of by the EPA during a second interim Removal Action.

In January 1983, pursuant to a Cooperative Agreement with the EPA, the Texas Department of Water Resources (now the Texas Natural Resource Conservation Commission) contracted with Lockwood, Andrews & Newnam, Inc. (LAN) to conduct a Remedial Investigation (RI) at the site. The initial phase of the RI was performed in April 1983 to establish a database for site characterization and evaluation. A supplemental phase was performed in November 1983 to refine and expand the original database. The French Limited Task Group conducted a 1986 field investigation and produced a supplemental remedial investigation report pursuant

to an Administrative Order of Consent (AOC), and the results were used in the feasibility study and selection of the remedy.

### **Final Remedial Action Implemented**

The components of the selected remedy as defined in the 1988 Record of Decision were as follows:

- The primary component of the remedy for the French Limited Site was in-situ biological treatment of the sludges and contaminated soils in the lagoon onsite.
- The contaminated groundwater was recovered and treated during implementation of the in-situ biological treatment process. Groundwater recovery and treatment continued until modeling showed that a reduction in the concentration of volatile organics to a level which attains the  $10^{-6}$  Human Health Criteria could be achieved through natural attenuation in 10 years or less.
- Surface water from the lagoon was treated to meet the Texas surface water quality standards for the San Jacinto River Segment 1001.
- Residues generated from the treatment process were stabilized to prevent leachate generation and used as backfill in the lagoon. The remaining lagoon volume was backfilled with clean soil. The surface was then graded to promote drainage away from the site.
- The final component of the remedy involves post-closure monitoring of the upper and lower aquifers for a period of 30 years.

The EPA negotiated a Consent Decree with the French Limited Task Group, entered in March 1990, to conduct the remedy established in the 1988 ROD. Remedial construction at the French Limited Site was performed by FLTG, Inc., the potentially responsible party (PRP) group of 90 settling companies established to perform the remediation. The remedy included construction of three major facilities: Lagoon Floodwall, Lagoon Bioremediation facilities, and Aquifer Remediation facilities. Other incidental construction relating to the operation and maintenance of the system (i.e., additional groundwater wells and dense nonaqueous phase liquid [DNAPL] containment) also was performed.

Major construction occurred during 1989. Incidental construction, additional wells, and maintenance upgrades were constructed on an as-needed basis until complete in December 1995. Active remediation took place from 1991 to 1995. The contaminated groundwater was recovered and treated in an aboveground, biological treatment facility.

FLTG enhanced the aquifer and groundwater remediation with injections of oxygen and nutrients to stimulate subsurface in situ biological treatment processes. Active groundwater recovery and treatment operations continued until computer modeling showed aquifer remediation goals could be met through natural attenuation within 10 years after system shut off in 1995. Aquifer remediation goals were Maximum Concentration Levels (MCLs) or  $1 \times 10^{-6}$  Human Health Criteria at the site boundary.

## IV. Remedial Actions

This section summarizes the status of the remedial actions since the last review and discusses the intended future progress of the action. Information on previous remedial actions at the French Site is provided in the first five-year review. Completion of implementation of the remedial action, system operations and maintenance, and the progress since the last review is provided below.

### Summary of Actions During Period of Second Five-Year Review

The completion of the Source Control remediation is documented in the Site Remediation Summary Report: Part A, Lagoon Remediation Verification, dated May 1995. During active remediation, the contaminated groundwater at the site was recovered and treated in an aboveground, biological treatment facility. In 1995, the groundwater remediation system was shut off based on modeling that predicted aquifer remediation goals could be met through natural attenuation in 10 years. The *Natural Attenuation Modeling Report* details the basis for this decision. The completion of the active aquifer remediation is documented in the Site Remediation Summary Report: Part B, Aquifer Verification, March 1996. In conjunction with the shutdown of the remediation system, many wells that were part of the active remediation system and remediation system monitoring were abandoned as part of the *Final Site Closure Plan*. This reduced the number of progress monitoring wells and compliance wells being used for monitored natural attenuation. These wells are shown in Figure ES-1.

From 1995 to the present, activities that were described for in the *Final Site Closure Plan* were implemented. These include dismantling of site buildings, implementing the vegetation monitoring plan, and securing the area with fence. These activities are described below, and details are provided in the *Final Site Closure Plan*.

In 1989, a sheet pile wall was constructed around the lagoon in response to flooding. During the review period, the sheet pile wall was cut off below grade, and the underground portion of the wall was left in place. The purpose of cutting the wall was to provide a barrier to keep contaminants remaining in the lagoon from migrating outside the wall. The removed portion of the wall was disposed in Cell D.

Building and treatment appurtenances were decontaminated as necessary and either sold or disposed of onsite in the waste cells. The site has been completely fenced in with chain-link topped with barbed wire.

Trees of the phreatophyte family were planted within the area encompassed by the sheet pile wall during 1995 and continued to be maintained throughout the review period. Additionally, native grasses were planted in backfilled soil on Cells A, B, E, and F. The purpose of the vegetation is to restore the lagoon surface to the natural state that existed prior to sand-mining activity at the site and to establish a gradient control. The plants are thriving and are contributing to the goal of restoring the natural state of the lagoon area. Conclusions on the effectiveness of the vegetation as a gradient control are undetermined at this point.

Beaver activity (dam and nest building) in the South Pond results in higher water levels, and changes to groundwater flow patterns have occurred over the past year. The changes in groundwater flow patterns do not appear to have an adverse impact on natural attenuation.

Based on a review of the progress monitoring results, several areas were selected for a focused oxygen addition program. The purpose of the oxygen addition program was to enhance passive remediation through natural attenuation by adding supplemental oxygen at select locations. Fourteen progress monitoring wells were selected in the SI and INT groundwater units for the oxygen addition and focused pumping program (see Figures 1 and 2). The oxygen addition program ran from March 16 through June 8, 1998. Oxygen volumes of 1,500 standard cubic feet (scf) per phase were achieved at most wells. Six phases of oxygen addition were performed. Six rounds of focused pumping were also completed in conjunction with the oxygen addition. The focused pumping ran through July 2, 1998. Dissolved oxygen was monitored during the pumping and indicated the general spread of oxygen outward from the oxygen addition wells to help enhance the natural attenuation progress. The program has been viewed as marginally successful.

### **Current Status of Remedial Action**

As indicated in Section III, construction was completed for the remedial action as of December 1995. Currently, FLTG is in the process of monitoring selected wells (defined in the *Final Site Closure Plan*) at the site. Certification of completion of aquifer remediation was originally expected in 2006, and long-term compliance monitoring was originally expected to begin in 2006, continuing through 2026.

The post-closure monitoring described in the *Final Site Closure Plan* consists of 10 years of progress monitoring and 20 years of compliance monitoring. During the progress monitoring, 13 wells in the SI unit and 18 wells in the INT unit are being sampled and analyzed to evaluate natural attenuation progress. Sampling events have taken place monthly during 1995, quarterly during 1996 - 1997, and twice-annually 1998 through 2000. In addition, several wells have monitored the gradient inside and outside of the lagoon sheet-pile wall. The gradient is a potential concern because the lack of an inward gradient could reduce the effectiveness of the remedial action by enabling contaminant migration through the sheet pile wall.

DNAPLs remain beneath the remediated lagoon. A small area of DNAPL residue

exists between the site and Gulf Pump Road, but has been successfully contained by the lagoon sheet pile wall and the INT-11 containment wall. The INT-11 containment wall was established in 1995.

### System Operations/Operation and Maintenance

Regular maintenance and operation of the remedial system has been on-going from 1995 through 2000. In general, operations and maintenance has been conducted according to the *Final Site Closure Plan*. In 1998, supplemental oxygen was added to focused areas, and is described in the section above. Actual O&M costs are presented in Table 2.

TABLE 2

Annual System O&M Costs

Year	Total Cost Rounded to Nearest \$1000	
	Budgeted	Actual
1995	250,000	240,000
1996	220,000	235,000
1997	210,000	187,000
1998	120,000	430,000*
1999	120,000	108,000

\*Includes focused oxygen addition effort that was not previously budgeted.

## V. Progress Since the Last Five-Year Review

The *First Five-Year Review*, submitted in 1994, concluded that significant progress had been achieved in meeting the remedial objectives of the record of decision (ROD), as summarized below:

- All major remedial facilities are operating in accordance with approved procedures and controls.
- Lagoon was remediated to ROD clean-up criteria.
- Air emissions during bioremediation of lagoon were negligible.
- Mobile DNAPL remaining beneath the remediated lagoon and non-mobile DNAPL between the site and Gulf Pump Road has been successfully contained.
- Offsite migration of contaminated groundwater is being adequately controlled.
- Significant reductions in groundwater contamination were achieved.

Recommendations and follow-up actions presented in the *First Five-Year Review* were as follows:

- Implementation of institutional controls
- Monitor lower aquifer and sheet-pile wall for DNAPL breakthrough

- Monitor residential wells in Riverdale subdivision
- Continue aquifer remediation operations

Most follow-up actions have been implemented and some are ongoing. The lagoon area is completely fenced, and the FLTG has control of properties where groundwater is exceeding compliance standards. Public access is restricted in these areas. During 1996, the lower aquifer was monitored and the sheet pile wall assessed for potential DNAPL breakthrough. It was determined that the sheet-pile wall was successfully inhibiting any DNAPL breakthrough from occurring. A wall assessment was also completed in October 2000 and showed the sheet pile wall was continuing to successfully inhibit DNAPL breakthrough to occur.

The potential for exposure of Riverdale residents has been reduced by aquifer remediation and installation of a new deep potable water well. The previous Riverdale drinking wells have been converted to monitoring wells, and land that the wells were located on has been purchased.

As discussed in this document, aquifer remediation operations are continuing to be monitored. Results of the monitoring are presented in the following section.

In addition to implementation of the recommended actions from the five-year review, the following activities have also taken place since the last review. These activities are discussed in the previous section:

- Sheet pile wall was cut off a few feet below the ground surface, building and treatment appurtenances were removed and site was fenced in.
- Trees (phreatophytes) were planted within area encompassed by confining wall for purposes of gradient control.
- Many wells that were part of active remediation system and remediation system monitoring were abandoned.
- Original 1995 natural attenuation models were revised, and the Oxygen Injection Program was implemented.
- Beaver activity in South Pond resulted in higher water levels and changes to groundwater flow patterns.

## **VI. Five-Year Review Process and Findings**

This section summarizes the overall review process including activities that involve the community and the tasks completed to conduct the review process.

### **Document Review**

To complete the second five-year review, the following site documents were reviewed:

- *First Five-Year Review (Type Ia)*, French Limited Site, December 1994

- *INT-11 DNAPL Area Cutoff Wall Installation and Permeability Certification Report, August 1995*
- *Natural Attenuation Modeling Report, December 1995*
- *Final Site Closure Plan, French Limited Project, January 1996*
- *Remediation Summary Report: Part B, Active Aquifer Remediation Verification, March 1996*
- *Superfund Site Close Out Report, July 1996*
- *Oxygen Addition and Focused Pumping Progress Update, July 1998*
- *French Limited Site Groundwater Sampling Report for 1999/2000, February 2000 (July, 1999; January 2000)*
- *French Limited Groundwater Monitoring Database (1992 - 1999).*
- *French Limited Site Groundwater Monitoring and Remedial Progress Report, 2<sup>nd</sup> Half, 2000, November 2000.*

Results and conclusions of these reports have been integrated in this document.

## **Groundwater Monitoring Review**

Groundwater monitoring data collected from 1992 to 1999 was reviewed to determine if the implemented remedial action and the progress of natural attenuation will likely lead to achieving the EPA Drinking Water Standards or  $1 \times 10^{-6}$  Human Health Risk criteria in 2006. Selected indicator compounds were reviewed to evaluate the natural attenuation progress. The indicator compounds are: benzene, nitrate, dissolved oxygen, total organic carbon, vinyl chloride, and 1, 2 dichloroethane (DCA). A site plan showing the location of current wells is shown in Figure ES-1, and water levels with inferred flow for the SI and INT units are shown in Figures 4 and 5. Isopleth contours for the indicator parameters above are shown in Figures 6 through 15. Representative results for wells achieving and not achieving compliance with the prescribed standards are discussed below, and are presented in Figures 16 through 25. The wells presented were chosen to demonstrate both areas where the remedial action appears to be achieving the intended objectives and areas that may be of concern.

In general, several wells (FLTG-013, FLTG-014, INT-022, INT-059-P-2, INT-060-P-3, INT-108, INT-118, INT-144, INT-214, S1-031, S1-033, SI-051-P-3, S1-108A, S1-111, and S1-135) indicate that standards are being consistently met on a regular basis. The remainder of the wells are potential areas of concern due to rebounding or no consistent decrease in concentration occurring over the last year. Wells occurring south of the Former French Lagoon and wells occurring west of the Former Harris Co. Landfill appear to be areas of concern. Examples of wells exhibiting both compliant and non-compliant characteristics are presented in Figures 16 through 25. The following is a discussion of those examples.

## **Groundwater Monitoring Review - Areas of Concern**

Wells INT-130R/RS and S1-123 are of primary concern in achieving compliance. Both wells occur south of the sheet pile wall and are in low gradient areas (see Figures 4, 5, 16, and 17).



These wells occur in an area that exhibits higher contaminant concentrations (see Figures 8 through 15). Well INT-130R/RS has experienced erratic levels of benzene, vinyl chloride, and particularly erratic levels for 1,2-DCA. A 1,2-DCA rebound occurred in 1998, and a recent decrease in concentration shown in December 1999 will require confirmation from future sampling (see Figure 16). Well S1-123 has also experienced rebound of 1,2-DCA and has exhibited erratic vinyl chloride levels since 1998. The apparent rebound for both 1,2-DCA and vinyl chloride will require additional evaluation and confirmation in future sampling.

In the vicinity of wells INT-130R/S and S1-123, wells INT-106 and INT-127 also demonstrate erratic contaminant level patterns. INT-106, south and upgradient of INT-130R/RS and S1-123, shows a rebound in benzene and 1,2-DCA levels as well as somewhat erratic vinyl chloride levels (see Figure 18). INT-127, west and also upgradient of INT-130R/RS and INT-127, shows erratic benzene levels. The apparent decrease exhibited in December 1999 for benzene in well INT-127 will need to be confirmed in subsequent sampling and evaluated (see Figure 19).

On the western side of the site, near the Former Harris Co. Landfill, INT-217 and INT-134 are exhibiting erratic benzene and vinyl chloride levels (see Figures 20 and 21). Well INT-134 is downgradient of well INT-217. The results from Wells INT-217 and INT-134 indicate significant decreases in benzene and vinyl chloride from 1999 to 2001. These results indicate the benzene standard should be achieved, but that cleanup standards may not be achieved for vinyl chloride, which currently are at 16ppb and 37ppb, respectively. The MCL cleanup level is 2.0 ppb for vinyl chloride; therefore, in the remaining period of compliance monitoring additional remedial actions could be required.

Other than high levels of total organic carbon throughout the portion of the site southwest of the sheet pile wall, it does not appear that upgradient wells INT-147 and INT-101 are exhibiting similar contamination level patterns (see Figure 8). Additionally, water level measurements (see Figures 4 and 5) indicate that water levels continue to fluctuate and that activities conducted to enhance gradient flow towards the sheet pile wall and into the lagoon may not be totally successful. Activities included planting vegetation inside the sheet pile wall (see *Final Site Closure Plan* for detail). Potentially, the lack of an inward gradient could reduce the effectiveness of the remedial action by enabling contaminant migration through the sheet pile wall.

The groundwater monitoring results from July 2000 confirm the trends previously discussed.

## **Groundwater Monitoring Review - Areas of Compliance**

Wells demonstrating compliance have exhibited slight increases in indicator parameter levels starting in 1995. In general, with the exception of the wells listed above, most wells are either demonstrating compliance with the standard or appear to be reaching compliance levels. This minimal increase has occurred after wells exhibited very low contaminant levels in 1992 through 1995 during the active pump and treat period. The one-time increase is on the order of less than 10 parts per billion (ppb) and is consistent with the conclusion of the pump and treat activity in 1995. Since slight increases occurred in 1995, the contaminant levels have remained steady. Well INT-108 is an example of a well that has consistently been

at less than 5 ppb for all indicator parameters since 1994 (see Figure 25). Well INT-108 is south of the sheet pile wall, approximately in the middle of the area but outside the wall, and relatively in the middle of the entire site. It exists on the edge of an area where the clay layer is absent. Table 3 provides a summary of representative wells.

TABLE 3  
Summary of Representative Wells

Location	Description
INT-130R/RS	Erratic benzene, 1,2-DCA, and vinyl chloride levels; sharp rebound occurring in 1998 for these compounds; area will be evaluated to define extent of potential residual and containment options evaluated.
S1-123	Rebound in 1,2-DCA levels, erratic vinyl chloride levels; area will be evaluated to define extent of potential residual and containment options evaluated.
INT-106	Rebound in benzene and 1,2-DCA levels, somewhat erratic vinyl chloride levels.
INT-127	Erratic benzene levels; apparent decrease will need to be confirmed in subsequent sampling.
INT-217	Erratic benzene and vinyl chloride levels; apparent decrease will need to be confirmed in subsequent sampling.
INT-134	Erratic benzene and vinyl chloride levels; apparent decrease will need to be confirmed in subsequent sampling.
INT-108	Marked decrease in benzene in 1993, and continued non-detection of contaminants since 1995.
INT-022	Slight increase in 1,2-DCA since 1998, but overall contaminants are all <10 ppb, and have stayed relatively stable since 1995.
FLTG-014	Slight increases in indicator parameters since 1995, but overall contaminants are all <10 ppb
INT-214	Slight increase in 1,2-DCA since 1998, but overall contaminants are all <10 ppb, and have stayed relatively stable since 1995.

## Community Involvement Activities

Community involvement activities have taken place several times per year since 1995. Activities included regular status reviews at the Crosby Chamber of Commerce and project reviews with other interested parties, site tours of the facility for schools and universities, and involvement in local environmental volunteer activities. Additionally, FLTG has updated repositories four times per year with current project information. Table 4 summarizes public involvement activities from 1995 through 2000:

Table 4  
Community Activities - 1995 through 2000

Date	Event
Feb-95	Status review; Crosby Chamber of Commerce
May-95	Status review; Crosby school administrators
Aug-95	Project review; local realtor's group
Nov-95	Status review; Crosby Chamber of Commerce
Mar-96	Status review; Channelview science teachers
Apr-96	Project review; Baytown nature center task force
Jun-96	Support beach shoreline cleanup

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Sep-96	Status review; Crosby Chamber of Commerce
Dec-96	Coordinate Baytown nature center fund raising program
Mar-97	French site tour and wetlands tour for Rice University students
Jun-97	Status review; local Crosby business group
Sep-97	Support Crosby fair and rodeo
Dec-97	French site tour
Mar-98	Status review Crosby Chamber of Commerce
Jun-98	Project review with property owners
Oct-98	Support Baytown nature center development
Jan-99	Status review; Channelview citizens group
Apr-99	Status review; Crosby Chamber of Commerce
Aug-99	Site tour; graduate students

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## Site Inspections

Site inspections were held three times per week between January 1995 and December 1997, and two times per week between January 1998 and December 1999. The scope of the site inspections included monitoring for evidence of surface chemicals, site security and well security, vegetation status, adjacent activity that could impact the site, and site mowing every two months. In general, site inspections did not indicate any out of the ordinary observations or occurrences.

## Project Status Meetings

FLTG, Inc. project status meetings have occurred monthly during 1996, quarterly during 1997, biannually during 1998 and annually during 1999 and 2000. The purpose of the meetings was to keep stakeholders informed of monitoring results, community activities and site inspections. Through the project status meetings, the focused oxygen and pumping program was developed to help enhance passive remediation at specific SI and INT wells. Additional refinements to the monitoring program have been implemented through these status meetings.

## VII. Technical Assessment

The technical assessment section assesses the effectiveness of the remedy. The purpose of the assessment is to determine whether or not the remedy is, or is expected to be, protective of human health and the environment. This determination is intended to examine whether or not the remedy is achieving, or is expected to achieve, the Remedial Action Objectives stated in the ROD.

The determination of effectiveness is made by answering three key questions specified in EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007), June 2001:

- Question A** - Is the remedy functioning as intended by the decision documents?
- Question B** - Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?
- Question C** - Has any other information come to light that could call into question the protectiveness of the remedy?

The text in this section is structured around these three questions.

### **Question A - Is the Remedy Functioning As Intended By the Decision Documents?**

The Source Control remedy continues to function as designed and is currently protective of human health and the environment. The final component of the groundwater remedy involves post-closure monitoring of the upper and lower aquifers to assess the natural attenuation. Contaminant levels in site groundwater have decreased over time, indicating that natural attenuation is occurring on the site. The groundwater remedy is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed. Although not an immediate threat to human health or environment, portions of the SI and INT groundwater units may not meet compliance criteria at the end of the progress monitoring in 2005. Monitoring and further characterization of these areas is needed. Additional remedial actions may be necessary to achieve the compliance criteria.

Measures implemented to direct the onsite groundwater gradient within the sheet pile wall have not been totally successful. Gradient is somewhat erratic and undefined based on recent water levels. Continued monitoring of the gradient inside and outside the sheet pile wall is needed.

Potential for exposure of Riverdale residents has been reduced by aquifer remediation and installation of a new deep potable water well. The previous Riverdale drinking wells have been converted to monitoring wells, and land that the wells were located on has been purchased. The lagoon area is completely fenced, and the FLTG has control of properties where groundwater is exceeding compliance standards. The FLTG, Inc. is continuing efforts to purchase the property south of Gulf Pump Road so this property can be used for long-term institutional controls.

### **Question B - Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of Remedy Selection Still Valid?**

No changes in exposure pathways, toxicity, or other contaminant characteristics have occurred. The *Final Site Closure Plan* provides information on the site risk assessment.

EPA Drinking Water Standards for metals and volatile organic compounds are listed in the *Final Site Closure Plan*. Standards were compared to maximum contaminant levels promulgated under the safe Drinking Water Act as of February 2001. For compounds without a promulgated standard, TNRCC residential groundwater medium-specific concentrations were reviewed. In all cases, regulatory standards for the chemical parameters monitored at the French Site have not become more protective (lower allowable concentration levels) since the last review.

### **Question C - Has any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?**

No additional information has come to light that affects the protectiveness of the remedy.

## VIII. Issues

Two issues have been noted during the second Five-Year Review as follows:

- Localized areas in the SI and INT groundwater units are not currently achieving compliance and monitoring results, indicating compliance standards may not be achieved within the remaining period of compliance.
- Measures implemented to direct the onsite gradient within the sheet pile wall have not been totally successful.

## IX. Recommendations and Follow-up Actions

The purpose of this section is to summarize areas of concern in current site operations and to identify actions needed. Although none of these concerns are believed to be an immediate or short-term threat to human and environmental health, these concerns represent areas that may potentially result in the remedial action not being protective in the future. In general, the actions needed include continued monitoring, additional characterization, and implementing additional remedial actions as necessary. The areas of concern and actions needed are as follows:

TABLE 5  
Summary of Areas of Concern

Area of Concern	Actions Needed
Not achieving compliance standards in specific wells/areas (see previous section)	Continue monitoring areas on frequent basis  Conduct characterization at S1-123, INT-26, INT-106, INT-130/130R, INT-134, INT-135, INT-144, and INT-217.  Initiate additional remedial action as necessary
Undirected site groundwater gradient, gradient has not responded to measures to direct gradient towards lagoon	Continue monitoring areas on frequent basis

## X. Protectiveness Statements

The Source Control remedy at the French Limited Site is protective of human health and the environment. In general, with the exception of a few areas, contaminant levels in site groundwater have decreased over time, indicating that natural attenuation is occurring on the site. The groundwater remedy is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

## XI. Next Review

The next Five-Year Review is due February 2007.

## Five-Year Review - Interview Record

**SITE NAME:** French Limited Superfund Site

**LOCATION:** Harris County, Tx. **Individual Contacted:** Richard L. Sloan, Project Coordinator  
Lyondell, White House, 2502 Shelton Rd., Channelview, TX. 77530, (281) 862-5575

**EPA ID Number** TXD980514814 , **Date of Interview** March 8, 2001, **Interview Method:** E-Mail

**Document Preparation:** Name, Organization, telephone No.: Address, Method of this Interview : E-Mail by Ernest Franke, RPM  
Amy Lange: CH2M HILL, as rep of EPA: 303-771-0952, Extension 5254: 100 Inverness Terrace East, Engle Wood, CO  
[alange@ch2m.com](mailto:alange@ch2m.com) :

### Interview Questions

1. What is your overall impression of the project(general sentiment)

**Response:** The site has continued to protect the public health and environment and the local community is satisfied.

2. From your perspective, what effect has the site operations had on the surrounding community?

**Response:** Site is currently in the long term monitoring phase. Impact on community is minimal. Site remedies continue to protect local community health and the environment.

3. Are you aware of any community concerns regarding the site or its operations and administration? If so, please give details.

**Response:** No comments or concerns expressed by community in the last year.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

**Response:** No significant issues. All gates and wells are locked. Occasional repairs are required.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office, if applicable, regarding the site? If so, please describe purpose and results.

**Response:** The site is inspected at least twice per week to assure that project security is maintained. This is in addition to field activities relating to sampling events in the long term management plan. All reporting is in accordance to that agreed to with the agencies.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office, if applicable? If so, please give details of the events and results of the responses.

**Response:** No public complaints or incidents. Increase in the concentration of chlorinated chemicals at several monitoring wells have required focused response which is on-going.

7. Do you feel well-informed about the site's activities and status?

**Response:** Yes. Project activities and site status are reviewed at bi-weekly meetings with staff and technical personnel.

8. Have there been any changes in State laws and regulations that may impact the protectiveness of the ground water or soil remedies.? If so please address.

**Response:** Monitoring data indicates that the remedies continue to protect the public health and the environment.

9. Has the site been in compliance with permitting and reporting requirements?

**Response:** Yes. All requirements have been met.

10. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

**Response:** Site is continuing to evaluate options for previously mentioned increase in the concentration of chlorinated chemicals and some modifications to the overall plan may be required.



Richard L. Sloan, Project Coordinator

March 8, 2001

Date



Ernest R. Franke, PE & RPLS  
Remedial Project Manager

March 8, 2001

Date

# French Limited Superfund Site

**Second Five-Year Review**  
**EPA ID # TXD980514814**  
**Crosby, Harris County, Texas**

This review documents EPA's approval of the French Limited Superfund Site Second Five-Year Review Report.

## **Summary of Second Five-Year Review Findings.**

The French Limited Superfund site has achieved the remediation goals for the Source Control activities that included installing the lagoon floodwall and the lagoon bioremediation facilities described in the First Five-Year Review. The Source Control remedy is currently protective of human and environmental health. This review addresses additional groundwater monitoring and analytical results since the First Five-Year Review. In general, contaminant levels have decreased over time, indicating that some natural attenuation is occurring onsite.

## **Actions Needed.**

Based on the review of the groundwater monitoring data, several areas in both the SI and INT unit are not achieving compliance standards, and indications from the monitoring results to date show that compliance standards may not be achieved within the remaining five year monitoring period without additional actions. The actions needed to help achieve compliance standards in these areas include the following:

- Continued groundwater monitoring of the site
- Additional source characterization in wells S1-123, INT-26, INT-106, INT-130/130R, INT-134, INT-135, INT-144, and INT-217
- Continued monitoring of the gradient inside and outside the sheet pile wall
- Initiate additional remedial actions as necessary to achieve compliance

## **Determinations.**

The remedy for Source Control at the French Limited Site is operating as designed and is protective of human health and the environment. I have determined that the groundwater remedy is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

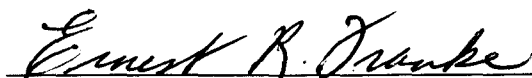
  
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Myron O. Knudson, P.E.

Director  
Superfund Division  
U.S. Environmental Protection Agency  
Region 6

3/12/02  
\_\_\_\_\_  
Date



Concurrences  
French Limited Superfund Site  
2<sup>nd</sup> Five-Year Review



Ernest R. Franke, P.E.  
U.S. EPA  
Remedial Project Manager

3/08/01; Rev 4/12/01; 4/24/01; 2/25/02

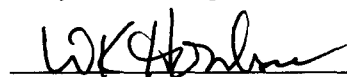
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Gus Chavarria, Chief  
U.S. EPA  
Project Management Section

4/17/01

Date



William K. Honker, P.E., Chief  
U.S. EPA  
Arkansas/Oklahoma/Texas Branch

4/23/01

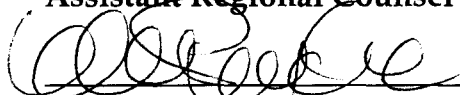
Date



Anne Foster  
U.S. EPA  
Assistant Regional Counsel

5/4/02

Date



Mark A. Peycke, Chief  
U.S. EPA  
Regional Counsel Superfund Branch

03/05/02

Date