

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
INTEROFFICE MEMORANDUM

2008 SEP -2 PM 1:00

CHIEF CLERKS OFFICE

To: Commissioners

Date: August 5, 2008

Through: *SW* Mark R. Vickery, P.G., Executive Director

DE Dan Eden, Deputy Director, Office of Permitting, Remediation & Registration

From: *Yef* Alan R. Batcheller, P.G., Director, Remediation Division

Subject: **Executive Summary**

Docket No: 2008-0928-SPF

Consideration of a Final Administrative Order, pursuant to Tex. Health & Safety Code Section 361.188, regarding the Pioneer Oil & Refining State Superfund Site (City of Somerset, Bexar County), which provides for listing the Site on the registry of state superfund sites and selection of a remedial action. The site is located approximately 1/4 mile south of Somerset city limits at 20280 South Payne Road.

I. Overview

The Pioneer Oil & Refining Proposed State Superfund Site (Site) is located approximately 1/4 mile south of the Somerset city limits in Bexar County, Texas. The Site was the location of a waste oil refinery abandoned in the late 1940's and covers approximately 12 acres. Historic activities at the Site resulted in the contamination of soil and groundwater with arsenic, lead, benzene and total petroleum hydrocarbons. The groundwater flow direction is to the south-southeast. In addition, there are two surface impoundments that contain highly acidic and oily sludge produced when the refinery was in operation.

The proposed remedy consists of the following measures:

- The two surface impoundments (or "pits") will be addressed through a process of stabilizing the waste sludge and containing it on-site with a liner and engineered cap. (The remedy does not plan for removal and off-site disposal). The on-site landfill will be fenced and maintained by Texas Commission on Environmental Quality (TCEQ).
- A Plume Management Zone (PMZ) with monitored natural attenuation was selected as the remedy for the contaminated groundwater plume. The PMZ will be monitored by the TCEQ at regular intervals. TCEQ anticipates initial quarterly monitoring, but the duration and frequency of the monitoring may vary depending on the evaluation of plume stability indicated by the resulting data.

The remainder of this memorandum summarizes the Site regulatory history, the characterization of the nature and extent of contamination, the efforts to identify responsible parties, the remedy selection process, and the staff recommendation.

II. Site History

The Pioneer Oil and Refining Company was operated as a waste oil refinery between roughly 1910 and 1949. Business names associated with the Site included Rainbow Oil Refining Company, Slimp Oil Company and

Pioneer Oil. The refinery was relatively small in capacity. In 1939, the Texas Petroleum Register indicated that the capacity was 2000 barrels per day. Although the facility has been abandoned for almost 60 years, the Site has two sludge impoundments, two active oil wells, two brick above ground tanks and several buildings associated with past operations. The City of Somerset has its wastewater treatment facility located at the northwest corner of the Site.

The TCEQ began an evaluation of the Site for inclusion in the State Superfund program by completing the Hazard Ranking System (HRS) report pursuant to 30 T.A.C. § 335.343. The HRS report is a numerically based screening system that uses information from initial investigations to assess whether a site qualifies for the state or federal Superfund program. The TCEQ conducted the HRS survey for the Site in 1990 and the Site earned a score of 24.54, which met the minimum HRS score qualifications for the state Superfund program.

On September 25, 1990, notice was published in the Texas Register, proposing the Site for listing in the State Registry of Superfund Sites (15 Tex Re. 5623-5624). A public meeting was held in Somerset on October 31, 1990.

III. Characterization of the Nature and Extent of Contamination

The TCEQ conducted the Remedial Investigation in several phases. Soil, sludge and groundwater samples were collected and analyzed. The investigation indicated that the central portion of the Site between the sludge impoundments and the oil refining structures had soil contaminated with lead, total petroleum hydrocarbons and benzene. The sludge samples had high concentrations of BTEX (benzene, toluene, ethylbenzene, and xylene) and total petroleum hydrocarbons. The sludge is also highly acidic, having a pH of less than 2. The groundwater is contaminated with arsenic, lead, benzene and total petroleum hydrocarbons. A yield test conducted in December of 2006 determined the rate of water production to be between 1000 and 1500 gallons per day and the concentrations of total dissolved solids to be over 1,000 mg per liter which makes the groundwater in this area Class 2.

The TCEQ conducted several treatability studies to identify remedial technologies for the contaminated soil, sludge and groundwater. Since this was an industrial site, the remedy will be designed to a commercial/industrial standard, as defined in 30 TAC §350.4(13). The soil and sludge treatability studies include stabilization of contaminated soil and sludge by mixing with cement kiln dust, fly ash, and Portland cement to raise the pH to a non hazardous level, to increase the unconfined compressive strength and to reduce the permeability and leachability of the stabilized mixture. The groundwater treatability studies included in-situ chemical oxidation, enhanced aerobic bioremediation and biosparging.

IV. Remedy Selection Process

The remedy selection process was initiated by first considering the soil and sludge remedy techniques separate from the possible groundwater remedy techniques. Then, different combinations of these remedy techniques were considered in four different remedial alternatives.

Soil and Sludge remedy techniques:

- (a) Excavation and stabilization of contaminated soil and sludge from both impoundments

- followed by off-site disposal,
- (b) Excavation and stabilization of contaminated soil and sludge from both impoundments followed by consolidation of all the stabilized materials in and south of the East Impoundment covered with an engineered cap,
- (c) Consolidation of excavated sludge from the West Impoundment and contaminated soil over the stabilized East Impoundment covered with an engineered cap, and
- (d) Consolidation of all excavated and stabilized sludge within East Impoundment and placement of an engineered cap over contaminated soil.

Groundwater remedy techniques:

- (i) pump and treat—which would treat the extracted groundwater through an air stripper, pH adjustment system, clarifier, and a filtration system.
- (ii) in-situ chemical oxidation—in which chemical oxidants would be injected into the groundwater to oxidize the contaminants.
- (iii) bioremediation—which involves injecting microorganism, nutrients and substrate to enhance biodegradation, and
- (iv) plume management zone (PMZ) with monitored natural attenuation—which involves the natural biodegradation of the contaminants. A PMZ is defined as the area of the groundwater protective concentration level exceedance (PCLE) zone plus any additional area allowed in accordance with the Texas Risk Reduction Rules (TRRP) at 30 TAC §350.33(f). The PCLE zone is that area of groundwater beneath the site which contains COCs at concentrations greater than the standard groundwater cleanup levels. A PMZ modifies the standard groundwater cleanup objectives by controlling and preventing the use of and exposure to the groundwater within the PMZ by recording institutional controls in the form of restrictive covenants or deed notices in the county's real property records.

These remedial techniques were combined to identify four remedial alternatives for the Site. These alternatives are:

Alternative #1: (a) Stabilization of soil and sludge with off site disposal and (b) pump and treat for groundwater.

Alternative #2: (a) Consolidation of excavated sludge from the West Impoundment and contaminated soil over the stabilized East Impoundment covered with an engineered cap; and (b) plume management zone with monitored natural attenuation for the groundwater.

Alternative #3 (a) Stabilization and onsite consolidation of soil and sludge covered with an engineered cap; and (b) plume management zone with enhanced monitored natural attenuation (with biosparging) for the groundwater.

Alternative #4: (a) Consolidation of excavated and stabilized sludge within East Impoundment and placement of an engineered cap over the contaminated soil; and (b) plume management zone for the groundwater.

These alternatives were evaluated in terms of technical feasibility, reliability, and cost. After appropriate opportunity for public comment, the TCEQ selected Alternative # 2 as the remedy for the Site.

In short, the remedy will include: Stabilization of East Impoundment sludge with Portland cement or similar material. The stabilized material will be grated and covered with a geo-textile liner. The sludge from the West Impoundment and the contaminated soil will be excavated and placed on the top of the stabilized East Impoundment. The consolidated material will be covered by an engineered cap. The capped area will be separated from the rest of the area by a chain link fence. Signs will be posted on the fence warning the public to keep out of the fenced area. The cap will be maintained and monitored by the TCEQ. Excavated areas will be backfilled with clean soil. The groundwater plume management zone will have monitoring wells installed along the axis of the plume and will be monitored by the TCEQ at regular intervals to evaluate its effectiveness. (Determination of the interval is based on site conditions and stability of the plume; we anticipate quarterly monitoring followed by monitoring once every four or six months and, finally, possibly annually.)

The remedy meets the criteria established in 30 T.A.C. § 335.348, including the requirement that "(t) he remedial action for a particular facility shall be selected based on the remedial alternative that the executive director determines to be the lowest cost alternative which is technologically feasible and reliable, effectively mitigates and minimizes damage to the environment, and provides adequate protection of the public health and safety and the environment." In comparison to the other remedial alternatives evaluated in the Feasibility Study process the proposed remedy is the lowest cost alternative. The estimated cost for the proposed remedy is \$1.6 million dollars.

The proposed remedy was presented for public comment in April 17, 2008, and was the subject of a public meeting held at the City Hall of Somerset. There were no public comments received in opposition to the selected remedy.

V. Efforts to Identify Responsible Parties

In parallel with the field investigation, the TCEQ conducted searches of record information that might indicate potentially responsible parties (PRPs) associated with the contamination. Those searches included extensive review of historic land ownership records and research into the oil companies which used the Site.

After considered review of all of the available information, Office of Legal Services staff concluded that although a number of entities or persons were examined in terms of responsibility (including former owners and operators), none of these entities or persons could be considered to be responsible parties because of legal impediments to their liability for the Site.

Therefore, staff are unable to name a party or parties as "responsible" at this time. This does not preclude implementation of the remedy for the Site and statutory provisions allow for naming and effecting cost recovery against any responsible parties which may be identified in the future.

VI. Staff Recommendation

Staff recommend that the Commission issue the proposed Administrative Order which will provide for implementing a remedy which is cost effective and protective of public health and safety and the environment. Approval of the Order will also cause the Site to be moved from "proposed" status to being listed on the registry of state superfund sites. If there are any questions, please contact Subhash C. Pal, P.E., Project Manager, State Lead Section at (512) 239-4513; or Cullen McMorrow, Staff Attorney, Litigation Division at (512) 239-0607. Please see the following web page for more information on the Site: www.tceq.state.tx.us/remediation/superfund/state/pioneer.html .

DOCKET NUMBER: 2008-0928-SPF

IN THE MATTER OF
THE SITE KNOWN AS
PIONEER OIL REFINING
STATE SUPERFUND SITE

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BEFORE THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Administrative Order

On _____, the Texas Commission on Environmental Quality (“Commission” or “TCEQ”) considered the Executive Director’s (“ED”) allegations of the existence of a release or threat of release of solid wastes and/or hazardous substances into the environment on, at or from the Pioneer Oil State Superfund Site (“Site”) that poses an imminent and substantial endangerment to the public health and safety or the environment pursuant to the Solid Waste Disposal Act, Tex. Health & Safety Code, Chapter 361 (the “Act”), including Section 361.188 and Section 361.272.

After proper notice, the TCEQ makes the following Findings of Fact and Conclusions of Law:

Findings of Fact

1. As of the date of this Administrative Order (“AO”), the TCEQ has not identified any parties determined to be responsible for the hazardous substances at the Site as defined by Section 361.271 of the Act.
2. When ranked, the Site had a State Superfund Hazard Ranking System (“HRS”) score of 24.54.
3. The portion of the Site used for ranking on the State Registry of Superfund Sites is described as follows:

Field notes of a 10.921 acre tract of land situated in Bexar County, Texas out of the Francisco Rolen Survey No. 48, Abstract No. 617, County Block 4014, Being a portion of a 12.940 acre tract of land conveyed to City of Somerset of record in Volume 8207, Page 903, Official Public Records of Bexar County, Texas and being more particularly described by metes and bounds as follows: Note: All iron pins set are ½” rebar with a yellow plastic cap stamped Baker Surveying.

Beginning at a ½” iron pin set in the east Right of Way line of Payne Road (60’ right-of-way) and the west line of the 12.940 acre tract for the southern most northwest corner of this tract.

Thence generally along a fence with a north and northwest line of this tract and across the 12.940 acre tract, the following calls:

1. S 86° 28' 23" E. 191.43 feet to a metal fence post for an interior corner,
2. N 04° 28' 23" E. 110.81 feet to a metal fence post for an angle point,
3. N 61° 30' 48" E. 187.84 feet to a metal fence post for an angle point,
4. N 81° 05' 29" E. 65.16 feet to a ½" iron pin set for an interior corner, and
5. N 01° 00' 00" E. 46.05 feet to a ½" iron pin set in the south line of a 4.397 acre tract of land, called Tract II, conveyed to City of Somerset of record in Volume 6249, Page 580, Official Public Records of Bexar County, Texas for and the north line of the 12.940 acre tract for the northern most northwest corner of this tract, from which a ½" iron pin found with a Baker Surveying cap for the northwest corner of the 12.940 acre tract and the southwest corner of the 4.397 acre tract bear N 78° 17' 10" W. 417.58 feet.

Thence S 86° 08' 47" E. 37.65 feet with the north line of the 12.940 acre tract and this tract and a south line of the 4.397 acre tract to a ½" iron pin found with a Baker Surveying cap for an angle point.

Thence S 78° 23' 54" E. 319.44 feet generally along a fence, with the north line of the 12.940 acre tract and this tract and a south line of the 4.397 acre tract and a 110.13 acre tract of land conveyed to Mary Lou Klemke of record in Volume 7223, Page 576, Official Public Records of Bexar County, Texas to a ½" iron pin found with a Baker Surveying cap for the northeast corner of the 12.940 acre tract and this tract.

Thence S 01° 06' 39" W. 1008.10 feet generally along a fence, with the east line of the 12.940 acre tract and this tract and the west line of the 110.13 acre tract to a ½" iron pin found for the southeast corner of the 12.940 acre tract of land and this tract and a northeast corner of a 2.383 tract of land, called Tract I, conveyed to City of Somerset of record in Volume 6249, Page 580, Official Public Records of Bexar County, Texas.

Thence N 46° 42' 44" W. 1043.36 feet with the southwest line of the 12.940 acre tract and this tract and the northeast line of the 2.383 acre tract to a ½" iron pin found in the east Right of Way line of Payne Road for the southwest corner of the 12.940 acre tract and this tract and the north corner of the 2.383 acre tract.

Thence N 00° 42' 56" W. 114.89 feet with the east Right of Way line of Payne Road and the west line of the 12.940 acre tract and this tract to the **Place of Beginning** and containing 10.921 acres of land according to a survey on the ground on April 17, 2008 by Baker Surveying Inc.

4. The Site consists of the area listed in Paragraph 3 above. In addition, the Site includes any areas outside the area listed in Paragraph 3 above where as a result, either directly or indirectly, of a release of hazardous substances from the area described in Paragraph 3 above, hazardous substances have been deposited, stored, disposed of or placed or have otherwise come to be located.
5. The Site was proposed for listing on the State Registry of Superfund Sites in the *Texas Register* on September 25, 1990, (15 TexReg 5623-5624).
6. The Site historically was used as a waste oil refinery between 1910 and 1949. The facility produced oil and oil-based products, including roofing tar and lubrication type oil. The

abandoned site has two waste sludge impoundments and several buildings associated with past operations.

7. The Chemicals of Concern at the Site include the following: Lead, benzene and total petroleum hydrocarbons (TPH) in the affected soil and sludge in two impoundments. In addition the sludge in both impoundments is highly acidic, having pH of less than 2 (hazardous). The groundwater at the Site is contaminated with arsenic, lead and TPH. These substances have been processed, deposited, stored, disposed of, or placed, or have otherwise come to be located on the Site.
8. The Chemicals of Concern listed in Paragraph 7 have been documented in affected soil, sludge and groundwater at the Site.
9. The substances listed in Paragraph 7 include:
 - A. Substances designated under Section 311(b)(2)(A) of the Federal Water Pollution Control Act, as amended (33 United States Code ("U.S.C.") Section 1321);
 - B. elements, compounds, mixtures, solutions, or substances designated under Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") (42 U.S.C. Section 9601 et seq., as amended);
 - C. hazardous wastes having the characteristics identified under or listed under Section 3001 of the Federal Solid Waste Disposal Act, as amended (42 U.S.C. Section 6921), excluding wastes, the regulation of which has been suspended by Act of Congress;
 - D. toxic pollutants listed under Section 307(a) of the Federal Water Pollution Control Act (33 U.S.C. Section 1317);
 - E. hazardous air pollutants listed under Section 112 of the Federal Clean Air Act, as amended (42 U.S.C. Section 7412); or
 - F. any imminently hazardous chemical substances or mixtures with respect to which the administrator of the Environmental Protection Agency ("EPA") has taken action under Section 7 of the Toxic Substances Control Act (15 U.S.C. Section 2606).
10. The substances listed in Paragraph 7 include one or more of the following: garbage, rubbish, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, municipal, commercial, mining, and agricultural operations and from community and institutional activities.
11. Solid wastes or hazardous substances at the Site listed in Paragraph 7 are, or potentially are, spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.
12. Potential pathways for exposure to the solid wastes or hazardous substances listed in Paragraph 7 include the risk of exposure to impacted soils and/or residuals through air emission, surface water runoff, and ingestion or inhalation pathways.

13. Exposure to levels of the Chemicals of Concern listed in Paragraph 7 found at the Site poses an unacceptable carcinogenic risk or an unacceptable toxicity risk.
14. The Remedy Selection Document (“RSD”) for the Site is attached to this AO as Exhibit A and incorporated herein by reference. The RSD is to be implemented as the selected Remedy in accordance with this AO.
15. The hazardous substances at the Site are not capable of being managed separately under the RSD.
16. No voluntary actions have been undertaken at the Site by any potentially responsible parties.
17. The following terms have the meaning set out below:

“Chemicals of Concern”	Any chemical that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity.
“Executive Director (ED)”	The Executive Director of the TCEQ or a designee.
“imminent and substantial endangerment”	A danger is imminent if, given the entire circumstances surrounding each case, exposure of persons or the environment to hazardous substances is more likely than not to occur in the absence of preventive action. A danger is substantial if, given the current state of scientific knowledge, the harm to public health and safety or the environment which would result from exposure could cause adverse environmental or health effects. 30 Tex. Admin. Code Section 335.342.
“include”	Use of the term include, in all its forms, in this AO is intended to express an enlargement or illustrative application specifying a particular thing already included within the preceding general words. It is not used as a term of limitation.
“Remedy”	The Remedy adopted for the Site in the Remedy Selection Document to clean up or control exposure at the Site in accordance with all applicable laws and regulations and to be implemented in accordance with this AO. The Remedy includes all applicable requirements contained in the Act and 30 Tex. Admin. Code Chapter 335, Subchapter K and 30 Tex. Admin. Code Chapter 350.

“Remedy Selection Document (RSD)”

The document that was developed for the Site based on Site specific information, that specifies the Remedy, and that was adopted by the ED after the opportunity for public review and comment.

Conclusions of Law

1. The substances referenced in Paragraph 7, which are found at the Site, are hazardous substances as defined in Section 361.003(11) of the Act, or are solid wastes as defined in Section 361.003(34) of the Act.
2. The site is a facility as defined in Section 361.181(c)(1). Hazardous substances were deposited, stored, disposed of, or placed or otherwise came to be located at the Site.
3. The Site is a facility as defined in Sections 361.003(36): “‘Solid waste facility’ means all contiguous land, including structures, appurtenances, and other improvements on the land, used for processing, storing, or disposing of solid waste. The term includes a publicly or privately owned solid waste facility consisting of several processing, storage, or disposal operational units such as one or more landfills, surface impoundments, or a combination of units.” This Site was used for processing, storing, or disposing of solid waste.
4. There has been a release (as defined in Section 361.003(28) of the Act) or threatened release of hazardous substances or solid waste into the environment at the Site that poses an “imminent and substantial endangerment” (as defined in 30 Tex. Admin. Code Section 335.342) to the public health and safety or the environment. Therefore, the Site will be listed on the State Registry of Superfund Sites per paragraph 26.
5. The release or threatened release of hazardous substances or solid waste into the environment at or from the Site has not been proven to be divisible pursuant to Section 361.276 of the Act.
6. The actions required by this AO are reasonable and necessary to protect the public health and safety or the environment.
7. The Site is ineligible for listing on the National Priorities List (“NPL”) because the HRS score was below 28.5.
8. Funds from the Federal Government are unavailable for implementing the RSD at this Site because it is ineligible for the NPL.

Order

Based on the Findings of Fact and Conclusions of Law, the TCEQ orders:

1. The Site will be listed on the State Registry of Superfund Sites, pursuant to Sections 361.183 and 361.184 of the Act and 30 Tex. Admin. Code 335.341.
2. In accordance with Section 361.1855 of the Act and for the purpose of selecting the Remedy, the ED has selected “commercial/industrial” as the appropriate land use for the Site. In

accordance with Section 361.190 of the Act, a person may not substantially change the manner in which the Site is used without notifying the ED and receiving the ED's written approval for the change.

3. Nothing in this AO shall be interpreted to prevent the ED from amending this AO or issuing a separate order to include any potentially responsible parties newly identified after the issue date of this AO pursuant to Section 361.188(c) of the Act
4. The groundwater remedy includes Plume Management Zone (PMZ) with Monitored Natural Attenuation. The groundwater plume will be monitored at a regular interval for three years. If the groundwater plume does not shrink within three years, bio-sparging will be considered for accelerated bioremediation. The duration and frequency of monitoring will be reevaluated and adjusted in accordance with the remedial objectives defined in the RSD.
5. The provisions of this AO are intended to be severable and are deemed severable. Should any provision of this AO be rendered unenforceable by a court of competent jurisdiction or other appropriate authority the remaining provisions will remain valid and enforceable.
6. Section headings are included for convenience of reference only and will be disregarded in the construction and interpretation of any of the provisions of this AO.
7. This AO will be effective on the date the AO is issued. The Chief Clerk will send a copy of this Administrative Order to all Parties.

Issued date:

Texas Commission on Environmental Quality

Buddy Garcia, Chairman

EXHIBIT A

Remedy Selection Document

**REMEDY SELECTION
DOCUMENT**



**PIONEER OIL & REFINING
PROPOSED STATE SUPERFUND SITE
SOMERSET, BEXAR COUNTY, TEXAS**

August 28, 2008

**PREPARED BY: SUBHASH C. PAL, P.E., PROJECT MANAGER
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
STATE LEAD SECTION
REMEDICATION DIVISION**

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**PIONEER OIL & REFINING PROPOSED STATE SUPERFUND SITE
SOMERSET, BEXAR COUNTY, TEXAS
REMEDY SELECTION DOCUMENT**

I. INTRODUCTION

The Pioneer Oil & Refining Proposed State Superfund Site (Site) is located approximately 1/4 mile south of the Somerset City limits in Bexar County, Texas (figure 1-1). The Site was the location of a waste oil refinery abandoned in the late 1940's and covers approximately 12 acres. Historic activities at the Site resulted in the contamination of soil and groundwater with lead, arsenic, total petroleum hydrocarbons (TPH) and benzene. In addition there are two impoundments that contain oily sludge produced when the refinery was in operation.

The Texas Commission on Environmental Quality (TCEQ) is the agency in the State of Texas given responsibility for implementing the laws of the state relating to the conservation of natural resources and the protection of public health and safety and the environment. The TCEQ addresses certain sites that may constitute an imminent and substantial endangerment to public health and safety or the environment through the state Superfund program.

II. PURPOSE

This *Remedy Selection Document (RSD)* is designed to address the contaminants at the Site and to provide protection of public health and safety and the environment. Words appearing in italics in this document are defined in Section X, "Glossary" of this document.

A. The purpose of this document is:

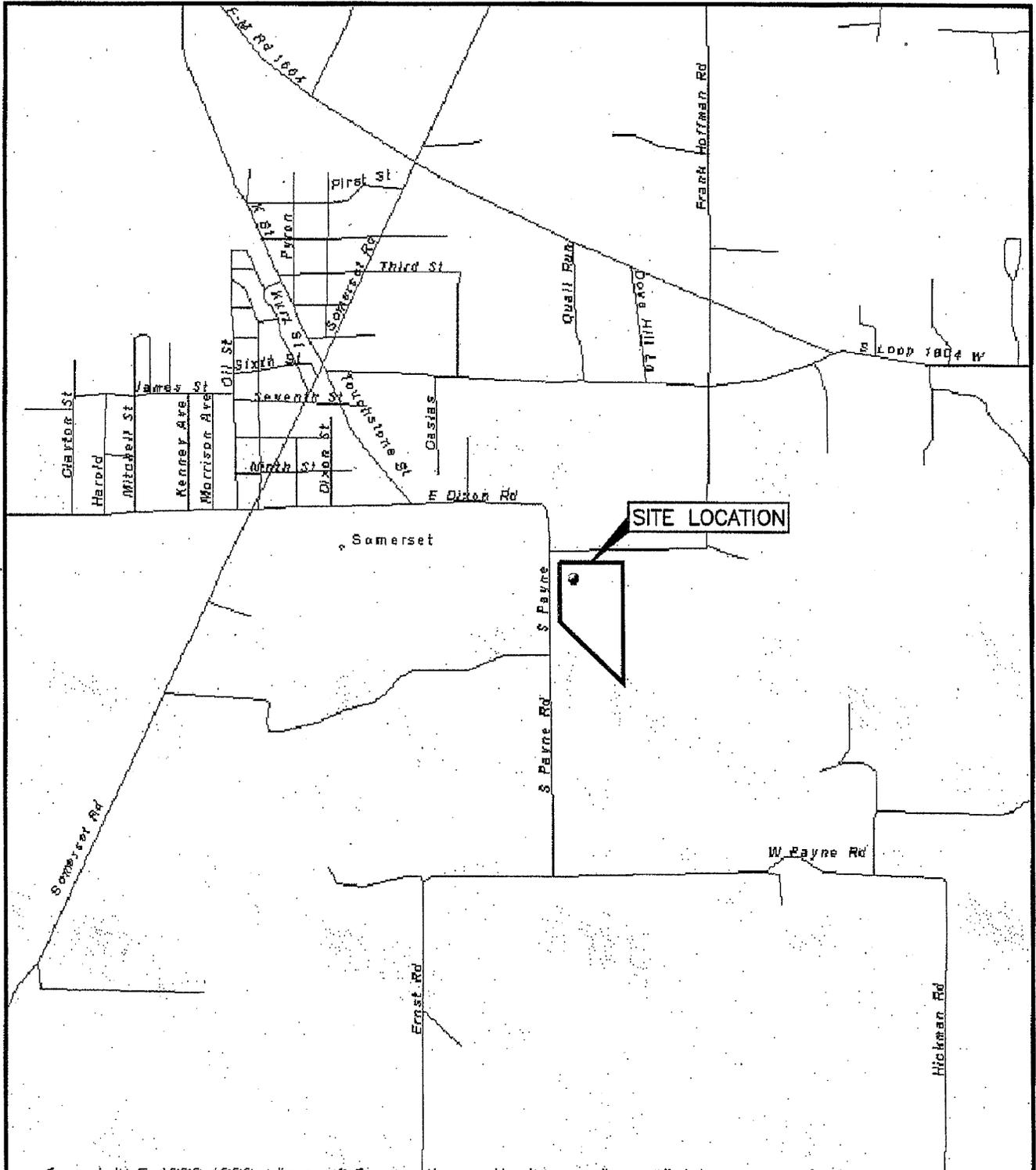
1. To describe the actions taken by the TCEQ to investigate the contamination, including any mitigating actions;
2. To describe the selected remedy for the Site.

B. This document summarizes information that can be found in greater detail in various studies and reports located in the Site files. Relevant documents are identified and summarized in Part V, "Summary of Reports" of this Remedy Selection Document. Copies of this documents summarized in this RSD as well as other relevant information, can be viewed at the local repository:

- | | |
|--------------------------------|--|
| (1) San Antonio Public Library | (2) City of Somerset Administrative Office |
| 600 Soledad | 7360 East 6 th Street |
| San Antonio, Texas | Somerset, Texas 78069 |

Or in Austin at the TCEQ Records Management Center:

Building E, 1st Floor
12100 Park 35 Circle
Austin, Texas 78753
(512) 239-2930



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WESTON SOLUTIONS		
FIGURE 1-1 SITE LOCATION MAP PIONEER OIL STATE SUPERFUND SITE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY SOMERSET, BEXAR COUNTY, TEXAS		
DATE DEC 07	PROJECT NO. 02444.016.008.0110	SCALE 1" = 2000'

III. LEGAL AUTHORITY

The investigation of the nature and extent of contamination at the Site and the selection of the *Remedial Action* is in accordance with the *Solid Waste Disposal Act* (codified as Chapter 361 of the Texas Health and Safety Code); Subchapter K: Hazardous Substance Facilities Assessment and Remediation rules found in Chapter 335 of 30 Texas Administrative Code (Subchapter K); and the *Texas Risk Reduction Program* (TRRP) rules found in Chapter 350 of 30 Texas Administrative Code.

While the Subchapter K rules are specific to the Superfund process, the TRRP rules are a comprehensive program for addressing environmental contamination and apply to many different types of corrective action administered by the TCEQ. The goal of the TRRP rules is to reduce the risk at a site to acceptable levels in terms of the concentration of contaminants that are allowed to remain in the soil and water. Under the TRRP rules, these acceptable concentration levels are called *Protective Concentration Levels* (PCLs).

A three-tiered approach may be used under the TRRP rules to calculate the PCLs for a site. The tiers represent increasing levels of evaluation where site-specific information is factored into the process. For example, Tier 1 uses conservative, generic models that do not account for site-specific factors while Tier 3 allows for more detailed and complex evaluations so that PCLs are appropriate for specific site conditions. The PCLs for this Site were developed under Tier 2 to protect human health and groundwater.

Critical to the analysis under all three of the tiers is the land use classification for the site. Under the TRRP rules, the land can be classified as either residential or commercial/industrial. Remediation to residential standards assumes that the site may be occupied by children and therefore is applicable not only to strictly residential land but also to playgrounds, schools, daycare centers and similar land uses. Remediation to commercial/industrial standards assumes that the site will not be regularly occupied by children and is protective of persons who may occupy the site as workers. Sites remediated to commercial/industrial standards cannot be used for residential-type activities unless further controls are implemented to make the site safe for that use. After discussion at a public meeting in October 31, 1990, the TCEQ determined that a commercial/industrial land use was appropriate for the Site.

The TRRP rules allow risks posed by the presence of contamination above a PCL to be managed by any combination of the following: 1) removal or decontamination of contaminated media; 2) physical controls such as landfills and caps which limit exposure to the contaminated media; or 3) institutional controls such as deed restrictions on the future use of the property which are also intended to limit exposure to the contaminated media. These remedies under the TRRP rules are divided into two main categories: Remedy Standard A and Remedy Standard B. To meet Remedy Standard A requirements, the contaminated media must be removed and/or decontaminated such that physical controls and, in most cases, institutional controls are not necessary to protect human and ecological receptors from unprotective levels of contamination based on the designated land use. To meet the requirements of Remedy Standard B, however, physical controls and institutional controls may be relied on to eliminate exposure to unprotective levels of contamination. These standards are described in detail in 30 T.A.C. §350.32 and §350.33, respectively. The proposed remedy at the Site meets the criteria established for Remedy Standard B.

IV. SITE HISTORY

The real property, a 12 acre tract, on which the Pioneer Oil refinery was located, was operated as a refinery between the late 1910's and the late 1940's. Business names associated with the site included Rainbow Oil and Refining Company, Slimp Oil Company, and Pioneer Oil. Rainbow conveyed the refinery and the lease to Pioneer Oil and Refining Company in 1920. Pioneer was dissolved in 1949. Property ownership was in the Kurz family, before 1961, the J.W. and Mary L. James, from 1961-1977, and the City of Somerset (1977-present).

The refinery was a small one: in 1939, the Texas Petroleum Register indicated that the capacity was 2000 barrels per day. The facility produced oil and oil based products, including roofing tar and lubricating type oil. The annual rental on the 12-acre tract was \$400 per year in the 1920's, which declined to \$300 in later years.

Although the facility has been abandoned for over 50 years, the site has two sludge impoundments, two active oil wells, two brick above ground tanks and several buildings associated with the operation (figure 1- 2).

V. SUMMARY OF REPORTS

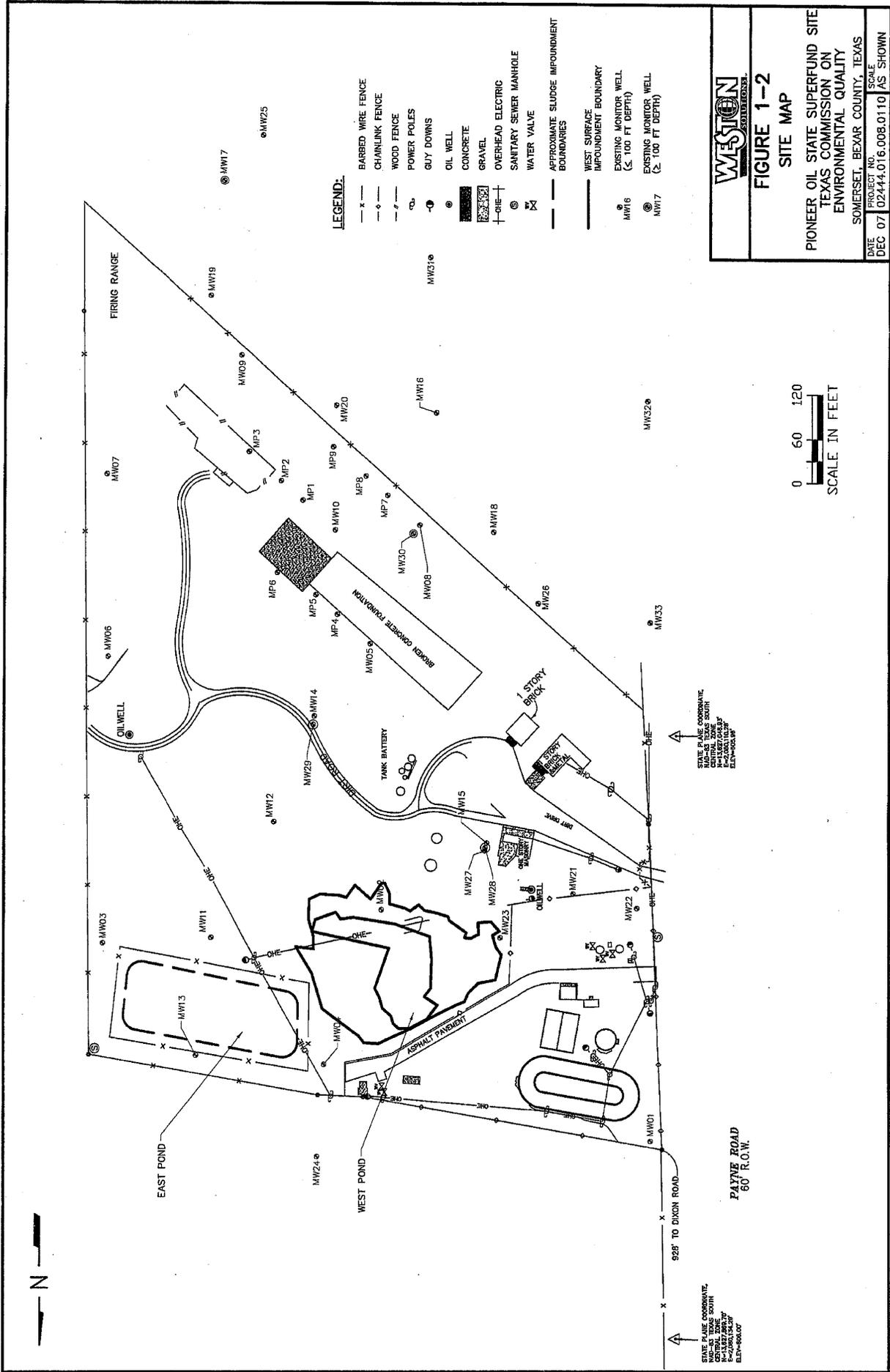
A. HAZARD RANKING SYSTEM REPORT

The *Hazard Ranking System* (HRS) is a numerically-based screening system that uses information from initial, limited investigations to assess whether a site qualifies for the state or federal Superfund program. Sites scoring 28.5 or greater may qualify for the federal Superfund program, while sites scoring 5 or greater may qualify for the state Superfund program. The HRS scoring for the Site was prepared by the TCEQ in June 1990 and is presented in the report titled "Hazard Ranking System Documentation Record". The Site earned a score of 24.54 which qualified the Site for proposal to the State Registry of Superfund Sites on September 25, 1990, and acceptance into the State Superfund program.

B. REMEDIAL INVESTIGATION REPORT

The Phase I *Remedial Investigation* (RI) was conducted by Brown and Root Environmental between August 1993 and May 1995. The Phase II RI was conducted by Woodward-Clyde between November 1995 and October 1996. The RI Report by Woodward-Clyde was accepted by the TCEQ on October 1996.

The RI indicated that the central portion of the site between the sludge impoundments and the old refining buildings had soil contaminated with lead, TPH (total petroleum hydrocarbons) and benzene. The *groundwater* at the site was contaminated with lead, arsenic, TPH and benzene. The sludge samples had high BTEX (Benzene, Toluene, Ethyl benzene and Xylene) and TPH values and had pH values less than 2.



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Weston Solutions continued the investigation from 2001 through 2003 by collecting soil and groundwater samples to better delineate the groundwater plume and to define the excavation boundary of the affected soil.

C. FEASIBILITY STUDY (FS)

The "Revised *Feasibility Study*, Pioneer Oil State Superfund Site, Somerset, Texas, January 2008" presents a summary of the specific threats identified at the Site and an evaluation of potential remedial alternatives to address those threats. Those alternatives and that evaluation are summarized in the following section of this RSD.

D. CLEAN-UP GOALS FOR THE IMPACTED MEDIA

MEDIA: SOIL AND SLUDGE

<i>Chemicals of Concern</i>	ACTION LEVEL (Critical PCL)	REMEDIAL ACTION OBJECTIVES
Lead	983.1 mg/kg	Tier II clean-up level to protect groundwater
Benzene	0.283 mg/kg	Tier II clean-up level to protect groundwater
Total Petroleum Hydrocarbons	67,000 mg/kg	Human health protection level from ingestion/dermal contact

MEDIA: GROUNDWATER

<i>Chemicals of Concern</i>	ACTION LEVEL (Critical PCL)	REMEDIAL ACTION OBJECTIVES
Lead	0.015 mg/l	to comply with drinking water standard
Benzene	0.005 mg/l	to comply with drinking water standard
Arsenic	0.010 mg/l	to comply with drinking water standard
Total Petroleum Hydrocarbons	5.7 mg/l	to protect human health from ingestion

E. TREATABILITY STUDY- Soil and Sludge

Two bench scale laboratory studies were conducted by Kemron Environmental Services (Kemron) in 2000 and 2001 to identify cost effective mixture design capable of reducing leachability and improving physical properties of the sludge at the site, specifically achieving unconfined compressive strength (UCS) greater than 15 psi, permeability less than 10^{-6} cm/sec and leachability below TRRP Tier 1 requirements. Various mixtures of Portland cement/hydrated lime/fly ash were tested to achieve intended results. The bench scale tests showed that high reagent mixtures were needed to stabilize the sludge and recommended to conduct pilot scale study to collect design data.

A pilot scale demonstration study was conducted by Hardine ESE, Inc. in 2002 to evaluate the ability to apply in-situ soil stabilization techniques to the sludge material at the site. Multiple tests were performed to evaluate different treatment conditions, including sludge mixing, reagent addition, soil addition, water addition and blending time. The objective of the pilot study was to achieve an effective ratio of the waste materials (i.e., east sludge, west sludge, and affected soil) to the reagent which ultimately achieves the treatability goals of compressive strength, permeability, leachability and pH, while minimizing the amount of reagent addition. The pilot scale study showed that the east pond sludge was responsive to treatment when blended with site soil, the west pond sludge was responsive to treatment with reagents. The west pond sludge was also responsive to treatment when blended with site soils followed by reagent addition.

TREATABILITY STUDY- Groundwater

In 2007 Weston Solutions, Inc. (Weston) conducted a pilot study to evaluate technologies to control the groundwater plume movement and evaluate enhanced monitored natural attenuation (MNA) as a remedy for the groundwater. Weston also conducted a yield test to determine the groundwater classification and the groundwater was classified as a Class 2 Aquifer. Therefore, a Plume Management Zone (PMZ) could be used as a remedy for the groundwater.

Weston conducted three tests, enhanced aerobic bioremediation using ORC Advanced™ (ORC-A), chemical oxidation utilizing RegenOx™, and bio-sparging by continuously delivering air to the saturated zone. The tests demonstrated that the enhanced MNA by introducing oxygen into the groundwater by RegenOx or air (bio-sparging), resulted in significant reduction of benzene concentrations.

VI. THE REMEDIAL ALTERNATIVES

REMEDIAL ALTERNATIVES – SOILS AND SLUDGE

1. **Stabilization with off-site disposal (figure 2-1)**

This remedial approach involves the excavation, stabilization, and off-site disposal of sludge in the impoundments and the contaminated soils. Based on the findings of the pilot scale study, the sludge from the impoundments will be initially blended with the site soils followed by stabilization with a mixture of cement, fly ash and lime. The stabilized material will comply with specific criteria of *unconfined compressive strength, permeability and leachability*. The stabilized material will then be transported to an off-site permitted landfill for disposal. The excavated areas will be backfilled to the existing grade with clean soil. No operation and maintenance will be necessary.

2. **Stabilization, on-site consolidation with an engineered cap (figure 2-2)**

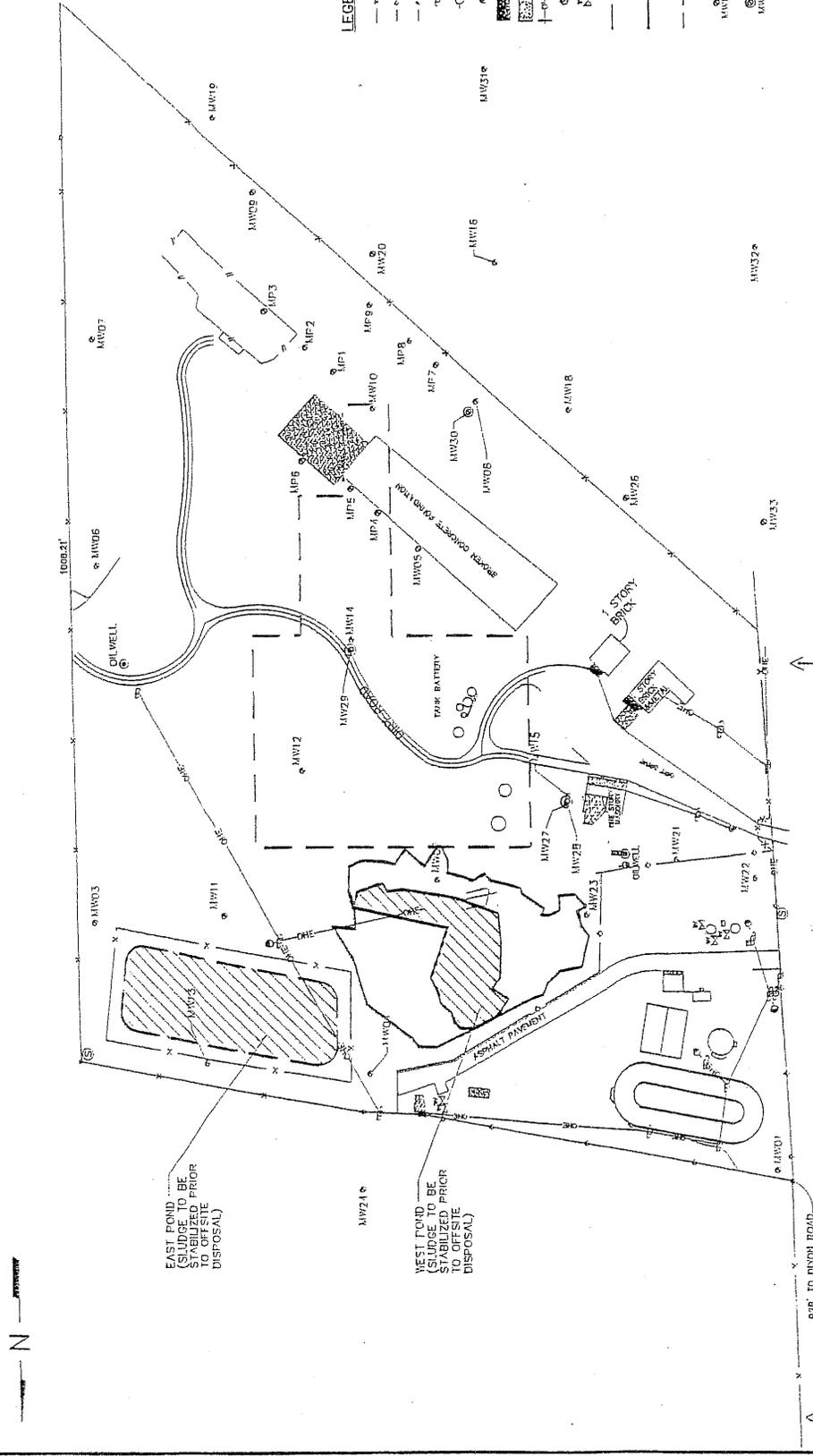
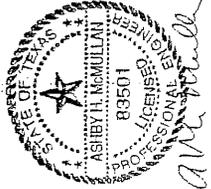
This approach involves the excavation, stabilization, and onsite consolidation of the impoundment sludge, and the contaminated soils. The stabilized material will be consolidated onsite in the vicinity of the east impoundment and will be covered with an engineered cap. The excavated areas will be backfilled to the existing grade with clean soil. The capped area will be monitored to evaluate the effectiveness of the remedy and will be deed recorded. Long term operation and maintenance will be necessary.

3. **Consolidation within East Impoundment with an engineered Cap (figure 2-3)**

This remedial approach involves excavation of the sludge from the West Impoundment and the affected site soils and consolidation of the materials into the stabilized East Impoundment. The sludge from the East Impoundment and contaminated soils will be mixed with lime, cement, fly ash or similar material to increase the pH to a non-hazardous range and to provide sufficient compressive strength to support the weight of consolidated sludge from West Impoundment and the engineered cap. The excavated areas will be backfilled with clean soil. The capped area will be monitored to evaluate the effectiveness of the remedial procedure and it will be deed recorded. Long term operation and maintenance will be necessary.

4. **Consolidation of Sludge within East Pond and Covers for the contaminated soil (figure 2-4)**

In this remedial alternative the sludge from the West Impoundment will be mixed with the sludge in the East Impoundment. The consolidated sludge will be mixed with lime, cement, fly ash or similar material to increase the pH of the mixture into the non-hazardous range and to provide sufficient compressive strength to support an engineered cap. The excavated area will be backfilled with clean soil. The contaminated soil to the south of the Impoundments will be covered in-place by engineered caps. The capped areas will be monitored to evaluate the remedy effectiveness and will be deed recorded. Long term operation and maintenance will be necessary.



- LEGEND:**
- BARBED WIRE FENCE
 - CHAINLINK FENCE
 - WOOD FENCE
 - POWER POLES
 - GUY DOWNS
 - OIL WELL
 - CONCRETE
 - ▨ GRAVEL
 - OVERHEAD ELECTRIC
 - SANITARY SEWER MANHOLE
 - WATER VALVE
 - APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
 - WEST SURFACE IMPOUNDMENT BOUNDARY
 - APPROXIMATE AREA OF AFFECTED SOIL
 - EXISTING MONITOR WELL (< 100 FT DEPTH)
 - ⊙ EXISTING MONITOR WELL (> 100 FT DEPTH)

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AN ENVIRONMENTAL SOLUTIONS COMPANY

FIGURE 2-1
SOIL & SLUDGE
REMEDIAL APPROACH 1
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
SOMERSET, BEXAR COUNTY, TEXAS

DATE	PROJECT NO.	SCALE
DEC 07	02444.016.008.0110	AS SHOWN

SCALE PLANE COORDINATE:
 NAD-83 TEXAS SOUTH
 N-TAXES 83-207
 E-130041028
 ELEV-5045.85

SCALE PLANE COORDINATE:
 NAD-83 TEXAS SOUTH
 N-TAXES 83-207
 E-130041028
 ELEV-5045.85

SCALE IN FEET
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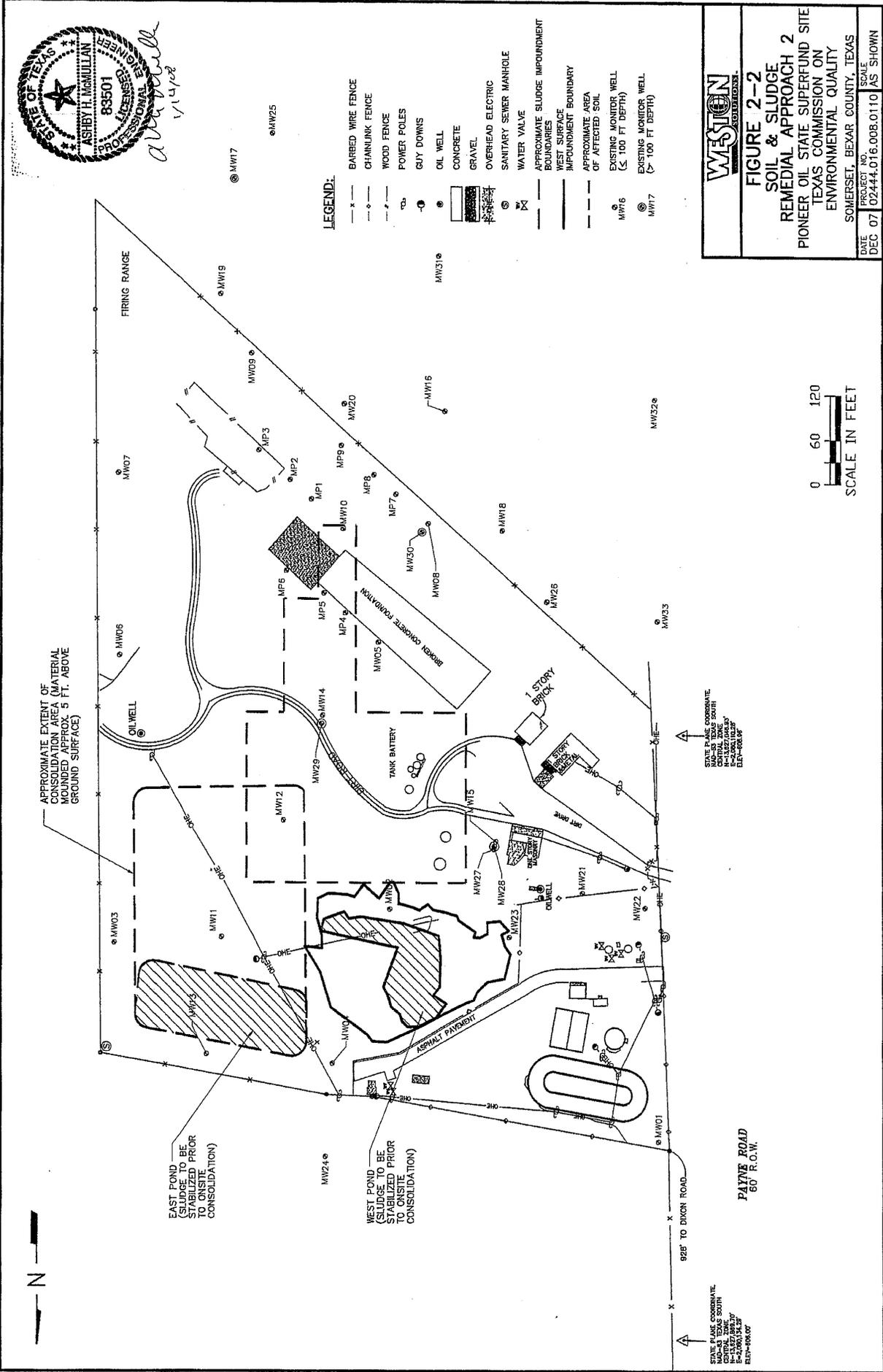
PAVING ROAD
 60' R.O.W.

90° TO BRIND ROAD.

SCALE PLANE COORDINATE:
 NAD-83 TEXAS SOUTH
 N-TAXES 83-207
 E-130041028
 ELEV-5045.85



1/14/02



- LEGEND:**
- X --- BARBED WIRE FENCE
 - O --- CHAINLINK FENCE
 - W --- WOOD FENCE
 - P --- POWER POLES
 - G --- GUY DOWNS
 - O --- OIL WELL
 - C --- CONCRETE
 - G --- GRAVEL
 - E --- OVERHEAD ELECTRIC
 - S --- SANITARY SEWER MANHOLE
 - V --- WATER VALVE
 - I --- APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
 - B --- WEST SURFACE IMPOUNDMENT BOUNDARY
 - A --- APPROXIMATE AREA OF AFFECTED SOIL
 - M --- EXISTING MONITOR WELL (≤ 100 FT DEPTH)
 - M --- EXISTING MONITOR WELL (> 100 FT DEPTH)

APPROXIMATE EXTENT OF CONSOLIDATION AREA (MATERIAL MOUNDED APPROX. 5 FT. ABOVE GROUND SURFACE)

EAST POND (SLUDGE) TO BE STABILIZED PRIOR TO ONSITE CONSOLIDATION)

WEST POND (SLUDGE) TO BE STABILIZED PRIOR TO ONSITE CONSOLIDATION)

STATE PLANE COORDINATE
NAD 83 TEXAS SOUTH
CENTRAL ZONE
E=1346784.27
N=400000.00
ELEV=400.00'

STATE PLANE COORDINATE
NAD 83 TEXAS SOUTH
CENTRAL ZONE
E=1346784.27
N=400000.00
ELEV=400.00'



PAINE ROAD
60' R.O.W.

928' TO DIXON ROAD.

STATE PLANE COORDINATE
NAD 83 TEXAS SOUTH
CENTRAL ZONE
E=1346784.27
N=400000.00
ELEV=400.00'

STATE PLANE COORDINATE
NAD 83 TEXAS SOUTH
CENTRAL ZONE
E=1346784.27
N=400000.00
ELEV=400.00'

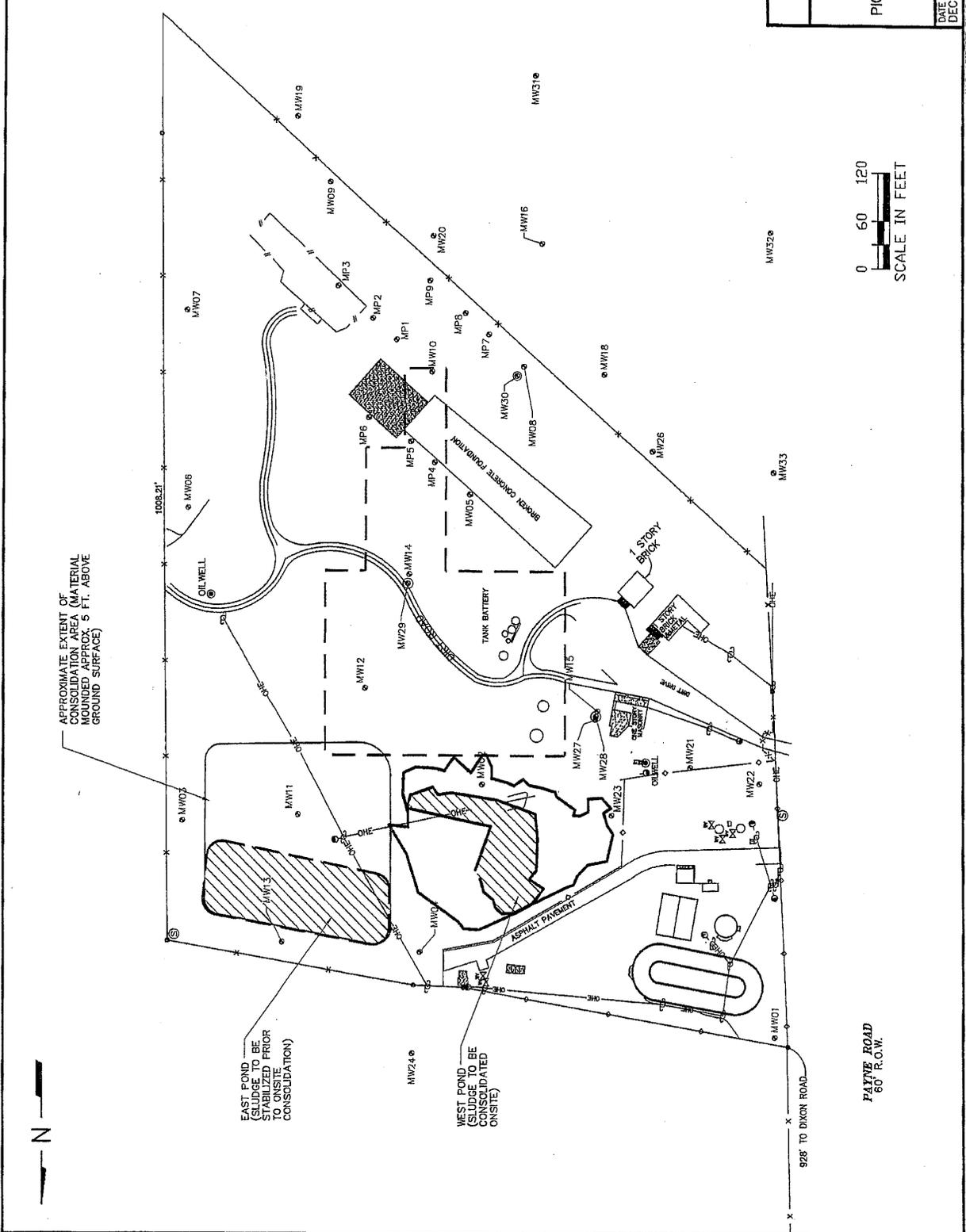


FIGURE 2-2
SOIL & SLUDGE
REMEDIAL APPROACH 2
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
SOMERSET, BEAR COUNTY, TEXAS

DATE DEC 07 02:44:016.008.0110 AS SHOWN
PROJECT NO. SCALE
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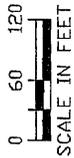
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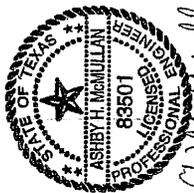
- MW17
- MW25
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- o — CHAINLINK FENCE
- / — WOOD FENCE
- ⊕ POWER POLES
- ⊖ GUY DOWNS
- OIL WELL
- CONCRETE
- ▨ GRAVEL
- +— OVERHEAD ELECTRIC
- ⊕ SANITARY SEWER MANHOLE
- ⊕ WATER VALVE
- |— APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
- |— WEST SURFACE IMPOUNDMENT BOUNDARY
- APPROXIMATE AREA OF AFFECTED SOIL
- MW16
- MW17
- EXISTING MONITOR WELL (≤ 100 FT DEPTH)
- EXISTING MONITOR WELL (≥ 100 FT DEPTH)



FIGURE 2-3
SOIL & SLUDGE
REMEDIAL APPROACH 3
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
 SOMERSET, BEXAR COUNTY, TEXAS

DATE	PROJECT NO.	SCALE
DEC 07	02444.016.008.0110	AS SHOWN

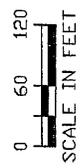
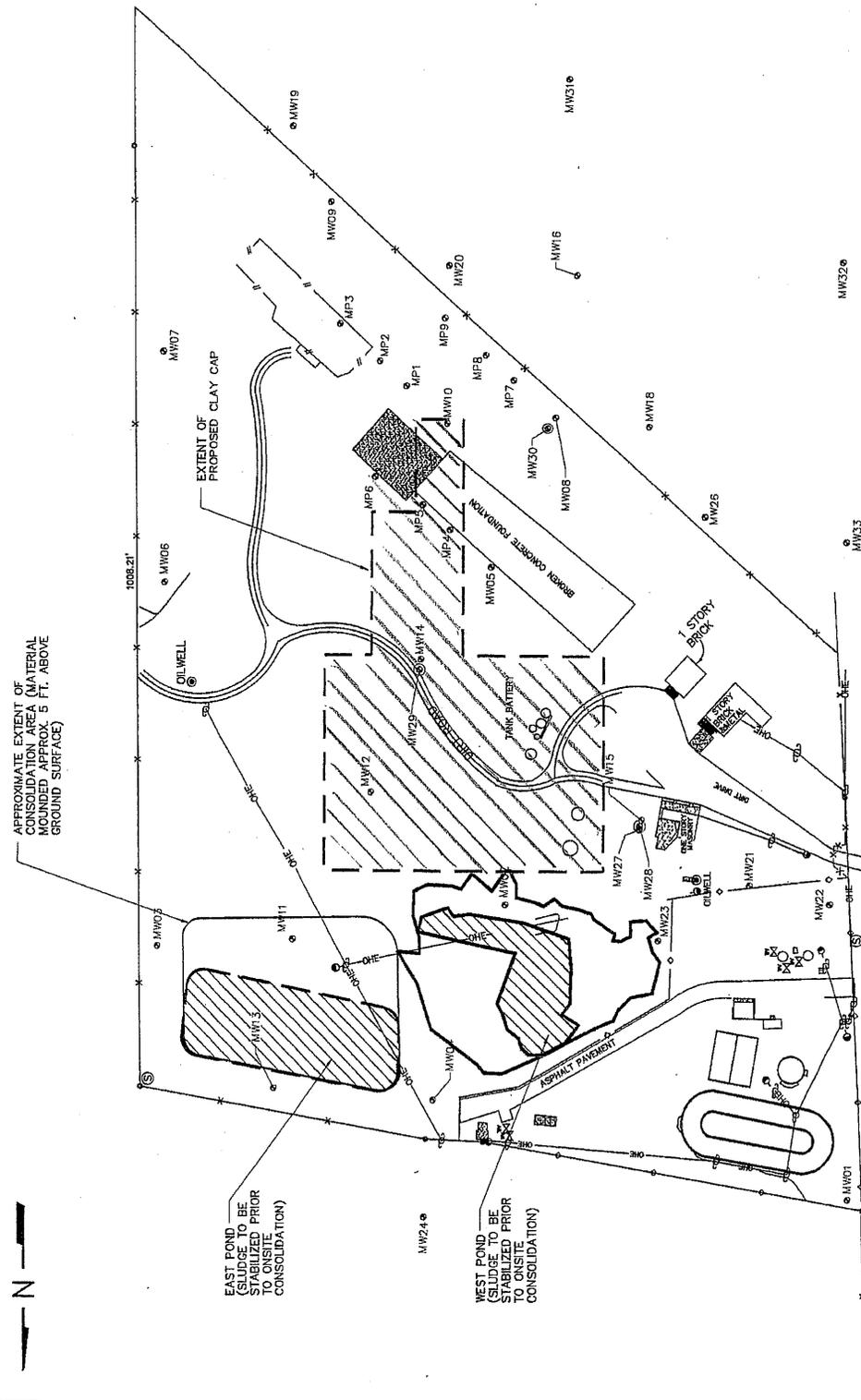




AMcAnultan
1/14/08

LEGEND:

- x--- BARBED WIRE FENCE
- o--- CHAINLINK FENCE
- f--- WOOD FENCE
- P--- POWER POLES
- D--- GUY DOWNS
- O--- OIL WELL
- C--- CONCRETE
- G--- GRAVEL
- E--- OVERHEAD ELECTRIC
- S--- SANITARY SEWER MANHOLE
- V--- WATER VALVE
- M--- APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
- W--- WEST SURFACE IMPOUNDMENT BOUNDARY
- A--- APPROXIMATE AREA OF AFFECTED SOIL
- M--- EXISTING MONITOR WELL (≤ 100 FT DEPTH)
- M--- EXISTING MONITOR WELL (≥ 100 FT DEPTH)



WESTON
CONSULTANTS

FIGURE 2-4
SOIL & SLUDGE
REMEDIAL APPROACH 4
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

SOMERSET, BEXAR COUNTY, TEXAS

PROJECT NO. 02444.016.008.0110 AS SHOWN
DATE DEC 07
SCALE
SOMERSET, BEXAR COUNTY, TEXAS

PLANS PROVIDED BY NEW FREEDOM CONSULTANTS FOR THE STATE OF TEXAS, DATE 01/14/08

REMEDIAL ALTERNATIVES – Groundwater

A. Pump and Treat (figure 2-5)

This remedial approach includes installation of extraction wells to pump the contaminated groundwater to an above ground treatment system to remove the chemical contaminants. The treatment system may include a combination of a pH adjustment unit, a clarifier, an air stripper, carbon adsorption column and a filtration unit. The treated water may be discharged into a publicly owned treatment work (POTW).

B. Plume Management Zone (figure 2-6)

Since the groundwater at the Pioneer Site is classified as Class 2, plume management zone (PMZ) is an applicable remedy. A PMZ is a TRRP Remedy Standard B remedial response objective where the groundwater PCL exceedance (PCLE) zone is controlled instead of groundwater removal or decontamination, and managed to prevent adverse effects to human health or ecological receptors. For class 2 groundwater the point of exposure (POE) can be moved to the down gradient edge of the PMZ. A series of monitor wells will be installed along the main axis of the affected groundwater plume. Samples from the axis wells plus select existing monitor wells will be collected for site specific COCs. The wells will be used to monitor concentration trends within the plume. Institutional controls must be established over the area of PMZ. It must be demonstrated that the COCs would not migrate past the POE. The PMZ can extend onto the unaffected off-site property; in that case the landowner must consent to institutional controls over the affected property. Based on the availability of superior water supply and historical use, it needs to be demonstrated that there is no reasonably anticipated future beneficial use of groundwater.

C. Plume Management Zone with Monitored Natural Attenuation (figure 2-7)

Monitored natural attenuation involves a combination of physical, chemical and biological processes that act to reduce the toxicity, mobility and the volume of contaminants in groundwater within a reasonable time. The effectiveness of the natural attenuation at the site will be monitored at regular intervals with the analysis of groundwater samples collected from the axis wells plus select existing monitor wells.

D. Plume Management Zone with Enhanced Monitored Natural attenuation (figure 2-8)

This remedial alternative uses introduction of chemical oxidant to expedite the natural attenuation of the chemical contaminants. The oxygen releasing compounds RegenOX or bio-sparging will be used to oxidize the COCs in the groundwater to convert the hazardous compounds into non-hazardous constituents. The effectiveness of the process will be monitored periodically by collecting samples from the axis wells plus select existing monitor wells.



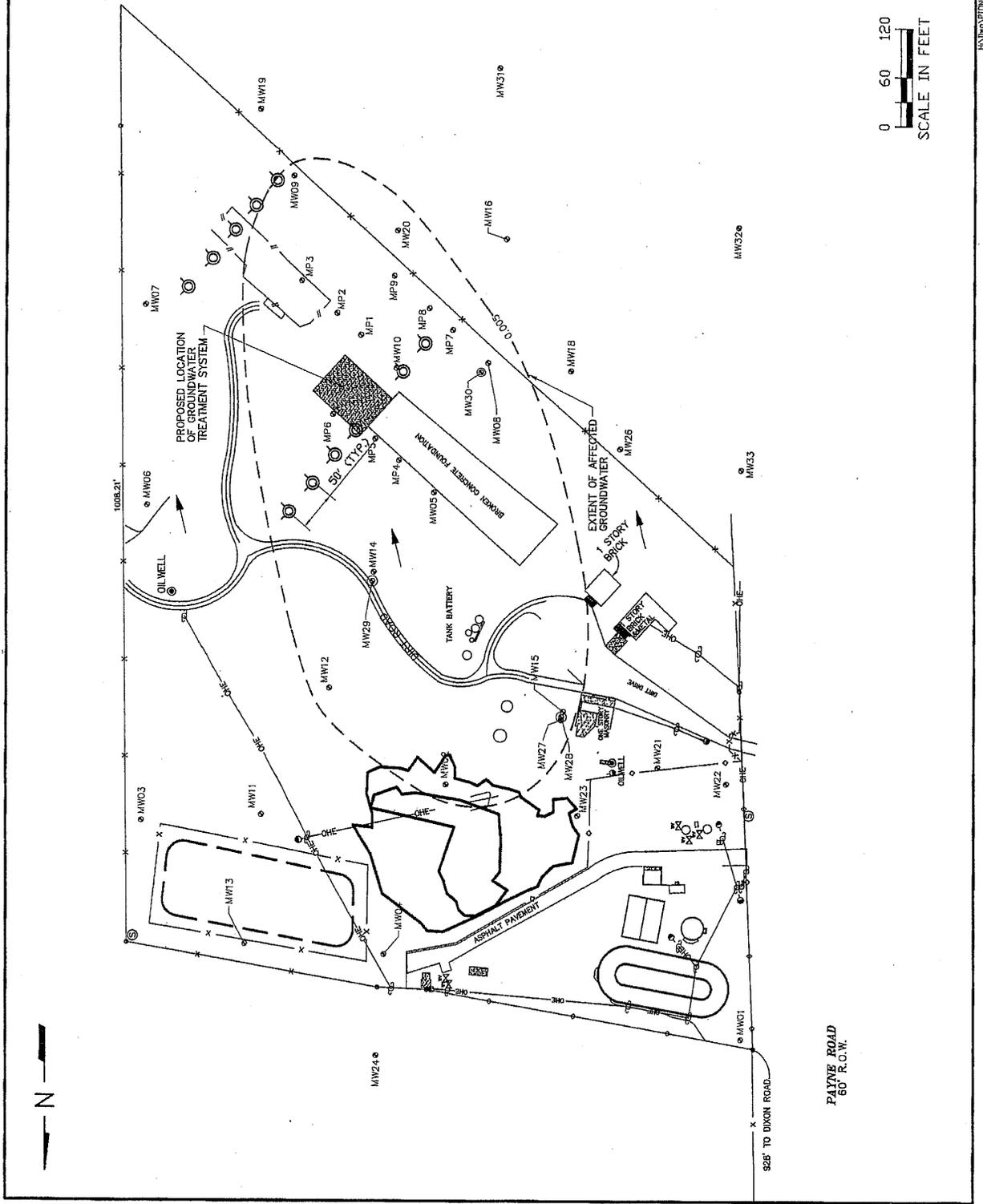
McMullan
1/14/08

- LEGEND:**
- x— BARBED WIRE FENCE
 - o— CHAINLINK FENCE
 - w— WOOD FENCE
 - p— POWER POLES
 - d— GUY DOWNS
 - o— OIL WELL
 - c— CONCRETE
 - g— GRAVEL
 - e— OVERHEAD ELECTRIC
 - s— SANITARY SEWER MANHOLE
 - v— WATER VALVE
 - s— APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
 - w— WEST SURFACE IMPOUNDMENT BOUNDARY
 - m— EXISTING MONITOR WELL (± 100 FT DEPTH)
 - m— EXISTING MONITOR WELL (± 100 FT DEPTH)
 - m— PROPOSED RECOVERY WELLS
- 0.005' — — — — — APPROXIMATE EXTENT OF AFFECTED GROUNDWATER BASED ON DECEMBER 2006 BEVERAGE DATA
- > GROUNDWATER FLOW DIRECTION

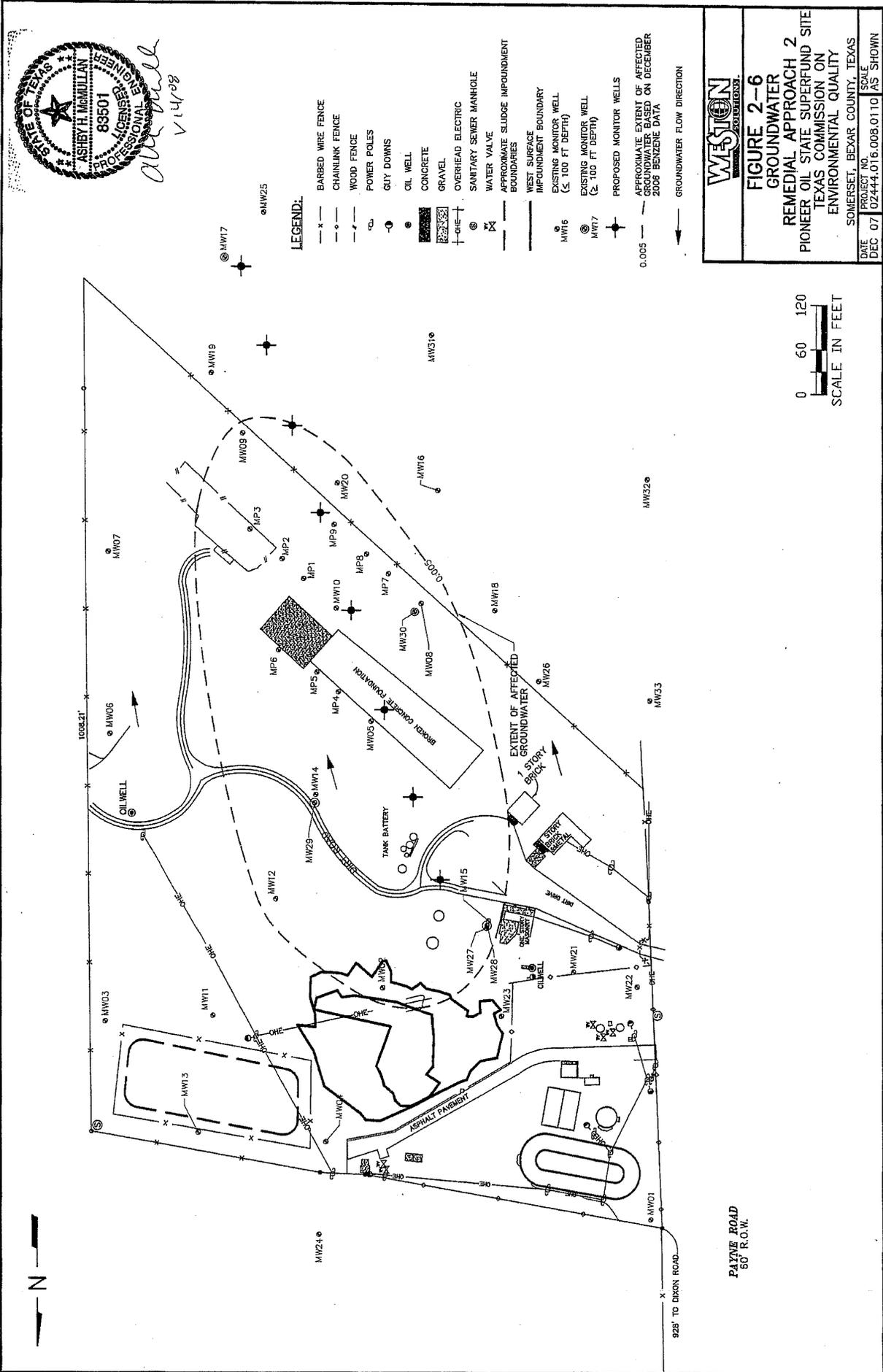
WESTON SOLUTIONS

FIGURE 2-5
GROUNDWATER
REMEDIATION APPROACH 1
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
SOMERSET, BEJAR COUNTY, TEXAS

DATE: DEC 07 02:44:01.6 008.0110
PROJECT NO: 02444
SCALE: AS SHOWN



PLANNING ENGINEER: OIL Rev F Feasibility Study 012897506 Rev Jan 10, 2008 - 465p



LEGEND.

- x — BARBED WIRE FENCE
- o — CHAINLINK FENCE
- / — WOOD FENCE
- □ — POWER POLES
- ⊙ — GUY DOWNS
- ● — OIL WELL
- ■ — CONCRETE
- ▨ — GRAVEL
- — — OVERHEAD ELECTRIC
- ⊕ — SANITARY SEWER MANHOLE
- ⊕ — WATER VALVE
- — — APPROXIMATE SLUDGE IMPOUNDMENT BOUNDARIES
- — — WEST SURFACE IMPOUNDMENT BOUNDARY
- ⊙ — EXISTING MONITOR WELL (≤ 100 FT DEPTH)
- ⊙ — EXISTING MONITOR WELL (≥ 100 FT DEPTH)
- ⊕ — PROPOSED MONITOR WELLS
- — — APPROXIMATE EXTENT OF AFFECTED GROUNDWATER BASED ON DECEMBER 2006 BENZENE DATA
- — — GROUNDWATER FLOW DIRECTION



FIGURE 2-6
GROUNDWATER
REMEDIAL APPROACH 2
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
 SOMERSET, BEXAR COUNTY, TEXAS

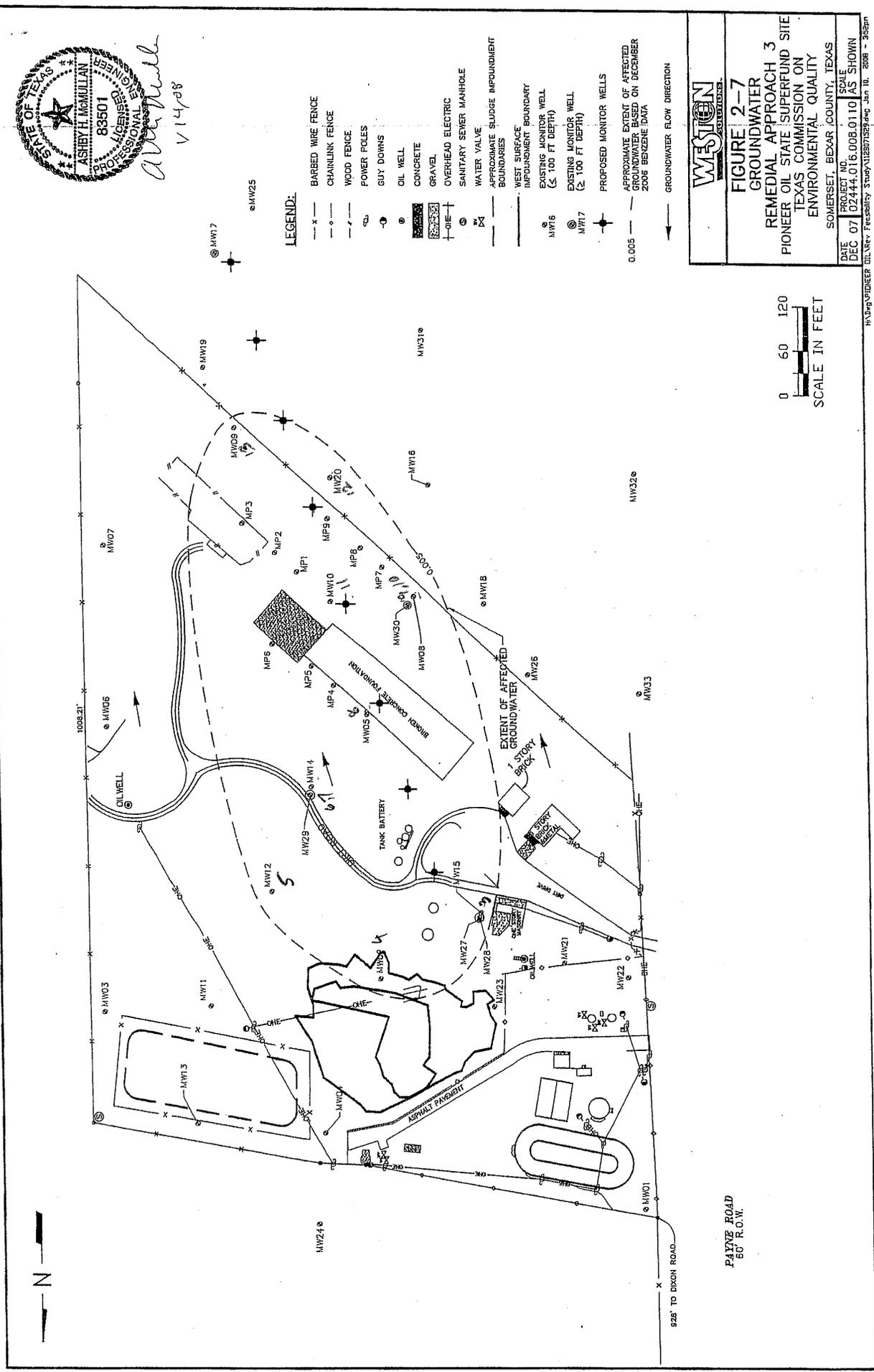
PROJECT NO. 02444-016.008.0110 AS SHOWN
 DATE DEC 07 2006
 SCALE AS SHOWN



3



Ashby H. McMullan
V1498



RAYMOND PIONEER Oil Spill Feasibility Study 11/20/07/08/09/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

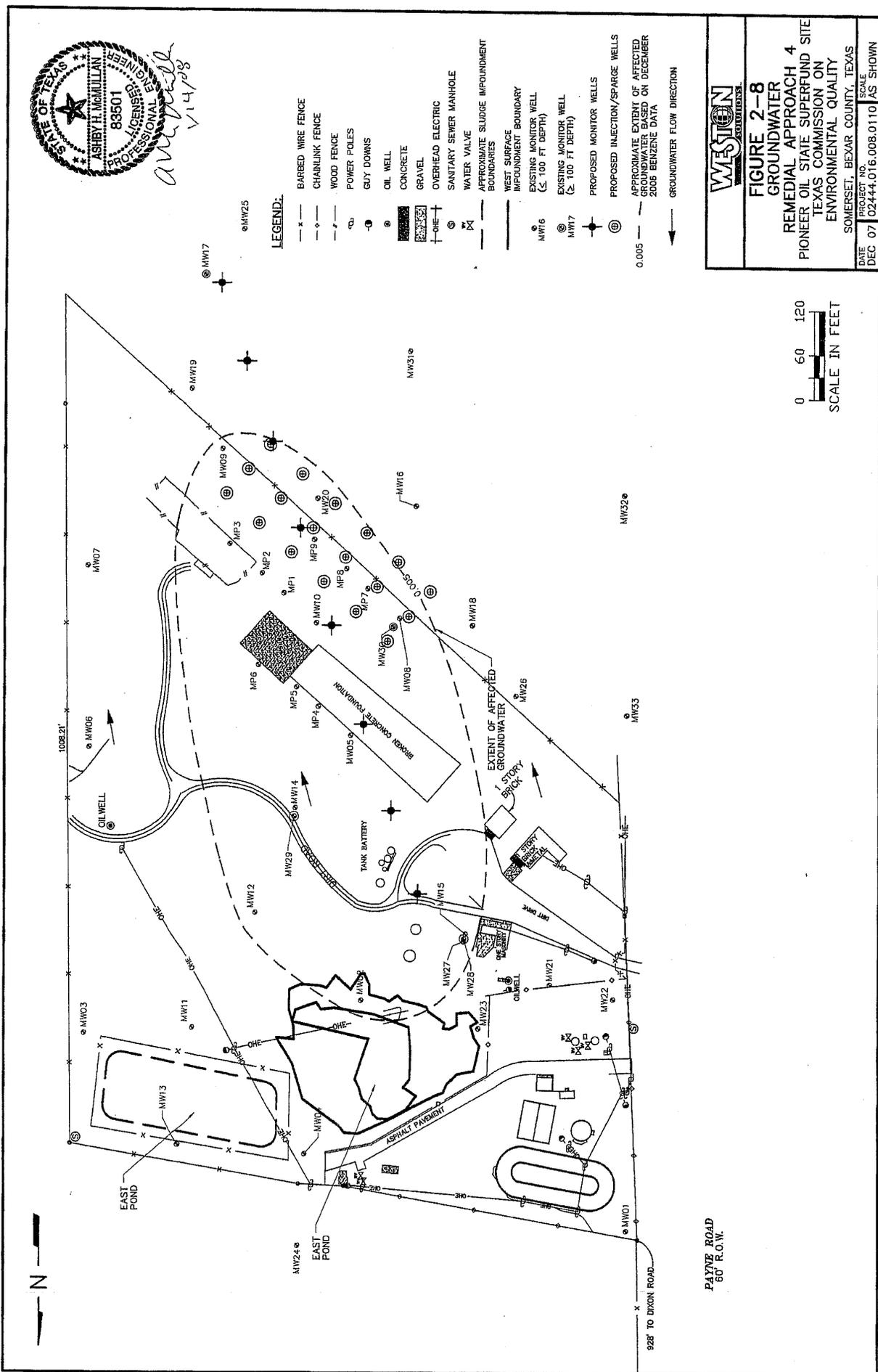


LEGEND:

- x — BARBED WIRE FENCE
- — CHAINLINK FENCE
- — WOOD FENCE
- — POWER POLES
- — GUY DOWNS
- OIL WELL
- CONCRETE
- ▨ GRAVEL
- +— OVERHEAD ELECTRIC
- +— WATER VALVE
- +— SANITARY SEWER MANHOLE
- +— APPROXIMATE SLUDGE IMPROUNDMENT BOUNDARIES
- +— WEST SURFACE IMPROUNDMENT BOUNDARY
- MP16 EXISTING MONITOR WELL (≤ 100 FT DEPTH)
- MP17 EXISTING MONITOR WELL (≥ 100 FT DEPTH)
- ⊕ PROPOSED MONITOR WELLS
- ⊕ PROPOSED INJECTION/SPARGE WELLS
- APPROXIMATE EXTENT OF AFFECTED GROUNDWATER BASED ON DECEMBER 2006 BENZENE DATA
- GROUNDWATER FLOW DIRECTION

PAYNE ROAD
60' R.O.W.

0 60 120
SCALE IN FEET



WESTON
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FIGURE 2-8
GROUNDWATER
REMEDIAL APPROACH 4
PIONEER OIL STATE SUPERFUND SITE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY
SOMERSET, BEXAR COUNTY, TEXAS

DATE	PROJECT NO.	SCALE
DEC 07	02444.016.008.0110	AS SHOWN

PH: 512.799.9100
F: 512.799.9101
www.westonsolutions.com

VII. EVALUATION OF REMEDIAL ALTERNATIVES

A *Remedial Action* may consist of any combination of removal or decontamination of contaminated media, physical controls such as landfills and caps, or institutional controls such as deed notice on the future use of the property. In accordance with 30 Texas Administrative Code Section 335.348(l) and the requirements of Section 361.193 of the *Solid Waste Disposal Act*, the TCEQ selects the *Remedial Action* for a site by determining which remedial alternative is “the lowest cost alternative which is technologically feasible and reliable, effectively mitigates and minimizes damage to the environment, and provides adequate protection of the public health and safety and the environment “.

Table 1 summarizes the estimated costs for various remedial approaches for the soil and sludge, and the groundwater. The table shows that the remedial approach # 3a, Consolidation in East Pond with a Clay Cap is the most cost effective remedy which also meets the other remedial criteria. For the groundwater remediation Plume Management Zone with Monitored Natural Attenuation (approach #3) is the most cost effective remedy. Tables 2 and 3 summarize the evaluation criteria for all the remedial approach.

Table 1

Evaluation of Remedial Approaches --Summary of Estimated Costs

Soil and Sludge Remedial Approaches

Approach	Description	Estimated Cost
1	Stabilization with Off-site Disposal	\$3,570,000.00
2a	Stabilization, Consolidation with Clay Cap	\$2,473,000.00
2b	Stabilization, Consolidation with Concrete Cap	\$3,348,000.00
3a	Consolidation in East Pond with Clay cap	\$888,000.00
3b	Consolidation in East Pond with Concrete Cap	\$1,339,000.00
4a	Consolidation in East Pond with Clay Cap, Clay cap over affected soils	\$1,002,000.00
4b	Consolidation in East Pond with Concrete Cap, Clay Cap over affected Soils	\$1,308,000.00

Groundwater Remedial Approaches

Approach	Description	Estimated Cost
1	Pump and Treat	\$1,437,000.00
2	Plume Management Zone	\$1,277,000.00
3	Plume Management Zone with Monitored Natural Attenuation	\$702,000.00
4	Plume Management Zone with In-situ Oxidation	\$3,150,000.00
5	Plume Management zone with Biosparging	\$815,000.00

The remedial approach for the soil and sludge, and groundwater were combined to arrive at the most effective remedial alternative in terms of technical feasibility, reliability, and cost which will effectively mitigate and minimize the damage to the environment and provide adequate protection of public health. Table 4 summarizes the Remedial Alternative evaluation. The summary shows that the Alternative #2, Onsite consolidation of soil and sludge combined with monitored natural attenuation of groundwater, is the most effective remedial alternative.

Table 2

Summary of Soil and Sludge Remedial Approach Evaluation

Remedial Approach	Long Term Effectiveness	Compliance with Applicable Regulations	Reduction of Toxicity, Mobility and Volume	Relative Cost	Impact of Implementation	Technical Merit	Total Score
1. Stabilization with offsite disposal	5	4	4	1	2	2	18
2a. Stabilization, on site consolidation with an engineered cap	3	4	3	3	4	3	20
2b. Stabilization, on site consolidation with an engineered concrete cap	3	4	3	2	3	2	17
3a. Consolidation within East Pond with an engineered cap	3	4	3	5	4	4	23
3b. Consolidation within East Pond with an engineered concrete cap	3	4	3	4	3	3	20
4a. Consolidation within East Pond with an engineered clay cap and compacted clay cap over affected site soils	3	4	2	5	4	4	22
4b. Consolidation within East Pond with an engineered concrete cap and compacted clay cap over affected site soils	3	4	2	4	5	3	21

Table 3

Summary of Groundwater Remedial Approach Evaluation

Remedial Approach	Long Term effectiveness	Compliance with Applicable Regulations	Reduction of Toxicity, Mobility and Volume	Relative Cost	Impact of Implementation	Technical Merit	Total Score
1. Pump and Treat	5	4	4	2	2	2	19
2. Plume management Zone	3	4	2	3	4	1	17
3. Plume Management Zone with Monitored Natural Attenuation	3	4	2	5	5	3	22
4a. Plume Management zone with Enhanced Monitored Natural Attenuation (RegenOx)	3	4	3	1	2	5	18
4b. Plume Management Zone with Enhanced Monitored Natural Attenuation (Biosparging)	3	4	3	4	3	5	22

VIII. THE SELECTED REMEDIAL ACTION

The TCEQ selectss (1) Consolidation of the sludge from the West Impoundment and contaminated soil into the Stabilized East Impoundment followed by covering of the impacted materials by engineered caps plus deed recordation for the remediation of sludge and soil and (2) Plume Management Zone with monitored natural attenuation for the remediation of groundwater at the site, as the proposed Remedial Action for the Site. This Remedial Action is described in detail in Part VI of this RSD.

Table 4

Summary of Remedial Alternative Evaluation

Remedial Alternative	Soil and Sludge Remedial Approach	Groundwater Remedial Approach	Cumulative Score
Alternative-1 Stabilization with off site disposal of soil and sludge, & pump and treat of ground water	18	19	37
Alternative-2 Onsite consolidation of soil and sludge and monitored natural attenuation of groundwater	23	22	45
Alternative -3 On site consolidation of soil and sludge & enhanced monitored natural attenuation of groundwater (biosparging)	23	22	45
Alternative -4 On site consolidation of soil and sludge with Cap over affected areas & Plume Management Zone for groundwater	22	17	39

XI COMMUNITY PARTICIPATION IN THE SUPERFUND PROCESS

This remedy was presented to the public during a public meeting held on April 17, 2008 at the Council Chamber of the Somerset City Hall, 7360 E. 6th Street, Somerset, Bexar County, Texas 78069. There were no objections to the remedy.

IX. REMAINING STEPS IN THE SUPERFUND PROCESS

There are no PRPs identified for the Site. The TCEQ will issue a final administrative order as provided by Section 361.188 of the Solid Waste Disposal Act (188 Order). At that time, the Site will no longer be considered a “proposed” state Superfund site but will then be “listed” on the State Registry of Superfund Sites.

Following issuance of the 188 Order, either the TCEQ will complete the detailed design of the selected remedy and cause that remedy to be implemented in its entirety. At any time in this process, the TCEQ may determine that a *minor change, significant change, or fundamental change* should be made to the Remedial Action. If a minor change is implemented, the TCEQ will document the change in the Site files without the necessity for another public meeting. If a significant change is made, a notice describing the changes will be posted in the Texas Register and in a newspaper of general circulation in the county where the Site is located. If a fundamental change is considered, another public comment period and meeting will be held to discuss that fundamentally changed proposed remedy.

Upon completion of the Remedial Action, the TCEQ may propose to delete the Site from the State Registry of Superfund Sites. A public meeting will be held before the Site is deleted from the State Registry.

X. GLOSSARY

Chemicals of Concern – Site related chemicals whose concentrations are high enough in soil and/or groundwater to constitute a potential risk for health and environment.

Feasibility Study - A description, screening, and analysis of the potential Remedial Action alternatives for a site.

Fundamental Change– A change to the Remedial Action which uses a different approach to achieve the remedial action goals, or one that uses the same approach but results in a remedial action that is less protective than the originally proposed remedial action.

Groundwater – The supply of fresh water found beneath the Earth’s surface, usually in aquifers, which is often used for supplying wells and springs

Leachability - The characteristics of dissolving out by the action of a percolating liquid.

Hazard Ranking System (HRS) - The scoring system used by the TCEQ to evaluate a site for the state or federal Superfund program. The scoring system was developed by the U.S. Environmental Protection Agency (EPA) as described in 40 Code of Federal Regulations Part 300, Appendix A.

Minor Change- A minor change is defined as changes to the Remedial Action which does not significantly affect the scope, performance, or cost of the originally proposed Remedial Action.

Monitored Natural attenuation - The term monitored natural attenuation refers to the reliance on natural attenuation process within a context of a carefully controlled and monitored site cleanup approach.

Permeability - It is a measure of resistance of a material to the passage of water.

Plume Management Zone – A plume management zone (PMZ) is a remedial response applied to Class 2 and Class 3 aquifer, where groundwater PCL exceedence (PCLE) zone is controlled in stead of removal or decontamination and manage to prevent adverse effects to human health and /or ecological receptors.

Potentially Responsible Parties (PRPs) - Persons or entities that the TCEQ considers potentially responsible for the contamination of the site pursuant to Section 361.271 of the Texas Health and Safety Code.

Protective Concentration Level (PCL) - The concentration of a chemical of concern which can remain within the source medium and not result in levels which exceed the applicable human health risk-based exposure limit or ecological protective concentration level at the point of exposure for that exposure pathway.

Remedial Action - An action, including remedial design and post-closure care, consistent with a remedy taken instead of or in addition to a removal action in the event of a release or threatened release of hazardous substances into the environment to prevent or minimize the release of a hazardous substance so that the hazardous substance does not cause an imminent and substantial endangerment to present or future public health and safety or the environment.

Remedial Investigation - An investigative study which may include removals, and/or a feasibility study, in addition to the development of protective concentration levels, designed to adequately determine the nature and extent of release or threatened release of hazardous substances and, as appropriate, its impact on airs, soils, groundwater and surface water, both within and beyond the boundaries of the facility.

Remedy Selection Document: This document presents the remedy for the Site that was approved by the public at the public meeting.

Response Action - Any activity taken to comply with the Texas Risk Reduction Program rules to remove, decontaminate and/or control (i.e., physical controls and institutional controls) chemicals of concern in excess of critical protective concentration levels in environmental media, including actions taken in response to releases to environmental media from a waste management unit before, during, or after closure.

Significant Change- A change to the Remedial Action which materially affects the scope, performance, or cost of the Remedial Action but which uses the same approach and results in a Remedial Action at least as protective as the originally proposed Remedial Action.

Solid Waste Disposal Act- Chapter 361 of the Texas Health and Safety Code. The purpose of the Solid Waste Disposal Act is to safeguard the health, welfare, and physical property of the people and to protect the environment by controlling the management of solid waste, including any hazardous waste that is generated. Subchapter F of Chapter 361 relates to the state Superfund process. The Texas Health and Safety Code is available on line at: <http://www.capitol.state.tx.us/statutes/statutes.html>.

Texas Risk Reduction Program (TRRP) - A program of the TCEQ that provides a consistent corrective action process directed toward protection of human health and the environment balanced with the economic welfare of the citizens of the state. The rules for this program are located in Chapter 350 of 30 Texas Administrative Code. The Texas Administrative Code is available online at: <http://www.sos.state.tx.us/tac/>.

Unconfined Compressive Strength – The unconfined compressive strength is a ratio of force applied at failure to the cross-section of a cylinder.