

REMEDY SELECTION DOCUMENT



**FEDERATED METALS STATE SUPERFUND SITE
HOUSTON, HARRIS COUNTY, TEXAS
December 8, 2014**

***PREPARED BY: SCOTT SETTEMEYER, P.G., PROJECT MANAGER
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
SUPERFUND SECTION
REMEDIATION DIVISION***

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

TABLE OF CONTENTS

I. LIST OF ACRONYMS _____	3
II. INTRODUCTION _____	4
III. PURPOSE _____	5
IV. LEGAL AUTHORITY _____	5
V. SITE HISTORY _____	7
VI. SUMMARY OF REPORTS _____	8
A. Hazard Ranking System Documentation Record _____	8
B. Remedial Investigation Reports _____	8
Soil/Solids: _____	9
Groundwater: _____	10
Protective Concentration Levels: _____	10
C. Removal Action Work Plans and Reports _____	11
D. Feasibility Study Document (FS) _____	12
E. Remedial Objectives and Action Levels _____	12
Table 1: Cleanup Goals for Groundwater _____	12
VII. REMEDY SELECTION _____	13
VIII. DESCRIPTION OF THE SELECTED REMEDY _____	14
IX. REMAINING STEPS IN THE SUPERFUND PROCESS _____	14
X. GLOSSARY _____	15

TABLE OF TABLES

Table 1: Cleanup Goals for Groundwater _____	12
--	----

TABLE OF FIGURES

Figure 1: Site Location Map _____	17
Figure 2: Site Map _____	18
Figure 3: Selected Groundwater Remedial Action Areas on the Production Area First Groundwater Bearing Unit _____	19
Figure 4: Selected Groundwater Remedial Action Areas on the Production Area Second Groundwater Bearing Unit _____	20
Figure 5: Selected Groundwater Remedial Action Areas on the Southern Parcel _____	21
Figure 6: Grid Areas for Enhanced Biodegradation Treatment of CVOCs in the First GWBU _____	22

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

I. LIST OF ACRONYMS

ASARCO – American Smelting and Refining Company

COC – Chemical of Concern

CVOC – Chlorinated Volatile Organic Compound

ELT – Environmental Liability Transfer, Inc. and ELT Houston LLC

FS – Feasibility Study

GWBU – Groundwater Bearing Unit

HRS – Hazard Ranking System

IC – Institutional Control

MCL – Maximum Contaminant Level

MNA – Monitored Natural Attenuation

PCE – Tetrachloroethylene

PCL – Protective Concentration Level

PHA – Port of Houston Authority

RA – Remedial Action

RD – Remedial Design

RI – Remedial Investigation

RSD – Remedy Selection Document

ROC – Radionuclides of Concern

SSSR – Solids, Soil, and Stormwater Removal

TAC – Texas Administrative Code

TCE – Trichloroethylene

TCEQ – Texas Commission on Environmental Quality

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

TRRP – Texas Risk Reduction Program

USACE – United States Army Corps of Engineers

UST – Underground Storage Tank

VOC – Volatile Organic Compound

II. INTRODUCTION

The Federated Metals state Superfund site is located near the eastern boundary of the City of Houston at the southeastern corner of the intersection of East Loop (Interstate 610) and Market Street, at 9200 Market Street (see Figure 1: Site Location Map and Figure 2: Site Map). The site is split between a northern 7.2-acre parcel (Production Area) and a southern 14.7-acre parcel (Southern Parcel). A strip of property that contains railroad lines is owned by the Union Pacific Railroad and separates the Production Area and the Southern Parcel.

Federated Metals Corporation operated from the 1940s to 1979. Federated Metals Corporation was a nonferrous metal alloy producer with 50 percent of the raw material derived from recovered scrap. The raw material (scrap and ingot material) was placed in smelters, flux was added to remove impurities and the metal was cast or molded into the desired forms. Magnesium sludge, or dross, which contained high concentrations of barium, was the primary waste product from this process and was disposed of within the Southern Parcel.

The site was placed on the first state Superfund Registry on January 16, 1987, and an Agreed Order was signed on June 30, 1993 and amended on December 1, 1999 to require that the site owner perform a **Remedial Investigation** and **Feasibility Study** (RI/FS). On October 1, 2008, the site property and liability were transferred from ASARCO to Environmental Liability Transfer, Inc. (**ELT, hereinafter referenced as Performing Party**). A new Agreed Order to complete the RI/FS and conduct the Remedial Design and **Remedial Action** (RD/RA) was signed with the effective date of October 1, 2008. The previous site owner, the **Performing Party**, sold the site to John Frantz in November 2013; however, the **Performing Party** retained the environmental liability for the site.

Currently, the site is bordered by East Loop to the west, with Pleasantville Neighborhood adjacent to the western edge of East Loop; Market Street and commercial/industrial properties to the north; commercial/industrial properties to the east; and south of the Southern Parcel is a dredge spoils area. The dredge spoils area is owned by the Port of Houston Authority (PHA), maintained by the US Army Corps of Engineers (USACE), and used for the disposal of dredge materials from the Houston Ship Channel. The majority of the East Loop that is adjacent to the site is an underpass.

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

The Texas Commission on Environmental Quality (TCEQ) is an agency in the State of Texas that implements many of the state laws 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.

III. PURPOSE

This **Remedy Selection Document** (RSD) presents the **Remedial Action** (also known as the remedy) for the site, which is designed to address the contamination and provide protection of public health and safety and the environment. Words appearing in **bold italics** in this document are defined in Section XII, “Glossary,” of this RSD.

The purpose of this document is to:

- describe the actions taken by the TCEQ and the **Performing Party** to investigate the contamination, including any mitigating actions;
- describe the **Remedial Action** selected to address the contaminated groundwater at the site.

This RSD summarizes information that can be found in greater detail in various reports located in the site files. Relevant documents are identified and summarized in Part VI, “Summary of Reports,” of this RSD.

Copies of the documents summarized in this RSD, as well as other relevant information, can be viewed at the local repository:

Pleasantville Neighborhood Library
1520 Gellhorn Drive
Houston, Texas 77029
(832) 393-2330

or in Austin at the TCEQ Central File Room:

12100 Park 35 Circle
Building E, 1st Floor
Austin, Texas 78753
(512) 239-2900

IV. LEGAL AUTHORITY

The investigation of the nature and extent of contamination at the site and the selection of the **Remedial Action** are in accordance with the **Solid Waste Disposal Act** (codified as Chapter 361 of the Texas Health and Safety Code); Subchapter K;

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

Hazardous Substance Facilities Assessment and Remediation rules found in Chapter 335 of Title 30 Texas Administrative Code (TAC) (Subchapter K); and the ***Texas Risk Reduction Program*** (TRRP) rules found in Chapter 350 of 30 TAC.

While the Subchapter K rules are specific to the state Superfund process, the TRRP rules are a comprehensive program for addressing chemical contamination and apply to many different types of corrective action administered by the TCEQ. The TRRP rules establish procedures for determining the acceptable concentration of chemicals of concern (COCs) that are protective of human health and the environment. These acceptable concentration levels are called ***Protective Concentration Levels*** (PCLs). A PCL can be thought of as the “cleanup level” for contamination. A Critical PCL is the lowest PCL for a COC within a source medium determined from all of the applicable human health exposure pathways as described in 30 TAC Section 350.71 and, when necessary, PCLs for applicable ecological exposure pathways as required in 30 TAC Section 350.77.

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. Tier 1 uses conservative, generic equations and input factors that do not account for site-specific factors; Tier 2 allows for the use of site-specific information, but requires the use of PCL equations provided by the TCEQ; and Tier 3 allows for more detailed and complex evaluations so that PCLs are appropriate for specific site conditions. Tier 1 PCLs were used for all site COCs, except metals, for which Tier 2 PCLs were calculated.

The land use classification is critical under all three of the tiers. Under the TRRP rules, land can be classified as either residential or commercial/industrial. Remediation to residential standards assumes that a 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 a site will not be regularly occupied by residents or other sensitive population such as children. The TRRP rules also establish that land use classification by comparing the current use of the property. Therefore, the TCEQ has determined that a commercial/industrial land use classification is 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 containment cells and caps, which limit exposure to the contaminated media; or 3) ***institutional controls***, such as restrictive covenants or deed notices, to inform future owners and the public of contamination on the property in an effort to limit exposure to the contaminated media. These remedy standards 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. To meet the requirements of Remedy Standard

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

B, however, physical controls and ***institutional controls*** may be relied on to protect human and ecological receptors from levels of contamination exceeding PCLs. These standards are described in detail in 30 TAC Sections 350.32 and 350.33. The selected remedy at the site meets the criteria established for Remedy Standard A.

V. SITE HISTORY

Federated Metals Corporation, a wholly owned subsidiary of ASARCO Master Inc., operated from the 1940s to 1979. Federated Metals Corporation was a nonferrous metal alloy producer with 50 percent of the raw material derived from recovered scrap. The raw material (scrap and ingot material) was placed in smelters, flux was added to remove impurities, and the metal was cast or molded into the desired forms. Magnesium sludge or dross which contained high concentrations of barium was the primary waste product from this process and was disposed within the Southern Parcel.

Federated Metals Corporation held a radioactive Source Material License from 1960 to 1971 for manufacturing of magnesium anodes from magnesium-thorium alloy scrap obtained from the thorium (Th) scrap, which contains some amount of naturally occurring Th-232. Recycling activities occurred in the Production Area, and waste materials were disposed on the surface of the Southern Parcel. The magnesium-thorium scrap was obtained primarily from the U.S. Department of Defense. Following smelting operations, the resulting sludge which contained elevated levels of Th-230 and Th-232 was disposed of on the Southern Parcel of the site.

The site was placed on the state Superfund Registry on January 16, 1987, and ASARCO signed an Agreed Order that became effective on June 30, 1993 and amended on December 1, 1999 to perform a ***Remedial Investigation*** and ***Feasibility Study*** (RI/FS).

The site is currently owned by John Frantz. The previous site owner, the ***Performing Party***, sold the site to John Frantz in November 2013; however, the ***Performing Party*** retained the environmental liability for the site. Prior to the ***Performing Party***, the site was owned by ASARCO Master, Inc. In August 2008, in conjunction with the ASARCO, LLC bankruptcy proceeding, the TCEQ, the Texas Office of the Attorney General, ASARCO, the ***Performing Party*** and EnergySolutions (EnergySolutions was formerly a contractor for ASARCO) negotiated a transfer of property and environmental liability from ASARCO to the ***Performing Party***. As of October 1, 2008, the site property and liability were transferred from ASARCO to the ***Performing Party***. A new Agreed Order to complete the RI/FS and conduct the RD/RA was signed with the effective date of October 1, 2008.

The Agreed Order executed on October 1, 2008, stipulated that all contaminated soil associated with the site would be removed, including radioactive materials. The soil removals were to be conducted concurrently with supplemental ***Remedial Investigation*** work. Removal of metals and radiologically impacted soils and waste in the Southern Parcel was conducted in 2007 and 2008. The Southern Parcel removal

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

action was completed when the TCEQ approved the *Soil Removal Report* (EnergySolutions, 2010) dated December 15, 2010. Removal of metals, lead, benzene, and radiologically impacted soils, solids, and surface water in the Production Area was conducted in February and March 2012. Additional field work and confirmation sampling for the radiologically impacted soils, solids, and surface water was conducted in February and March 2014. The TCEQ has reviewed the analytical data obtained from this sampling event and concurs that all regulatory requirements have been met. The report documenting removal of radionuclides of concern (ROCs) in the Production Area is currently pending approval. The Production Area removal is complete and the TCEQ approved the *Solids, Soils, and Stormwater Removal Report* (SSSR, ELT, April 2014) in May 2014.

The Agreed Order executed on October 1, 2008, stipulated that delineation of the nature and extent of groundwater impacts would be completed in a supplemental **Remedial Investigation** followed by a **Feasibility Study** to evaluate potential remedial actions for groundwater, with a preference for in-situ chemical oxidation or enhanced bioremediation. The **Remedial Investigation** of the site was conducted in several phased efforts but was concluded with TCEQ acceptance of the *Final Supplemental Remedial Investigation Report* dated October 7, 2011. The **Feasibility Study** was completed when TCEQ approved the *Final Feasibility Study Report for Groundwater* dated October 30, 2012. A **Feasibility Study** was not performed for soil because the 2008 Agreed Order required the **Performing Party** to remove and dispose of all contaminated soil concurrently with performing the supplemental **Remedial Investigation** work.

VI. SUMMARY OF REPORTS

A. Hazard Ranking System Documentation Record

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 December 1985 and is presented in the report titled "Documentation Records for Hazard Ranking System for Federated Metals in Houston, Harris County, Texas." The site earned a score of 21.28. The TCEQ listed the site on the first state Superfund Registry and published notice in the *Texas Register* on January 16, 1987.

B. Remedial Investigation Reports

The site **Remedial Investigation** was completed in several phases. The first **Remedial Investigation** was conducted by state contractors (Phase I and Phase II). The next phase of investigation was conducted by ASARCO pursuant to a 1993 Agreed Order and a 1999 amendment to that Agreed Order. The final site investigation was conducted by the **Performing Party** pursuant to a 2008 Agreed Order. The final site

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

investigation consisted of two parts, both of which are called supplemental **Remedial Investigations**. The first supplemental **Remedial Investigation** focused on the soils above the water table of the Southern Parcel and radioactive materials throughout the site. This investigation was conducted for the site through May 2008 under the original and amended Agreed Order by the **Performing Party** and EnergySolutions, and was documented in a *Supplemental RI Report* (EnergySolutions, September 2010). An additional supplemental **Remedial Investigation** Report (ELT, 2011) was prepared by the **Performing Party** and focused on solids/soils and groundwater beneath the Production Area and the groundwater beneath the Southern Parcel. The results from the **Remedial Investigation** activities identified the need to address impacts for the media of concern listed below. Removal actions for soils and solid media of concern were conducted and have been completed as noted below, whereas remedial actions for groundwater are forthcoming and are addressed within the **Feasibility Study**.

Soil/Solids:

- COCs consisting of metals and volatile organic compounds (VOCs) were found within soil and solids above their respective Critical Soil PCLs in isolated locations at the surface and shallow subsurface beneath the Production Area and within the retention pond used for stormwater management. Removal actions, which removed these COCs, were conducted in February and March 2012. The Production Area removal action is complete and the TCEQ approved the *Solids, Soils, and Stormwater Removal Report* (SSSR, ELT, April 2014) in May 2014.
- ROCs were found within isolated locations of surface and shallow subsurface soil above background activity levels within the Production Area. Removal actions, which removed these ROCs, were conducted in February and March 2012. The TCEQ has reviewed the analytical data obtained from this sampling event and concurs that all regulatory requirements have been met. The report documenting removal of ROCs in the Production Area is currently pending approval.
- ROCs were found in surface and shallow subsurface soils above the background activity levels within the Southern Parcel. The ROC's impact in soil within the Southern Parcel has been addressed by removal actions undertaken by EnergySolutions in which the impacted waste and soil were removed via excavation and transport for off-site disposal. Documentation of these actions is provided in the *Soil Removal Report for the Federated Metals State Superfund Site* (EnergySolutions, 2010).
- As with ROCs in soil in the Southern Parcel, the COCs in soil in the Southern Parcel were addressed by removal actions undertaken that removed the impacted waste and soil via excavation and transport for off-site disposal (*Soil Removal Report for the Federated Metals State Superfund Site*, EnergySolutions, 2010).

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

Groundwater:

- Chlorinated volatile organic compounds (CVOCs) in groundwater were detected above respective Critical Groundwater PCLs beneath the Production Area. There is a relatively large area in the first groundwater bearing unit (GWBU) covering the western half of the Production Area, and a relatively smaller portion of this area where the CVOCs are found in the second GWBU.
- Lead was found above Critical Groundwater PCLs in a relatively isolated area of the first GWBU beneath the Production Area and in connection with the stormwater retention pond.
- Benzene was found above Critical Groundwater PCLs in a relatively isolated area of the first GWBU downgradient of the former underground storage tank (UST).
- ROC, specifically total radium, was found above its Federally promulgated Maximum Contaminant Level (MCL) in groundwater beneath the Southern Parcel. The ROC was found above the background levels within the Southern Parcel soils, and it was removed during soil remediation as noted above. In addition, total radium was found at concentrations below its Federally promulgated MCL but above background in groundwater beneath the Southern Parcel in connection with the dredge disposal area. Recent advances in the uranium analytical method have demonstrated that the concentrations of total uranium in groundwater at the site are below the Federally promulgated MCLs in all wells, so a remedy is not required. However, total uranium is retained as a COC and will be monitored to confirm that concentrations remain below Federally promulgated MCLs.

Protective Concentration Levels:

PCLs and Critical PCLs were selected for each site-specific COC for complete and reasonably anticipated to be complete exposure pathways.

Tier 1 commercial/industrial PCLs were used for on-site data evaluation, and Tier 1 residential PCLs were used for off-site data evaluation (properties immediately adjacent to the site). In addition, Tier 2 site-specific PCLs were calculated for metals, which were only detected on-site. PCLs are also dependent on the size of the source area, and the TRRP rules provide tiered PCLs for situations where source areas are relatively small on a site impacted by COCs. Given that the source areas at this site are comparatively small and spread throughout, PCLs for all COCs detected in on-site and off-site soils and groundwater were calculated based on the 0.5 acre source area.

Critical PCLs for each media and each scenario were selected as described below. A summary of the Critical PCLs is presented in the *Supplemental RI Report*, (October 2011, Table 1-3a -1-3e.)

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

- **Soil:** The lower of the Tier 1 PCLs (surface soil PCL for combined soil ingestion, dermal contact, inhalation of volatiles and particulates, and for residential land use, ingestion of aboveground and below-ground vegetables ($^{Tot}Soil_{Comb}$), PCL for surface and subsurface soil to protect groundwater ($^{GW}Soil_{Ing}$), and PCL for inhalation of volatiles from subsurface soil ($^{Air}Soil_{Inh-v}$) was selected as the Critical Soil PCL for soil parameters except metals. For each metal compound, the lower of the Tier 1 PCL was compared to the calculated Tier 2 $^{GW}Soil_{Ing}$ and the state-wide background (30 TAC Section 350.51); the highest of these three standards was selected as the Critical Soil PCL for metals. This selection process was used for on-site (commercial/industrial) and off-site (residential) scenarios.

- **Groundwater:** The Critical Groundwater PCLs are the same as the Tier 1 Residential PCLs for groundwater ingestion ($^{GW}GW_{Ing}$).

Site data (including the data obtained in the *Supplemental RI Report* and in some cases the historical data) was compared to the Tier 1 and Tier 2 Critical PCLs in order to determine the lateral and vertical extent of soil and groundwater contamination.

C. Removal Action Work Plans and Reports

Between 2007 and 2014, several removal actions were completed at the site. These removal actions are documented in the following reports:

- *Soil Removal Report for the Federated Metals State Superfund Site* (ELT, EnergySolutions, 2010);
 - This report documents the removal of contaminated soil and waste from the Southern Parcel.

- *Radiological Closure Work Plan For the Production Area* (ELT, ALMAC Environmental Services, August 2011);
 - This work plan describes the removal action necessary to clean up the areas impacted by ROC in the Production Area.

- *Solids, Soils, and Stormwater Removal Work Plan*, (ELT, Janeil Environmental Solutions, August 2011);
 - This work plan describes the removal action necessary in the Production Area to address impacted solids that were deposited on concrete and within the stormwater collection system, soil, and stormwater in the retention pond.

- *Final Solids, Soils, and Stormwater Removal Report*, (ELT, Janeil Environmental Solutions, April 2014).

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

- This report documents the removal of contaminated solids, soil, and stormwater from the Production Area.

D. Feasibility Study Document (FS)

The **Feasibility Study** for the Federated Metals site, dated October 30, 2012, presented an evaluation of potential remedial alternatives to address the COCs in the site groundwater.

E. Remedial Objectives and Action Levels

The Agreed Order specifies that groundwater will be remediated to prevent expansion, migration off-site, and migration downward to the next groundwater bearing zone; meet the PCLs under 30 TAC Chapter 350 and 30 TAC Section 290.108(b); and meet the requirements for unrestricted use under 30 TAC Section 336.603. Table 1 below provides the Cleanup Goals for Groundwater. The action level is the Tier 1 Residential ^{GW}GW_{Ing} PCL or Federally promulgated MCL. Note that the first groundwater bearing unit (GWBU) is a Class 2 groundwater resource.

Table 1: Cleanup Goals for Groundwater

CHEMICALS OF CONCERN (COCS)	ACTION LEVEL (Critical PCL)	AREA OF CONCERN
Benzene	5 µg/L	Downgradient of the Former UST in the Production Area
1,1-Dichloroethene	7 µg/L	First and Second GWBU in the Production Area
cis-1,2-Dichloroethene	70 µg/L	First and Second GWBU in the Production Area
trans-1,2-Dichloroethene	100 µg/L	First and Second GWBU in the Production Area
Total Radium	5 pCi/L	Southern Parcel Groundwater
Total Uranium	30 µg/L	Southern Parcel Groundwater
Lead (total)	15 µg/L	Downgradient of the Stormwater Retention Pond in the Production Area
Tetrachloroethene (PCE)	5 µg/L	First and Second GWBU in the Production Area
Trichloroethene (TCE)	5 µg/L	First and Second GWBU in the Production Area

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

CHEMICALS OF CONCERN (COCS)	ACTION LEVEL (Critical PCL)	AREA OF CONCERN
Vinyl chloride	2 µg/L	First and Second GWBU in the Production Area

Notes:

µg/L – microgram/Liter

pCi/Liter – picoCuries per Liter

VII. REMEDY SELECTION

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 restrictions on the future use of the property. In accordance with 30 TAC Section 335.348(l) and the requirement of Texas Health and Safety Code Section 361.193, 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. Based on these evaluation criteria, the TCEQ has selected the following **Remedial Action** for this site:

- Enhanced Monitored Natural Attenuation (enhanced MNA) with augmented biodegradation for the Production Area CVOCs in the first groundwater bearing unit (GWBU);
- Monitored Natural Attenuation (MNA) for CVOCs in the second GWBU of the Production Area;
- MNA for benzene in groundwater downgradient of the Former UST;
- MNA for lead in groundwater downgradient of the pond; and
- MNA for total radium and total uranium in the Southern Parcel groundwater.

During a public meeting held on July 17, 2014 at the Ebbert L. Furr High School Auditorium, located at 520 Mercury Drive, Houston, Texas, the above-mentioned remedy for the site was presented to the public. Although there were many questions about the site, there were no objections to the proposed remedy from the public.

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

VIII. DESCRIPTION OF THE SELECTED REMEDY

The remedy will consist of the use of MNA and enhanced MNA for the COCs in groundwater.

Natural attenuation refers to the processes that diminish the concentrations of contaminants found in groundwater including degradation by chemical and biological processes, adsorption within the groundwater flow medium, and dilution within the porous medium. MNA includes a period of groundwater monitoring designed to evaluate the attenuation of contaminants over time until the concentrations of contaminants have reduced to the remedial action goals. Groundwater monitoring will continue until the concentrations of COCs in groundwater have met the **Remedial Action** goals. The initial monitoring schedule will be developed during the **Remedial Action** and future frequency will be determined based on sampling results.

Enhanced MNA incorporates additional groundwater treatment to reduce concentrations of CVOCs in groundwater and facilitate MNA. The treatment will consist of an in-situ technology leading to the destruction of CVOCs in the groundwater through the enhancement of natural biological processes (biodegradation). Reagents, such as 3-D Microemulsion and HRC Primer®, will be injected into the subsurface in order to provide a reducing environment and an electron donor which can lead to the destruction of CVOCs into harmless constituents including ethenes. The reagents will be injected in each of four impacted areas of the first GWBU in order to provide conditions within the GWBU that enhance degradation of the CVOCs for an estimated period of three-to-four years. The four impacted areas are as follows: 1) along the western boundary (an area of approximately 33,000 square feet), and in the vicinity of the following three groundwater monitoring wells (GMW): 2) GMW-8 (an area of approximately 4,500 square feet); 3) GMW-9 (an area of approximately 7,600 square feet); and 4) GMW-14 (an area of approximately 5,500 square feet). In the largest area along the western boundary, there will be an injection of an additional product that incorporates zero valent iron as a constituent in order to augment the initial injection of 3-D Microemulsion and HRC Primer® for more complete degradation of CVOCs. Figure 6 shows the grid areas that are identified for the application of this technology. Detailed engineering specifications will be developed during the remedial design phase.

IX. REMAINING STEPS IN THE SUPERFUND PROCESS

The TCEQ conducted a public meeting on July 17, 2014 to solicit public comment on the proposed remedy. The TCEQ considered all comments received relating to the proposed **Remedial Action** and has selected the **Remedial Action** to implement at the site.

Following the selection of the **Remedial Action**, the **Performing Party** will complete the detailed design of the selected remedy and implemented in its entirety under the oversight of the TCEQ. 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

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

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 public meeting will be held to discuss the fundamentally changed proposed remedy.

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

X. GLOSSARY

Feasibility Study (FS) - 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.

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.

Institutional Control (IC) - A legal instrument placed in the property records in the form of a deed notice, restrictive covenant, or other form established in the TRRP rules which indicates the limitations on or conditions governing the use of the property which ensures protection of human health and the environment.

Minor change - A change to the Remedial Action which does not significantly affect the scope, performance, or cost of the originally proposed Remedial Action.

Performing Party - Environmental Liability Transfer, Inc., and ELT Houston LLC.

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.

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

Remedial Investigation (RI) - 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 air, soils, groundwater and surface water, both within and beyond the boundaries of the site.

Remedy Selection Document (RSD) - The document which describes the TCEQ's selected **Remedial Action**.

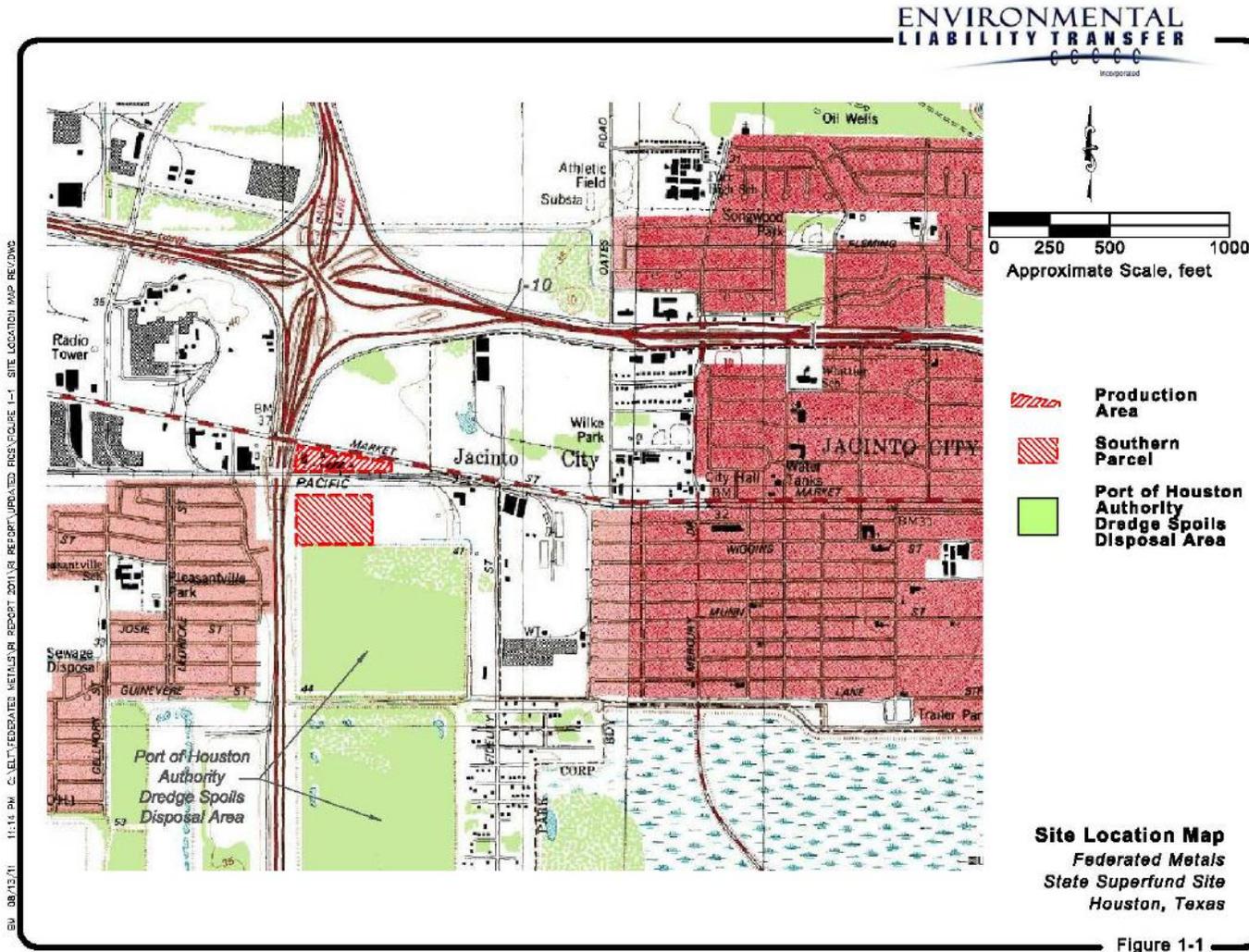
Significant change - A change to the Remedial Action which materially affects the scope, performance, or cost of the Remedial Action, but which uses the same approach and results in a Remedial Action at least as protective as the originally proposed Remedial Action.

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 online at: www.statutes.legis.state.tx.us/Docs/HS/htm/HS.361.htm.

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: www.sos.state.tx.us/tac/.

Federated Metals State Superfund Site Houston, Harris County, Texas Remedy Selection Document

Figure 1: Site Location Map



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012

Federated Metals State Superfund Site Houston, Harris County, Texas Remedy Selection Document

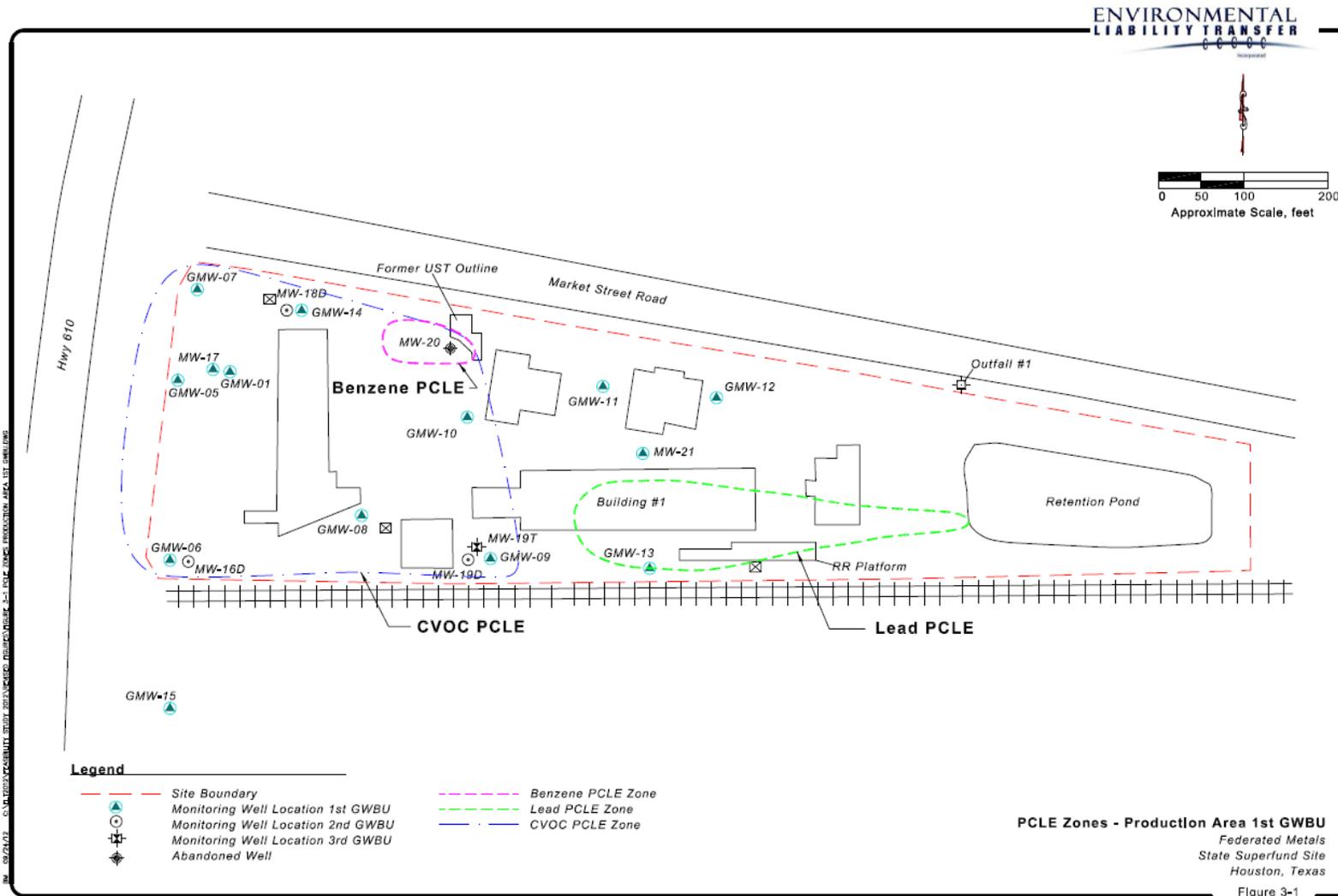
Figure 2: Site Map



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012

Federated Metals State Superfund Site Houston, Harris County, Texas Remedy Selection Document

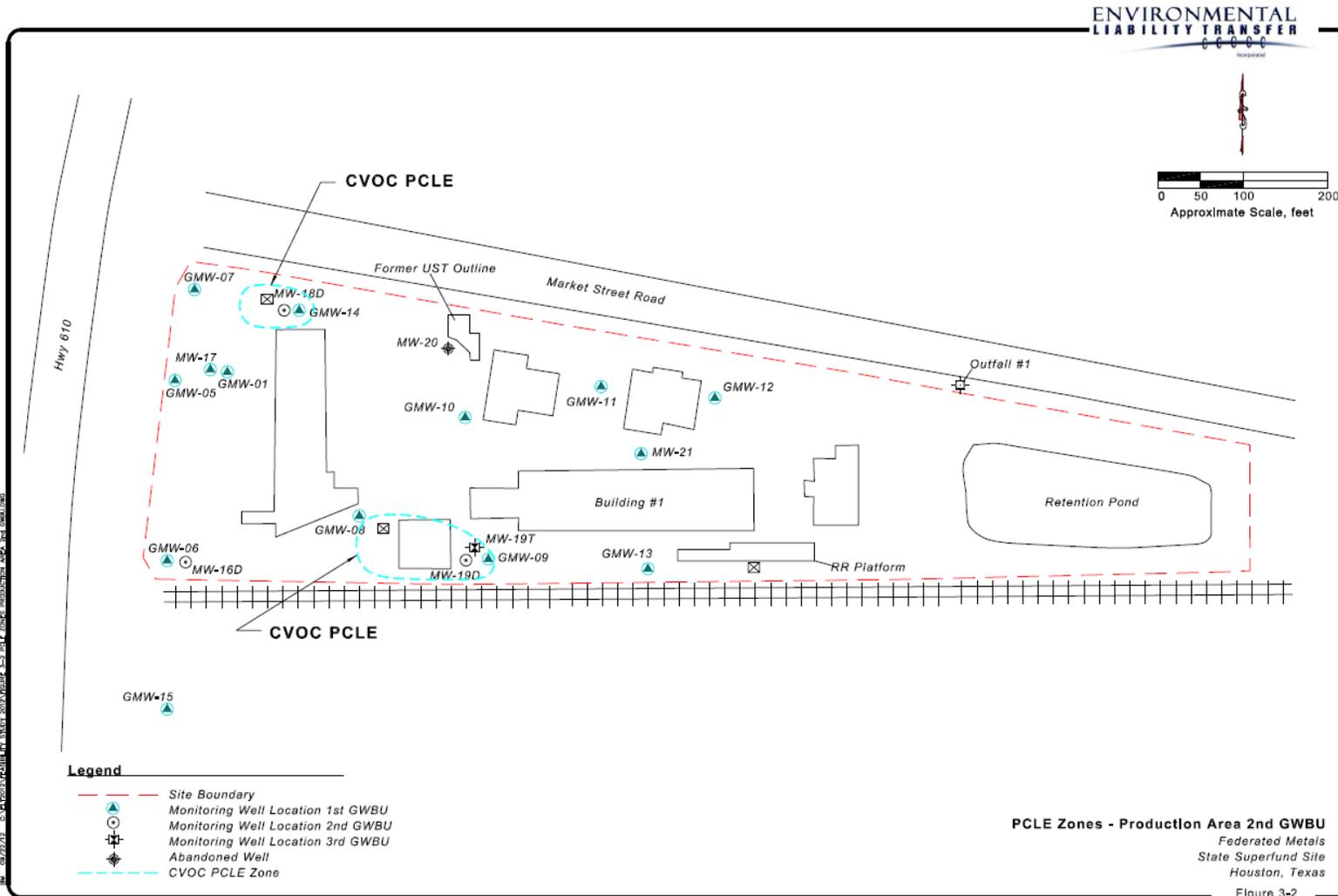
Figure 3: Selected Groundwater Remedial Action Areas on the Production Area First Groundwater Bearing Unit



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

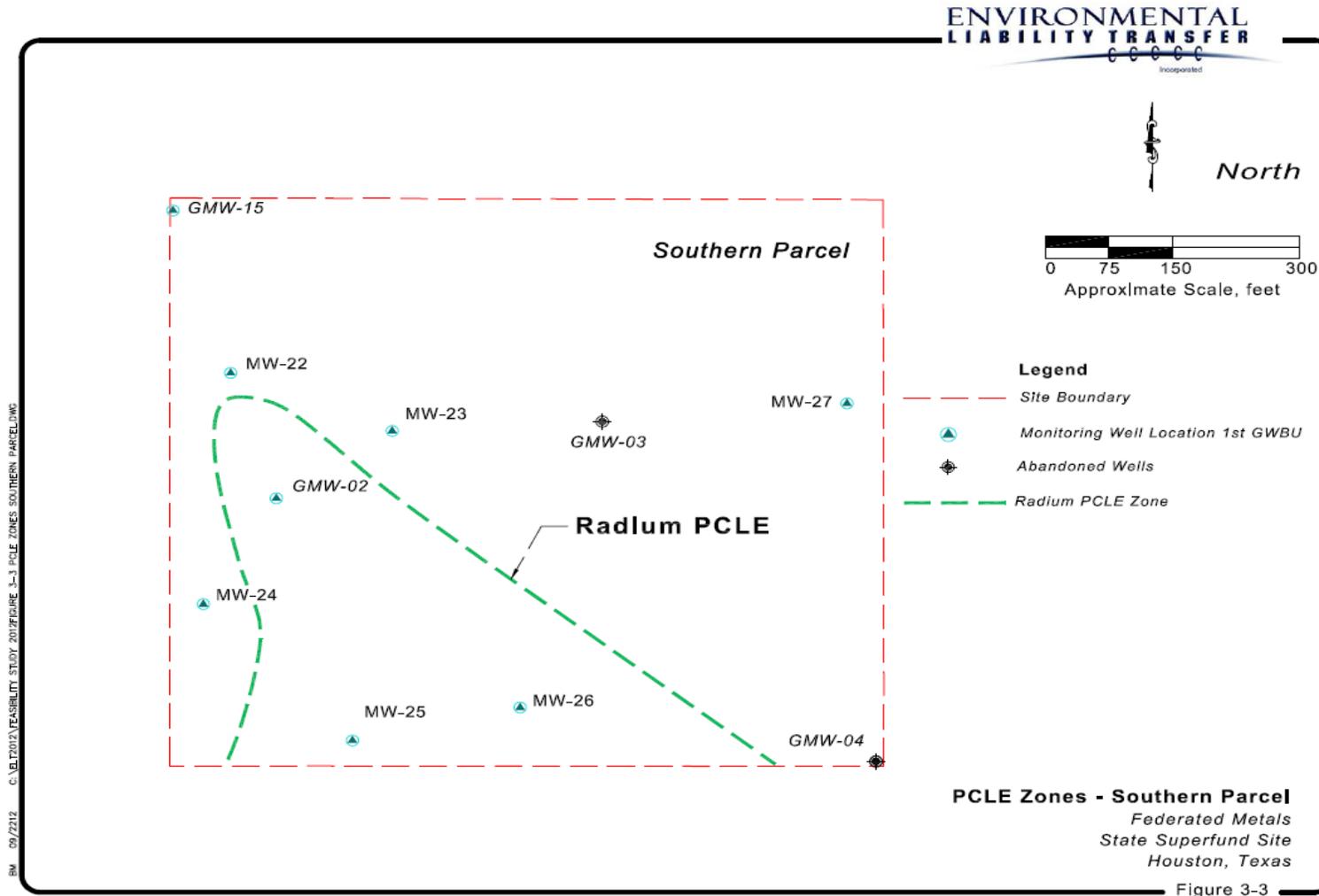
Figure 4: Selected Groundwater Remedial Action Areas on the Production Area Second Groundwater Bearing Unit



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

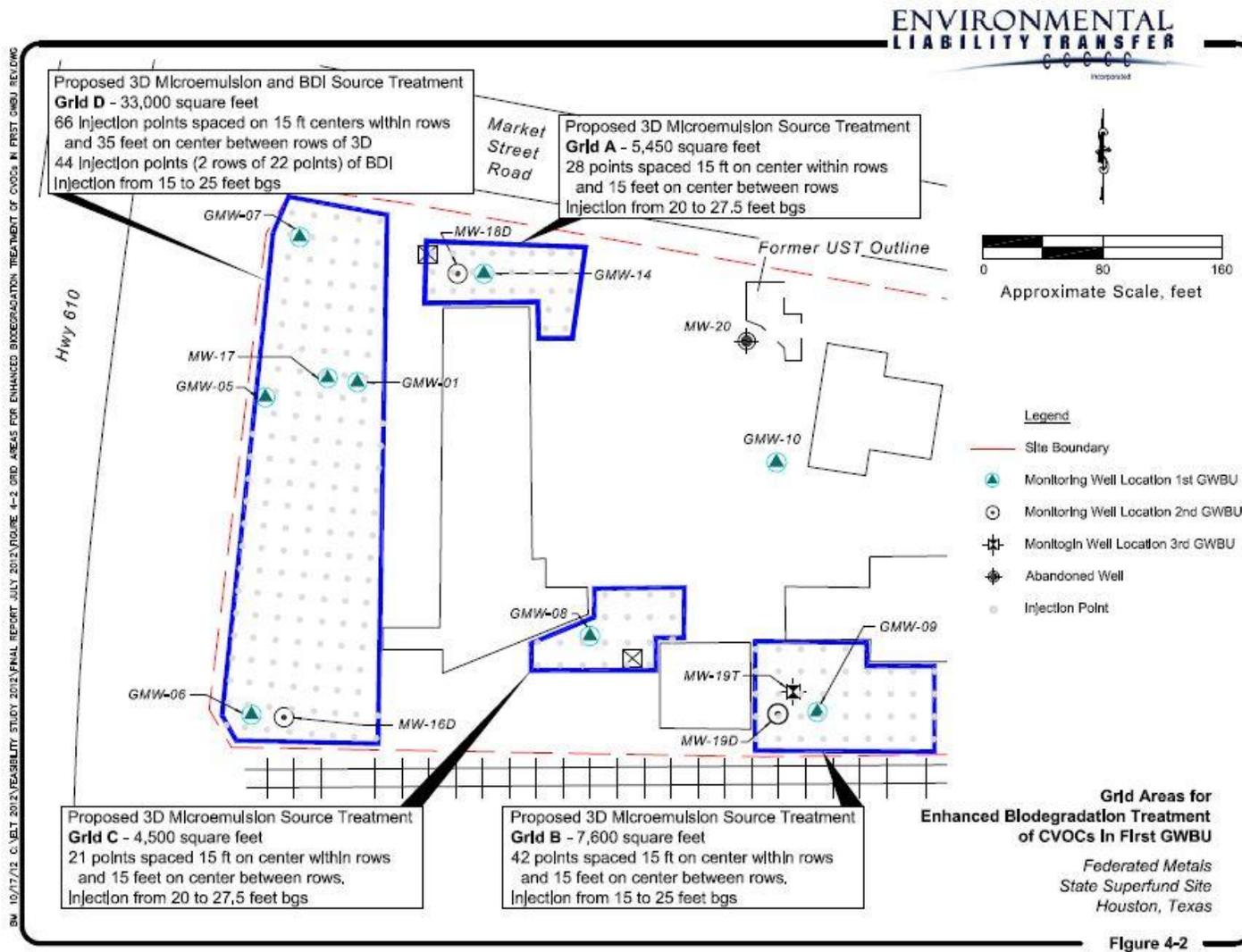
Figure 5: Selected Groundwater Remedial Action Areas on the Southern Parcel



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012

**Federated Metals State Superfund Site
Houston, Harris County, Texas
Remedy Selection Document**

Figure 6: Grid Areas for Enhanced Biodegradation Treatment of CVOCs in the First GWBU



Source: Final Feasibility Study Report for Groundwater, Federated Metals State Superfund Site, ELT October 2012