

**SECOND FIVE-YEAR REVIEW FOR
THE HIGHLANDS ACID PIT
HIGHLANDS, HARRIS COUNTY, TEXAS**

This memorandum documents approval by the U.S. Environmental Protection Agency (EPA) of the Highland Acid Pit Second Five-Year Review Report.

Summary of Five-Year Review Findings

The source control soil remedy called for excavation and off-site disposal of industrial waste sludge and surface capping to control erosion offsite. Remedial Activities were completed in 1987, and Operation and Maintenance activities were conducted from July 1988 to September 1999. Site maintenance includes mowing, gate and fence repairs or replacement, defective or damaged well replacement, and appropriate follow-up response to site theft, vandalism and flooding events.

The site's ground water remedy was a no action ROD. EPA conducted additional ground water sampling from December 1997 to September 1999. The Operational and Functional (O&F) Activities Report documented concentrations of site contaminants above Maximum Contaminant Levels (MCLs) in the middle and deep aquifers. The 1987 ground water Record of Decision identified MCLs as applicable or relevant and appropriate requirements for the middle and deep aquifers, although these contaminants were not present above the MCLs in 1987.

An Operation and Maintenance (O&M) manual for the Highlands Acid Pit site has been written by the State of Texas Natural Resource Conservation Commission (TNRCC) and approved by EPA. TNRCC selected a contractor and issued notice to proceed in February with O&M activities. TNRCC's contractor conducted the field O&M activities in February and March 2002. The TNRCC contractor received the laboratory analytical data results, and the results were entered into the model for tracking the data trend analysis. In addition, the TNRCC and the EPA have selected which wells to plug and abandon, and the EPA's contractor is to begin final O&F Activities in September 2002.

Actions Needed

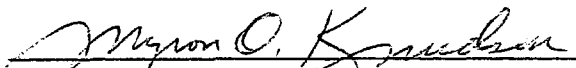
The presence of site contaminants above the MCLs in the middle and deep aquifers must be addressed. In addition, the O&F Work will consist of plugging and abandoning five or six on-site monitoring wells: MA-04, UA-13, UA-03, MA-08 and DA-08 have been identified to plug and abandon. The protective bollards and cluster fencing from the plugged and abandoned wells will be reused in the replacement wells. Two new down gradient wells are to be installed with well pads, relocated protective bollards and fencing. Well DA-01 is to have a bailer plug removed and well integrity confirmed or it shall be replaced.

Determinations

The remedy at the Highlands Acid Pit Superfund site currently protects human health and the environment because: 1) the source control remedy has been implemented and is functioning as intended, 2) the contamination found in the middle and deep aquifers has not affected nearby area water supply wells, and 3) based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: 1) continue to monitor the shallow, middle, and deep aquifers to assess changes in the concentration of site-related



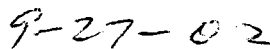
contaminants; 2) model the movement of site-related contaminants in the middle and deep aquifers to determine the direction of plume movement and potential for exposure from future ground water use; and 3) address whether MCLs are applicable or relevant and appropriate requirements for the middle and deep aquifers, and if they are, whether a waiver is appropriate.



Myron O. Knudson, P.E.

Director, Superfund Division

U.S. Environmental Protection Agency Region 6




Date

CONCURRENCES:


SECOND FIVE-YEAR REVIEW FOR

HIGHLANDS ACID PIT

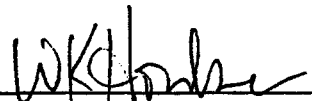
EPA ID# TX980514996

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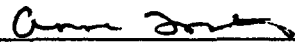
Date: 7/30/01 Rev 2/15/02 Rev 9/24/02

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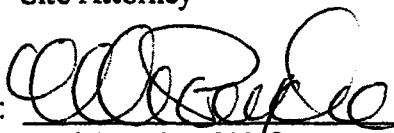
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Date: _____

**SECOND FIVE-YEAR REVIEW REPORT
FOR THE
HIGHLANDS ACID PIT
HIGHLANDS,
HARRIS COUNTY, TEXAS**

SEPTEMBER 2002

**U.S. ENVIRONMENTAL PROTECTION AGENCY
1445 Ross Avenue
Dallas, TX 75202-2733**

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirement
ASTDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	Environmental Protection Agency
HAP	Highlands Acid Pit
IDW	Investigation-derived waste
GPM	Gallons per minute
HASP	Health and Safety Plan
IRM	Initial Remedial Measure
MCL	Maximum contaminant level
$\mu\text{g}/\text{kg}$	Micrograms per kilogram (parts per billion or ppb)
$\mu\text{g}/\text{L}$	Micrograms per liter (ppb)
mg/kg	Milligrams per kilogram (parts per million or ppm)
mg/L	Milligrams per liter (ppm)
MSL	Mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&FAR	Operational and Functional Activities Report
O&M	Operations and maintenance
OU	Operable unit
RA	Remedial Action
RAL	Risk action levels
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial investigation/feasibility study
ROD	Record Of Decision
SARA	Superfund Amendments and Reauthorization Act
SOW	Statement of work
TAC	Texas Administrative Code
TDWR	Texas Department of Water Resources
Tetra Tech	Tetra Tech EM Inc.
TNRCC	Texas Natural Resource Conservation Commission
TRRP	Texas Risk Reduction Program
VOC	Volatile organic compound
Weston	Roy F. Weston

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA), Region 6, conducted a Second Five-Year Review of the Remedial Actions implemented at the Highlands Acid Pit Superfund Site (HAP site). This report documents the methods, findings, and conclusions of the review conducted from March 2001 to September 2002. The purpose of this review is to determine whether the remedy chosen for the site is protective of human health and the environment.

During the early 1950s, the HAP site was used for the disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from oil/gas refining processes. The site is a 6-acre peninsula within the San Jacinto River 10-year flood plain. The HAP site is located in Harris County, 16 miles east of Houston, Texas, and 1.4 miles west of Highlands, Texas, at the end of Clear Lake Road and adjacent to the east side of the San Jacinto River. The site is bordered by two adjacent active oil and gas wells and a petroleum distribution center north of the site, flooded sand pits to the east, Clear Lake to the south, and Grennel Slough to the west.

In September 1983, the HAP site was put on the National Priorities List. The source control Record of Decision (ROD) was signed in June 1984, with the remedy being excavation and off-site disposal. The no-action ground water ROD was signed in June 1987. The source control Remedial Action contract was awarded to Chemical Waste Management in September 1986, and the Post-Closure Report, documenting that the Remedial Action had been completed, was finalized in December 1987.

Operation and maintenance (O&M) have been performed at the HAP site from July 1988 to July 1996 by the Texas Natural Resource Conservation Commission (TNRCC). In June 1993, the TNRCC assumed all responsibility for continuing the 30 years of O&M at the HAP site.

Ground water sampling of private wells in August 1994 determined that the water quality was excellent (compared with drinking water standards). The Operational and Functional (O&F) Activities Report determined that ground water flow is to the west, away from the private wells that were sampled in 1994.

The first Five-Year Review was completed in June 1996. In 1997, EPA and the TNRCC felt it necessary to perform O&F activities to determine if the ground water was (1) traveling in the same direction it was when the ROD was written and (2) if migrating laterally or downward. Since all of the monitoring wells were within the contaminant plume, EPA and the TNRCC concluded that additional monitoring wells needed to be installed outside of the plume and that an aquifer pump test was necessary to determine the possibility of vertical migration between distinct water-bearing units.

EPA conducted the O&F activities, a tidal study and aquifer testing from December 1997 to September 1999. During these activities, monitoring wells were added, and the site trends were addressed. Also, since the site fencing had been damaged due to flooding, it was necessary to repair the site and cluster fencing during O&F activities. The site was made more functional by landscaping the contours to minimize flood damage in the future. Finally, EPA evaluated the analytical data and provided recommendations on delisting the site. The O&F Activities Report, dated November 2000, summarized the site activities and performance evaluation of the selected remedy and ground water monitoring system. The report documented eight sampling events and addressed HAP exposure pathways and direction of ground water flow. The report documented that site contaminants had migrated into the middle and deep aquifer in concentrations above the MCLs.

An Operation and Maintenance Manual for the Highlands Acid Pit site has been written by TNRCC and approved by EPA. The TNRCC selected a contractor and issued notice to proceed in February with the O&M activities. TNRCC's contractor conducted the field O&M activities in February and March 2002. The TNRCC contractor received the laboratory analytical data results, and the results were entered into the model for tracking the data trend analysis. In addition, the TNRCC and EPA have selected the wells to plug and abandon, and the EPA's contractor is to begin final O&F Activities in September 2002.

Documents reviewed for this second Five-Year Review included the (1) 1984 source control operable unit Record of Decision (ROD), (2) 1987 ground water operable unit ROD, (3) 1996 Five-Year Review, (4) 1996 annual monitoring report, and (5) November 2000 O&F Activities Report. This Second Five-Year Review also included a site inspection and interviews with residents and state

personnel. The monitoring wells appeared to be in good shape during the site inspection; however, the vegetative cover is overgrown and site mowing will be needed in the preventative site maintenance program. An oil and gas facility (not associated with the HAP site) is adjacent to and north of the HAP site, and two production wells have been completed and are operational at this time.

Comments from the site surveys included: (1) a local business owner's overall impression that the project is acceptable and that site operations have cleaned up the surrounding community; and, (2) TNRCC stated that surface conditions are reflective of the source control ROD but that the ground water conditions in the middle and deep ground water zones require monitoring, analysis, and Five-Year Reviews. The need for O&M for ground water monitoring to begin as soon as possible was discussed with Mr. Jim Feeley, Project Manager for TNRCC.

Recommendations and follow-up actions include: (1) monitoring of surface water, sediment, and ground water, (2) off-site ground water monitoring to confirm the effectiveness of the remedy, (3) monitoring wells MA-08 and DA-08 should be plugged and abandoned due to questions related to well integrity, (4) Well DA-01 should be unplugged or replaced with a new well, (5) vegetative and grass mowing, and repairs to the gate and fence should be included as a part of regular site maintenance, and (6) modeling the movement of site-related contaminants in the middle and deep aquifers to determine the direction of plume movement and potential for exposure from future ground water use.

Ecological risk assessment guidance was not available at the time the Remedial Investigation was conducted. However, EPA risk assessors have compared analytical data from the sediment samples collected in the area of the site to Region 6 contaminant screening levels for fresh water sediments established in June 2002. These samples were collected from December 1997 until September 1998. Screening levels are not regulatory standards or cleanup levels, but guidelines to be used to determine if further study of the sediments is warranted.

The results of this comparison indicate that site-related contaminants are not affecting sediments in the area of the site and that the concentrations of these contaminants have decreased since December 1997. In one sample, collected in September 1998, the concentration of lead was slightly above the screening level (42.6 mg/kg vs. 35 mg/kg). In four previous and four subsequent samples at the same location,

lead concentrations were found to be below the sediment screening level. Also, the concentration of arsenic in a sample collected in April 1999 was above the screening level (0.82 mg/kg vs 0.6 mg/kg). In five previous and two subsequent samples, arsenic concentrations were below the sediment screening level. Based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site.

The remedy at the Highlands Acid Pit Superfund site currently protects human health and the environment because: 1) the source control remedy has been implemented and is functioning as intended, 2) the contamination found in the middle and deep aquifers has not affected nearby area water supply wells, and 3) based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: 1) continue to monitor the shallow, middle, and deep aquifers to assess changes in the concentration of site-related contaminants, 2) model the movement of site-related contaminants in the middle and deep aquifers to determine the direction of plume movement and potential for exposure from future ground water use, and 3) address whether MCLs are applicable or relevant and appropriate requirements for the middle and deep aquifers, and if they are, whether a waiver is appropriate.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name (from WasteLAN): Highlands Acid Pit Superfund Site

EPA ID (from WasteLAN): TX980514996

Region: 6

State: TX

City/County: Highlands, Texas/Harris County

SITE STATUS

NPL Status: Final Deleted Other (specify) Second Five-Year Review

Remediation Status (choose all that apply): Under Construction Operating
 Complete

Multiple OUs?* YES NO

Construction Completion Date: July 1987

Has site been put into reuse? YES NO

REVIEW STATUS

Reviewing Agency: EPA State Tribe Other Federal Agency _____

Author Name: Tetra Tech EM Inc.

Author Title: N/A

Author Affiliation: Environmental Contractor

Review Period:** 6/13/96 to 8/2/002

Date(s) of Site Inspection: May 8, 2001

Type of review:*** Statutory

- Policy Post-SARA Pre-SARA NPL-Removal only
 Non-NPL Remedial Action Site NPL State/Tribe-lead
 Regional Discretion

Review Number: 1 (first) 2 (second) 3 (third) Other (specify) _____

Triggering Action:****

- Actual RA Onsite Construction at OU1 Actual RA Start at OU #__
 Construction Completion Previous Five-Year Review Report
 Other (specify) _____

Triggering Action Date (from WasteLAN): 6/13/96

Due Date (Five Years After Triggering Action Date): 6/13/01

Five-Year Review Summary Form

Deficiencies:

- The ground cover at the Highlands Acid Pit site is overgrown and should be cut for preventative site maintenance.
- Monitoring wells MA-08 and DA-08 should be plugged and abandoned because of questions related to well integrity.

Recommendations and Follow-up Actions:

The presence of site contaminants above the MCLs in the middle and deep aquifers must be addressed. Monitoring wells MA-08 and DA-08 should be plugged and abandoned due to questions related to their integrity. In addition, the well DA-01 is to be unplugged, or P&A and replaced with a new well. The well pad at DA-07 should be demolished and the protective bollards and cluster fencing and gate removed and reused.

Protectiveness Statement(s):

The remedy at the Highlands Acid Pits Superfund site currently protects human health and the environment because: 1) the source control remedy has been implemented and is functioning as intended, 2) the contamination found in the middle and deep aquifers has not affected nearby area water supply wells, and 3) based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: 1) continue to monitor the shallow, middle, and deep aquifers to assess changes in the concentration of site-related contaminants, 2) model the movement of site-related contaminants in the middle and deep aquifers to determine the direction of plume movement and potential for exposure from future ground water use, and 3) address whether MCLs are applicable or relevant and appropriate requirements for the middle and deep aquifers, and if they are, whether a waiver is appropriate.

Other Comments:

None.

1.0 INTRODUCTION

The Five-Year Reviews determine whether the remedy at a site is protective of human health and the environment. The second Five-Year Review for the Highlands Acid Pit (HAP) Superfund site, is required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) because the Remedial Actions at the site do not allow for unlimited use and unrestricted exposure. A Record of Decision (ROD) for the source control operable unit was signed in June 1984, and a ROD for the ground water operable unit was signed in June 1987.

2.0 SITE CHRONOLOGY

Table 1 lists the chronology of events for the HAP site.

3.0 BACKGROUND

During the early 1950s, the HAP site was used for disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from a refinery process. The site is a 6-acre peninsula within the 10-year flood plain of the San Jacinto River. The HAP site is located in Harris County, 16 miles east of Houston, Texas, and 1.4 miles west of Highlands, Texas, at the end of Clear Lake Road and adjacent to the east side of the San Jacinto River. The site is bordered by a two adjacent active oil and gas wells and a petroleum distribution center north of the site, flooded sand pits to the east, Clear Lake to the south, and Grennel Slough to the west.

TABLE 1
CHRONOLOGY OF SITE EVENTS

Date	Event
May 1978	TDWR— now the TNRCC—received a telephone complaint concerning the site.
September 1978	Sludge, sediment, and storm water samples were analyzed, revealing low pH, low concentrations of metals, high chemical oxygen demand, and high total organic carbon.
October 1981	Ground water samples were analyzed, revealing VOCs and heavy metals.
June 1982	HAP was proposed for the NPL with a Hazard Ranking System score of 37.77.
September 1982	EPA and TDWR (TNRCC) entered into a Cooperative Agreement for a state-led RI/FS. The RI/FS contract was awarded to EH&A, with Weston as the primary subcontractor.
September 1983	HAP was included on the NPL.
December 1983	EH&A submitted the <i>Site Investigation Report</i> , which indicated extensive contamination by heavy metals and VOCs across much of the site.
December 1983	EH&A completed the RI/FS.
June 1984	The ROD for the Source Control Operable Unit was signed, selecting excavation and off-site disposal as the remedy.
January 1985	EH&A and Weston completed the Remedial Action Design and Site Safety Plan.
December 1985	The Source Control RD was approved.
September 1986	The Source Control RA was awarded to Chemical Waste Management.
June 1987	The ROD for the Ground Water Operable Unit was signed, selecting no action as the remedy.
November 1987	EH&A submitted the <i>Final Report Volumes I and II - Source Control Remedial Construction</i> .

TABLE 1 (Continued)

CHRONOLOGY OF SITE EVENTS

Date	Event
December 1987	EH&A completed the <i>Final Report of the Ground Water Sampling Event for Post Closure.</i>
July 1988 to July 1996	O&M began at the HAP site.
May 1989	EH&A submitted the Post Closure Operation and Maintenance Plan, and subsequent sampling events and reports followed.
June 1993	TNRCC assumed all responsibility for continuing the 30 years of O&M at the HAP site.
August 1994	TNRCC collected ground water samples from the private well for the Baytown Boat Club and concluded that the water quality was excellent based on analyzed constituents.
May 1996	EPA and TNRCC agreed on a revised well-development plan, which proposed 10 additional monitoring wells with a revised monitoring strategy, and an expansion of the sampling and analysis program.
June 1996	EPA completed the first Five-Year Review for the HAP site.
December 1997 to September 1999	Tetra Tech conducted Operational and Functional activities at the HAP site.

Notes:

EH&A	Epsy Houston & Associates, Inc.
EPA	U.S. Environmental Protection Agency
HAP	Highlands Acid Pit
NPL	National Priorities List
O&M	Operations and maintenance
RA	Remedial action
RD	Remedial design
RI/FS	Remedial investigation and feasibility study
ROD	Record of decision
TDWR	Texas Division of Water Resources
TNRCC	Texas National Resources Commission
VOC	Volatile organic compound

The site lies within the Jessie White Survey A-83 of Harris County, Texas, within the Coast Prairie and East Texas Timberlands (Figure 1). The HAP site also lies within Federal/State Census Tract Number 25901 and is within the planning jurisdiction of the Baytown, Texas Planning Commission. The census tract encompasses most of the City of Highlands and adjacent unincorporated areas near the site. There are no known zoning or land use restriction ordinances in effect or planned within the jurisdiction of the Baytown Planning Commission. Little development is foreseen in the site area due to its location within the 100-year flood plain of the San Jacinto River. The site peninsula itself lies within the 10-year flood plain of the San Jacinto River. The flow of the San Jacinto River is controlled by the dam at Lake Houston, local meteorological events, and tides (Tetra Tech 2000).

4.0 REMEDIAL ACTIONS

The following sections discuss the remedies selected, remedy implementation, and system operations.

4.1 REMEDY SELECTED

The selected remedy for source control was excavation and off-site disposal. The selected remedy included:

- Excavation of waste material to an approximate depth of 8 feet
- Transportation of waste to a permitted Class I hazardous waste disposal facility
- Backfilling the excavated area with clean fill
- Constructing a temporary site perimeter fence with warning signs
- Installing a ground water monitoring system
- Performing ground water monitoring and site maintenance for a 30-year period

EPA and the Texas Natural Resource Conservation Commission (TNRCC) agreed that the selected remedy met the criteria outlined in Section 300.430(f) of the National Contingency Plan (NCP). In addition, the Centers for Disease Control reviewed and concurred with the recommended remedy since it would adequately alleviate any public health threat that might result from the site (EPA 1984). The Source Control ROD was signed on June 25, 1984, and the Remedial Design (RD) was completed in December 1985.

The ground water ROD was signed on June 26, 1987. The selected remedy was no action, with a recommendation for monitoring the surface environment (surface water and sediments), and ground water. However, the 1987 ROD selected no action because sampling prior to the ROD did not detect contaminants of concern in the middle or deep aquifer. The applicable or relevant and appropriate requirements identified for the middle and deep aquifers were MCLs.

4.2 REMEDY IMPLEMENTATION

Construction activities for the source control remedy began in February 1987 and were completed by July 1987. These activities included excavating the contaminated soil, conveying the contaminated soil to the Chemical Waste Management disposal site in Carlyss, Louisiana, and backfilling the excavation with clean soil. Although the ROD for the ground water remedy called for no action, monitoring wells were installed for 30 years of monitoring at the HAP site pursuant to the recommendation in the ROD for monitoring.

4.3 SYSTEM OPERATIONS

EH&A and Woodward Clyde conducted operations and maintenance (O&M) monitoring activities from July 21, 1988, to July 31, 1996.

In 1997, EPA and the TNRCC felt it necessary to perform O&F activities to determine if the ground water was (1) traveling in the same direction contemplated in the ROD, and (2) not

migrating laterally or downward. Since all of the monitoring wells were within the contaminant plume, EPA and the TNRCC concluded that additional monitoring wells needed to be installed outside of the plume and that an aquifer pump test was necessary to determine the possibility of vertical migration between distinct water-bearing units.

EPA conducted the O&F activities, a tidal study and aquifer testing from December 1997 to September 1999. During these activities, monitoring wells were added, and the site trends were addressed. Also, since the site fencing had been damaged due to flooding, it was necessary to repair the site and cluster fencing during O&F activities. The site was made more functional by landscaping the contours to minimize flood damage in the future. Finally, EPA evaluated the analytical data and provided recommendations on delisting the site. The O&F Activities Report, dated November 2000, summarized the site activities and performance evaluation of the selected remedy and ground water monitoring system. The report documented eight sampling events and addressed HAP exposure pathways and direction of ground water flow. The report documented that site contaminants had migrated to the middle and deep aquifers in concentrations above MCLs.

5.0 FIVE-YEAR REVIEW PROCESS

The Five-Year Review for the HAP site consisted of the following activities: (1) a review of relevant documents, (2) a review for changes in risk assessment methods or standards bearing on the protectiveness of the remedy, (3) surveys of individuals with technical knowledge of the site, (4) surveys of individuals living near the site, and (5) a site inspection.

6.0 FIVE-YEAR REVIEW FINDINGS

The following sections present the findings of this second Five-Year Review.

6.1 SURVEYS

Interview questionnaires were completed by (1) Mr. Bubba Crawford, owner of the Baytown Boat Club, (2) Mr. Jim Feeley, the TNRCC project manager, and (3) Mr. Jared Fuqua, a project contractor and consultant. The completed questionnaires are provided in Appendix B of the inspection report, which is attached to this Five-Year Review Report.

Mr. Crawford's overall impression is that the project is acceptable, and that site operations have cleaned up the surrounding community. Mr. Crawford also stated that he feels well informed about the site's activities and progress.

Mr. Feeley stated that surface conditions are reflective of the source control ROD, but that the ground water conditions require further monitoring followed-up by Five-Year Reviews, specifically the middle and deep ground water zones. Mr. Feeley also stated that TNRCC has actively participated in the O&F Activities Report, and is resuming the role of lead agency for post closure operation and maintenance. Mr. Feeley did not know of any complaints or violations within the last five years and feels well informed about site activities and progress. Mr. Feeley stated that the only potentially relevant change in state laws or regulations is the Texas Risk Reduction Program (TRRP); however, he understood that the RODs would have to be reopened for TRRP to be applicable. Mr. Feeley also commented that (1) there appears to be a cross-contamination problem with one or two of the nested wells completed in the middle and deep zones, and TNRCC supports EPA's desire to abandon these wells; (2) TNRCC believes that further monitoring is required to determine the conditions in the middle and lower zones; and

(3) TNRCC is revising the O&M plan and will then retain a contractor to begin monitoring activities.

Mr. Fuqua stated that Tetra Tech performed activities at the HAP site including (1) installing additional ground water monitoring wells; (2) performing eight quarters of monitoring; and (3) completing a tidal study and aquifer testing, which can be found in the O&F Activities Report (Tetra Tech, dated November 2000). The O&F project was successful in determining ground water flow direction, collecting monitoring data for analysis, evaluation, and remedy assessment. Mr. Fuqua does not know of any complaints regarding the site and feels well informed about the site's activities and progress. Mr. Fuqua recommended that O&M activities be initiated.

6.2 SITE INSPECTION

The site inspection was conducted on May 8, 2001. Attendees were (1) Mr. Ernest Franke of EPA, (2) Mr. Jim Feeley of TNRCC, and (3) Mr. Jared Fuqua of Tetra Tech. The site inspection report is found in Appendix B of this document. An oil and gas plant (that is not associated with the HAP site) is currently built adjacent to the HAP site, and two production wells have been completed at this time and are operational.

The exterior and cluster fences, gates, roads, and locks were in satisfactory condition. Each well enclosure was inspected and photographed. One plugged and abandoned well, DA-07, needs the wellpad demolishing, protective bollards and cluster fencing and gate removed, and reused. It was noted that there was no sign displaying the site name and identifying it as a Superfund site. TNRCC agreed to have a sign posted with the appropriate site and contact information. The vegetative cover is overgrown and should be mowed to ensure adequate visibility, well access, and general safety. Proper site maintenance will help ensure the longevity of the wells and fencing, and will increase the level of prevention or detection of theft, vandalism, or sabotage.

6.3 ARAR REVIEW

A review of the federal standards, requirements, criteria, or limitations, which were determined to be applicable or relevant and appropriate requirements (ARARs), indicated that the HAP site activities are in compliance with ARARs identified in the ROD, with the exception of the MCLs identified as ARARs for the middle and deep aquifers. There have been no changes in ARARs that bear on the protectiveness of the remedy.

6.4 DATA REVIEW

Data reviewed in the O&F Activities Report revealed: (1) net ground water flow is to the west away from the private wells; (2) benzene bio-degradation is limited by the low pH environment; (3) benzene concentrations above maximum contaminant levels (MCL) have been detected in the middle aquifer and deep aquifer; (4) arsenic was detected in the middle aquifer wells above MCLs; (5) some samples showed lead, chromium, cadmium and selenium above MCLs in the middle aquifer and arsenic and lead above MCLs in the deep aquifer; (6) benzene in surface water is continuing to be detected; and (7) contaminants of concern (COC), benzene, and arsenic have been detected in HAP sediments (Tetra Tech, O&FA Report, November 2000).

Although benzene continues to be detected in ground water, the ground water flow both in the original ROD and in the findings of the O&F Activities Report is to the west, and thus any apparent potential for migration is away from any sources of drinking water (such as, water wells). Tetra Tech evaluated biodegradation in the aquifer system to assess whether natural attenuation was occurring. The results of the evaluation concluded that biodegradation did not have a significant impact on the attenuation of the site contaminants.

Ecological risk assessment guidance was not available at the time the Remedial Investigation was conducted. However, EPA risk assessors compared analytical data from the sediment samples collected in the area of the site to Region 6 contaminant screening levels for fresh water sediments

established in June 2002. These samples were collected from December 1997 until September 1998. Screening levels are not regulatory standards or cleanup levels, but guidelines to be used to determine if further study of the sediments is warranted.

The results of this comparison indicate that site-related contaminants are not affecting sediments in the area of the site and that the concentrations of these contaminants have decreased since December 1997. In one sample, collected in September 1998, the concentration of lead was slightly above the screening level (42.6 mg/kg vs. 35 mg/kg). In four previous and four subsequent samples at the same location, lead concentrations were found to be below the sediment screening level. Also, the concentration of arsenic in a sample collected in April 1999 was above the screening level (0.82 mg/kg vs 0.6 mg/kg). In five previous and two subsequent samples, arsenic concentrations were below the sediment screening level.

Based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site.

7.0 ASSESSMENT

The following conclusions support the conclusion of this second Five-Year Review.

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

- **System Operations/O&M**—O&M ground water monitoring activities should resume as soon as possible.
- **Cost of System Operations/O&M**—O&M costs were not available for review.
- **Opportunities for Optimization**—O&M ground water monitoring activities should resume as soon as possible.
- **Early Indicators of Potential Remedy Failure**—O&M ground water monitoring activities should resume for evaluation of potential remedy failure.

Question B: Are the assumptions used at the time of remedy selection still valid?

- **Changes in Standards and To Be Considered**—No changes that bear on the protectiveness of the remedy.
- **Changes in Exposure Pathways**—No changes that bear on the protectiveness of the remedy.
- **Changes in Toxicity and Other Contaminant Characteristics**—No changes that bear on the protectiveness of the remedy.
- **Changes in Risk Assessment Methodologies**—No changes that bear on the protectiveness of the remedy.

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

No information other than the information documented above has been identified to question the protectiveness of the remedy.

8.0 DEFICIENCIES

Deficiencies that were discovered during the Five-Year Review are noted in Table 2.

TABLE 2

IDENTIFIED DEFICIENCIES

Deficiencies	Currently Affects Protectiveness (Y/N)
Monitoring Wells Require Maintenance	
TNRCC expressed concern that there may be cross contamination between the middle and deep zones. The integrity of monitoring wells MA-08 and DA-08 was questioned (Tetra Tech 2000), and plugging and abandoning of MA-08 and DA-08 is recommended.	Unknown
Security Measures Required	
None	N
Surface Conditions	
The ground cover is overgrown and should be cut for preventative maintenance.	N
Surface Water	
None	N
Ground Water	
Benzene levels exceeding the MCL have been detected (Tetra Tech 2000) in the middle and upper aquifers	Unknown

Notes:

MCL Maximum contaminant level

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Monitoring of surface water, sediment, and ground water should resume as soon as possible. In addition, the O&F Activities Report recommended that monitoring wells MA-08 and DA-08 should be plugged and abandoned due to questions related to well integrity. This activity should be completed at the earliest convenience.

The vegetative ground cover should be cut as part of regular site maintenance. The well pad should be demolished, and the protective bollards and cluster fencing and gate should be properly removed from well DA-07. The presence of site contaminants above MCLs in the middle and deep aquifers must be addressed.

Table 3 lists recommendations and follow-up actions for the HAP site.

10.0 PROTECTIVENESS STATEMENTS

The remedy at the Highlands Acid Pit Superfund site currently protects human health and the environment because: 1) the source control remedy has been implemented and is functioning as intended, 2) the contamination found in the middle and deep aquifers has not affected nearby area water supply wells, and 3) based on the comparison of field data to sediment screening levels, EPA concludes that site related contaminants are not affecting sediments near the site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: 1) continue to monitor the shallow, middle, and deep aquifers to assess changes in the concentration of site-related contaminants; 2) model the movement of site-related contaminants in the middle and deep aquifers to determine the direction of plume movement and potential for exposure from future ground water use; and 3) address whether MCLs are applicable or relevant and appropriate requirements for the middle and deep aquifers, and if they are, whether a waiver is appropriate.

11.0 NEXT REVIEW

This is a site that requires ongoing Five-Year Reviews. The next review will be conducted within the next five years, but no later than five years from the signature date of this review.

12.0 OTHER COMMENTS

None.

TABLE 3

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Deficiencies	Recommendations /Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)
O&M ground water monitoring	Complete the O&M manual as soon as possible and resume ground water monitoring activities	N/A	TNRCC	February 2002	N
Overgrown ground cover	Set a regular maintenance schedule for grass mowing	N/A	TNRCC	February 2002	N
Monitoring well integrity	Plug and abandon MA-08 and DA-08	N/A	EPA	September 2002	N
Monitoring well DA-01 plugged	Unplug well or New replacement well	EPA	EPA	September 2002	N

Notes:

N/A Not applicable

APPENDIX A
DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

- Tetra Tech EM Inc. October 2000. "Operational and Functional Activities Report."
- U.S. Environmental Protection Agency (EPA). June 1984. Record of Decision (ROD) Source Control Operable Unit.
- EPA. June 1987. "Abbreviated ROD Ground Water Operable Unit."
- EPA. August 1988. "CERCLA Compliance with Other Laws Manual."
- EPA. June 1996. "First Five-Year Review, Highlands Acid Pit Superfund Site, Harris County, Texas."
- EPA. October 1999. "Comprehensive Five-Year Guidance." EPA/540R/R-98/050. Office of Emergency and Remedial Response. OSWER Directive 9355.7-03B-P. Washington, DC. Draft.
- Woodward-Clyde Consultants (WWC). 1996. "Annual Monitoring Report FY 1996, Highlands Acid Pit Superfund Site, Highlands, Texas."

APPENDIX B
SITE VISIT REPORT
(33 Pages)

SITE VISIT REPORT

**HIGHLANDS ACID PIT SUPERFUND SITE
HIGHLANDS, HARRIS COUNTY, TEXAS**

July 2001

**U.S. ENVIRONMENTAL PROTECTION AGENCY
1445 Ross Avenue
Dallas, TX 75202-2733**

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3.0 SITE INSPECTION ACTIVITIES	B-2
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Exhibits

- A PHOTOGRAPHS
- B SITE INSPECTION CHECKLIST

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is hereby conducting a Five-Year Review of the effectiveness of the remedy employed at the Highlands Acid Pit (HAP) site to protect human health and the environment.

A site inspection was conducted as part of the requirements for a Five-Year Review, to verify that all components of the selected remedy are operating in accordance with criteria established in the 1984 Source Control Record of Decision (ROD). This report summarizes the results of the site inspection at the HAP site.

2.0 BACKGROUND

The HAP site was used for the disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from a refinery process, during the early 1950s. The HAP site is located in Harris County, 16 miles east of Houston, Texas, and 1.4 miles west of Highlands, Texas, at the end of Clear Lake Road and adjacent to the east side of the San Jacinto River. The site is bordered by a wooded area to the north, flooded sand pits to the east, Clear Lake to the south, and Grennel Slough to the west. The site is a 6-acre peninsula within the 10-year flood plain of the San Jacinto River.

The site lies within the Jessie White Survey A-83 of Harris County, Texas, within the Coast Prairie and East Texas Timberlands. The HAP site lies within Federal/State Census Tract Number 25901 and is within the planning jurisdiction of the Baytown, Texas Planning Commission. The census tract encompasses most of the City of Highlands and adjacent unincorporated areas near the site. There are no known zoning or land use restriction ordinances in effect or planned within the jurisdiction of the Baytown Planning Commission. Little development is foreseen in the site area due to its location within the 100-year flood plain of the

San Jacinto River. The flow of the San Jacinto River is controlled by the dam at Lake Houston, local meteorology events, and tides.

The selected remedy from the ROD was excavation and off-site disposal. The selected remedy included:

- excavation of waste material to an approximate depth of 8 feet
- transportation of waste to a permitted Class I hazardous waste disposal facility
- backfilling the excavated area with clean fill
- constructing a temporary site perimeter fence with warning signs
- installing a ground water monitoring system
- performing ground water monitoring and site maintenance for a 30-year period

The selected ground water remedy was no action, with a recommendation for monitoring the surface environment (surface water and sediments) and ground water.

3.0 SITE INSPECTION ACTIVITIES

Tetra Tech conducted the site inspection on May 8, 2001. The objective was to assess site conditions for the second Five-Year Review. Photographic documentation of the site inspection is presented in Exhibit A. The site inspection checklist is presented in Exhibit B.

The following individuals were present during the site visit:

- Mr. Ernest Franke, EPA
- Mr. Jim Feeley, TNRCC
- Mr. Jared Fuqua, Tetra Tech

4.0 FINDINGS

TNRCC is preparing an update for the O&M Manual for the HAP site so that O&M activities can resume. The O&M will include a contingency or emergency response plan, and O&M and Occupational Safety and Health Administration (OSHA) training records. As part of the development of the O&M manual, TNRCC agreed to compile ground water monitoring records and install a project sign for the HAP site.

The fencing and roads were in good condition, and the site locks were in place. High vegetation covered the site, and was growing inside the enclosed well clusters fencing. No recent flooding at the HAP site was apparent. A visual inspection of the monitoring wells noted good conditions with no apparent damage or vandalism.

An oil and gas production plant was installed at the entrance to the adjacent fenced property (approximately 200 feet east on Clear Lake Road) at the time of the inspection. Two wells for the production plant have been drilled.

EXHIBIT B
SITE VISIT CHECKLIST
(13 Pages)

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable."

I. SITE INFORMATION			
Site Name: Highlands Acid Pit	Date of Inspection: 05/08/01		
Location and Region: Highlands, Texas Region 6	EPA ID: 034-FRFF-06ZZ		
Agency, office, or company leading the five-year review: EPA	Weather/temperature: Overcast/windy 85-90 °F		
Remedy Includes: (Check all that apply) <ul style="list-style-type: none"> <input type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Ground water pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other <u>Ground water monitoring and site maintenance</u> 			
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached			
II. INTERVIEWS (Check all that apply)			
1. O&M Site Manager	<u>N/A</u> Name	_____ Title	_____ Date
Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> Report attached _____ _____			
2. O&M Staff	<input type="checkbox"/> <u>N/A</u> Name	_____ Title	_____ Date
Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> 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, record of deeds, or other city and county offices, etc.). Fill in all that apply.

Agency TNRCC

Contact Jim Feeley
Name

Project Manager
Title

April 27, 2001
Date

(512)239-2462
Phone no.

Problems, suggestions: Report attached _____

Agency _____

Contact _____
Name

Title

Date

Phone no.

Problems, suggestions: Report attached _____

Agency _____

Contact _____
Name

Title

Date

Phone no.

Agency _____

Contact _____
Name

Title

Date

Phone no.

Problems, suggestions: Report attached _____

4. Other interviews (optional): Report attached.

Mr. Bubba Crawford, owner of the Baytown Boat Club

Mr. Jared Fuqua, HAP site contractor and consultant

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> O&M manual | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> As-built drawings | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input type="checkbox"/> N/A |
| <input type="checkbox"/> Maintenance logs | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input type="checkbox"/> N/A |

Remarks TNRCC O&M Manual preparation is in progress

2. Site-Specific Health and Safety Plan

- | | |
|--|--|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Contingency plan/emergency response plan | <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |

Remarks Both plans should be included in the O&M Manual

3. O&M and OSHA Training Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks Should be included in the O&M Manual

4. Permits and Service Agreements

- | | | |
|---|--|---|
| <input type="checkbox"/> Air discharge permit | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Effluent discharge | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Waste disposal, POTW | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Other permits _____ | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |

Remarks _____

5. Gas Generation Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks _____

6. Settlement Monument Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks _____

7. Ground Water Monitoring Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks TNRCC will compile

8. Leachate/Condensate Extraction Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks _____

9. Discharge Compliance Records

- | | | |
|---|--|---|
| <input type="checkbox"/> Air | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Water (effluent) | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |

Remarks _____

10. Daily Access/Security Logs

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|

Remarks _____

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Other _____
- Contractor for State
- Contractor for PRP

2. O&M Cost Records Not Available/HAP Not Started

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Breakdown attached

Total annual cost by year for review period, if available

From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS

- Applicable N/A

A. Fencing

- 1. Fencing damaged** Location shown on site map Gates secured N/A
- Remarks All locks in place

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A
Remarks TNRCC will construct and install

C. Institutional Controls

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) Ground water sampling/post flooding inspection
Frequency _____

Responsible party/agency TNRCC

Contact <u>Jim Feeley</u>	<u>Project Manager</u>	_____	<u>(918) 437-7773</u>
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 Monitoring has not been initiated by TNRCC

D. General

1. **Vandalism/trespassing** Location shown on site map No vandalism evident
Remarks _____

2. **Land use changes on site** N/A
Remarks Additional well (oil/gas) has been drilled (on adjacent property)

3. **Land use changes offsite** N/A
Remarks Oil and gas production plant was being installed at the entrance to the fenced property (approximately 200 feet east, down Clear Lake Road adjacent to the HAP site)

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 High vegetation covering site and growing inside well cluster compounds
(fenced enclosures)

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface (Site Cover Only)

1. Settlement (Low spots) Location shown on site map Settlement not evident

Areal 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

Areal extent _____ Depth _____

Remarks _____

4. Holes Location shown on site map Holes not evident

Areal extent _____ Depth _____

Remarks _____

5. Vegetative Cover Grass Cover properly established No signs of stress
 Trees/Shrubs (indicate size and locations on a diagram)

Remarks The ground cover needs to be cut.

6. Alternative Cover (armored rock, concrete, etc.) N/A

Remarks Access road in good condition

7. **Bulges** Location shown on site map Bulges not evident
 Areal extent _____ Depth _____
 Remarks _____

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
 Wet areas Location shown on site map Areal extent _____
 Ponding Location shown on site map Areal extent _____
 Seeps Location shown on site map Areal extent _____
 Soft subgrade Location shown on site map Areal extent _____
 Remarks _____

9. **Slope Instability** Slides Location shown on site map No evidence of slope instability
 Areal 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 Okay
 Remarks _____

2. **Bench Breached** Location shown on site map N/A Okay
 Remarks _____

3. **Bench Overtopped** Location shown on site map N/A Okay
 Remarks _____

C. **Letdown Channels** Applicable N/A

1. **Settlement** Location shown on site map No evidence of settlement
 Areal extent _____ Depth _____
 Remarks _____

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

3. Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion _____
4. Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting _____
5. Obstructions <input type="checkbox"/> Location shown on site map Type _____ Areal extent _____ <input type="checkbox"/> No obstructions Size _____ Remarks _____	
6. Excessive Vegetative Growth Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	
2. Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	
3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	

4.	Leachate Extraction Wells	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____					
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A	
Remarks _____					
E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A					
1.	Gas Treatment Facilities	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____					
2.	Gas Collection Wells, Manifolds, and Piping	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____					
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____					
F. Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A					
1.	Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks _____					
2.	Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks _____					
G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A					
1.	Siltation	Areal extent _____	Depth _____	<input type="checkbox"/>	
		<input type="checkbox"/> Siltation not evident			
Remarks _____					
2.	Erosion	Areal extent _____	Depth _____		
		<input type="checkbox"/> Erosion not evident			
Remarks _____					

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
H. Retaining Walls	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____		Vertical displacement _____
Rotational displacement _____		
Remarks _____		
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks _____		
I. Perimeter Ditches/Off-Site Discharge	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Areal extent _____		Depth _____
Remarks _____		
2. Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input type="checkbox"/> Vegetation does not impede flow		
Areal extent _____		Type _____
Remarks _____		
3. Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Areal extent _____		Depth _____
Remarks _____		
4. Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
VIII. VERTICAL BARRIER WALLS		
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Areal extent _____		<input type="checkbox"/> Depth
Remarks _____		

2. **Performance Monitoring** Type of monitoring _____
 Performance not monitored
 Frequency _____ Evidence of breaching
 Head differential _____
 Remarks _____

IX. GROUND WATER/SURFACE WATER REMEDIES Applicable N/A

A. Ground Water Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
 Good condition All required wells located Needs O&M N/A
 Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
 Good condition Needs O&M
 Remarks N/A

3. **Spare Parts and Equipment**
 Readily available Good condition Requires upgrade Needs to be provided
 Remarks N/A

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

1. **Collection Structures, Pumps, and Electrical**
 Good condition Needs O&M
 Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
 Good condition Needs O&M
 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 O&M
 Sampling ports properly marked and functional
 Sampling/maintenance log displayed and up to date
 Equipment properly identified
 Quantity of ground water treated annually _____
 Quantity of surface water treated annually _____
 Remarks _____

2. Electrical Enclosures and Panels (Properly rated and functional)

N/A Good condition Needs O&M
 Remarks _____

3. Tanks, Vaults, Storage Vessels

N/A Good condition Proper secondary containment Needs O&M
 Remarks _____

4. Discharge Structure and Appurtenances

N/A Good condition Needs O&M
 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 O&M N/A
 Remarks _____

D. Monitored Natural Attenuation

1. Monitoring Wells (Natural attenuation remedy)

Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A
 Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are 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 to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

No Action. Ground Water Record of Decision

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.

O&M has not been initiated. O&M plan is in progress by TNRCC contractor.

C. Early Indicators of Potential Remedy Failure

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.

Could not evaluate.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Could not evaluate.

APPENDIX C

SURVEYS

(Seven Pages)

TABLE 3

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Deficiencies	Recommendations /Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)
O&M ground water monitoring	Complete the O&M manual as soon as possible and resume ground water monitoring activities	N/A	TNRCC	February 2002	N
Overgrown ground cover	Set a regular maintenance schedule for grass mowing	N/A	TNRCC	February 2002	N
Monitoring well integrity	Plug and abandon MA-08 and DA-08	N/A	EPA	September 2002	N
Monitoring well DA-01 plugged	Unplug well or New replacement well	EPA	EPA	September 2002	N

Notes:

N/A Not applicable

APPENDIX A
DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

Tetra Tech EM Inc. October 2000. "Operational and Functional Activities Report."

U.S. Environmental Protection Agency (EPA). June 1984. Record of Decision (ROD) Source Control Operable Unit.

EPA. June 1987. "Abbreviated ROD Ground Water Operable Unit."

EPA. August 1988. "CERCLA Compliance with Other Laws Manual."

EPA. June 1996. "First Five-Year Review, Highlands Acid Pit Superfund Site, Harris County, Texas."

EPA. October 1999. "Comprehensive Five-Year Guidance." EPA/540R/R-98/050. Office of Emergency and Remedial Response. OSWER Directive 9355.7-03B-P. Washington, DC. Draft.

Woodward-Clyde Consultants (WWC). 1996. "Annual Monitoring Report FY 1996, Highlands Acid Pit Superfund Site, Highlands, Texas."

APPENDIX B
SITE VISIT REPORT
(33 Pages)

SITE VISIT REPORT

**HIGHLANDS ACID PIT SUPERFUND SITE
HIGHLANDS, HARRIS COUNTY, TEXAS**

July 2001

**U.S. ENVIRONMENTAL PROTECTION AGENCY
1445 Ross Avenue
Dallas, TX 75202-2733**

CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION	B-1
2.0 BACKGROUND	B-1
3.0 SITE INSPECTION ACTIVITIES	B-2
4.0 FINDINGS	B-3

Exhibits

- A PHOTOGRAPHS
- B SITE INSPECTION CHECKLIST

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is hereby conducting a Five-Year Review of the effectiveness of the remedy employed at the Highlands Acid Pit (HAP) site to protect human health and the environment.

A site inspection was conducted as part of the requirements for a Five-Year Review, to verify that all components of the selected remedy are operating in accordance with criteria established in the 1984 Source Control Record of Decision (ROD). This report summarizes the results of the site inspection at the HAP site.

2.0 BACKGROUND

The HAP site was used for the disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from a refinery process, during the early 1950s. The HAP site is located in Harris County, 16 miles east of Houston, Texas, and 1.4 miles west of Highlands, Texas, at the end of Clear Lake Road and adjacent to the east side of the San Jacinto River. The site is bordered by a wooded area to the north, flooded sand pits to the east, Clear Lake to the south, and Grennel Slough to the west. The site is a 6-acre peninsula within the 10-year flood plain of the San Jacinto River.

The site lies within the Jessie White Survey A-83 of Harris County, Texas, within the Coast Prairie and East Texas Timberlands. The HAP site lies within Federal/State Census Tract Number 25901 and is within the planning jurisdiction of the Baytown, Texas, Planning Commission. The census tract encompasses most of the City of Highlands and adjacent unincorporated areas near the site. There are no known zoning or land use restriction ordinances in effect or planned within the jurisdiction of the Baytown Planning Commission. Little development is foreseen in the site area due to its location within the 100-year flood plain of the

San Jacinto River. The flow of the San Jacinto River is controlled by the dam at Lake Houston, local meteorology events, and tides.

The selected remedy from the ROD was excavation and off-site disposal. The selected remedy included:

- excavation of waste material to an approximate depth of 8 feet
- transportation of waste to a permitted Class I hazardous waste disposal facility
- backfilling the excavated area with clean fill
- constructing a temporary site perimeter fence with warning signs
- installing a ground water monitoring system
- performing ground water monitoring and site maintenance for a 30-year period

The selected ground water remedy was no action, with a recommendation for monitoring the surface environment (surface water and sediments) and ground water.

3.0 SITE INSPECTION ACTIVITIES

Tetra Tech conducted the site inspection on May 8, 2001. The objective was to assess site conditions for the second Five-Year Review. Photographic documentation of the site inspection is presented in Exhibit A. The site inspection checklist is presented in Exhibit B.

The following individuals were present during the site visit:

- Mr. Ernest Franke, EPA
- Mr. Jim Feeley, TNRCC
- Mr. Jared Fuqua, Tetra Tech

4.0 FINDINGS

TNRCC is preparing an update for the O&M Manual for the HAP site so that O&M activities can resume. The O&M will include a contingency or emergency response plan, and O&M and Occupational Safety and Health Administration (OSHA) training records. As part of the development of the O&M manual, TNRCC agreed to compile ground water monitoring records and install a project sign for the HAP site.

The fencing and roads were in good condition, and the site locks were in place. High vegetation covered the site, and was growing inside the enclosed well clusters fencing. No recent flooding at the HAP site was apparent. A visual inspection of the monitoring wells noted good conditions with no apparent damage or vandalism.

An oil and gas production plant was installed at the entrance to the adjacent fenced property (approximately 200 feet east on Clear Lake Road) at the time of the inspection. Two wells for the production plant have been drilled.

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, record of deeds, or other city and county offices, etc.). Fill in all that apply.

Agency TNRCC
Contact Jim Feeley Project Manager April 27, 2001 (512)239-2462
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.

Agency _____
Contact _____
Name Title Date Phone no.

Problems, suggestions: Report attached _____

4. Other interviews (optional): Report attached.

Mr. Bubba Crawford, owner of the Baytown Boat Club

Mr. Jared Fuqua, HAP site contractor and consultant

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents	<input checked="" type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
Remarks <u>TNRCC O&M Manual preparation is in progress</u>				
2. Site-Specific Health and Safety Plan	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
Remarks <u>Both plans should be included in the O&M Manual</u>				
3. O&M and OSHA Training Records		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks <u>Should be included in the O&M Manual</u>				
4. Permits and Service Agreements	<input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
Remarks _____				
5. Gas Generation Records		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____				
6. Settlement Monument Records		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____				
7. Ground Water Monitoring Records		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A N/A
Remarks <u>TNRCC will compile</u>				
8. Leachate/Condensate Extraction Records		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____				
9. Discharge Compliance Records	<input type="checkbox"/> Air <input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A N/A
Remarks _____				
10. Daily Access/Security Logs		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____				

IV. O&M COSTS

1. O&M Organization

- State in-house Contractor for State
 PRP in-house Contractor for PRP
 Other _____

2. O&M Cost Records Not Available/HAP Not Started

- Readily available Up to date
 Funding mechanism/agreement in place
 Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period, if available

From _____	to _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	to _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	to _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	to _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	to _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		

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

Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

- 1. Fencing damaged** Location shown on site map Gates secured N/A
 Remarks All locks in place

B. Other Access Restrictions			
1. Signs and other security measures Remarks <u>TNRCC will construct and install</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A	
C. Institutional Controls			
1. Implementation and enforcement			
Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) <u>Ground water sampling/post flooding inspection</u>			
Frequency _____			
Responsible party/agency <u>TNRCC</u>			
Contact <u>Jim Feeley</u>	<u>Project Manager</u>	_____	<u>(918) 437-7773</u>
Name	Title	Date	Phone no.
Reporting is up-to-date	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Other problems or suggestions: <input type="checkbox"/> Report attached			
2. Adequacy			
<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate	<input checked="" type="checkbox"/> N/A	
Remarks <u>Monitoring has not been initiated by TNRCC</u>			
D. General			
1. Vandalism/trespassing			
<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident		
Remarks _____			
2. Land use changes on site			
<input type="checkbox"/> N/A			
Remarks <u>Additional well (oil/gas) has been drilled (on adjacent property)</u>			
3. Land use changes offsite			
<input checked="" type="checkbox"/> N/A			
Remarks <u>Oil and gas production plant was being installed at the entrance to the fenced property (approximately 200 feet east, down Clear Lake Road adjacent to the HAP site)</u>			

VI. GENERAL SITE CONDITIONS			
A. Roads	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1. Roads damaged	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
Remarks _____ _____			
B. Other Site Conditions			
Remarks <u>High vegetation covering site and growing inside well cluster compounds</u> <u>(fenced enclosures)</u>			
VII. LANDFILL COVERS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
A. Landfill Surface (Site Cover Only)			
1. Settlement (Low spots)	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident	
Areal extent _____	Depth _____		
Remarks _____ _____			
2. Cracks	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Cracking not evident	
Lengths _____	Widths _____	Depths _____	
Remarks _____ _____			
3. Erosion	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident	
Areal extent _____	Depth _____		
Remarks _____ _____			
4. Holes	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident	
Areal extent _____	Depth _____		
Remarks _____ _____			
5. Vegetative Cover	<input checked="" type="checkbox"/> Grass <input type="checkbox"/> Cover properly established	<input type="checkbox"/> No signs of stress	
<input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram)			
Remarks <u>The ground cover needs to be cut.</u>			

6. Alternative Cover (armored rock, concrete, etc.)	<input type="checkbox"/> N/A		
Remarks <u>Access road in good condition</u>			

7. Bulges Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Depth _____	<input checked="" type="checkbox"/> Bulges not evident
8. Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____
9. Slope Instability Areal extent _____ Remarks _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
2. Bench Breached Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
3. Bench Overtopped Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Settlement Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2. Material Degradation Material type _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Areal extent _____	<input type="checkbox"/> No evidence of degradation

3. Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion
4. Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting
5. Obstructions <input type="checkbox"/> Location shown on site map Size _____ Remarks _____	Type _____ <input type="checkbox"/> No obstructions Areal extent _____
6. Excessive Vegetative Growth <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Remarks _____	Type _____ Areal extent _____
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A
2. Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A
3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A

4. Leachate Extraction Wells			
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____			
<hr/>			
5. Settlement Monuments			
<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A	
Remarks _____			
<hr/>			
E. Gas Collection and Treatment			
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1. Gas Treatment Facilities			
<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____			
<hr/>			
2. Gas Collection Wells, Manifolds, and Piping			
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____			
<hr/>			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____			
<hr/>			
F. Cover Drainage Layer			
<input type="checkbox"/> Applicable		<input checked="" type="checkbox"/> N/A	
<hr/>			
1. Outlet Pipes Inspected			
<input type="checkbox"/> Functioning		<input type="checkbox"/> N/A	
Remarks _____			
<hr/>			
2. Outlet Rock Inspected			
<input type="checkbox"/> Functioning		<input type="checkbox"/> N/A	
Remarks _____			
<hr/>			
G. Detention/Sedimentation Ponds			
<input type="checkbox"/> Applicable		<input checked="" type="checkbox"/> N/A	
<hr/>			
1. Siltation			
Areal extent _____	Depth _____		<input type="checkbox"/>
<input type="checkbox"/> Siltation not evident			
Remarks _____			
<hr/>			

2.	Erosion	Areal extent _____	Depth _____
	<input type="checkbox"/> Erosion not evident		
	Remarks _____		
<hr/>			
3.	Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
<hr/>			
4.	Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
<hr/>			
H. Retaining Walls		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
<hr/>			
2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks _____		
<hr/>			
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
<hr/>			
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks _____		
<hr/>			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
<hr/>			
4.	Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
<hr/>			

VIII. VERTICAL BARRIER WALLS

Applicable N/A

1. Settlement Location shown on site map Settlement not evident
Areal extent _____ Depth
Remarks _____

2. Performance Monitoring Type of monitoring _____
 Performance not monitored
Frequency _____ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUND WATER/SURFACE WATER REMEDIES

Applicable N/A

A. Ground Water Extraction Wells, Pumps, and Pipelines Applicable N/A

1. Pumps, Wellhead Plumbing, and Electrical
 Good condition All required wells located Needs O&M N/A
Remarks _____

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
 Good condition Needs O&M
Remarks N/A

3. Spare Parts and Equipment
 Readily available Good condition Requires upgrade Needs to be provided
Remarks N/A

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

1. Collection Structures, Pumps, and Electrical
 Good condition Needs O&M
Remarks _____

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
 Good condition Needs O&M
Remarks _____

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 O&M
 Sampling ports properly marked and functional
 Sampling/maintenance log displayed and up to date
 Equipment properly identified
 Quantity of ground water treated annually _____
 Quantity of surface water treated annually _____

Remarks _____

2. Electrical Enclosures and Panels (Properly rated and functional)

- N/A Good condition Needs O&M

Remarks _____

3. Tanks, Vaults, Storage Vessels

- N/A Good condition Proper secondary containment Needs O&M

Remarks _____

4. Discharge Structure and Appurtenances

- N/A Good condition Needs O&M

Remarks _____

5. Treatment Building(s)

- C 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 O&M N/A

Remarks _____

D. Monitored Natural Attenuation

1. Monitoring Wells (Natural attenuation remedy)

- Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A

Remarks _____

X. OTHER REMEDIES

D. Monitored Natural Attenuation

1. Monitoring Wells (Natural attenuation remedy)

- Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A

Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are 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 to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

No Action. Ground Water Record of Decision

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.

O&M has not been initiated. O&M plan is in progress by TNRCC contractor.

C. Early Indicators of Potential Remedy Failure

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.

Could not evaluate.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Could not evaluate.

EXHIBIT B
SITE VISIT CHECKLIST
(13 Pages)

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable."

I. SITE INFORMATION	
Site Name: Highlands Acid Pit	Date of Inspection: 05/08/01
Location and Region: Highlands, Texas Region 6	EPA ID: 034-FRFF-06ZZ
Agency, office, or company leading the five-year review: EPA	Weather/temperature: Overcast/windy 85-90 °F
Remedy Includes: (Check all that apply) <ul style="list-style-type: none"> <input type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Ground water pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other <u>Ground water monitoring and site maintenance</u> 	
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M Site Manager	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <u>N/A</u> Name </div> <div style="width: 20%;"> _____ Title </div> <div style="width: 20%;"> _____ Date </div> </div> <p> Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> Report attached _____ _____ </p>
2. O&M Staff	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <input type="checkbox"/> <u>N/A</u> Name </div> <div style="width: 20%;"> _____ Title </div> <div style="width: 20%;"> _____ Date </div> </div> <p> Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> Report attached _____ _____ </p>

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> O&M manual | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> As-built drawings | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input type="checkbox"/> N/A |
| <input type="checkbox"/> Maintenance logs | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input type="checkbox"/> N/A |
- Remarks TNRCC O&M Manual preparation is in progress

2. Site-Specific Health and Safety Plan

- | | |
|--|--|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Contingency plan/emergency response plan | <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
- Remarks Both plans should be included in the O&M Manual

3. O&M and OSHA Training Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks Should be included in the O&M Manual

4. Permits and Service Agreements

- | | | |
|---|--|---|
| <input type="checkbox"/> Air discharge permit | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Effluent discharge | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Waste disposal, POTW | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Other permits _____ | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
- Remarks _____

5. Gas Generation Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks _____

6. Settlement Monument Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks _____

7. Ground Water Monitoring Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks TNRCC will compile

8. Leachate/Condensate Extraction Records

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks _____

9. Discharge Compliance Records

- | | | |
|---|--|---|
| <input type="checkbox"/> Air | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Water (effluent) | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
- Remarks _____

10. Daily Access/Security Logs

- | | |
|--|---|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A |
|--|---|
- Remarks _____

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A
Remarks TNRCC will construct and install

C. Institutional Controls

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) Ground water sampling/post flooding inspection
Frequency _____

Responsible party/agency TNRCC

Contact <u>Jim Feeley</u>	<u>Project Manager</u>	_____	<u>(918) 437-7773</u>
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 Monitoring has not been initiated by TNRCC

D. General

1. **Vandalism/trespassing** Location shown on site map No vandalism evident
Remarks _____

2. **Land use changes on site** N/A
Remarks Additional well (oil/gas) has been drilled (on adjacent property)

3. **Land use changes offsite** N/A
Remarks Oil and gas production plant was being installed at the entrance to the fenced property (approximately 200 feet east, down Clear Lake Road adjacent to the HAP site)

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 High vegetation covering site and growing inside well cluster compounds
(fenced enclosures)

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface (Site Cover Only)

1. Settlement (Low spots) Location shown on site map Settlement not evident
 Areal 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
 Areal extent _____ Depth _____
 Remarks _____

4. Holes Location shown on site map Holes not evident
 Areal extent _____ Depth _____
 Remarks _____

5. Vegetative Cover Grass Cover properly established No signs of stress
 Trees/Shrubs (indicate size and locations on a diagram)
 Remarks The ground cover needs to be cut.

6. Alternative Cover (armored rock, concrete, etc.) N/A
 Remarks Access road in good condition

7. Bulges Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Depth _____	<input checked="" type="checkbox"/> Bulges not evident
8. Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____
9. Slope Instability Areal extent _____ Remarks _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
2. Bench Breached Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
3. Bench Overtopped Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Settlement Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2. Material Degradation Material type _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Areal extent _____	<input type="checkbox"/> No evidence of degradation

3. Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion _____ _____
4. Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting _____ _____
5. Obstructions <input type="checkbox"/> Location shown on site map Type _____ Size _____ Areal extent _____ Remarks _____	<input type="checkbox"/> No obstructions _____ _____
6. Excessive Vegetative Growth Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	_____ _____
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	_____ _____
2. Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	_____ _____
3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	_____ _____

4. Leachate Extraction Wells			
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____			
5. Settlement Monuments			
<input type="checkbox"/> Located		<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A
Remarks _____			
E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1. Gas Treatment Facilities			
<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____			
2. Gas Collection Wells, Manifolds, and Piping			
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M		
Remarks _____			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____			
F. Cover Drainage Layer			
<input type="checkbox"/> Applicable		<input checked="" type="checkbox"/> N/A	
1. Outlet Pipes Inspected			
<input type="checkbox"/> Functioning		<input type="checkbox"/> N/A	
Remarks _____			
2. Outlet Rock Inspected			
<input type="checkbox"/> Functioning		<input type="checkbox"/> N/A	
Remarks _____			
G. Detention/Sedimentation Ponds			
<input type="checkbox"/> Applicable		<input checked="" type="checkbox"/> N/A	
1. Siltation			
Areal extent _____	Depth _____		<input type="checkbox"/>
<input type="checkbox"/> Siltation not evident			
Remarks _____			
2. Erosion			
Areal extent _____	Depth _____		
<input type="checkbox"/> Erosion not evident			
Remarks _____			

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
H. Retaining Walls	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks _____		
I. Perimeter Ditches/Off-Site Discharge	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Areal extent _____ Depth _____		
Remarks _____		
2. Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input type="checkbox"/> Vegetation does not impede flow		
Areal extent _____ Type _____		
Remarks _____		
3. Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Areal extent _____ Depth _____		
Remarks _____		
4. Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
VIII. VERTICAL BARRIER WALLS		
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Areal extent _____ <input type="checkbox"/> Depth		
Remarks _____		

2. Performance Monitoring <input type="checkbox"/> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____ <input type="checkbox"/> Evidence of breaching
IX. GROUND WATER/SURFACE WATER REMEDIES	
A. Ground Water Extraction Wells, Pumps, and Pipelines	
<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input checked="" type="checkbox"/> N/A Remarks _____	
2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks <u>N/A</u>	
3. Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks <u>N/A</u>	
B. Surface Water Collection Structures, Pumps, and Pipelines	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____	
2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____	
3. Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____	
C. Treatment System	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 O&M
 Sampling ports properly marked and functional
 Sampling/maintenance log displayed and up to date
 Equipment properly identified
 Quantity of ground water treated annually _____
 Quantity of surface water treated annually _____
 Remarks _____

2. Electrical Enclosures and Panels (Properly rated and functional)

N/A Good condition Needs O&M
 Remarks _____

3. Tanks, Vaults, Storage Vessels

N/A Good condition Proper secondary containment Needs O&M
 Remarks _____

4. Discharge Structure and Appurtenances

N/A Good condition Needs O&M
 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 O&M N/A
 Remarks _____

D. Monitored Natural Attenuation

1. Monitoring Wells (Natural attenuation remedy)

Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A
 Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are 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 to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

No Action. Ground Water Record of Decision

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.

O&M has not been initiated. O&M plan is in progress by TNRCC contractor.

C. Early Indicators of Potential Remedy Failure

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.

Could not evaluate.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Could not evaluate.

APPENDIX C

SURVEYS

(Seven Pages)

APPENDIX A
DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

Tetra Tech EM Inc. October 2000. "Operational and Functional Activities Report."

U.S. Environmental Protection Agency (EPA). June 1984. Record of Decision (ROD) Source Control Operable Unit.

EPA. June 1987. "Abbreviated ROD Ground Water Operable Unit."

EPA. August 1988. "CERCLA Compliance with Other Laws Manual."

EPA. June 1996. "First Five-Year Review, Highlands Acid Pit Superfund Site, Harris County, Texas."

EPA. October 1999. "Comprehensive Five-Year Guidance." EPA/540R/R-98/050. Office of Emergency and Remedial Response. OSWER Directive 9355.7-03B-P. Washington, DC. Draft.

Woodward-Clyde Consultants (WWC). 1996. "Annual Monitoring Report FY 1996, Highlands Acid Pit Superfund Site, Highlands, Texas."

APPENDIX B
SITE VISIT REPORT
(33 Pages)

SITE VISIT REPORT

**HIGHLANDS ACID PIT SUPERFUND SITE
HIGHLANDS, HARRIS COUNTY, TEXAS**

July 2001

**U.S. ENVIRONMENTAL PROTECTION AGENCY
1445 Ross Avenue
Dallas, TX 75202-2733**

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<u>Section</u>	<u>Page</u>
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3.0 SITE INSPECTION ACTIVITIES	B-2
4.0 FINDINGS	B-3

Exhibits

- A PHOTOGRAPHS
- B SITE INSPECTION CHECKLIST

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is hereby conducting a Five-Year Review of the effectiveness of the remedy employed at the Highlands Acid Pit (HAP) site to protect human health and the environment.

A site inspection was conducted as part of the requirements for a Five-Year Review, to verify that all components of the selected remedy are operating in accordance with criteria established in the 1984 Source Control Record of Decision (ROD). This report summarizes the results of the site inspection at the HAP site.

2.0 BACKGROUND

The HAP site was used for the disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from a refinery process, during the early 1950s. The HAP site is located in Harris County, 16 miles east of Houston, Texas, and 1.4 miles west of Highlands, Texas, at the end of Clear Lake Road and adjacent to the east side of the San Jacinto River. The site is bordered by a wooded area to the north, flooded sand pits to the east, Clear Lake to the south, and Grennel Slough to the west. The site is a 6-acre peninsula within the 10-year flood plain of the San Jacinto River.

The site lies within the Jessie White Survey A-83 of Harris County, Texas, within the Coast Prairie and East Texas Timberlands. The HAP site lies within Federal/State Census Tract Number 25901 and is within the planning jurisdiction of the Baytown, Texas Planning Commission. The census tract encompasses most of the City of Highlands and adjacent unincorporated areas near the site. There are no known zoning or land use restriction ordinances in effect or planned within the jurisdiction of the Baytown Planning Commission. Little development is foreseen in the site area due to its location within the 100-year flood plain of the

San Jacinto River. The flow of the San Jacinto River is controlled by the dam at Lake Houston, local meteorology events, and tides.

The selected remedy from the ROD was excavation and off-site disposal. The selected remedy included:

- excavation of waste material to an approximate depth of 8 feet
- transportation of waste to a permitted Class I hazardous waste disposal facility
- backfilling the excavated area with clean fill
- constructing a temporary site perimeter fence with warning signs
- installing a ground water monitoring system
- performing ground water monitoring and site maintenance for a 30-year period

The selected ground water remedy was no action, with a recommendation for monitoring the surface environment (surface water and sediments) and ground water.

3.0 SITE INSPECTION ACTIVITIES

Tetra Tech conducted the site inspection on May 8, 2001. The objective was to assess site conditions for the second Five-Year Review. Photographic documentation of the site inspection is presented in Exhibit A. The site inspection checklist is presented in Exhibit B.

The following individuals were present during the site visit:

- Mr. Ernest Franke, EPA
- Mr. Jim Feeley, TNRCC
- Mr. Jared Fuqua, Tetra Tech

4.0 FINDINGS

TNRCC is preparing an update for the O&M Manual for the HAP site so that O&M activities can resume. The O&M will include a contingency or emergency response plan, and O&M and Occupational Safety and Health Administration (OSHA) training records. As part of the development of the O&M manual, TNRCC agreed to compile ground water monitoring records and install a project sign for the HAP site.

The fencing and roads were in good condition, and the site locks were in place. High vegetation covered the site, and was growing inside the enclosed well clusters fencing. No recent flooding at the HAP site was apparent. A visual inspection of the monitoring wells noted good conditions with no apparent damage or vandalism.

An oil and gas production plant was installed at the entrance to the adjacent fenced property (approximately 200 feet east on Clear Lake Road) at the time of the inspection. Two wells for the production plant have been drilled.

EXHIBIT B
SITE VISIT CHECKLIST

(13 Pages)

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable."

I. SITE INFORMATION			
Site Name: Highlands Acid Pit	Date of Inspection: 05/08/01		
Location and Region: Highlands, Texas Region 6	EPA ID: 034-FRFF-06ZZ		
Agency, office, or company leading the five-year review: EPA	Weather/temperature: Overcast/windy 85-90 °F		
Remedy Includes: (Check all that apply) <ul style="list-style-type: none"> <input type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Ground water pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other <u>Ground water monitoring and site maintenance</u> 			
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached			
II. INTERVIEWS (Check all that apply)			
1. O&M Site Manager	N/A _____ Name	_____ Title	_____ Date
Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> Report attached _____ _____			
2. O&M Staff	<input type="checkbox"/> N/A _____ Name	_____ Title	_____ Date
Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions: <input type="checkbox"/> 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, record of deeds, or other city and county offices, etc.). Fill in all that apply.

Agency TNRCC
Contact Jim Feeley Project Manager April 27, 2001 (512)239-2462
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.

Agency _____
Contact _____
Name Title Date Phone no.

Problems, suggestions: Report attached _____

4. Other interviews (optional): Report attached.

Mr. Bubba Crawford, owner of the Baytown Boat Club

Mr. Jared Fuqua, HAP site contractor and consultant

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)		
1. O&M Documents		
<input checked="" type="checkbox"/> O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input type="checkbox"/> As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
<input type="checkbox"/> Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
Remarks <u>TNRCC O&M Manual preparation is in progress</u>		
2. Site-Specific Health and Safety Plan		
<input type="checkbox"/> Readily available	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks <u>Both plans should be included in the O&M Manual</u>		
3. O&M and OSHA Training Records		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks <u>Should be included in the O&M Manual</u>		
4. Permits and Service Agreements		
<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		
5. Gas Generation Records		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		
6. Settlement Monument Records		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		
7. Ground Water Monitoring Records		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks <u>TNRCC will compile</u>		
8. Leachate/Condensate Extraction Records		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		
9. Discharge Compliance Records		
<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		
10. Daily Access/Security Logs		
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks _____		

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Other _____
- Contractor for State
- Contractor for PRP

2. O&M Cost Records Not Available/HAP Not Started

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Breakdown attached

Total annual cost by year for review period, if available

From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	to _____		<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS

- Applicable N/A

A. Fencing

- 1. Fencing damaged** Location shown on site map Gates secured N/A
Remarks All locks in place

B. Other Access Restrictions			
1. Signs and other security measures Remarks <u>TNRCC will construct and install</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A	
C. Institutional Controls			
1. Implementation and enforcement			
Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) <u>Ground water sampling/post flooding inspection</u>			
Frequency _____			
Responsible party/agency <u>TNRCC</u>			
Contact <u>Jim Feeley</u>	<u>Project Manager</u>	_____	<u>(918) 437-7773</u>
Name	Title	Date	Phone no.
Reporting is up-to-date	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Other problems or suggestions: <input type="checkbox"/> Report attached			
2. Adequacy			
	<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate	<input checked="" type="checkbox"/> N/A
Remarks <u>Monitoring has not been initiated by TNRCC</u>			
D. General			
1. Vandalism/trespassing			
	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident	
Remarks _____			
2. Land use changes on site			
	<input type="checkbox"/> N/A		
Remarks <u>Additional well (oil/gas) has been drilled (on adjacent property)</u>			
3. Land use changes offsite			
	<input checked="" type="checkbox"/> N/A		
Remarks <u>Oil and gas production plant was being installed at the entrance to the fenced property (approximately 200 feet east, down Clear Lake Road adjacent to the HAP site)</u>			

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 High vegetation covering site and growing inside well cluster compounds
(fenced enclosures)

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface (Site Cover Only)

1. Settlement (Low spots) Location shown on site map Settlement not evident
 Areal 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
 Areal extent _____ Depth _____
 Remarks _____

4. Holes Location shown on site map Holes not evident
 Areal extent _____ Depth _____
 Remarks _____

5. Vegetative Cover Grass Cover properly established No signs of stress
 Trees/Shrubs (indicate size and locations on a diagram)
 Remarks The ground cover needs to be cut.

6. Alternative Cover (armored rock, concrete, etc.) N/A
 Remarks Access road in good condition

7. Bulges Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Depth _____	<input checked="" type="checkbox"/> Bulges not evident
8. Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____ <input type="checkbox"/> Areal extent _____
9. Slope Instability Areal extent _____ Remarks _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
2. Bench Breached Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
3. Bench Overtopped Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Settlement Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2. Material Degradation Material type _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Areal extent _____	<input type="checkbox"/> No evidence of degradation

3. Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion _____
4. Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting _____
5. Obstructions <input type="checkbox"/> Location shown on site map Type _____ Areal extent _____ <input type="checkbox"/> No obstructions Size _____ Remarks _____	
6. Excessive Vegetative Growth Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	
2. Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	
3. Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____	

4. Leachate Extraction Wells
 Properly secured/locked Functioning Routinely sampled Good condition
 Evidence of leakage at penetration Needs O&M 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 O&M
 Remarks _____

2. Gas Collection Wells, Manifolds, and Piping
 Good condition Needs O&M
 Remarks _____

3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)
 Good condition Needs O&M 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 Areal extent _____ Depth _____
 Siltation not evident
 Remarks _____

2. Erosion Areal extent _____ Depth _____
 Erosion not evident
 Remarks _____

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
H. Retaining Walls	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____		Vertical displacement _____
Rotational displacement _____		
Remarks _____		
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks _____		
I. Perimeter Ditches/Off-Site Discharge	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Areal extent _____		Depth _____
Remarks _____		
2. Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input type="checkbox"/> Vegetation does not impede flow		
Areal extent _____		Type _____
Remarks _____		
3. Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Areal extent _____		Depth _____
Remarks _____		
4. Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
VIII. VERTICAL BARRIER WALLS		
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Areal extent _____		<input type="checkbox"/> Depth
Remarks _____		

2. Performance Monitoring <input type="checkbox"/> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____ <input type="checkbox"/> Evidence of breaching
IX. GROUND WATER/SURFACE WATER REMEDIES	
A. Ground Water Extraction Wells, Pumps, and Pipelines	
<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input checked="" type="checkbox"/> N/A Remarks _____	
2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks <u>N/A</u>	
3. Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks <u>N/A</u>	
B. Surface Water Collection Structures, Pumps, and Pipelines	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____	
2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____	
3. Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____	
C. Treatment System	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 O&M
 Sampling ports properly marked and functional
 Sampling/maintenance log displayed and up to date
 Equipment properly identified
 Quantity of ground water treated annually _____
 Quantity of surface water treated annually _____

Remarks _____

2. Electrical Enclosures and Panels (Properly rated and functional)

- N/A Good condition Needs O&M

Remarks _____

3. Tanks, Vaults, Storage Vessels

- N/A Good condition Proper secondary containment Needs O&M

Remarks _____

4. Discharge Structure and Appurtenances

- N/A Good condition Needs O&M

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 O&M N/A

Remarks _____

D. Monitored Natural Attenuation

1. Monitoring Wells (Natural attenuation remedy)

- Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A

Remarks _____

X. OTHER REMEDIES

If there are remedies applied at the site which are 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 to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

No Action. Ground Water Record of Decision

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.

O&M has not been initiated. O&M plan is in progress by TNRCC contractor.

C. Early Indicators of Potential Remedy Failure

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.

Could not evaluate.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Could not evaluate.

APPENDIX C

SURVEYS

(Seven Pages)

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highlands Acid Pit Site		EPA Work Assignment No.: 034-FRFE-06ZZ	
Subject: Five-Year Review Background Information Survey		Date: 04/17/01	
Contact Made By:			
Name: Ernest Franke		Title: Work Assignment Project Manager	Organization: EPA
Telephone No.: (214) 665-8521 E-Mail: franke.ernest@epamail.epa.gov		Street Address: U.S. EPA 1455 Ross Avenue, Suite 1200 City, State, Zip: Dallas, Texas 75202	
Name: Tim Startz		Title: Project Manager	Organization: Tetra Tech EM Inc.
Telephone No.: (214) 740-2064 E-Mail: startzt@ttemi.com		Street Address: 350 N. St. Paul, Suite 2600 City, State, Zip: Dallas, Texas 75201	
Individual Contacted:			
Name: Bubba Crawford		Title: Owner, Baytown Boat Club	Organization:
Telephone No.:		Street Address: City, State, Zip:	
E-Mail Address:		Signature:	
Survey Questions			
Please return your survey in the enclosed envelope to Tim Startz by May 1, 2001.			
1. What is your overall impression of the project (general sentiment)? Response: Acceptable			
2. What effect have site operations had on the surrounding community? Response: Cleaned area			

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highlands Acid Pit Site

EPA Work Assignment No.: 034-FRFE-06ZZ

Subject: Five-Year Review Background Info Survey

Date: 04/27/01

Survey Questions (Cont.)

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

Response: None

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

Response: None

5. Do you feel well informed about the site's activities and progress?

Response: Yes

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

Response: None

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highland Acid Pit Site		EPA Work Assignment No.: 034-FRFE-06ZZ
Subject: Five-Year Review Operation and Maintenance Survey		Date: 04/27/01
Contact Made By:		
Name: Ernest Franke	Title: Work Assignment Manager	Organization: EPA
Telephone No.: (214) 665-8521 E-Mail: franke.ernest@epamail.epa.gov	Street Address: U.S. EPA 1455 Ross Avenue, Suite 1200 City, State, Zip: Dallas, Texas 75202	
Name: Tim Startz	Title: Project Manager	Organization: Tetra Tech EM Inc.
Telephone No.: (214) 740-2064 E-Mail: startzt@ttemi.com	Street Address: 350 N. St. Paul, Suite 2600 City, State, Zip: Dallas, Texas 75201	
Individual Contacted:		
Name: Jim Feeley	Title: Project Manager	Organization: Texas Natural Resource Conservation Commission
Telephone No.: (512)239-2462	Street Address: P. O. Box 13087 City, State, Zip: Austin, TX 78711-3087	
E-Mail Address: jfeeley@tnrcc.state.tx.us	Signature:	
Survey Questions		

Please return your survey to Tim Startz by May 1, 2001.

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

Surface conditions at the site are stable and generally reflect the conditions established in source control ROD. The conditions in the ground water require further study.

2. Has your office conducted routine communications or activities (site visits, inspections, reporting activities, etc.) regarding the site? If so, please give purpose and results.

The TNRCC has been actively involved as support agency to EPA in conducting the Operational and Functional (O&F) study of ground water at the site. This has involved report review, meetings, site visits, and other activities. With the completion of the O&F study, TNRCC is resuming the role of lead agency for post closure Operation and Maintenance (O&M).

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highlands Acid Pit Site

EPA Work Assignment No.: 034-FRFE-06ZZ

Subject: Five-Year Review Operation and Maintenance Survey

Date: 04/27/01

Survey Questions (Cont.)

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

Not in the last five years.

4. Do you feel well informed about the site's activities and progress?

Yes. As a participant in the O&F study, the TNRCC has had access to all reports and activities. However, determining the actual conditions at the site regarding the middle and deep ground water will require further study.

5. Have there been any changes in State laws and regulations that may impact the protectiveness of the ground water or soil remedies?

While there have been significant changes in State laws and regulations, in particular the promulgation of the Texas Risk Reduction Program rules, these rules would not come into play unless the Record of Decision were to be reopened.

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

NA.

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

At this point, it appears there is a cross-contamination problem with one or possibly both of two nested wells completed in the middle and deep zones. Both EPA and TNRCC agree these wells need to be removed and planning is underway to do so. It is the TNRCC's belief that further monitoring is required to determine the actual conditions in the middle and lower zones. TNRCC is revising the O&M plan and will then contract for monitoring services.

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highland Acid Pit Site		EPA Work Assignment No.: 034-FRFE-06ZZ
Subject: Five-Year Review Operation and Maintenance Survey		Date: 05/08/01
Contact Made By:		
Name: Ernest Franke	Title: Work Assignment Manager	Organization: EPA
Telephone No.: (214) 665-8521 E-Mail: franke.ernest@epamail.epa.gov	Street Address: U.S. EPA 1455 Ross Avenue, Suite 1200 City, State, Zip: Dallas, Texas 75202	
Name: Tim Startz	Title: Project Manager	Organization: Tetra Tech EM Inc.
Telephone No.: (214) 740-2064 E-Mail: startzt@ttemi.com	Street Address: 350 N. St. Paul, Suite 2600 City, State, Zip: Dallas, Texas 75201	
Individual Contacted:		
Name: Jared Fuqua	Title: Project Manager	Organization: Tetra Tech EM Inc.
Telephone No.: (214)740-2053	Street Address: 350 N. St. Paul Street, Suite 2600 City, State, Zip: Dallas, TX 75201	
E-Mail Address: fuquaj@ttemi.com	Signature:	
Survey Questions		
Please return your survey to Tim Startz by May 1, 2001.		
1. What is your impression of the project (general sentiment)? The project was successful in determining ground water flow direction and the acquisition of monitoring data for evaluation.		
2. Has your office conducted routine communications or activities (site visits, inspections, reporting activities, etc.) regarding the site? If so, please give purpose and results. Historical site activities included installing additional ground water monitor wells. Performed eight quarters of monitoring, completed a tidal study and aquifer testing. Activities were summarized in the Operational and Functional Activities Report.		

HIGHLANDS ACID PIT SITE SURVEY

Site Name: Highlands Acid Pit Site

EPA Work Assignment No.: 034-FRFE-06ZZ

Subject: Five-Year Review Operation and Maintenance Survey

Date: 05/08/01

Survey Questions (Cont.)

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

No.

4. Do you feel well informed about the site's activities and progress?

Yes.

5. Have there been any changes in State laws and regulations that may impact the protectiveness of the ground water or soil remedies?

Pre-SARA ROD.

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

Yes.

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

Initiate O&M activities.