

**EXPLANATION OF SIGNIFICANT DIFFERENCES**

**PETRO-CHEMICAL SYSTEMS, INC.  
(TURTLE BAYOU)  
SUPERFUND SITE**

**West Road Area, Main Waste Area, Office Trailer Area, and Easement Area  
(LYONDELL ENVIRONMENTAL CUSTODIAL TRUST PROPERTIES)**



**UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
SUPERFUND DIVISION  
REGION 6**

**August 2012**

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3. <b>Charles Faultry /s Carlos Sanchez</b> 		CS	07/03/2012																								
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<b>Remarks:</b> Please note the Completion Date in CERCLIS for the ESD is 6/30/12. Attaching the WORD document and PDF of the for TI Waiver for Lyondell Trust properties. The figures load slower in WORD, the figures load faster in PDF.  NOTE: The ESD had to be updated to include the new TRRP GW Protection Standard for 1,1-DCA.																											
<b>From: (Name, org, symbol, Agency/Post)</b>		<b>Room No./Bldg:</b> 6SF-RA																									
Raji Josiam		<b>Phone Number:</b> 214.665.8529																									
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- tb rccommentsESD - Lyondell Trust TI Zone - Petro-Chem (Turtle Bayou) - June 2012-Updated TRRP.doc

**Inquiry/Supporting Documents:**



- 2012-06-04\_TI Boundary Plan Addendum 1\_Turtle Bayou\_Lyondell\_FINAL.pdf



- ESD - Lyondell Trust TI Zone - Petro-Chem (Turtle Bayou) - June 2012-Updated TRRP.pdf

**Final Document(s):**

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US EPA CONCURRENCE PAGE

Explanation of Significant Differences  
August 2012  
Petro-Chemical Systems, Inc. Site  
EPA ID# TXD980873350

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Rajalakshmi Josiam  
Remedial Project Manager

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Carlos Sanchez, Chief  
AR/TX Section

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Charles Faultry, Associate Director  
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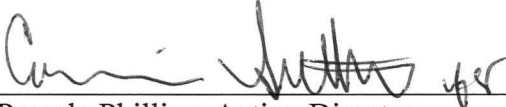
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Anne Foster  
Site Attorney

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Mark Peycke, Branch Chief  
Office of Regional Counsel

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Date

  
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Pamela Phillips, Acting Director  
Superfund Division

  
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Date

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A	State of Texas Letter
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## ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
AS	Monitoring Well
AW	Monitoring Well
BDA	Bayou Disposal Area
C1	Clay Unit 1
C2	Clay Unit 2
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
CR 126	County Road 126
DCA	Dichloroethane
DCE	Dichloroethene
DCP	Dichloropropane
EPEC	El Paso Energy Corporation Polymers Inc.
ESD	Explanation of Significant Differences
EW	Monitoring Well
EMW	Monitoring Well
FM 563	Farm to Market Road 563
FS	Feasibility Study
JW	Monitoring Well
KW	Monitoring Well
M1	Silt to Silty Clay Unit
MCLs	Maximum Contaminant Levels
mg/kg	Milligrams per kilogram or parts per million
MNA	Monitored Natural Attenuation
MW	Monitoring Well
µg/L	Micrograms per liter or parts per billion
NAPL	Non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List
OU1	Operable Unit 1
OU2	Operable Unit 2
PAH	Polycyclic Aromatic Hydrocarbon
PCL	Protective Concentration Limit
ppb	Parts per billion
PMZ	Plume Management Zone
PW	Monitoring Well
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
S1	Sand Unit 1
S2	Sand Unit 2
SRI/FFS	Supplemental Remedial Investigation/Focused Feasibility Study
SVE	Soil Vapor Extraction
TBA	Tert-Butyl Alcohol

## **ACRONYMS AND ABBREVIATIONS (continued)**

TCA	Trichloroethane
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TI	Technical Impracticability
TNRCC	Texas Natural Resource Conservation Commission
TRRP	Texas Risk Reduction Program
UAO	Unilateral Administrative Order
US EPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound

## **I. INTRODUCTION**

Site Name: Petro-Chemical Systems, Inc. (a.k.a. Turtle Bayou)  
CERCLA Id No.: TXD980873350  
Site Location: Fifteen miles southeast of Liberty, Texas, and approximately six miles north of Interstate 10 along Farm to Market Road 563 (FM 563), Liberty County, Texas  
Lead Agency: U.S. Environmental Protection Agency, Region 6 (EPA)  
Support Agency: Texas Commission of Environmental Quality (TCEQ)

This decision document presents the Explanation of Significant Differences (ESD) for the Petro-Chemical Systems, Inc. Superfund Site (Site), located fifteen miles southeast of Liberty, Texas, and approximately six miles north of Interstate 10 along Farm to Market Road 563 (FM 563), in Liberty County, Texas. This ESD is issued in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i). The Director of the Superfund Division, Environmental Protection Agency (EPA), Region 6, has been delegated the authority to sign this ESD.

The ESD will become part of the Administrative Record for the Site. The administrative record is available to the public for review during regular business hours at the following locations:

### **Liberty Municipal Library**

1710 Sam Houston Ave.

Liberty, Texas 77575

(936) 336-8901

Monday-Thursday 10:00 am - 6:00 pm;

Friday 1:00 pm - 5:00 pm;

Saturday 10:00 am - 4:00 pm

### **Texas Commission on Environmental Quality**

Records Management Center

12100 Park 35 Circle, Building E

Austin, Texas 78753 - 3087

Toll free phone number: 1-800-633-9363 or

512-239-2900

Monday – Friday 8:00 am - 5:00 pm

## **II. STATEMENT OF PURPOSE**

This ESD is being issued pursuant to the Record of Decision (ROD) Amendment for the Site signed on September 22, 2006 (henceforth referred to as the 2006 ROD Amendment). The original ROD for Operable Unit 2 (OU2) of the Site was signed on September 6, 1991, addressing source control and groundwater contamination at five of the waste disposal areas at the Site. The 1991 ROD was followed by a ROD Amendment signed on April 30, 1998 (henceforth referred to as the 1998 ROD Amendment), the 2006 ROD Amendment, and a September 2010 ESD (henceforth referred to as the 2010 ESD).

The 2006 ROD Amendment documented EPA's determination that complete restoration of groundwater is technically impracticable in some areas of the Site, and that applicable or relevant and appropriate requirements (ARARs) for groundwater restoration would be waived through a Technical Impracticability (TI) waiver. This determination included groundwater on the Lyondell Properties, now the Lyondell Environmental Custodial



Trust (Lyondell Trust) properties, which include four of the waste disposal areas at the Site: the West Road Area, Main Waste Area, Office Trailer Area (which also comprises the B-53/MW-45 and MW-10 areas), and Easement Area. The 2006 ROD Amendment identified the need to designate the exact boundaries of the groundwater zones where remediation is technically impracticable (TI Zones) in these areas after a two-year transitional monitoring period. The 2006 ROD Amendment also stated that the two-year monitoring period data would provide an indication whether the selected remedy will be effective in preventing contaminants with concentrations exceeding the groundwater protection standards from migrating beyond the boundaries of the TI Zones to be established. The EPA is issuing this ESD for the West Road Area, Main Waste Area, Office Trailer Area, and Easement Area to establish the final boundaries of the TI Zone for these areas and document that the data indicates that the remedy selected will be effective in preventing contaminants from migrating beyond the established TI Zone boundaries.

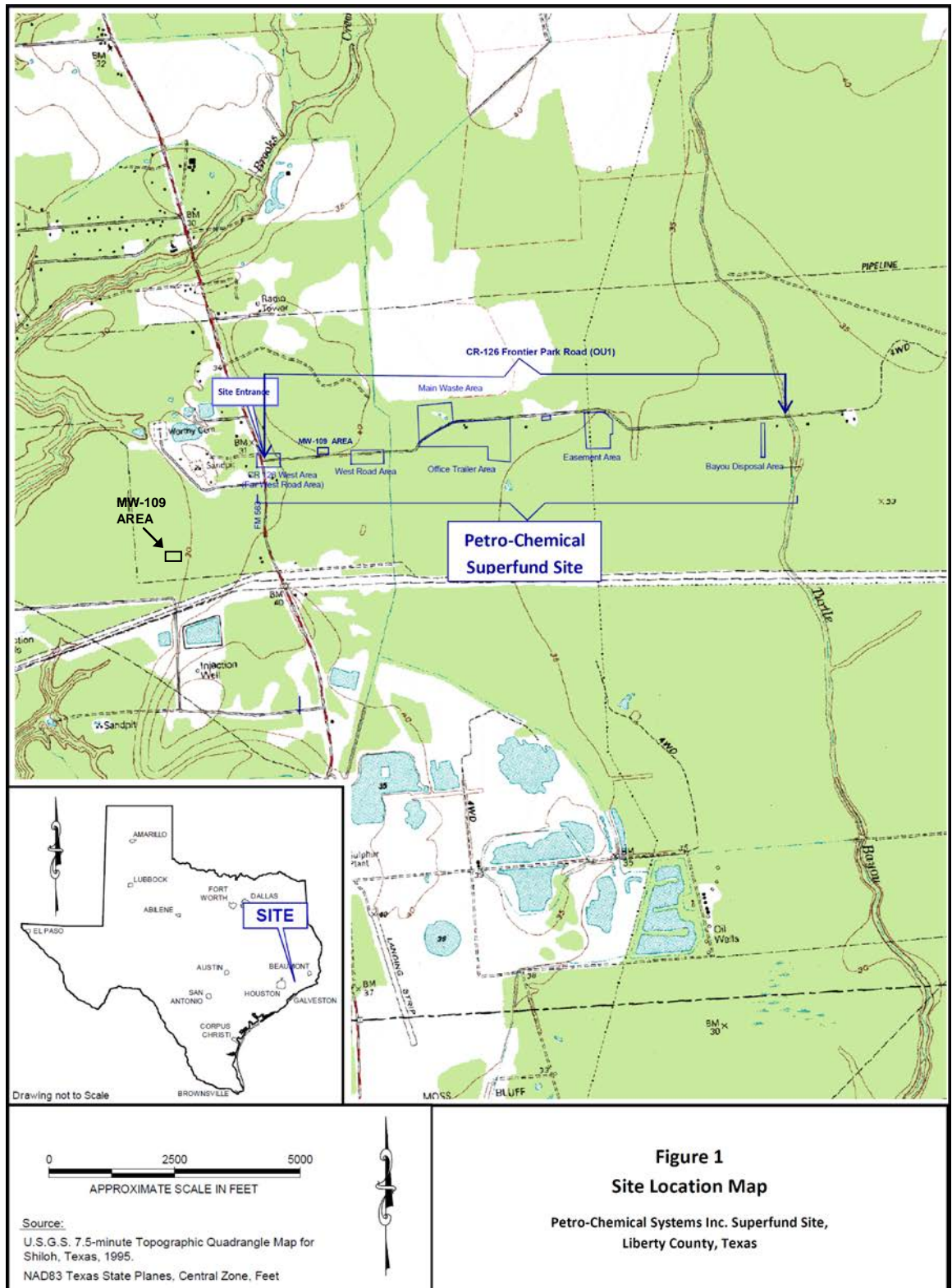
### **III. SITE HISTORY AND CONTAMINATION**

Unpermitted waste disposal at the Site appears to have started in the late 1960s. Disposal of waste at the Site is documented in the Texas Water Quality Board records as early as 1971. Records indicate the dumping of waste oils in unlined pits and on Frontier Park Road (now known as CR 126). Since the Site was never an authorized waste disposal facility, the exact nature of disposal activities at the Site is uncertain. However, it appears that the waste was dumped indiscriminately from trucks at numerous locations. Eight waste disposal areas have been identified at the Site, two of which were identified only after remedial activities commenced. These eight waste disposal areas are Frontier Park Road/CR 126, the Main Waste Area, the Office Trailer Area, the Easement Area, the Bayou Disposal Area, the West Road Area, the CR 126 West Area, and the MW-109 Area.

The Site was subdivided into five-acre and fifteen-acre plots and sold for residential development. Residential use of the Site has been continuous since 1974, except during the previous remedial activity on Frontier Park Road completed in August 1988, during which the US EPA temporarily relocated site residences. Currently there are seven residences on CR 126 adjacent to waste disposal areas (CR 126 West Area, MW-109 Area, Easement Area, and the Bayou Disposal Area). Figure 1 below shows the Site Location Map and Figure 2 below shows the Site Plan for the Lyondell Trust properties.

In 1984, the EPA proposed the Site for inclusion on the National Priorities List (NPL). The Site was placed on the NPL in 1986.

The Site was previously divided into two operable units (OU). Contamination along CR 126, formally Frontier Park Road (OU1), was addressed first. The remedial investigation (RI) and feasibility study (FS) conducted in 1986 found that several sections of CR 126 were contaminated with volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs).



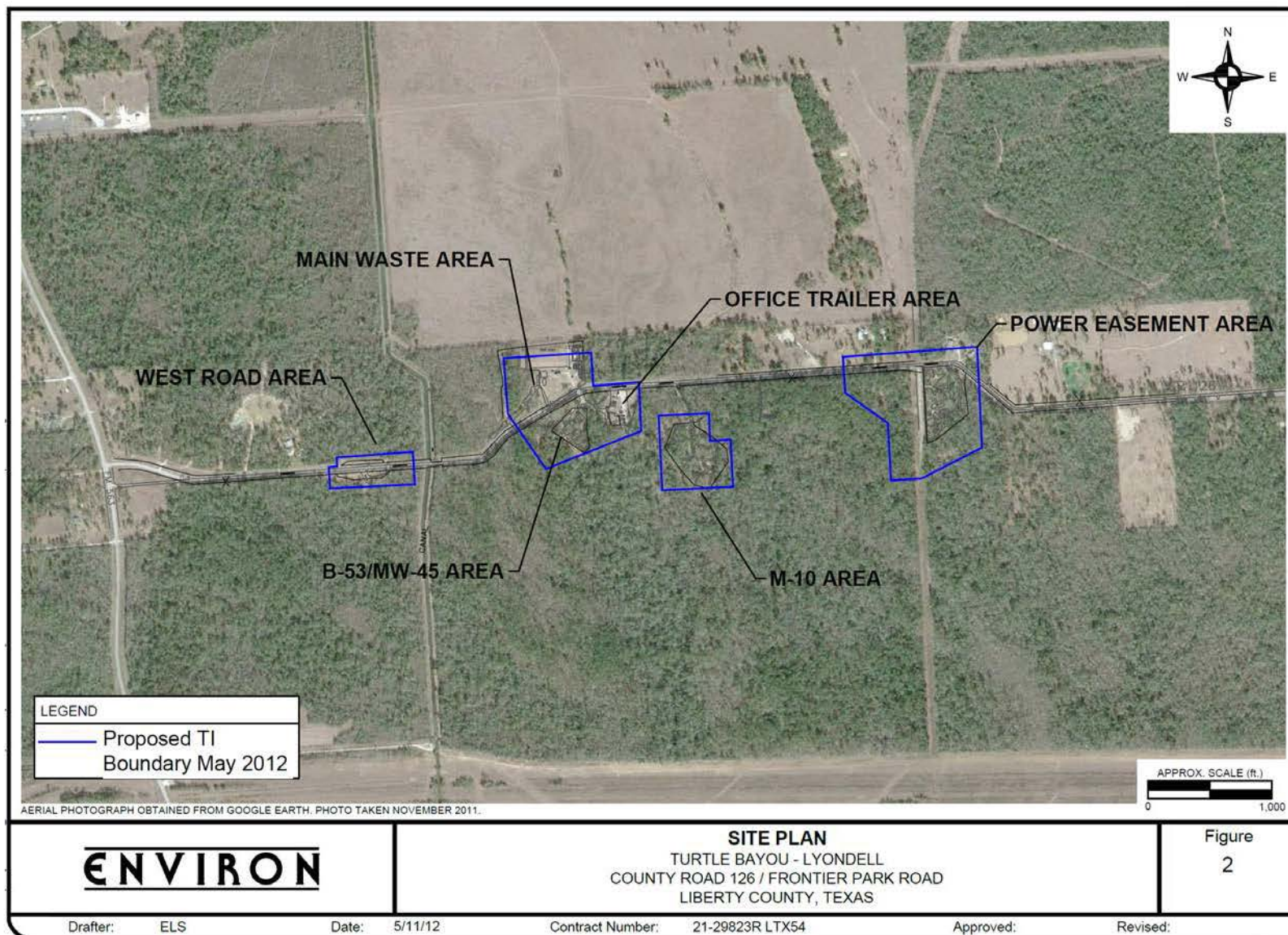




Table 1 summarizes the different decision documents and associated operable units and/or areas.

**Table 1**  
**Operable Units/Areas and Decision Documents**

<b>Operable Unit</b>	<b>Areas Addressed</b>	<b>Decision Document</b>	<b>Date</b>	<b>Description</b>
OU1	Frontier Park Road (CR-126)	ROD	March 27, 1987	Excavation of contaminated area and paving of road; Remedial Action conducted by EPA
OU2	1. West Road Area, 2. Office Trailer Area, 3. Main Waste Area, 4. Easement Area, and 5. Bayou Disposal Area	ROD	September 6, 1991	Source control remedial alternatives and groundwater contamination; Remedial Action Conducted by Lyondell and ARCO under Unilateral Administrative Order (UAO) of December 22, 1993
OU2	1. West Road Area, 2. Office Trailer Area, 3. Main Waste Area, 4. Easement Area, and 5. Bayou Disposal Area	ROD Amendment	April 30, 1998	Modified remedial components for soil and additional remedy components identified for “hot spots”. Modified groundwater remedy and included Monitored Natural Attenuation (MNA). Consent Decree entered into on December 8, 1998 required Lyondell to address Areas 1 through 4; EPA and TCEQ were to address Area 5
-	1. West Road Area, 2. Office Trailer Area, 3. Main Waste Area, 4. Easement Area, 5. Bayou Disposal Area, and 6. CR 126 West Area	ROD Amendment	September 22, 2006	Documenting Technical Impracticability (TI) waiver for some areas of Site groundwater; presenting MW-109 information; amending groundwater and soil cleanup criteria; amending remedy for Bayou Disposal Area (BDA) and Main Waste Area temporary RCRA storage facility. BDA and CR 126 West Area addressed by EPEC Polymers Inc. (EPEC) under August 21, 2007 Consent Decree
-	MW-109 Area	ESD	September 2010	Remedial Action at the MW-109 Area addressed by EPA
-	CR 126 West Area	ESD	June 2012	Establishing the boundaries of the TI Zone for the CR 126 West Area
-	1. West Road Area, 2. Office Trailer Area, 3. Main Waste Area, 4. Easement Area,	ESD	June 2012	Establishing the boundaries of the TI Zone for the Lyondell Trust’s areas

The ROD for OU1, signed on March 27, 1987, called for the excavation of 5,900 cubic yards of soil contaminated with PAHs or total VOC concentrations greater than 100 milligrams per kilogram (mg/kg). Contaminated soils ranging from one to five feet in depth were excavated along the first 1,800 feet from the intersection of CR 126 and FM 563. The excavated materials were placed in a temporary RCRA storage facility constructed in the Main Waste Area. The excavated area was backfilled with clean soil, and the entire length of the road was paved. This work was completed in August 1988.

A second RI/FS was conducted in 1988 to define the nature and extent of contamination throughout the rest of the Site (OU2). A Supplemental RI and Focused FS (SRI/FFS) were also performed in 1991. In addition to CR 126, the RI/FS and SRI/FFS identified the following five waste disposal areas: the West Road Area, the Main Waste Area, the Office Trailer Area, the Easement Area, and the Bayou Disposal Area (BDA). Soil and underlying shallow groundwater were contaminated primarily with VOCs and polycyclic aromatic hydrocarbons (PAHs). Additionally, small isolated areas of soil were found to contain lead concentrations up to 5,000 mg/kg.

The shallow aquifer is not currently being used as a source of drinking water on-site. However, the shallow aquifer does have the potential to be used as a source for drinking water in the future and is considered a class 2-B aquifer by the State of Texas. A class 2-B aquifer has water quality such that it is a usable aquifer but that for other reasons (i.e., low water yield capacity) is not currently used. The contamination of the shallow aquifer was determined to present future potential risk above groundwater cleanup standards. Therefore, exposure to contaminated groundwater was considered the primary site risk for OU2.

The Site's 1991 ROD addressed OU2 and identified source control remedial alternatives for application at the Site. For the Main Waste Area (including the temporary RCRA storage facility), the Office Trailer Area, the West Road Area, and the Easement Area, the specified remedy for the contaminated soil included the following:

- Soil vapor extraction (SVE) to remove volatile organics from affected soils;
- Air injection below affected soils to enhance removal of volatile organics;
- Vapor collection by SVE wells and transport for treatment through surface piping;
- Catalytic thermal destruction of volatile organic vapors;
- Storm water vertical infiltration control by an engineered soil and synthetic liner cap;
- Dismantling of the temporary RCRA storage facility (if warranted) with remedial action for the potentially contaminated soils beneath the storage facility;
- Consolidation of lead contaminated soils in the Main Waste Area followed by capping.

The 1991 ROD also identified remedial alternatives to address groundwater contamination in the West Road Area, Main Waste Area, Office Trailer Area, and the Easement Area. The 1991 ROD specified:

- Removal of volatile organic contaminants using vapor extraction (in-situ air stripping);
- Vapor collection and transport followed by catalytic thermal destruction of volatile organics;
- Horizontal migration control with a slurry wall.

Additional 1991 remedy components included the installation of structures to control storm water runoff, groundwater monitoring, and the restoration of the Site surface upon completion of remedial action.

On December 22, 1993, the EPA issued a Unilateral Administrative Order (UAO) for the OU2 remedial design and remedial action. Pursuant to the UAO, Lyondell Chemical Company (previously known as ARCO Chemical Company) and Atlantic Richfield Company worked with the US EPA and the Texas Natural Resources Conservation Commission (TNRCC - currently the TCEQ) to complete the Site's remedial design. The OU2 remedial design, which included several field pilot studies, began on September 21, 1992, and was completed on May 22, 1998.

On April 30, 1998, the EPA issued a ROD Amendment. The 1998 ROD Amendment identified various remedial components to be used independently or in combination to achieve the Site's performance standards in addition to those specified in the 1991 ROD. The selected remedy to address contaminated soils in the West Road Area, Main Waste Area, Office Trailer Area, and the Easement Area included the sequenced application of SVE, bioventing, and monitored natural attenuation. The designated remedy for the contaminated soils in the temporary RCRA storage facility located in the Main Waste Area included the combination of SVE and aqueous phase bioremediation. Additional contingent remedy components for the contaminated soils of the temporary RCRA storage facility included bioventing and soil washing. For areas designated as "hot spots," additional remedy components were identified. Hot spots were areas with high concentrations of dissolved and/or free phase non-aqueous liquids with benzene concentrations in excess of 100,000 parts per billion (ppb) at depths greater than ten feet. The additional remedy components included thermal desorption, focused hot spot excavation and on-site bio-treatment, excavation and offsite disposal/treatment, and containment and infiltration control.

The 1998 ROD Amendment also addresses a modification to the soil cleanup criteria for benzene and revises the contaminated groundwater remedy in the West Road Area, Main Waste, Office Trailer Area, and the Easement Area from in- situ air stripping to in-situ bioremediation. The Site's in-situ bioremediation system used injection wells in combination with extraction wells to circulate oxygenated water with nutrients to stimulate bacteria and other microbial forms of life to help cleanup the contamination. The 1998 ROD Amendment also included monitored natural attenuation and institutional controls.

On December 8, 1998, the EPA entered into a Consent Decree with Lyondell Chemical Company and Atlantic Richfield Company. The Consent Decree supersedes the provisions of the UAO that address obligations of Lyondell Chemical Company and

Atlantic Richfield Company. Pursuant to the Consent Decree, Lyondell Chemical Company and Atlantic Richfield Company have been required to address contamination in the Site's West Road Area, Main Waste Area, Office Trailer Area, and the Easement Area. The EPA and TCEQ were responsible for addressing contamination in the Bayou Disposal Area.

Active remediation of the West Road Area, Main Waste Area, Office Trailer Area, and Easement Area occurred between 1996 and 2005. Confirmatory samples were taken in September 2010 and the sampling results confirm that the soil cleanup criteria have been met. A Remedial Action Report was submitted to the EPA and TCEQ in August 2011.

On September 22, 2006, a second ROD Amendment (the 2006 ROD Amendment) modified the 1998 ROD Amendment. A new contaminated area, the CR 126 West Area, was identified after issuance of the 1998 ROD Amendment, and the 2006 ROD Amendment selected a remedy for this new area. The 2006 ROD Amendment further discusses various factors found across the Site, including the Lyondell Trust Properties, that inhibit groundwater restoration and support the granting of TI waivers. Investigations conducted at the Site indicate that the conditions related to the three factors below work to preclude the timely cleanup of contaminated groundwater:

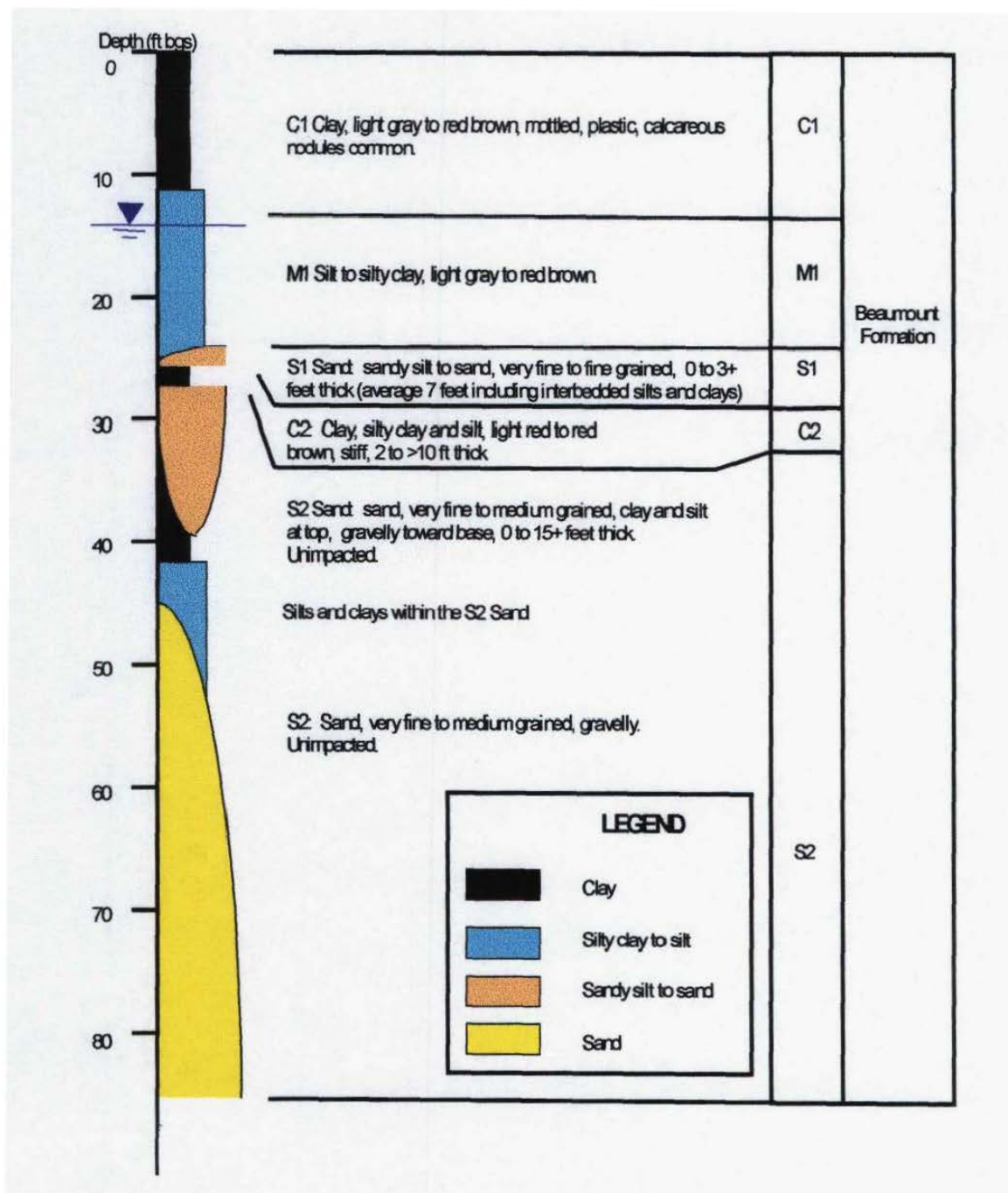
- Hydrogeologic factors;
- Contaminant related factors; and
- Remediation system inadequacies.

Investigations conducted at the different areas of the Site indicate that conditions related to each of the above three factors work to preclude the timely restoration of ground water.

Hydrogeologic factors in the Lyondell Trust Areas are consistent with increased difficulty in remediation of contaminated soil and ground water. These factors include a complex and heterogeneous stratigraphy of interbedded silts and clays and some sand, low hydraulic conductivity, a downward vertical gradient, and high temporal variation in the water levels. The Stratigraphic Summary is presented in Figure 3.

The uppermost unit is a clay unit designated as C1. The C1 clay is about 12 feet thick, heavily rooted by grasses and shrubs to about a one foot depth, moderately rooted to about three feet, with less frequent pine roots to about 10 feet. The C1 overlies a silt unit, the M1, and a basal sand unit, the S1. The M1 silt and contiguous S1 sand lie between approximately 12 and 29 feet below grade under the entire site. The C2 clay lies at the base of the S1 sand and varies from two to more than ten feet thick. It isolates the S1 sand from the S2 sand, in which local supply wells have typically been installed. These units are part of the Beaumont Formation, which dips southeasterly towards the Gulf.

**FIGURE 3**  
**Stratigraphic Summary**





Given the overall clayey and silty nature of the S1 Sand in the Lyondell Trust Areas, the removal or in-situ treatment of constituents is limited because migration of contaminants or of treatment media (e.g., air, oxidants, or nutrients) is restricted by the following:

- Low hydraulic conductivity of the formation, limiting advective flow processes, resulting in diffusion being the primary mass transfer mechanism; and
- The tendency of the clays to adsorb constituents and trap non-aqueous phase waste liquids (NAPLs), retarding their migration and limiting their availability to remedial recovery technologies.

The hydraulic conductivity of the shallow S1 Zone sandy layer is fairly low, about  $5 \times 10^{-4}$  cm/s (centimeters per second), due to its high clay and silt content. As a result, in the shallow zone the pumping rates are limited. The low hydraulic conductivity of the S1 Sand and the associated low pumping rate limits the ability of a groundwater recovery system to effectively remediate the shallow ground water. For example, the S1 shallow zone pump tests indicated a 4-foot draw down at a pumping rate of only 0.1 gallon per minute. At pumping rates this low it will take many years for a groundwater recovery system to effectively flush multiple volumes of water through the affected portion of the shallow zone, making remediation ineffectual.

In contrast to the S1, the hydraulic conductivity of the intermediate zone (the upper portion of the S2 Sand) is higher, or about  $1 \times 10^{-2}$  cm/s. As a result, in the intermediate/deeper zone the pumping rates are greater. For example, an aquifer test in the intermediate zone indicated that a 7-foot draw down was achieved at a rate of 10 gallons per minute, indicating that a higher pumping rate could have been tolerated. However, the presence of constituents in an adsorbed phase in the C2 Clay between the S1 and S2 Sands will limit the ability of a groundwater recovery system to effectively remediate the S2 Sand and to recover constituents adsorbed onto the intervening clays.

The hydraulic conductivity of the clays and silty clays in the C1 Clay, S1 Zone, and C2 Clay appears to be about four orders of magnitude less than the sandy materials (i.e., less than  $1 \times 10^{-7}$  cm/s). The low permeability of the clays and silty clays will limit the ability of in-situ remedial technologies to recover contaminants adsorbed onto the silts and clays. The clays and silty clays will, therefore, serve as an ongoing diffusion-limited source of constituents to the S1 and S2 Sands that will limit the long-term ability of remedial efforts to clean up those aquifers.

Constituent and source-related factors at the Lyondell Trust Areas indicative of difficult remedial conditions, as identified in the US EPA's TI guidance, include a complex contaminant distribution [as reflected by the historical disposal of aqueous and non-aqueous phase liquids (NAPL) that penetrated about 40 ft into the ground; the large volume of affected media encompassing a 5-acre area, and deep affected media within the S2 Sand at depths up to 85 feet below ground surface]; the large volume of the original release over several years (as reflected in the total mass estimated to be present); and a complex mix of chemical properties for the constituents in the wastes disposed in or near the Lyondell Trust areas.

It should be noted that the contaminants reported present in the soil and ground water of the Lyondell Trust Areas represent a complex mixture of aromatic and chlorinated hydrocarbons and alcohols as well as metals. Therefore, remedial technologies that may work well for one family of constituents may not be effective for another. For example, one common approach for chlorinated solvent plumes is to use a reactive barrier composed of ferric iron. However, such a reactive barrier will not work for benzene and other aromatic hydrocarbons and alcohols. Similarly, attempts to in-situ aerobically degrade the aromatic hydrocarbons with the injection of oxygen and nutrients will not be effective for chlorinated hydrocarbons such as dichloroethene and dichloroethane and could disrupt the natural attenuation processes currently occurring.

As part of the TI evaluation, various remediation methods were evaluated. As has been demonstrated by the remedial efforts of Lyondell Chemical Company and Atlantic Richfield, the combination of the hydrogeologic conditions and contaminant related factors have limited the effectiveness of numerous remedial approaches in attaining complete restoration of contaminated soils and the underlying aquifers. However, it is important to note that these same hydrogeologic conditions and contaminant related factors have also assisted in preventing the migration of contaminants. Despite the fact that disposal occurred over 30 years ago, migration of affected ground water has been limited to less than about 200 ft in the S1 Sand and less than about 300 ft in the S2 Sand for most constituents. Therefore, for practical purposes, the source can be considered naturally contained.

In conclusion, the EPA determined in the 2006 ROD Amendment, based on years of remedy implementation of numerous remedial technologies across the Site, various studies, and consideration of other factors (i.e., hydrogeologic, contaminant related), that in areas where disposal has taken place, complete restoration of contaminated ground water to Federal drinking water standards is technically impracticable.

The 2006 ROD Amendment amends the Site's ground water contaminant cleanup levels to include levels for contaminants detected at elevated concentrations in the CR 126 West Area and at multiple locations throughout the Site. Specifically, vinyl chloride, 1,2-dichloroethane, cis-1,2-dichloro-ethylene, trans-1,2-dichloroethylene, 1,2-dichloropropane, 1,1,2-trichloroethane, trichloroethylene, 1,1-dichloroethylene, styrene, and toluene were added as contaminants of concern (COCs). The ground water cleanup levels are based on their Federal drinking water standards [i.e., Maximum Contaminant Levels (MCLs)]. An MCL is the highest level of a contaminant that EPA allows in drinking water.

Additional contaminants detected at elevated concentrations are acetone, 1,1-dichloroethane, and tert butyl alcohol. These contaminants do not have established federal cleanup criteria for the site for either soil or ground water. The Texas Commission on Environmental Quality (TCEQ) has recommended the following ground water cleanup values for these contaminants: acetone (22,000 µg/L), 1,1-dichloro-ethane (4,900 µg/L), and tert butyl alcohol (2,200 µg/L). These TCEQ ground water cleanup values are Texas Risk Reduction Program (TRRP), Tier One Ground Water Protective Concentration Limits (PCL) and are recommended when complete site-specific information is not available. In the 2006 ROD Amendment the TRRP Tier 1 PCL for

1,1-dichloroethane was listed as 2,400 µg/L. This TRRP number has been updated to 4,900 µg/L in May 2007. The updated number is used here in this ESD. A summary of the ground water standards from the previous site decision documents (i.e., 1991 ROD), and those discussed above are presented in Table 2.

**TABLE 2**  
**Ground Water Protection Standards**

Contaminant	Ground Water Cleanup Standard (µg/L)	Criteria
Benzene	5.0	MCL (1991 ROD)
Ethylbenzene	700	MCL (1991 ROD)
Xylene	10000	MCL (1991 ROD)
Naphthalene	327	Health Based Value (1991 ROD)
Lead	15	Action level (1991 ROD)
1,2-dichloroethane	5	MCL
1,1-dichloroethylene	7	MCL
Cis-1,2-dichloroethylene	70	MCL
Trans-1,2-dichloroethylene	100	MCL
1,2-dichloropropane	5	MCL
1,1,2-trichloroethane	5	MCL
Trichloroethylene	5	MCL
Styrene	100	MCL
Toluene	1000	MCL
Vinyl chloride	2	MCL
Acetone	22000	TCEQ TRRP Tier One PCL
1,1-dichloroethane	4900	TCEQ TRRP Tier One PCL
Tert butyl alcohol	2200	TCEQ TRRP Tier One PCL

**Notes:**

MCL Maximum Contaminant Level

TRRP Texas Risk Reduction Program

Since the 1998 and 2006 ROD Amendments, a significant change in the overall Site's current and anticipated land use has occurred for large portions of the Site. Specifically, for the Site's West Road Area, Main Waste Area, Office Trailer Area, and Easement Area, residential land use is no longer reasonably anticipated. Lyondell Chemical Company has acquired these properties and has restricted access to these areas such that residential use on this property will not occur. The Lyondell Trust was established in March 2010 following the bankruptcy of Lyondell. The environmental issues for the Lyondell properties are now being addressed by the Trustee of the Lyondell Trust. Potential future exposures would likely be limited to road utility workers, trespassers, maintenance workers and contractors involved in the groundwater monitoring program.

#### **IV. SELECTED REMEDIAL ACTION COMPONENTS**

The 1998 ROD Amendment identified various remedial technologies to be used independently or in combination to achieve the Site's performance standards. Pursuant to the 1998 Consent Decree with Lyondell and Atlantic Richfield, the remedies identified in the 1998 ROD Amendment were used to address contamination at the West Road Area, the Main Waste Area, the Office Trailer Area, and the Easement Area.

The sequenced application of SVE, bioventing, and MNA were the remedial technologies selected to address contaminated soils in the four waste disposal areas now part of the Lyondell Trust Properties. Specifically, the soil remedy components for each area included SVE, bioventing, soil washing, storm water management controls, MNA, and institutional controls. In addition, the designated remedy for the contaminated soils in the Main Waste Area's temporary RCRA storage facility included the combination of SVE and aqueous phase bioremediation, and the contingent remedy components included bioventing and soil washing. Additional remedy components were identified for "hot spots" and included thermal desorption, focused hot spot excavation and on-site bio-treatment, excavation and off-site disposal/treatment, and containment and infiltration control.

The 1998 ROD Amendment also revised the contaminated groundwater remedy from in-situ air stripping to in-situ bioremediation for the West Road Area, Main Waste, Office Trailer Area, and the Easement Area. This in-situ bioremediation system used injection wells in combination with extraction wells to circulate oxygenated water. The water contained nutrients to stimulate bacteria and other microbes to help reduce contamination. Water extracted from the system was pumped to a wastewater treatment plant located in the Main Waste Area, treated to TCEQ standards, and discharged. In addition to this technology, the 1998 ROD Amendment included selected directional containment, MNA, and institutional controls.

Active remediation was complete in the Main Waste Area, the West Road Area, the Office Trailer Area, and the Easement Area in 2005. The 2006 ROD Amendment documented that a TI waiver was appropriate because it is technically impracticable to restore portions of the shallow groundwater at the Site, including both the S1 and the deeper S2 sands. The 2006 ROD Amendment identified the factors that support granting a TI waiver for these four areas, as described in Section III of this ESD. This 2006 ROD Amendment also amended the remedy for the Main Waste Area's Temporary RCRA storage facility to allow it to be left in place.

## **V. BASIS FOR THE DOCUMENT**

The EPA is issuing this ESD for the West Road Area, Main Waste Area, Office Trailer Area (which also comprises the B-53/MW-45 and MW-10 areas), and Easement Area to establish the final boundaries of the TI Zone for these areas and document that the remedy selected is effective in preventing contaminants from migrating beyond the S1 and S2 TI Zone boundaries.

An evaluation of the technical impracticability of restoring Site groundwater was presented in the March 2005 Technical Impracticability Evaluation Document prepared by Applied Hydrology Associates. The 2006 ROD Amendment stated that the precise horizontal delineation of TI zones for the Site would be delayed until evaluation of data collected during a 2-year transitional monitoring period was complete. A two-year transitional monitoring period was completed and results were presented in the Natural Attenuation Demonstration Report and Third Quarter 2007 Ground Water Monitoring Report dated March 17, 2008. The 2-year transitional monitoring results indicated the need for additional monitoring well installation and groundwater sampling to further delineate both horizontal and vertical plumes to establish appropriate boundaries for the TI zones. Groundwater monitoring during 2008 and 2009 was conducted and results were presented in the 2008-2009 Ground Water Monitoring Report. Additional monitoring wells were installed and sampled in September through December 2010 in order to delineate the extent of the plume boundary. In order to further define the plume boundaries both horizontally and vertically, more wells were installed in April and May 2011.

The August 2011 TI Boundaries Plan presents the results of the additional groundwater related activities performed in April-May 2011 and identifies the current groundwater monitoring well network including newly installed wells. In the past, the M1, M1/S1 and S1 units were combined into one contour set for interpretation. However, the groundwater plumes were not clearly defined within these units. Therefore, in order to better define the groundwater plumes these contour sets have been separated into two (the M1 and the M1/S1 combined, and the S1 presented separately). A total of three separate sets of contours are now provided for the Lyondell Trust areas: one set for wells screened across the M1 and the M1/S1 unit, a second set for wells screened across the S1 unit, and a third set for wells screened across the deeper S2 unit.

The proposed TI Zone boundaries were updated in the August 2011 TI Boundaries Plan based on the results of the data collected from the 2011 groundwater monitoring event. Based on further discussions with the EPA, TCEQ, and Lyondell Trustee, it was agreed that the August 2011 proposed TI Zone boundaries will serve as Compliance Boundaries to monitor the stability of the contaminated groundwater plume and to evaluate any changes in Site groundwater conditions. The final TI Zone Boundaries that were agreed upon are smaller in area than those that were proposed. The final TI Zone Boundaries and the Compliance Boundaries for the West Road Area, the Main Waste Area, the Office Trailer Area and the Easement Area are shown in Figures 4, 5, and 6.

The Compliance Boundaries correlate to the location of a plume management zone (PMZ) under the TCEQ TRRP rule (30 TAC 350), and the objectives are in general accordance with plume management zone criteria outlined in the Texas Administrative Code, as requested by TCEQ. The Compliance Boundary for each of these areas has been established to provide the following:

- Verification of compliance with ARARs within the Compliance Zone (the area between the TI Zone Boundary and Compliance Boundary)
- Verification that the plume has not migrated to the monitoring wells in the Compliance Zone
- Availability of ample time, if contingency measures are to be taken, before the plume migrates to the Compliance Zone boundary.

Figures 4 through 6 indicate proposed locations for additional monitoring well nests needed for long term-monitoring. Sampling frequencies of these proposed wells will be discussed in the Long-Term Monitoring Plan to be submitted.

The final TI Zone Boundaries represent that part of the shallow groundwater units currently exceeding the groundwater protection limits. In general, the TI Zone boundaries were drawn to encompass the plume boundaries, while taking into account the flow direction, existing monitoring well locations, and seasonal variation. The TI Zone boundaries fall approximately 50 feet beyond the current plume extents. The Compliance Zone boundaries are located approximately 100 feet beyond the TI Zone boundaries and have also been squared off to simplify the administration of the Compliance Zones. A more detailed description of the rationale for the location of the TI and Compliance Zone boundaries in each area is provided below.

**West Road Area:** As shown on Figure 4, the Contaminants of Concern (COCs) for the TI Zone boundary locations for the West Road Area are benzene and tert-butyl alcohol (TBA) as follows:

- The north TI Zone boundary is based on the TBA plume location in the M1 and the M1/S1 units centered on monitoring well AW-010.
- The east TI Zone boundary is based on the benzene plume location in the M1 and the M1/S1 units centered on monitoring wells AS-002, MW-078, and AW-032.
- The south TI Zone boundary is based on the benzene plume location in the S1 unit centered on monitoring well MW-112 and the TBA plume location in the S1 unit centered on monitoring well MW-152.
- The west TI Zone boundary is based on the TBA plume location in the S1 unit centered on monitoring well MW-152.

Based on the December 2011 water level data, the groundwater flows to the southwest in the M1/S1 unit, to the west in the S1 unit, and to the northwest in the S2 unit. There are not enough M1 wells to determine a groundwater flow direction in the M1 unit. For the West Road Area, the TI Zone extends vertically to the bottom of the S2 unit.

A slurry wall exists on the West Road area that extends across the west-central area of the Site. Performance of the slurry wall is monitored by the M1 and M1/S1 unit wells AW-ESD – Lyondell Trust Properties  
Petro-Chemical Systems, Inc. Superfund Site

010, located within the slurry wall boundary, and AW-038, located down gradient and outside the slurry wall boundary.

**B-53/MW-45, Office Trailer, Main Waste, and MW-10 Areas:** Due to proximity of the B-53/MW-45, Office Trailer, Main Waste, and MW-10 Areas, the plumes in these areas cross the area boundaries. As a result, the TI and Compliance Zone boundaries for these four areas were evaluated together. As shown on Figure 5, one TI Zone has been defined for the B-53/MW-45, Office Trailer, and Main Waste Areas. There was enough separation between the plumes in the MW-10 Area and the adjacent Office Trailer Area to define a separate TI Zone for the MW-10 Area; however, there is only one Compliance Zone for the four areas.

The COCs for the TI Zone boundary locations for the B-53/MW-45, Office Trailer, and Main Waste Areas are benzene, TBA, and vinyl chloride as follows:

- The north TI Zone boundary in the western portion of the B-53/MW-45, Office Trailer, and Main Waste Areas is based on the vinyl chloride plume location in the M1 and the M1/S1 units centered on monitoring well BW-002 and the TBA plume location in the S1 unit centered on monitoring wells MW-155, MW-131, MW-134, MW-118, and MW-156. The north TI Zone boundary in the eastern portion of the B-53/MW-45, Office Trailer, and Main Waste Areas is based on the benzene plume location in the M1 and M1/S1 units centered on monitoring well FW-009.
- The east TI Zone boundary in the northern portion of the B-53/MW-45, Office Trailer, and Main Waste Areas is based on the TBA plume location in the S1 unit centered on monitoring wells MW-155, MW-131, MW-134, MW-118, and MW-156. The east TI Zone boundary in the southern portion of the B-53/MW-45, Office Trailer, and Main Waste Areas is based on the benzene plume location in the M1 and M1/S1 units centered on monitoring well FW-009.
- The south TI Zone boundary is based on the TBA plume location in the M1 and M1/S1 units centered on monitoring wells DS-002, DW-014, and DW-019.
- The west TI Zone boundary is based on the TBA plume location in the S1 unit centered on monitoring wells MW-155, MW-131, MW-134, MW-118, and MW-156 and the vinyl chloride plume location in the S1 unit centered on monitoring wells MW-118 and MW-156.

The COCs for the TI Zone boundary locations for the MW-10 Area are benzene and TBA as follows:

- The north TI Zone boundary in the western portion of the MW-10 Area is based on the benzene plume location in the M1 and M1/S1 units centered on monitoring well MW-010/EW-002. The north TI Zone boundary in the eastern portion of the MW-10 Area is based on the TBA plume location in the M1 and M1/S1 units centered on monitoring wells MW-010/EW-002, JW-001, KW-017, and KW-021.
- The east TI Zone boundary is based on the TBA plume location in the M1 and M1/S1 units centered on monitoring wells MW-010/EW-002, JW-001, KW-017, and KW-021.

- The south TI Zone boundary is based on the benzene plume location in the S1 unit centered on monitoring well EMW-005.
- The west TI Zone boundary is based on the TBA plume location in the M1 and M1/S1 units centered on monitoring wells MW-010/EW-002, JW-001, KW-017, and KW-021; and the TBA plume location in the S1 unit centered on monitoring well MW-115.

Based on the December 2011 water level data, the groundwater flows to the south-southwest in the M1, M1/S1, and S1 units and to the southwest in the S2 unit in the B-53/MW-45, Office Trailer, and Main Waste Areas. Based on the December 2011 water level data, the groundwater flows to the south-southeast in the M1 and M1/S1 units and to the southeast in the S1 unit in the MW-10 Area. There are not enough S2 wells to determine a groundwater flow direction in the S2 unit in the MW-10 Area. For the B-53/MW-45, Office Trailer, and Main Waste Areas, the TI Zone extends vertically to the bottom of the S2 unit, and for the MW-10 Area, the TI Zone extends vertically to the bottom of the S1 unit.

**Power Easement Area:** As shown on Figure 6, the COCs for the TI Zone boundary locations for the Power Easement Area are benzene, 1,2-dichloroethane (1,2-DCA), TBA, and vinyl chloride as follows:

- The north TI Zone boundary is based on the benzene plume location in the M1 and the M1/S1 units centered on monitoring wells NW-013 and NW-016.
- The east TI Zone boundary is based on the 1,2-DCA plume location in the S1 unit centered on monitoring well MW-116.
- The south TI Zone boundary is based on the 1,2-DCA plume location in the S1 unit centered on monitoring well MW-116, and the TBA plume location in the M1 and M1/S1 units centered on monitoring wells PW-012 and EMW-022.
- The west TI Zone boundary in the southern portion of the Power Easement Area is based on the TBA plume location in the M1 and M1/S1 units centered on monitoring wells PW-012 and EMW-022. The west TI Zone boundary in the northern portion of the Power Easement Area is based on the benzene and vinyl chloride plume locations in the M1 and M1/S1 units centered on monitoring well EMW-032.

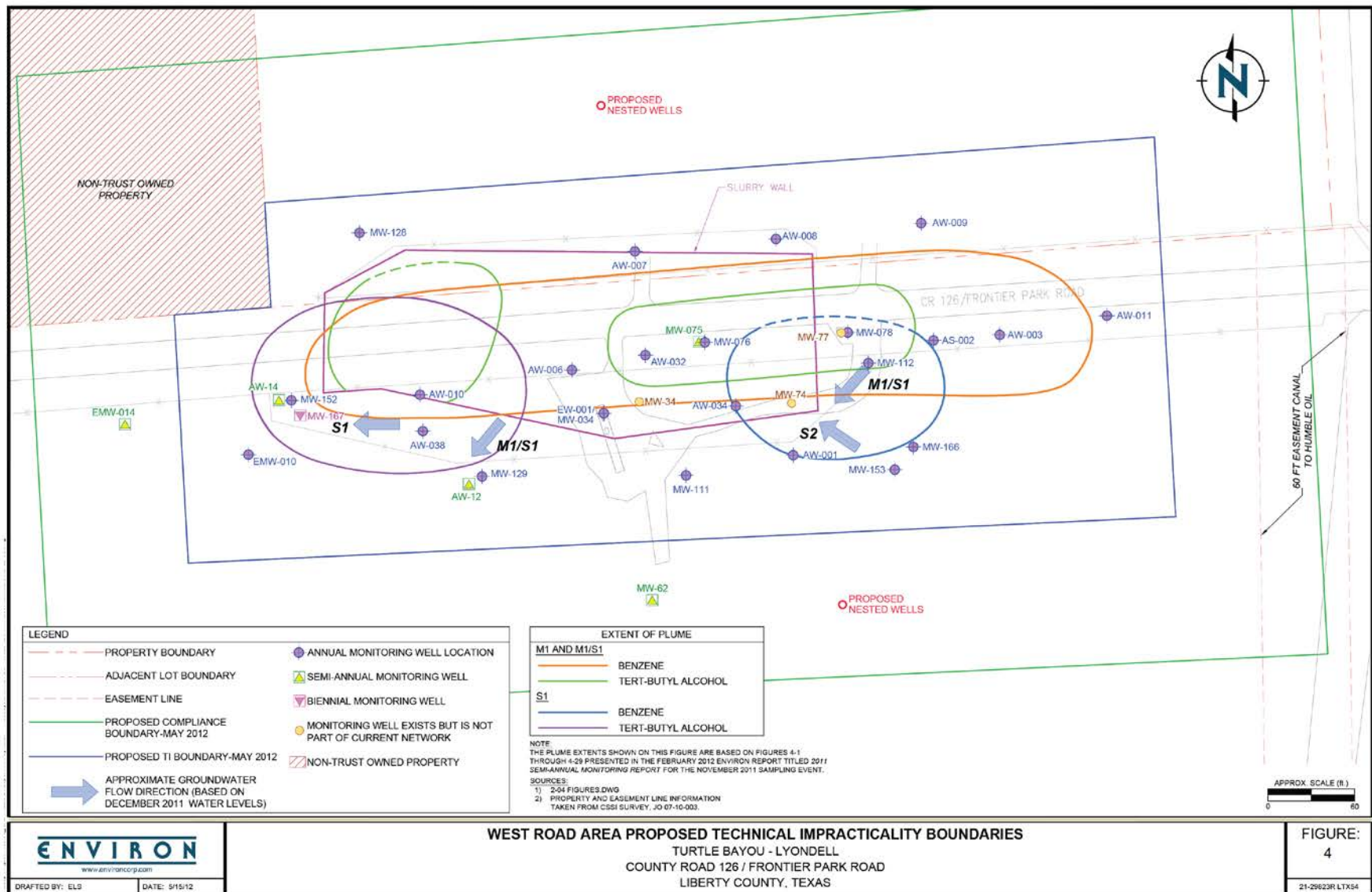
Based on the December 2011 water level data, the groundwater flows to the southwest in the M1, M1/S1, S1, and S2 units. For the Power Easement Area, the TI Zone extends vertically to the bottom of the S1 unit.

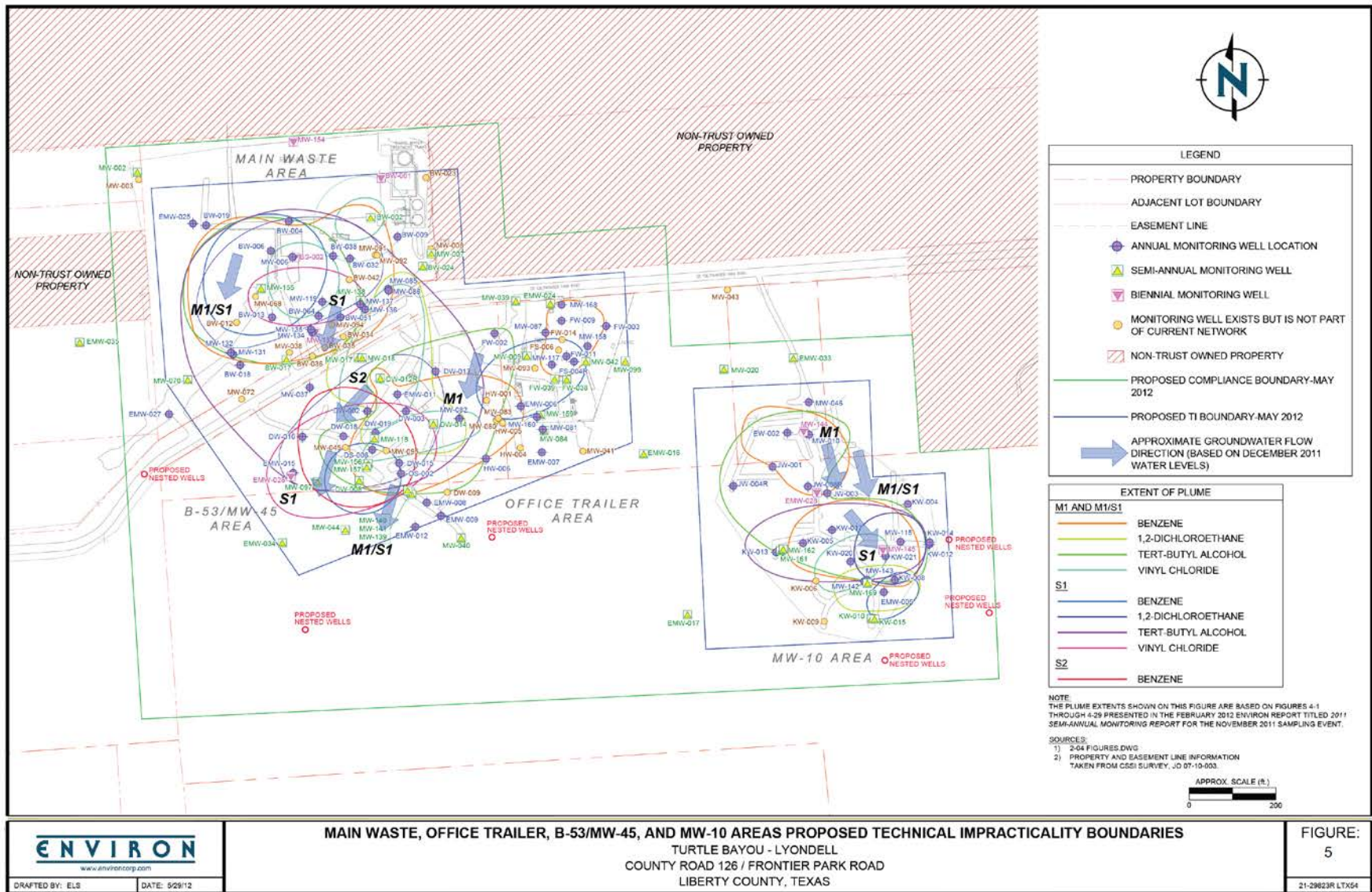
The groundwater monitoring data for the October 2010, December 2010, April 2011, November 2011, and December 2011 sampling events were compared to groundwater cleanup standards to determine the COCs requiring ARAR waivers within each area. The specific COCs that were detected at least once above the groundwater cleanup standards and that will consequently require an ARAR waiver are listed in the Table 3 below for each of the areas and hydrogeologic units. The M1, M1/S1, and S1 units have been combined because these units are adjacent, the well screens are overlapping in some cases, and they do not have a confining layer separating them.



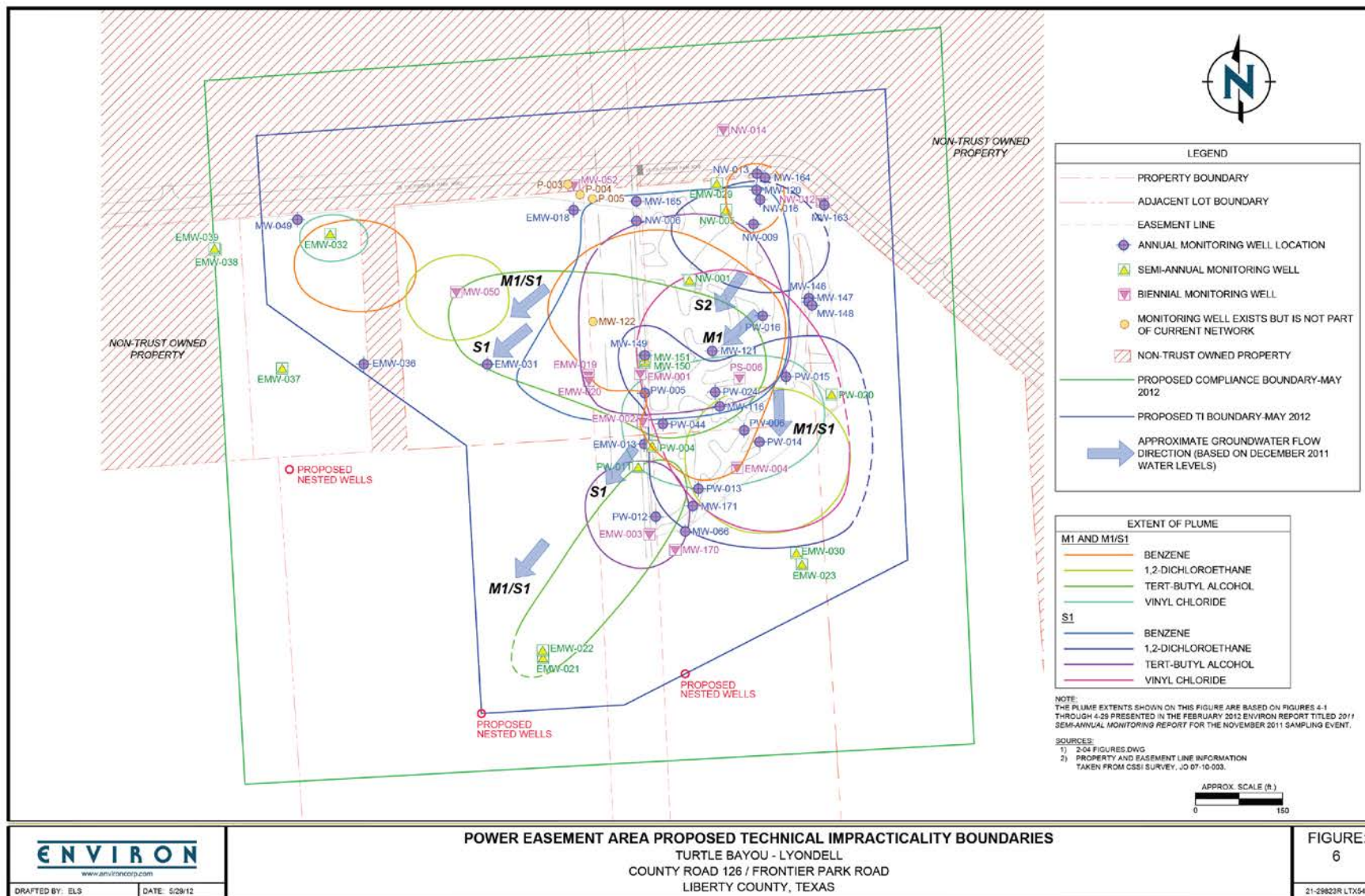
**Table 3**  
**Summary of COCs Requiring ARAR**  
**Waivers**

Area	COCs Requiring ARAR Waivers for the M1, M1/S1, and S1 Units to a Depth of Approximately 40 Feet Below Ground Surface	COCs Requiring ARAR Waivers for the S2 Unit to a Depth of Approximately 115 Feet Below Ground Surface
West Road Area	Benzene, Ethylbenzene, Naphthalene, TBA	Benzene
Main Waste Area	Benzene; 1,2-DCA; Naphthalene; TBA; 1,1,2-TCA; Vinyl Chloride	None
B-53/MW-45 Area	Benzene; 1,2-DCA; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; 1,2-DCP; Naphthalene; TBA; Toluene; 1,1,2-TCA; TCE; Vinyl Chloride; m,p-Xylenes	Benzene; Lead; TBA; Vinyl Chloride
Office Trailer Area	Benzene, TBA	None
MW-10 Area	Benzene; 1,2-DCA; Ethylbenzene; Naphthalene; TBA; Toluene; Vinyl Chloride	None
Power Easement Area	Benzene; 1,1-DCA; 1,2-DCA; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; 1,2-DCP; Ethylbenzene; Naphthalene; Styrene; TBA; Toluene; 1,1,2-TCA; TCE; Vinyl Chloride; m,p-Xylenes	None









## **VI. DESCRIPTION OF SIGNIFICANT DIFFERENCES**

The final TI Zone boundaries for the West Road Area, the Main Waste Area, the Office Trailer Area, and the Easement Area are presented in Figures 4 through 6 of this ESD. The Compliance Boundary for each of these areas has been established to provide the following:

- Verification of compliance with ARARs within the Compliance Zone (the area between the TI Zone Boundary and Compliance Boundary)
- Verification that the plume has not migrated to the monitoring wells in the Compliance Zone
- Availability of ample time, if contingency measures are to be taken, before the plume migrates to the Compliance Zone boundary.

The COCs for which ARARs will be waived for the S1 and S2 are identified in Table 3. The soil cleanup levels defined for the direct contact exposure (residential and non-residential) will remain in effect and within and outside the TI Zones.

Figures 4 through 6 indicate proposed locations for additional monitoring well nests needed for long term-monitoring. Sampling frequencies of these proposed wells will be discussed and included in the Long-Term Monitoring Plan to be submitted.

The final TI Zone Boundaries and new monitoring wells will be surveyed and recorded. Because the groundwater within the TI zones will remain above the groundwater criteria the use of groundwater within the TI zones will be restricted by institutional controls both for the Lyondell Trust properties and those not owned by the trust. Deed restrictions will be established to prevent excavation and installation of potable water wells within the Compliance Zone.

Contingent remedial measures will be considered if dissolved COCs in groundwater are not stable. The primary criteria for assessing plume stability will be the horizontal extent and concentrations of the dissolved COCs in groundwater. If groundwater monitoring data indicate that the dissolved COCs are expanding or increasing in concentration, sampling and analysis will be performed for confirmation. If plume expansion or COC concentration increase is confirmed, an evaluation will be conducted to assess the need for contingent response measure(s). If a contingent response appears necessary, alternative measures will be evaluated. Such contingent measures may include one or more of the following:

- Plugging of wells and installation of replacement wells;
- Ground water pumping potentially with in situ bioremediation (e.g., via nutrient injection);
- In situ ground water sparging or air stripping;
- The injection of nutrients to enhance natural attenuation;
- Additional excavation and/or in situ chemical oxidation to reduce contaminant mass; or

- Installation of a slurry wall, reactive barrier, horizontal grouting, or other containment structure.

Any contingent response to be implemented will be determined based on the rate and contaminant mass that has migrated from the area. Any contingent response action will be developed for EPA and TCEQ approval prior to implementation.

## **VII. SUPPORT AGENCY COMMENTS**

The support agency, TCEQ, has been consulted and provided the opportunity to comment on this ESD in accordance with NCP §§300.435 (c)(2) and 300.435 (c)(2)(i) and CERCLA § 121 (f). TCEQ's comments are presented in the Appendix in the letter dated June 18, 2012 and June 20, 2012.

## **VIII. STATUTORY DETERMINATIONS**

The EPA has determined that these significant changes comply with the statutory requirements of CERCLA § 121, 42 U.S.C. § 9621, are protective of human health and the environment, comply with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, are cost-effective, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The Site remedy, as set forth in previous decision documents, also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Since hazardous substances, pollutants, or contaminants remain in the West Road Area, Main Waste Area, Office Trailer Area, and the Easement Area above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted no less often than every five years in conjunction with the overall Site five-year review process, to ensure that the remedy is, or will be, protective of human health and the environment.

## **IX. PUBLIC PARTICIPATON**

Pursuant to the National Contingency Plan §300.435(c)(2)(ii), the following public participation requirements have occurred:

- A notice of the availability of the of the Proposed Plan for the 2006 ROD Amendment, which documents the TI waiver determination, and the Administrative Record were published in a local newspaper of general circulation – The Vindicator, on Wednesday, April 12, 2006. The newspaper notification also announced the start of the public comment period and provided the location and date for a public meeting. In addition, a similar notification was placed on the Internet at [www.i-dineout.com](http://www.i-dineout.com) on April 12, 2006. EPA's Remedial Project Manager was informed by local citizens that they often check the i-dineout

website for local information. The notification remained on the website until the end of the public comment period.

- The public comment period started on April 12, 2006 and ended on May 12, 2006. On April 27, 2006, a public meeting was held at the Calvary Baptist Church located about one mile north of the site at the intersection of Farm-to-Market Road 563 and County Road 129. The purpose of the meeting was to discuss the major components of the Amended Proposed Plan of Action and to provide the local community an opportunity to provide verbal and written comments on the Amended Proposed Plan of Action. In addition to U.S. EPA personnel, Texas Commission on Environmental Quality personnel, and the court reporter, 43 persons attended the public meeting.
- A full account of the public meeting can be found in the public meeting transcript. The transcript is included in the Administrative Record for this ROD Amendment.

As required by NCP § 300.435 (c)(2)(i)(B), a Notice of Availability and a brief description of this ESD will be published in the local paper.

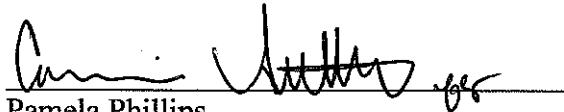
This ESD will become part of the Administrative Record (NCP 300.825(a)(2)), which has been developed in accordance with Section 113 (k) of CERCLA, 42 U.S.C. § 9613 (k).

#### **X. AUTHORIZING SIGNATURE**

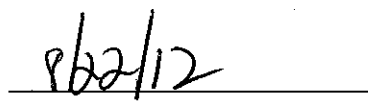
I have determined the remedy for the Petro-Chemical Systems Inc. Superfund Site as modified by this ESD is protective of human health and the environment, and will remain so provided the actions presented in the Site decision documents, including this ESD, are implemented.

This ESD documents significant changes related to the remedy at the Petro-Chemical Systems Inc. Superfund Site. The support agency, TCEQ, has been consulted and provided the opportunity to review and comment on this ESD.

U.S. Environmental Protection Agency



Pamela Phillips  
Acting Director  
Superfund Division



Date

## APPENDIX



Bryan W. Shaw, Ph.D., *Chairman*  
Carlos Rubinstein, *Commissioner*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 18, 2012

Ms. Raji Josiam  
Remedial Project Manager  
US EPA Region 6  
1445 Ross Ave., Ste 1200, 65F-AP  
Dallas, TX 75202

RE: The EPA June 2012 Draft Explanation of Significant Differences (ESD) for the Technical Impracticability (TI) Zone Boundaries Establishment, Lyondell Trust Properties, and  
Draft ESD for TI Zone Boundaries Establishment, CR-126 West Road Area (EPEC Polymers Inc. property);  
Petro-Chemical Systems/ Turtle Bayou Superfund Site, Liberty County, Texas

Dear Ms. Josiam:

The Texas Commission on Environmental Quality (TCEQ) has completed review for the Environmental protection Agency (EPA) June 2012 Draft ESD for the TI Zone Boundaries Establishment, Lyondell Trust Properties and Draft ESD for TI Zone Boundaries Establishment, CR-126 West Road Area (EPEC Polymers Inc. Property). The TCEQ has participated in a numerous phone conferences with the EPA and potential responsible parties representatives to discuss the TI zone boundaries based on all available information for the groundwater plume status at the site. The TCEQ agrees with the final TI Zone boundaries as were presented in these two documents.

TCEQ's small editorial comments are presented below:

### Draft ESD- Lyondell Trust Properties

1. The document needs a Acronym list;
2. Page 4, last paragraph: the last sentence need to be completed;
3. Page 8, first top sentence: change "PNA" to "PAH";
4. Page 9, third paragraph (middle on the page): Recommendation to delete "Hot spots were areas where the soil permeability....." The "hot spots" were defined based on the high COCs concentration or NAPL presence, not permeability;
5. Page 9, second paragraph from the bottom: "The 1998 ROD Amendment...." Include: "addresses a modification to the soil cleanup criteria for benzene and.."
6. Page 12, third paragraph from the bottom, last sentence: Recommendation to change "distribution of constituents" to "presence of constituents in an absorbed phase". Sentence needs revision.

Ms. Raji Josiam  
July 18, 2012  
Page 2 of 2

7. Page 13, end of top paragraph: change "CR 126 West Area" to " West Road Area, Main Waste Area, Office Trailer Area, and Easement Area".

Draft ESD - EPEC Polymers Inc. property:

1. The document needs Acronym list
2. Page 7: needs page number on the page bottom
3. Page 9, second paragraph from bottom: same as coment#6 for the Draft ESD – Lyondell properties
4. Page 10, bottom paragraph, second sentence: " As has been demonstrated by the remedial efforts of Lyondell Chemical Company and Atlantic Richfield..." How about EPEC involvement?

If you have questions, please contact me at 512-239-6368.

Sincerely,



Luda Voskov, P.G., Project Manager  
Team 2, Superfund Section  
Remediation Division  
Texas Commission on Environmental Quality

LV/lv

Cc: Patricia Scott, TCEQ, Office of Legal Services

Bryan W. Shaw, Ph.D., *Chairman*  
Carlos Rubinstein, *Commissioner*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 20, 2012

Ms. Raji Josiam  
Remedial Project Manager  
US EPA Region 6  
1445 Ross Ave., Ste 1200, 6SF-RA  
Dallas, TX 75202

RE: The June 18, 2012 TCEQ comment letter on the EPA June 2012 Draft Explanation of Significant Differences (ESD) for the Technical Impracticability (TI) Zone Boundaries Establishment, Lyondell Trust Properties, and Draft ESD for the TI Zone Boundaries Establishment, CR-126 West Road Area (EPEC Polymers Inc. property);  
Petro-Chemical Systems/ Turtle Bayou Superfund Site, Liberty County, Texas

Dear Ms. Josiam:

The Texas Commission on Environmental Quality (TCEQ) would like to present additional comments on the Environmental protection Agency (EPA) June 2012 Draft ESD for the TI Zone Boundaries Establishment, Lyondell Trust Properties and Draft ESD for TI Zone Boundaries Establishment, CR-126 West Road Area (EPEC Polymers Inc. Property). The TCEQ comments are presented below.

Draft ESD – Lyondell Trust Properties:

1. Page 14 of 26: The Texas Risk Reduction Program (TRRP) Rule cleanup levels for acetone and 1,1-dichloroethane. ESD lists level for acetone at 2,400 µg/L and 1,1-dichloroethane as 2,400 µg/L. TRRP table has a value for acetone of 22,000 µg/L and 1,1-dichloroethane of 4,900 µg/L. Acetone is correctly listed in Table 2, but 1,1-dichloroethane is incorrect. The 1,1-dichloroethane value of 2,400 µg/L was revised by the TCEQ to 4,900 µg/L in May 24, 2007.
2. Page 24 of 26: "The plan is to establish deed restrictions to prevent excavation and installation of portable water wells within the Compliance Zone".

*The purpose of the institutional controls, including deed restrictions for the areas where remedial action has been designated as Technically Impracticable is to help prevent exposure to chemicals of concern that remain on-site above the protective concentration level. Due to EPA's difficulty in taking property interest under federal property regulations,*



*the primary responsibility for enforcing the deed restrictions will rest with the TCEQ. In order to maintain the integrity of the remedial action, it is important that TCEQ be granted the power to enforce these deed restrictions. Therefore, TCEQ would like to be granted the opportunity to draft the initial version of any deed restriction, and be given the opportunity to comment upon all draft and final versions.*

Draft ESD - Epec Polymers Inc. Property.

1. Page 11 of 32: Please make the following typographical change: Specifically, vinyl chloride, 1,2-dichloroethane, *cis*-1,2-dichloroethylene, *trans*-1,2-dichloroethylene, 1,2-dichloropropane, 1,1,2-trichloroethane, trichloroethylene, styrene and toluene where added as Constituents of Concern (COCs).
2. Page 11 of 32: Please make the following changes: The Texas Commission on Environmental Quality (TCEQ) has recommended the following groundwater cleanup values for these contaminants: acetone (22,000 µg/L), 1,1-dichloroethane (4,900µg/L) and tert butyl alcohol (2,200 µg/L).
3. Table 2, page 12 of 32: Please correct the following:
  - A. *Cis*-1,2-dichloroethylene to *cis*-1,2-Dichloroethylene.
  - B. *Trans*-1,2-dichloroethylene to *trans*-1,2-Dichloroethylene.
  - C. The cleanup standard for 1,1-dichlorethane from 2400 µg/L to 4900 µg/L.
4. Page 13 of 32, first bulleted item: See comment #2 for the ESD, Lyondell properties.
5. Page 13 of 32, last paragraph: Please define the following abbreviations: Concentrations of 1,1-dichloroethane (1,1-DCA), vinyl chloride, benzene, and tert butyl alcohol (TBA) have historically comprised the largest portion of contaminant mass in the SI zone. A Mann-Kendall statistical trend analysis was performed on the four COCs for the purpose of characterizing the concentration trends for the COCs in the Far West Road Area (FWRA).
6. Page 14 of 32, last paragraph: Please specify specific part of TRRP rules that specify the PMZ criteria. The Compliance Boundary correlate to the location of a plume management zone (PMZ) under the TRRP Rules promulgated in the Texas Administrative Code (30 TAC § 350.33), and the objectives are in general accordance with plume management zone criteria outlined in TRRP, as requested by TCEQ.
7. Page 15 of 32: Use italic for the stereoisomers of 1,2-dichloroethylene: *cis*-1,2-Dichloroethylene, *trans*-1,2-Dichloroethylene.
8. Page 16 of 32: Update groundwater cleanup standard for 1,1-DCA on map to 4.9mg/L.

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9. Page 21 of 32: Update groundwater cleanup standard for 1,1-DCA on map to 4.9mg/L.
10. Page 29 of 32. Provide a more specific cite to the Texas Administrative Code for the monitoring well construction standards. The wells will be constructed in accordance with specifications outlined in the Texas Administrative Code, Title 30, Chapter 330, Municipal Solid Waste Rules, Subchapter J, Groundwater Monitoring and Corrective Action, § 330.421, Monitoring Well Construction Specifications (30 TAC § 330.421).

If you have questions, please contact me at 512-239-6368.

Sincerely,



Luda Voskov, P.G., Project Manager  
Team 2, Superfund Section  
Remediation Division  
Texas Commission on Environmental Quality

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cc: Patricia Scott, TCEQ, Office of Legal Services