present. The current paucity of vegetation and minimal site use by terrestrial receptors in the former industrial portions of the Site justify the conclusion that ecological exposure is low.

As part of the SLERA, maximum concentrations of analytes detected in ecological exposure media were identified and screened against highly conservative Ecological Screening Levels (ESLs). The screening was completed to select constituents of potential concern (COPCs) for the Step 2 exposure and risk calculations. Exposure and risk characterizations of COPCs for direct contact were performed using the maximum detected concentrations and risks were characterized using Hazard Quotients. Wildlife ingestion exposure pathways were evaluated for bioaccumulative chemicals using dose modeling with the maximum concentrations and the 95% UCLs. Risks to wildlife were characterized using Hazard Quotients calculated for no-observable-adverse-effect-levels (NOAELs) and lowest-observed-adverse-effect-level (LOAEL) endpoints.

Results of the SLERA showed that the COPCs identified in Sabine Lake surface water and sediment do not pose risks of sufficient magnitude to warrant remedial action. Therefore, the selected remedy to address ecological risk will consist of allowing degradation to naturally attenuate organic COPCs and to implement on-site source control to prevent future run off of soil contaminants to Sabine Lake.

Results of the SLERA indicated that the COPCs identified in on-site surface soil could pose an unacceptable risk to terrestrial biota by a direct contact pathway and to wildlife by a food/prey ingestion pathway, if receptors were present. The lack of vegetation and minimal site use by terrestrial receptors justifies the conclusion that ecological risks are negligible and therefore exposure is low. However, future long-term industrial use of the Site is uncertain, and potential exposure could occur if ecological succession were to proceed naturally. Therefore, the selected remedy will include soil remediation to address uncertainty associated with the potential for future on-site ecological risk.

In order to evaluate potential response areas, Site soil concentrations from the ESI and RI data were compared to safe soil concentrations for worst case exposure to the American robin. Safe soil concentrations were back calculated for COPCs that exceeded LOAEL values. Several ecological "hot spots" were identified as response areas. Based on these results, Preliminary Remediation Goals were developed for on site contaminants that pose a risk to ecological receptors. A safe soil concentration of 497 mg/kg lead in surface soil was calculated. These safe soil concentrations factor in site-specific conditions of current and future commercial/industrial land use and the paucity of vegetation and minimal usable habitat available to the robin and other terrestrial receptors.

Preliminary Remediation Goals (PRGs)

Human Health PRGs

Based on the risk characterization, quantitative risks at the Palmer Barge Site appear to be generally within the range of risk management criteria typically employed in the Superfund program, that is a cumulative cancer risk in the range from $1x10^{-6}$ to $1x10^{-4}$ and a hazard index of 1. However, soil concentration data from a historic investigation not included in the baseline risk calculations indicate that site contaminants may pose a risk to human health at the Site.

Criteria were developed for all soil COPCs that were detected in either the ESI or RI data sets above MSSLs. However, uncertainties associated with background, occurrences of arsenic at concentrations exceeding the MSSL are prevalent at the Site yet most of these results are at concentrations that are below background. Therefore, site soil arsenic concentrations from the RI and ESI were compared to site-specific background levels. The target cleanup level for lead is based on the MSSL concentration of 800 mg/kg for an industrial/commercial site.

PRGs for the 10^{-6} level were taken directly from the Region 6 MSSL tables. Site-specific PRGs were calculated for the 10^{-5} and 10-4 target risk levels. Any COPCs on the list that are not considered carcinogenic, or in cases where the COPC exhibits both cancer and noncancer effects, the noncancer PRG based on a hazard index of 1.0 was used as the PRG if that concentration was lower than the cancer-based PRG.

In consultation with TCEQ, EPA chose a 10^{-5} target cleanup level for the Palmer Barge site based on exposure to contaminants that exceed those levels at surface soils (0 to 2 feet). The contaminants of concern and the selected PRGs are presented in Table 9. The results indicate that four (4) locations have concentrations exceeding the 10^{-5} PRGs.

Table 9
Human Health Preliminary Remediation Goals for 10^{-5} Target Risk Level

Constituent	Maximum Concentration mg/kg	PRG Cleanup Level mg/kg
Aldrin	9.2	1.1
Benzo(a)pyrene	240	2.3
Benzo(a)anthracene	280	23
Dieldrin	4.4	1.2
Heptachlor Epoxide	9.5	2.1
Naphthalene	370	210
Pentachlorophenol	570	100

Table 9 Human Health Preliminary Remediation Goals for 10^{-5} Target Risk Level		
Lead	5050	800

Note: A safe soil concentration of 497 mg/kg lead in surface soil was calculated. These safe soil concentrations factor in site-specific conditions of current and future commercial/industrial land use and the paucity of vegetation and minimal usable habitat available to the robin and other terrestrial receptors.

Ecological Safe Soil Concentrations

Based on the results of the Screening Level Risk Assessment, safe soil concentrations were developed for on site soils that would be protective of ecological receptors. The ecological safe soil concentrations for on site soils are presented in Table 10. The results indicate that seven (7) locations exceed the target cleanup levels for the site surface soils (0 to 2 feet).

Table 10 SLERA Safe Soil Concentrations		
Constituent	**Maximum Concentration mg/kg**	**Target Cleanup Levels mg/kg**
Butyl Benzyl Phthalate	24	5.37
4,4-DDD	51	0.0864
4,4-DDE	26	0.0864
4,4-DDT	11	0.0865
Methoxychlor	4.7	0.09
Lead	5050	497

Basis for Action

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The response action will address remaining "hot spots" that were not addressed during the Time Critical Removal Action conducted in August 2000.

REMEDIAL ACTION OBJECTIVES AND GOALS

Remedial action objectives (RAOs) were developed for the Palmer Barge Site for those COCs that pose a carcinogenic risk above EPA's target cancer risk range or non-carcinogenic hazard to human health and the environment based on site-specific risk calculations. RAOs are also

defined such that Applicable or Relevant and Appropriate Requirements (ARARs) are met. The Remedial Action Objectives were developed based on the following:

- The reasonable anticipated land use scenario is based on the future redevelopment of this Site for industrial or commercial use, consistent with current site use and surrounding land use;
- Potential ecological risks were considered for site soils to prevent exposure to ecological receptors and prevent surface runoff of contaminants to the Sabine Lake sediments.

The remedial action objectives for this Site are:

- Prevent direct contact, ingestion, and inhalation of surface soils that exceed human health based levels, based on the industrial worker scenario, for the chemicals of concern;
- Prevent off-site migration of COCs to Sabine Lake sediments that exceed human and ecological based levels for the chemicals of concern; and,
- Prevent exposure to site soils that may pose a risk to ecological receptors.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Under CERCLA and the NCP, the ROD is required to describe the "... federal and state requirements that are applicable or relevant and appropriate to the site that the remedy will attain." 40 C.F.R. 300.400(f)(5)(ii)(A). These ARARs derive from the potential ARARs that were identified by EPA, which were identified as "requirements applicable to the release or remedial action contemplated based upon an objective determination of whether the requirement specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site." 40 C.F.R. 300.400 (g)(1). If not applicable to a specific release, these federal or state requirements might still be determined to be "relevant and appropriate to the circumstances of the release." *See* 40 C.F.R. 300.400(g)(2). *See also* CERCLA, 42 U.S.C. §9621(d)(2)(A). An ARAR could be specific to a given action, chemical, or location at a CERCLA site. The NCP defines "applicable requirements" as follows:

> *Applicable requirements* means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environment or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. 40 C.F.R. 300.5.

The NCP then goes on further to define "relevant and appropriate requirements":

> *Relevant and appropriate requirements* means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under

> federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and *are more stringent than federal requirements may be relevant and appropriate.* (Emphasis Added). 40 C.F.R. 300.5.

Thus, it is clear from the NCP that state requirements must be "substantive"; and as the statute commands, they must be "more stringent" than any federal standard, requirement or limitation. 42 U.S.C. §9621(d)(2)(A)(ii). ARARs deal with the degree of cleanup, or levels and standards of control and are not procedural or administrative requirements. *See* NCP Preamble, 55 Fed. Reg. 8666, 8756 (Mar. 8, 1990). *See* also *State of Ohio v. United States Environmental Protection Agency,* 997 F.2d 1520, 1526-27 (D.C. Cir., 1993). In connection with state ARARs, the NCP also amplifies and explains the nature of "promulgated" standards or limitations, where it provides:

> Only those state *standards* that are *promulgated,* are identified in a timely manner, and *are more stringent* than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of *general applicability and are legally enforceable.* (Emphasis Added). 40 C.F.R. 300.400(g)(4).

If a standard is not applicable, the question of whether the standard is relevant and appropriate to the circumstances of the release is addressed by several enumerated factors, which " . . . shall be examined, where pertinent, to determine whether a requirement addresses problems or situations sufficiently similar to the circumstances of the release or remedial action contemplated, and whether the requirement is well-suited to the site, and is therefore both relevant and appropriate." 40 C.F.R. 300.400(g)(2). Finally, there is a category of other federal or state advisories, criteria, or guidance, which may be used to develop a CERCLA remedy that falls into a category called "to be considered (TBC)" guidelines. 40 C.F.R. 300.400(g)(3).

ARARs are divided into three categories: chemical specific, action specific, and location specific. These classifications are described as follows:

> *Action Specific ARARs* are technology or activity based requirements or limitations on actions taken regarding hazardous substances, pollutants, and contaminants.

> *Chemical Specific ARARs* are promulgated values that include health or risk based standards, numerical values, or methodologies that, when applied to site-specific conditions, establish the acceptable amount or contaminant concentration that may be detected in or discharged to the ambient environment. These values focus on protecting

public health and the environment. However, technological or cost limitations may influence some values, such as maximum contaminant levels (MCLs).

Location Specific ARARs relate to the geographical position of the site, such as state and federal laws and regulations that protect wetlands or construction in flood plains. The extent to which any location specific requirements may be considered depends solely on the sensitivity of the environment and any possible impact caused by remedial activities.

The ARARs pertaining to RA activities at the Site are divided into action, chemical, and location specific categories as described in the following tables. In addition, any TBCs and potential waivers are discussed.

Table 11
Action Specific ARARs

Requirement	Justification
Federal	
Storm Water Regulations 40 CFR Parts 122, 125	National Pollution Discharge Elimination System (NPDES) permits are addressed relative to storm water discharges associated with industrial activity. These regulations require the development and implementation of a storm water pollution prevention plan or a storm water best management plan. Monitoring and reporting requirements for a variety of facilities are outlined. Applicable to the Site.
Permits and Enforcement; CERCLA Section 121(e)	This section specifies that no federal, state, or local permit shall be required for any portion of a CERCLA remedial action that is conducted on the site of the facility being remediated. This includes exemption from the RCRA permitting process. Applicable to the Site.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; 40 CFR Part 264 Subparts B, C, D and G	Subparts B, C, and D establish minimum standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store, or dispose of hazardous waste. Subpart G establishes standards for closure and post closure care for site design and operation. These standards will be relevant and appropriate to the Site if wastes onsite are identified as RCRA hazardous wastes or are sufficiently similar to RCRA hazardous wastes.
National Contingency Plan, 40 CFR Part 300.430; Baseline Human Health Risk Assessment, RI/FS, and ROD	Evaluates baseline human health risk as a result of current and potential future site exposures, and establishes contaminant levels in environmental media for protection of public health. Also provides guidelines and requirements for conducting RI/FS and ROD. Applicable to the Site.

Exceptions to ARAR Rules; CERCLA 121(d)(4)	Allows EPA to waive compliance with ARARs in six circumstances: 1. The selected action is only part of a total remedial action that will comply with the ARAR requirements when completed. 2. Compliance with the ARAR requirements would present greater health/environmental risks than alternative options. 3. Compliance with the ARAR requirements is technically impracticable from an engineering perspective. 4. The selected remedy will attain a standard of performance that is equivalent to an ARAR required standard through use of another method or approach. 5. With respect to a state requirement, the state has not demonstrated consistent application of the requirement in similar circumstances. 6. Where the remedy is to be fund-financed (as opposed to private-party financed), meeting the ARAR standard would not provide balance between the need for cleanup at the site in question considering the amount of fund resources that must be used at other sites in need of cleanup. These provisions are applicable to the Site.
Permits and Enforcement; CERCLA Section 121(e)	This section specifies that no federal, state, or local permit shall be required for any portion of a CERCLA remedial action that is conducted on the site of the facility being remediated. This includes exemption from the RCRA permitting process. Applicable to the Site.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; 40 CFR Part 264 Subparts B, C, D and G	Subparts B, C, and D establish minimum standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store, or dispose of hazardous waste. Subpart G establishes standards for closure and post closure care for site design and operation. These standards will be relevant and appropriate to the Site if wastes onsite are identified as RCRA hazardous wastes or are sufficiently similar to RCRA hazardous wastes.
Use and Management of Containers Tank Systems; 40 CFR Part 264 Subparts I and J	Subpart I sets operating and performance standards for container storage of hazardous waste. These requirements would be relevant and appropriate to the Site for containers used for storage of liquids, soil, or other wastes as part of the remedial action. Subpart J outlines similar standards but applies to tanks rather than containers.
Standards for Waste Piles and Landfills; 40 CFR Part 264 Subparts L and N	Subpart L sets design and operating requirements for the storage or treatment of wastes in piles. If the waste piles are closed with wastes left in place, Subpart N requirements must be met. Subpart N establishes construction, design, performance, closure, and operation requirements pertaining to hazardous waste landfills. If treatment, storage, or disposal of RCRA waste in piles is included as part of the remedial action, Subpart L and/or N would be relevant and appropriate to the Site. Subpart N would be applicable to the Site in the event that hazardous wastes are identified at the Site.

Miscellaneous Units; 40 CFR Part 264 Subpart X	Relates to "miscellaneous" units that treat, store, or dispose of hazardous wastes. Provides general performance standards for location, design, construction, operation, monitoring, and closure/post closure. If the remedial action includes treatment, storage, or disposal of hazardous waste in a miscellaneous unit, these requirements would be relevant and appropriate to the Site.
Land Disposal Restrictions (LDRs); 40 CFR Part 268 Subpart C, Prohibitions on Land Disposal; Subpart D, Treatment Standards	40 CFR Part 268 establishes restrictions on land disposal unless treatment standards are met or a "no migration exemption" is granted. LDRs establish prohibitions, treatment standards, and storage limitations before disposal for certain wastes as set forth in Subparts C and D. Treatment standards are expressed as either concentration-based performance standards or as specific treatment methods. Wastes must be treated according to the appropriate standard before wastes or the treatment residuals of wastes may be disposed in or on the land. The Universal Treatment Standards (UTS) establish a concentration limit for 300 regulated constituents in soil regardless of waste type. The LDRs are applicable to the Site if hazardous wastes are identified.
Requirements for Identification and Listing of Hazardous Wastes; 40 CFR Part 261	These regulations establish the requirements for the identification and listing of hazardous wastes. These requirements are applicable to the Site and would require that potential hazardous wastes be tested for identification and listed if appropriate.
Standards Applicable to Generators and Transporters of Hazardous Waste; 40 CFR Part 262 and Part 263	Part 262 establishes the record keeping requirements and manifesting requirements for the transport of hazardous wastes. Part 263 establishes requirements for the transport of hazardous wastes. These requirements would be applicable to the Site if hazardous wastes are identified and shipped offsite for disposal.
Department of Transportation Requirements Governing the Transportation of Hazardous Materials; 49 CFR Parts 107 and 171-179	Establishes the requirements for the transportation of hazardous materials as defined by the U. S. Department of Transportation. These requirements would be applicable to the Site if the hazardous wastes are identified and transported offsite for disposal.
State	
TPDES Construction Storm water Permit; 30 TAC 205	Requires submission of Notice of Intent (NOI) for coverage under the general permit for storm water discharges resulting from construction occurring on sites greater than 1 acre in size. This requirement will be applicable to the Site during the site remedial construction.

Spill Prevention and Control; 30 TAC 327	Requires that releases of reportable quantities of listed materials be reported to the agency (TCEQ) within 24 hours. The responsible person shall submit written information, such as a letter, describing the details of the discharge or spill and supporting the adequacy of the response action, to the appropriate TCEQ regional manager within 30 working days of the discovery of the reportable discharge or spill. The regional manager has the discretion to extend the deadline. The rule is applicable to the Site if during remedial activities a release greater than the documented reportable quantity of a listed material occurs.
Control of Air Pollution from Visible Emissions and Particulate Matter; 30 TAC 111	Requires that all reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including use of water or chemicals for control of dust in the construction operations, clearing of land, and on dirt roads or stockpiles. Applicable during excavation and transport of soils, or any other activity that may generate airborne particulate matter at the Site.
Texas Industrial Solid Waste and Municipal Solid Waste Regulations; 30 TAC 335	Guidelines for generators to determine if a solid waste is a hazardous waste. Requires adherence to record keeping and shipping requirements. Applicable to the soils and wastes to be removed at the Site, which may or may not be hazardous.

Table 12
Chemical Specific ARARs

Requirement	Justification
Federal	
American Conference of Governmental Industrial Hygienists-Threshold Limit Values (TLV)	TLVs are based on the development of a time weighted average (TWA) exposure to an airborne contaminant over an 8-hour work day or a 40-hour work week. TLVs identify levels of airborne contaminants at which health risks may be associated. These values are applicable to work at the Site.
Clean Air Act (CAA) 40 CFR Part 61	The CAA is the primary federal legislation protecting air quality. National Primary and Secondary Ambient Air Quality Standards (NAAQS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and the New Source Performance Standards (NSPS) are promulgated by EPA under the CAA. These requirements are relevant and appropriate to the Site.

National Primary and Secondary Air Quality Standards (NAAQS); 40 CFR, Part 50	The NAAQS specify the maximum concentration of a federally regulated air pollutant (i.e., SO2, particulate matter (PM10), NO2, CO, ozone, and lead) in an area resulting from all sources of that pollutant. No new construction or modification of a facility, structure or installation may emit an amount of any criteria pollutant that will interfere with the attainment or maintenance of a NAAQS (see 40 CFR ' 51.160). For the federal NAAQS standards, all measurements of air quality are corrected to a reference temperature of 25EC and to a reference pressure of 760 mm Hg (1,013.2 millibars). These requirements may be applicable during the excavation and disposal activities at the Site.
American Conference of Governmental Industrial Hygienists-Estimated Limit Values (ELV)	ELVs are based on TLVs and converted to reflect exposure to contaminants on a 24-hour per day basis. The calculation of an ELV does not take into consideration the additive and synergistic effects of contaminants and additional exposures from media other than air. ELVs are not expected to be completely protective of the potential effects of exposures to contaminants; however, they do provide some indication of airborne contaminant levels at which adverse health effects could occur. These values are relevant and appropriate for the Site.
Safe Drinking Water Act 40 USC 399 Primary Drinking Water Standards (Maximum Contaminant Levels [MCLs]); 40 CFR Part 141	Establishes MCLs for drinking water. Surface water near the site is not designated for public or private water supply, but may be used for recreational purposes. The shallow ground water at the site is not considered as a drinking water supply source; therefore, MCLs are not applicable to the Site.
Maximum Contaminant Level Goals (MCLG); 40 CFR Part 141.50	These levels do not take into account cost or feasibility, and are fully protective of human health. They are only enforceable under CERCLA under specific community water system provisions that are not applicable or relevant and appropriate to the Site.
Federal Clean Water Act (CWA) Water Quality Criteria; 40 CFR Part 131; U.S. EPA Quality Criteria for Water, 1976, 1980, and 1986	These criteria (ambient water quality criteria) apply to water classified as a fisheries resource. These requirements are relevant and appropriate to the surface water in Sabine Neches Channel. These criteria are contained in Clean Water Act (CWA) ' 303 and 304. As non-enforceable criteria, these criteria are included as to be considered only.
Hazardous Substances; 40 CFR Part 116.3 and 116.4	Establishes reporting requirements for certain discharges of reportable quantities of hazardous substances. Creates no substantive clean up requirement. May be relevant and appropriate to the Site based on the chosen remedial alternative and if discharges of reportable quantities of hazardous substances occur during implementation of the remedy.

Solid Waste Disposal Act Subtitle C Requirement; 40 CFR, Part 264, Subpart F	Governs the maximum concentration of constituents released to ground water from solid waste management units (SWMU). Applicable to the Site if the chosen remedy includes onsite disposal and ground water is adversely affected.
Designation of Hazardous Substances; 40 CFR, Part 302.4	This section provides tables of the following substances: (a) Listed hazardous substances. The elements and compounds and hazardous wastes appearing in Table 302.4 are designated as hazardous substances under Section 102(a) of CERCLA. (b) Unlisted hazardous substances. A solid waste, as defined in 40 CFR 261.2, which is not excluded from regulation as a hazardous waste under 40 CFR 261.4(b), is a hazardous substance under Section 101(14) of CERCLA if it exhibits any of the characteristics identified in 40 CFR 261.20 through 261.24. These requirements are applicable to the Site because solid/hazardous wastes were previously disposed at the site and hazardous substances are present in soil and sediment.
Land Disposal Restrictions 40 CFR, Part 268	Establish numerical treatment standards for disposal of hazardous wastes. These requirements are potentially applicable if hazardous wastes are identified and offsite disposal is a selected remedy.
State	
Texas Surface Water Quality Standards; 30 TAC 307	Establishes limits for constituents for the protection of surface water quality. Requires the maintenance of the quality of water in the state consistent with public health and enjoyment, propagation and protection of terrestrial and aquatic life, operation of existing industries, and economic development of the state. These requirements are applicable for release of COCs from the Site into the Sabine-Neches Channel.
Hazardous Metals (30 TAC 319, General Regulations Incorporated into Permits, Subchapter B)	Establishes allowable concentrations for discharge of hazardous metals to inland waters (319.22). These requirements are potentially applicable for the Site as hazardous metals have been detected in soil and sediment samples collected from the Site and the hazardous metals may be discharged to waters of the state.
Waste Classification 30 TAC 335, Subchapter R	Establish numerical criteria for designating a waste as a hazardous waste or as one of three classes of solid waste. These requirements are applicable for classification of wastes generated during the site remediation.

Table 13 Location Specific ARARs	
Requirement	**Justification**
Federal	
Executive Order on Flood plain Management, Order No. 11988	Requires all federal agencies and associates to avoid long- and short-term adverse impacts associated with occupancy and modification of flood plains. Any actions taken to reduce the risk or impact of remedial actions should accomplish the following: • Reduce the risk of flood loss. • Minimize the impacts of floods on human safety, health, and welfare. • Restore and preserve the natural and beneficial values served by flood plains. This requirement is applicable only if the site lies within the 100-year flood plain or the remedy impacts a 100-year flood plain.
Fish and Wildlife Coordination Act 16 USC ' 661 et seq. 16 USC ' 742 a 16 USC ' 2901	Requires consultation when a modification of a stream or other water body is proposed or authorized and requires adequate provision for protection of fish and wildlife resources. These requirements are relevant and appropriate to the Site for removal of contaminated sediment from the Sabine Lake if the remedy requires contaminated sediment to be removed.
Endangered Species Act; 16 USC ' 1531 et. seq. 50 CFR Part 402	Requires that proposed action minimize impacts on endangered species within critical habitats upon which endangered species depend, including consulting with Department of Interior. Endangered or threatened species have not been identified at the Site; the Act is not an ARAR for the Site.

Table 14 To Be Considered Guidelines	
Requirement	Justification
Federal	
References Doses (RfDs), EPA office of Research and Development	The EPA Office of Research and Development provides non-enforceable toxicity data for specific chemicals for use in public health assessments. This data is used to assess the risks associated with contaminated media at the Site.

Risk Specific Doses (RSDs), EPA Carcinogen Assessment Group and EPA Environmental Criteria and Assessment Office	RSDs represent the dose of a chemical in mg/kg of body weight per day associated with a specific risk level (i.e., 10-6). RSDs are determined by dividing the selected risk level by the cancer potency factor (slope factor). This standard is used to assess the risks associated with contaminated media at the Site.
State	
Texas Risk Reduction Program (TRRP) 30 TAC 350	TRRP establishes the TCEQ's minimum remediation standards for present and past uncontrolled constituent releases. TRRP uses risk evaluation to determine if corrective action is necessary for the protection of human health and the environment and to identify acceptable constituent levels in the impacted media. TRRP defines the land use categories, ground water classifications, requirements for plume management zone, soil reuse issues, and tiered risk evaluation for affected sites. This state regulation is not applicable for the Federal superfund sites but should be considered at the Site.

DESCRIPTION OF REMEDIAL ALTERNATIVES

Statutory Requirements/Response Objectives

Under its legal authorities, the EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA, 42 U.S.C. § 9621, establishes several other statutory requirements and preferences, including: (1) a requirement that EPA's remedial action, when complete, must comply with all applicable, relevant, and appropriate federal and more stringent state environmental and facility siting standards, requirements, criteria or limitations, unless a waiver is invoked; (2) a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (3) a preference for remedies in which treatment permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances. Response alternatives were developed to be consistent with these statutory mandates. However, since Principal Threat wastes are not present at the site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element is not warranted.

Technology and Alternative Development and Screening

Construction and engineering controls were evaluated in the remedial alternatives since the contaminated soils and sediments were identified as a low-level threat waste that can be reliably contained and would present only a low risk in the event of release.

CERCLA and the National Contingency Plan (NCP) set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed to address the soil and sediment contamination at the Palmer Barge Site. Four remedial alternatives involving different construction and engineering control options for the soil and sediment contamination were selected for detailed analysis. Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the Feasibility Study Report. The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy or procure contracts for construction. The present-worth costs associated with the ground water monitoring requirements are calculated using a discount rate of seven percent (7%).

Common Elements

Alternatives 2 through 4 contain the following common elements:

- Institutional Controls - Implementation of Institutional Controls to restrict future land use to industrial purposes only. The Institutional Control shall be a restrictive covenant by the property owner, to the benefit of the State of Texas and the United States Government, recorded in the real property records of Jefferson County, Texas;

- Abandonment of existing monitoring wells - As the BLRA determined that groundwater at the Site does not contribute significantly to Site risk, five existing monitoring wells at the Site will be abandoned; and

- Wastewater AST demolition and sludge removal - Sludge contained within the Wastewater AST will be removed and disposed of off-site. The tank will be decontaminated, and reused as scrap metal by the property owner.

Summary of Remedial Alternatives for Soils

Alternative 1: No Further Action

Estimated Capital Cost: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth (7%): $0

Regulations governing the Superfund program, 40 C.F.R. § 300.430(e)(6) require that the "no action" alternative be evaluated at every Site to establish a baseline for comparison. Under this alternative, EPA would take no further action at the Site to prevent exposure to the remaining contaminated soils and sediment at the Site.

ALTERNATIVE 2 - Institutional Controls

Estimated Capital Cost: $135,000
Estimated Annual O&M Costs: $500
Estimated Present Worth (7%): $141,205

Alternative 2 includes the following activities:

- Institutional Controls - To limit future use of the property to industrial purposes;
- Abandonment of existing monitoring wells - Five (5) existing monitoring wells at the Site will be abandoned; and
- Wastewater AST demolition and sludge removal - Sludge contained within the Wastewater AST will be removed and disposed of off-site. The tank will be decontaminated and left on site.
- The time to implement this remedy would be 1 to 3 months.

Alternative 2 involves no remedial action to address the contaminants that pose a risk to human health and the environment. Structural controls, such as posting of "no excavation" signs and fencing, would be implemented in addition to proprietary controls restricting future land use to industrial purposes only.

Effectiveness

Alternative 2 provides no physical control of exposure to impacted soils and no reduction in risk to human health. This alternative would not comply with any applicable or relevant and appropriate requirements, such as PRGs developed during the HHRA or safe soil concentrations developed based on the SLERA. The potential for sediment runoff from the Site that may contain COPCs would not be eliminated. This alternative would not provide protection to current or future site workers. Alternative 2 does not reduce the toxicity, mobility, or volume of the waste.

Implementability

There are no implementability issues associated with this alternative.

ALTERNATIVE 3 - EXCAVATION/ON-SITE DISPOSAL/SOIL COVER/ICs

Estimated Capital Cost: $310,669
Estimated Annual O&M Costs: $10,000
Estimated Present Worth (7%): $504,759

Alternative 3 includes the following activities:

- Excavation of approximately 1,204 cubic yards of the upper two feet of soil that exceed risk based levels at each of the response areas;
- Relocation of the excavated soils to a designated area on-site and consolidation. The area required for consolidation encompasses approximately 12,800 square feet;
- Confirmation sampling at each of the response areas. Confirmation samples would be collected from each response area and analyzed for COPCs.
- Backfilling of the response areas with clean soil;
- Placement of an isolation soil cover over the relocated and consolidated impacted soils consisting of a synthetic root penetration barrier and 24-inches of clean soil, including 3 to 4 inches of topsoil suitable for vegetation growth; and
- Installation of structural controls to protect human health. Structural controls to be installed as part of this alternative include fencing around the area designated for disposal and posting of "no trespassing" signs.
- The time to implement this remedy would be approximately 2 months.

Effectiveness

Placement of an isolation soil cover over surface soils reduces risk by eliminating potential pathways identified in the HHRA that included ingestion, dermal contact, and inhalation of dust/vapors. Alternative 3 complies with applicable or relevant and appropriate requirements by preventing exposure to contaminants that present a risk to human health and the environment. This alternative does not provide any reduction in the toxicity, mobility, or volume of impacted soil. Alternative 3 would involve the disturbance of surface soils exceeding acceptable risk levels. The potential for a slight, temporary increase of risk to the community and to field personnel exists; however, engineering controls (e.g., water sprays) may be implemented to reduce risk due to fugitive dust during construction.

Under Alternative 3, five response areas would be excavated and backfilled with clean soil or gravel. Therefore, the potential for sediment runoff from the Site that may contain COPCs will be eliminated. The soil cover over the consolidation area containing impacted soils would prevent or reduce the potential for runoff of contaminated soils.

To ensure long-term effectiveness of this alternative, maintenance of the isolation soil cover must be completed. Failure to properly maintain the cover could result in the potential for direct contact with impacted soils. This alternative would also rely on structural controls to reduce potential for exposure, and long-term maintenance of these controls would be required. Because this alternative would result in contaminated soils remaining onsite above health based levels, five year reviews will be conducted to ensure that the remedy continues to be protective of human health and the environment, in accordance with CERCLA 121(c).

Implementability

It is anticipated that no special techniques, materials, permits, or labor would be required to implement this Alternative. The area required to contain approximately 1,204 cubic yards of contaminated soils is approximately 12,800 square feet or a 115-foot by 115-foot cell. This amount of land is readily available onsite. The cover soil, which will consist of 24 inches of low permeability soil, is readily available, as is the synthetic root penetration barrier. The low permeability soil and topsoil required for construction is available locally.

ALTERNATIVE 4 - EXCAVATION/OFF-SITE DISPOSAL

Estimated Capital Cost: $351,975
Estimated Annual O&M Costs: $500
Estimated Present Worth (7%): $428,180

Alternative 4 consists of the following activities:

- Excavation of approximately 1,204 cubic yards of the upper two feet of soil that exceed risk based levels at each of the response areas;
- Confirmation sampling at each of the response areas. Confirmation samples would be collected from each response area and analyzed for COPCs.
- Backfilling of the response areas with clean soil;
- Off-site disposal of the excavated soils at a permitted disposal facility; and
- Implementation of Institutional Controls to restrict future land use to industrial purposes only. The Institutional Control shall be a restrictive covenant by the property owner, to the benefit of the State of Texas and the United States Government, recorded in the real property records of Jefferson County, Texas;
- The time to implement this remedy is expected to be approximately 2 months.

The objective of this alternative is to protect human health and the environment by removing materials that exceed risk based levels from the Site. Pending results of waste characterization, it could be necessary to dispose of the excavated materials at a hazardous waste landfill.

Effectiveness

Alternative 4 is protective of human health by removing the source of the risk at the Site. Alternative 4 complies with applicable or relevant and appropriate requirements by removing contaminants from the site that exceed risk based levels for protection of human health and the environment. This option does not provide any reduction in the toxicity, mobility, or volume of impacted soil through treatment. Alternative 4 would involve the disturbance of surface soils exceeding acceptable risk levels. The potential for a slight, temporary increase of risk to the community and to field personnel exists; however, engineering controls (e.g., water sprays) may be implemented to reduce risk due to fugitive dust during construction.

As part of Alternative 4, the response areas would be excavated and backfilled with clean soil or gravel. Therefore, the potential for sediment runoff from the site that may contain COPCs would be eliminated. Alternative 4 ensures long-term effectiveness and permanence by removing the source of the risk from the Site.

Implementability

Implementability issues associated with this alternative include land disposal restrictions (LDR). Alternative 4 must be implemented in accordance with applicable State and Federal LDR rules. Successful implementation of this alternative requires that the impacted soils be characterized to determine the type of disposal facility that must be used. Should waste characterization results indicate that the impacted soils are considered hazardous, disposal at a hazardous waste landfill would be required. In addition, under Federal LDR rules, all hazardous waste must be treated before land disposal to meet Universal Treatment Standards (UTS). The results of the Toxicity Characteristic Leaching Procedure (TCLP) analysis for waste characterization will determine whether incineration or disposal in a Resource Conservation and Recovery Act (RCRA) hazardous waste landfill is necessary to meet the LDR requirements in the event that the soil is found to be a hazardous waste. However, it is anticipated that the impacted soils on-site will be characterized as non-hazardous waste. Non-hazardous soils will be transported to a solid waste landfill. Safety concerns during transportation are minimal due to the relatively small volume of soil to be transported, such that the volume of additional truck traffic should not constitute a significant additional risk.

COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The nine evaluation criteria are (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; 4) reduction of toxicity, mobility, or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State/support agency acceptance; and (9) community acceptance. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below.

1. **Overall Protection of Human Health and the Environment** addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternatives 3 and 4 are protective of human health and the environment through the use of engineering controls to reduce or control the risk of accidental exposure to contaminated soils and sediments that exceed risk based levels. Alternative 2 provides some controls from potential

exposure of site contaminants through institutional controls. Alternative 1 does not reduce or control risks from potential exposure at the Site.

2. **Compliance with Applicable or Relevant and Appropriate Requirements ("ARAR").** Section 121(d) of CERCLA, 42 U.S.C. §9621(d), and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as ARARs, unless such ARARs are waived under CERCLA section 121(d)(4), 42 U.S.C. §9621(d)(4).

Alternatives 3 and 4 would meet their respective ARARs from Federal and State laws. Alternatives 3 and 4 could trigger the RCRA land disposal restrictions through the excavation and consolidation of the soils in an on-site location or the off-site disposal in a permitted RCRA landfill. Alternatives 1 and 2 do not meet Federal or State ARARs.

3. **Long-term Effectiveness and Permanence** refers to expected residual risk and the ability to maintain reliable protection of human health over time, once cleanup levels have been met.

Alternatives 3 and 4 achieve long-term effectiveness through the use of engineering controls to prevent exposure to the soils and sediments. Alternative 4 provides the most effective and permanent solution through the off-site disposal of soils that exceed the PRGs. Alternatives 3 and 4 also utilize institutional controls to prevent accidental exposure to the contaminated soils and sediments. Alternatives 1 and 2 do not provide long-term effectiveness of permanence since exposure to site contaminants would not be addressed. Alternative 2 only uses institutional controls to prevent exposure to contaminated soils and sediments.

4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

The use of engineering controls for containment of the waste material in Alternatives 3 and 4 are appropriate since the contaminated soils and sediments represent a low level threat at this Site. Therefore, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element does not apply at this Site.

5. **Short-term Effectiveness** addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during implementation

Alternatives 3 through 4 would be effective within 2 months or less through actions to address all or part of the contaminated soils and sediments. All of the alternatives have minimal impacts to the on-site workers, the surrounding community, and the environment during implementation.

The off-site disposal of contaminated materials in Alternative 4 would result in truck traffic through the community during implementation.

6. **Implementability** considers the technical and administrative feasibility of a remedy such as relative availability of goods and services and coordination with other governmental entities.

Alternative 1 and 2 can be easily implemented in a very short period of time. The technical feasibility for consolidation and capping the materials in Alternatives 3 is the simplest in terms of readily available materials and equipment. Disposal of contaminated materials at an off-site facility under Alternative 4 will require additional actions to secure a disposal facility, costs, transportation, and supporting documentation. There are no expected administrative problems with any of the alternatives.

7. **Cost** includes estimated capital and operation and maintenance costs as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

Capital costs range from $135,000 for Alternative 2 to $351,975 for Alternative 4. Annual operation and maintenance costs for the Site range from $500 for Alternatives 2 and 4 to $10,000 for Alternative 3. Cost summaries are found in Table 11 .

Table 15
Present Worth Cost Summary of the Alternatives

Remedial Alternative	Capital Cost	Present Worth of Total O&M Cost	Estimated Years of O&M	Total Present Worth Cost
1	$0	$0	0	$0
2	$135,000	$6,205	30	$141,205
3	$310,669	$124,090	30	$504,759
4	$351,975	$6,205	30	$428,180

8. **State Agency Acceptance** considers whether the State agrees with U.S. EPA's analyses in the FS Report and Preferred Remedy in the Proposed Plan.

The State of Texas, through the Texas Commission on Environmental Quality, supports Alternative 4. The state's concurrence letter is included in Appendix A.

9. **Community Acceptance** considers whether the local community agrees with U.S. EPA's analyses and preferred alternative described in the Proposed Plan.

The community provided comments on the proposed remedy components and no recommendations were made to change the preferred alternative, Alternative 4. The EPA has

considered these comments before making a final remedy selection. The EPA's response to comments are included in the Responsiveness Summary.

PRINCIPAL AND LOW-LEVEL THREAT WASTES

Principal threat wastes are those source materials that are highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The source materials include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. Low level threat wastes are source materials that generally can be reliably contained and that would present only a low risk in the event of release. The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable.

The Site investigation did not identify liquids or semi-liquid wastes that would appear to be a highly mobile source material. The sludge material in the remaining AST may contain waste materials that could be considered principal threat waste. The sludge materials will be sampled and disposed of at an off-site permitted facility. The disposal facility will be based on the sampling results prior to disposal. The risk evaluation did not identify other wastes materials that are highly toxic to human health under the industrial/commercial exposure scenario. Therefore, the EPA has determined the contaminated soils and sediment to be a low-level threat waste based on the overall risk posed by the contamination and the low mobility of the contaminants in the soil and sediment.

SELECTED REMEDY

Description of the Selected Remedy

The selected remedy will achieve the remedial action objectives of: 1) prevent human exposure, based on industrial/commercial worker scenarios, through dermal contact, ingestion, or inhalation, to contaminated soil above risk-based standards; 2) prevent off-site migration of contaminated soils to Sabine Lake; and, 3) prevent exposure to site soils that may pose a risk to ecological receptors. The Selected Remedy consists of the following components:

- Excavation of approximately 1,204 cubic yards of the upper two feet of soil that exceed human health and ecological risk based levels at each of the response areas;
- Confirmation sampling at each of the response areas. Confirmation samples would be collected from each response area and analyzed for COPCs.
- Backfilling of excavated areas with clean soil;
- Off-site disposal of the excavated soils at a permitted disposal facility;
- Implementation of Institutional Controls to restrict future land use to industrial purposes only. The Institutional Control shall be a restrictive covenant by the property owner, to the benefit of the State of Texas and the United States Government, recorded in the real property records of Jefferson County, Texas;;

- Abandonment of existing monitoring wells - Five (5) existing monitoring wells at the Site will be abandoned; and
- Wastewater AST sludge removal and decontamination - Sludge contained within the remaining Wastewater AST will be removed and disposed of off-site. The tank will be decontaminated and reused as scrap metal by the property owner.

Remedial Action Areas

Four (4) "hot spots" were identified at the site that exceeded the 10^{-5} human health risk-based PRGs. The location are shown on Figure 3-2 and the estimate area and volume are presented on Table 12.

Table 16
Response Areas for Human Health Risk

Response Area	Contaminant	Area square feet (Ft^2)	Volume Assuming two foot depth cubic yards (Yd^3)
HR-1- Open Top Slop Tanks area	PAHs	953	71
HR-2- Boiler House ASTs area	Lead	759	56 (overlaps with ECO #1)
HR-3- south of the Wastewater ASTs	heptachlor epoxide	1,983	147 (overlaps with ECO #2
HR-4	benzo(a)pyrene	1,932	143
	TOTAL	**5627**	**200**

SLERA Response Areas

The SLERA identified on site surface soils that require response action to mitigate potential future ecological risks at the Site. Analysis of on-site areas needing soil remediation to protect ecological resources were performed by calculation of safe soil concentrations for the worst case exposure to a sensitive ground feeding bird, the American robin. Response areas were then developed based on the locations where soil concentrations exceeded the safe soil values.

Safe soil concentrations for the American robin were back-calculated for all COPCs whose 95% UCL concentration resulted in a dose that exceeded a LOAEL value in the evaluation of bioaccumulative risks. Safe soil concentrations were back-calculated by interactively entering soil concentrations into the dose rate model until the exposure point concentration resulted in a dose equivalent to the toxicity reference value (TRV) LOAEL (i.e., a LOAEL-based HQ = 1.0). The calculated safe soil concentrations, or ecological PRGs, were then compared to detected concentrations to identify sampling locations where there is a potential for adverse effects to the

American robin. Locations Contaminants exceeding the safe soil concentrations are shown on Figure 3-3. Areas and volume of surface soils that exceed the safe soil concentrations are presented on Table 13.

Lead was the only metal that had a 95% UCL concentration that exceeded the TRV LOAEL. Back calculation from the TRV LOAEL resulted in a safe soil concentration of 497 mg/kg lead in surface soil. These safe soil concentrations factor in site-specific conditions of current and future commercial/industrial land use and the paucity of vegetation and minimal usable habitat available to the robin and other terrestrial receptors. Comparisons of the safe soil concentration to detected concentrations indicate that two locations from the RI data set and four locations from the ESI data set exceed the safe soil concentration for the American robin.

The evaluation of pesticides indicated that the 95% UCL concentrations of methoxychlor and DDT exceeded LOAEL doses for American robin. Detected concentrations of these pesticides exceeded calculated safe soil concentrations at two RI locations and at four ESI locations. At one location the exceedance of 4,4'-DDD is co-located with an exceedance of lead.

Based on the data presented in the SLERA, seven response areas were identified for remedial action to address ecological site risk. Two of the ecological response areas overlap with areas identified for response to human health risk.

Table 17
Response Areas for Ecological Safe Soil Levels

Response Area	Contaminant	Area square feet ($Ft^{2)}$	Volume Assuming two foot depth cubic yards ($Yd^{3)}$
ECO Area 1	lead and butyl benzyl phthalate	1,764	131
ECO Area 2	4,4'-DDD	513	38
ECO Area 3	4,4'-DDD and 4,4'-DDE	1,527	113
ECO Area 4	4,4'-DDD and 4,4'-DDE	1,647	122
ECO Area 5	4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and methoxychlor	2,419	179
ECO Area 6	lead	806	60
ECO Area 7	4,4'-DDE and lead	4,869	361
	TOTAL	**13,545**	**1,004**

Approximate Volume Requiring Remedial Action

Total soil volume to addressed locations that may pose a risk to both human health and ecological receptors is approximately 1,204 cubic yards. This estimate is based on removing contaminated soils down to a maximum depth of two (2) feet. Actual volume may be less if the contaminants are not present down to the two-foot depth or the areal extent is less than what was estimate in the Feasibility Study. The volume could increase if the areal extent of contamination increases once remedial action activities are conducted. In addition, the selected remedy includes removing approximately 233 cubic yards of sludge contained within the Wastewater AST and disposing of this material at an off-site permitted facility.

Summary of Estimated Remedy Costs

The cost estimate summary information in Table 14 is based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of changes in the qualifying bids for performance of the remedial action and progress due to Site and weather conditions. Major changes may be documented in the form of a memorandum in the Administrative Record file, an ESD, or a ROD amendment. The total present worth cost is calculated using a 7% discount rate. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 18
Estimated Capital Cost for Selected Remedy

Description	Unit	Estimated Quantity	Unit Costs ($)	Total
Mobilization	Lump Sum	1	$50,000	$50,000
Site Preparation/Erosion Control	Lump Sum	1	$10,000	$10,000
TCLP Testing	Lump Sum	1	$10,000	$10,000
Excavation	Cubic Yards	1,204	$6.30	$7,585
Transportation and Handling	Ton	2,047	$8.30	$16,990
Disposal (Non-Hazardous)	Ton	2,047	$50.00	$102,350
Backfilling	Cubic Yards	1,204	$12.50	$15,050
Site Restoration and Demobilization	Lump Sum	1	$10,000	$10,000
Implementation of ICs	Lump Sum	1	$5,000	$5,000
Abandon Existing Monitor Wells	Each	5	$5,000	$25,000
Wastewater AST Demolition and Sludge Removal	Lump Sum	1	$100,000	$100,000

Table 18 Estimated Capital Cost for Selected Remedy				
SUBTOTAL CAPITAL COSTS				**351,975**

Additional Construction Costs		
Description		
Design and Procurement Services	$30,000	$30,000
Construction Oversight	$20,000	$20,000
Reporting	$20,000	$20,000
Total Additional Construction Costs		**$70,000**

Operation and Maintenance Costs		
Annual Maintenance of ICs	$500 per year	$500
30 years O&M Net Present Value at 7.0%		**$6,205**
TOTAL ESTIMATED REMEDIAL COST		**428,180**

Expected Outcomes of Selected Remedy

The expected outcome of the selected remedy is that the contaminated soils and sediment will no longer present an unacceptable risk to future industrial and construction workers via ingestion, inhalation, or dermal exposure and the property will be suitable for redevelopment as an industrial or commercial property. The remedial action is expected to achieve the remedial objectives and goals within approximately 6 months. The Site will be available for socio-economic or community revitalization projects following implementation of the selected remedy.

Site-specific soil concentrations protective of ground water were not developed because the Site ground water is not considered a potential drinking water source. The site is located on a isle constructed from dredge materials and therefore, the site ground water does not represent a true ground water transmissive zone. The site shallow ground water resulted from the dredging operations that built the isle.

STATUTORY DETERMINATIONS

Under CERCLA section 121, 42 U.S.C. § 9621, the EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate

requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through the excavation and off-site disposal of contaminated soils that pose a risk to human health and ecological receptors. Excavation and off-site disposal will provide a permanent solution to the contaminated soils that pose a risk. The placement of a clean soil cover will also prevent direct contact with contaminants that may remain on site below the two-foot depth. Placement of an institutional control on the Site property would ensure that the site remains protective for the intended industrial use. This will ensure future site development is consistent with the industrial/commercial human health exposure scenario (i.e., non-residential usage) that is the basis for the soil cleanup goals.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy complies with those Federal and State requirements that are applicable or relevant and appropriate for this remedial action. There were no location-specific ARARs pertinent to the selected remedy.

Cost Effectiveness

The estimated present worth cost of the selected remedy is $428,180. The selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following standard was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP 300.430(f)(1)(ii) (D)). The overall effectiveness of the remedy is determined by evaluating three of the five balancing criteria used in the detailed analysis of the alternatives: (1) long-term effectiveness and permanence; (2) reduction in toxicity, mobility, and volume through treatment; and (3) short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The selected remedy best attains long-term effectiveness than Alternatives 2 and 3; achieves an equal or greater reduction in toxicity, mobility, and volume as the less expensive Alternatives 2 and 3 and an equal reduction within an appropriate time frame as Alternatives 2 and 3; and, is equally effective in the short-term when compared with all the alternatives. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs, and hence, this alternative represents a reasonable value for the money to be spent.

Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy meets the statutory requirement to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The EPA has determined that the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost. The statutory preference for treatment as a principal element is not warranted for this site since principal threat waste materials were not identified during the remedial investigation.

Preference for Treatment as a Principal Element

Principal threat wastes were not identified at the Site and the contaminated soils are considered low-level threat waste and therefore treatment is not warranted.

Institutional Controls

Institutional Controls (IC's) are required to maintain the permanence and effectiveness of the Selected Remedy for soil and sediment at the Site. *The objective of the IC's is to maintain a future industrial or commercial land use scenario for the onsite impacted property.*

The Institutional Control shall be a restrictive covenant by the property owner, to the benefit of the State of Texas and the United States Government, recorded in the real property records of Jefferson County, Texas.

The timing of implementation of the IC's will be consistent with the proposed remedial action schedule, and IC's should be in place before signature of the Preliminary Closeout Report (PCOR), signifying remedial action construction completion.

EPA will be responsible for implementing the IC's, with technical assistance from the TCEQ. Future responsibilities for IC management will be negotiated with the current property owner.

Five-Year Review Requirements

Since the selected remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review must be conducted no less often than every five years from initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), and as provided in the current guidance on Five Year Reviews [OSWER Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (June 2001)], EPA must

conduct a statutory review no less often than every five years from the initiation of construction at the Site.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Palmer Barge Site was released for public comment on July 27, 2005. The Proposed Plan identified Alternative 4, Excavation and Off-Site Disposal, as the preferred alternative for the contaminated soil and sediment. Based upon its review of the written and verbal comments submitted during the public comment period, the EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PALMER BARGE LINE SUPERFUND SITE
PORT ARTHUR, JEFFERSON COUNTY, TEXAS
RECORD OF DECISION

PART 3: RESPONSIVENESS SUMMARY

STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

The EPA has prepared this Responsiveness Summary for the Site, as part of the process for making a final remedy selection. This Responsiveness Summary documents, for the Administrative Record, public comments and issues raised during the public comment period on the EPA's recommendations presented in the Proposed Plan, and provides the EPA's responses to those comments. The EPA's actual decisions for the Site are detailed in the ROD. Pursuant to Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9617, the EPA has considered all comments received during the public comment period in making the final decision contained in the ROD for the Site.

Overview of Public Comment Period.

The EPA issued its Proposed Plan of Action detailing remedial action recommendations for public review and comment on July 27, 2005. These and other Site documents can be found in the Administrative Record file and the information repositories at the following locations: Port Arthur Public Library located at 4615 9th Avenue, Port Arthur, Texas; the U.S. Environmental Protection Agency Region 6 located at 1445 Ross Avenue, Dallas, Texas; and the Texas Commission on Environmental Quality located at 12100 Park 35 Circle, Building E, 1st Floor, Austin, Texas. The notice of the availability of these documents was published in the Port Arthur News on July 28, 2005. A public comment period was held from July 27, 2005 to August 25, 2005. The EPA and the Texas Commission on Environmental Quality conducted a public meeting on August 11, 2005, to discuss the Proposed Plan and receive comments from the community. The public meeting was held at the West Groves Education Center, located at 5840 West Jefferson, in Groves ,Texas.

This Responsiveness Summary summarizes comments submitted during the public comment period and presents the EPA's written response to each issue, in satisfaction of community relations requirements of the NCP. The EPA's responses to comments received during the public meeting are provided below and in some cases include subsequent expanded responses to those comments as appropriate.

Summary of Public Comments and EPA Responses

Comment: Question was asked if the remaining AST will be cleaned as part of the preferred alternative.

EPA Response: The sludge in the remaining AST will be removed and disposed of off-site and the tank will be decontaminated in the preferred alternative and all alternatives except the no action alternative.

Comment: All risks need to be considered. Digging around a landfill may present a risk. The risk of excavation on Palmer may not have been properly assessed when you start considering the difference between excavation and capping, and capping may actually provide certain improvements to preexisting conditions as far as providing a better cap for the preexisting landfill.

EPA Response: The excavation alternative will not dig into the landfill materials. Under the excavation alternatives contaminated materials would be removed to a depth of two (2) feet below ground surface and would not remove materials below this depth, which is where most of the landfill materials are located. Furthermore, information from the investigations conducted at the site indicate that the landfill materials are not found in thick layers and are mixed with the dredge fill materials. Test results do not indicate that these mixed materials present a significant risk at the Site. Areas that are excavated would be backfilled with clean soil and would be an improvement to the materials that are presently located at the site. The backfilled materials would provide a better cap for the site.

Comment: Although the Palmer Barge and State Marine sites are next to each other, you would think in general they should come out pretty much the same result but they're different levels, different type of contamination -- as measured by the R.I. process.

EPA Response: The contaminated materials at both the State Marine and Palmer Barge sites are similar since both sites were used for barge cleaning operations. After the removal action conducted in August 2000, the remaining residual contaminated is at different concentrations at both sites. Although not the same contaminants were identified as presenting a risk at each site, were are present at both sites, but may not represent the same risk. Also the distribution of contamination at the site was different. So, although the sites are next to each other and were used for the same type of activities, the remaining contaminants are at different concentrations and different risk levels.

Comment: Question was asked regarding the difference in O&M cost for the Palmer Barge site and State Marine site sediment in Sabine Lake. The site soil excavation alternative for the State Marine site includes monitored natural attenuation for the sediments while the soil excavation alternative for the Palmer Barge does not. The concern raised was that all the cost for monitoring of the Sabine Lake sediments was included in the State Marine alternative.

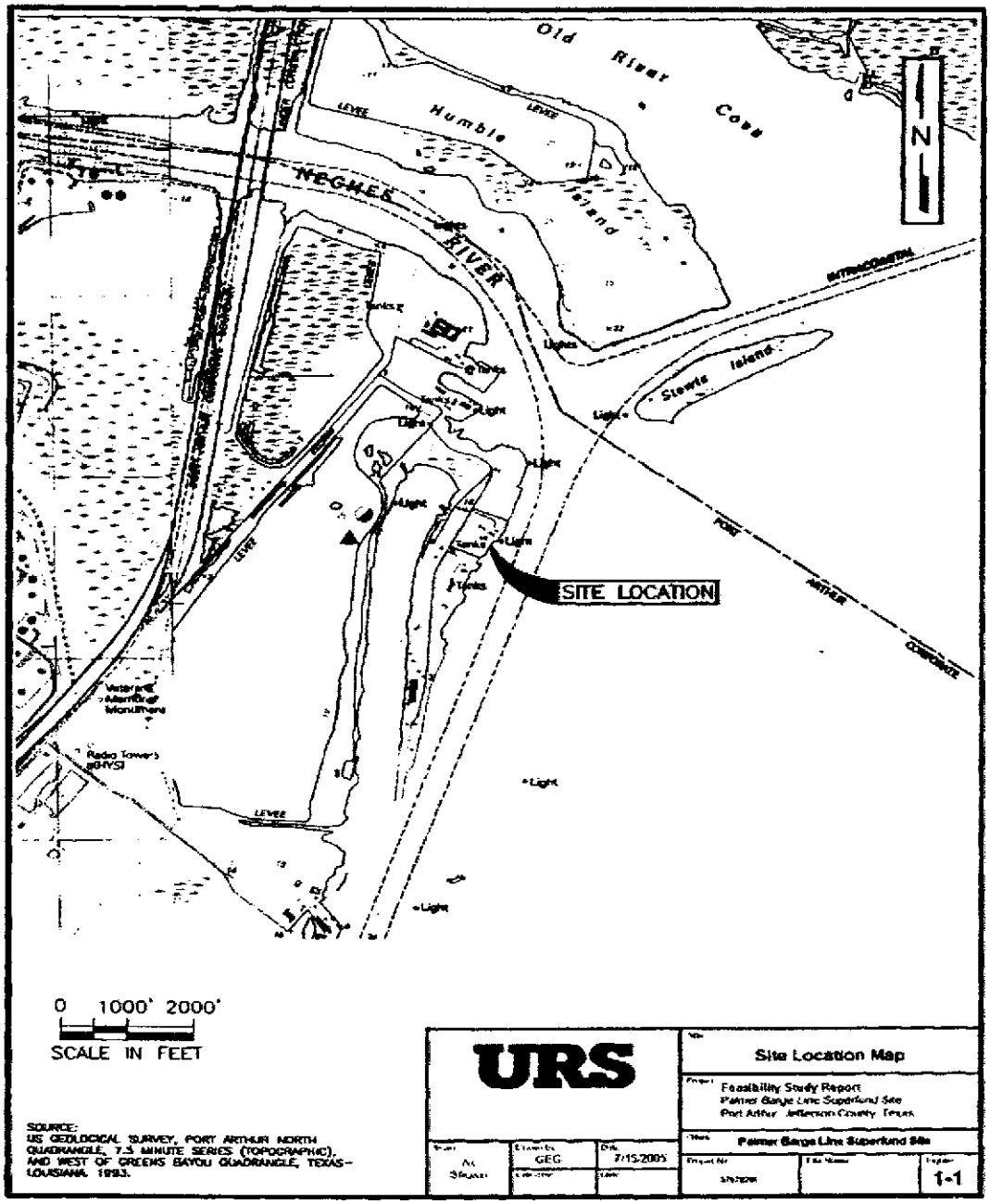
EPA Response: The monitored natural attenuation of the State Marine sediments does not include monitoring of the sediments located next to the Palmer Barge site. The contaminant levels found in the sediments next to the State Marine site were higher than those found next to the Palmer Barge site. That is part of the reason that other alternatives are being considered for

the sediments located next to the State Marine site. The monitoring of the sediments for the State Marine site would be only for the sediment next to the site and would not include monitoring for the sediments located next to the Palmer Barge site.

In addition, the preferred remedial alternative for the Palmer Barge Site will include excavation and off-site disposal of site soil that may present a risk to ecological receptors. This will further ensure that site soils do not migrate off-site to the Sabine Lake sediments and accumulate at concentrations that may pose a risk to the environment.

TECHNICAL AND LEGAL ISSUES

The Selected Remedy is consistent with the potential property redevelopment for industrial or commercial use. Institutional controls will be a necessary component of the long-term Site management to ensure future property development is consistent with the soil cleanup levels.



SOURCE:
US GEOLOGICAL SURVEY, PORT ARTHUR NORTH QUADRANGLE, 7.5 MINUTE SERIES (TOPOGRAPHIC), AND WEST OF CREEMS BAYOU QUADRANGLE, TEXAS-LOUISIANA, 1993.

URS

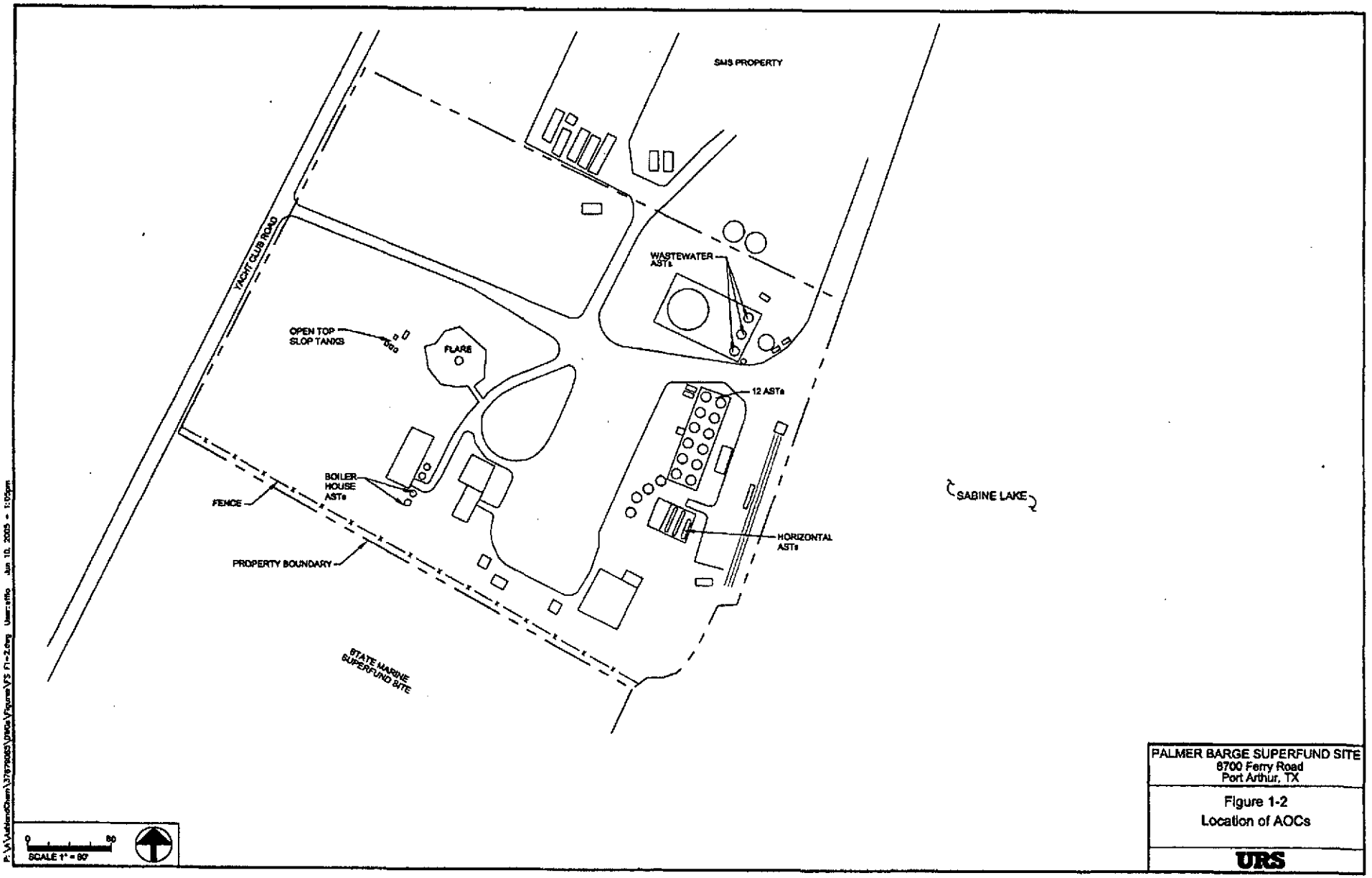
Site Location Map

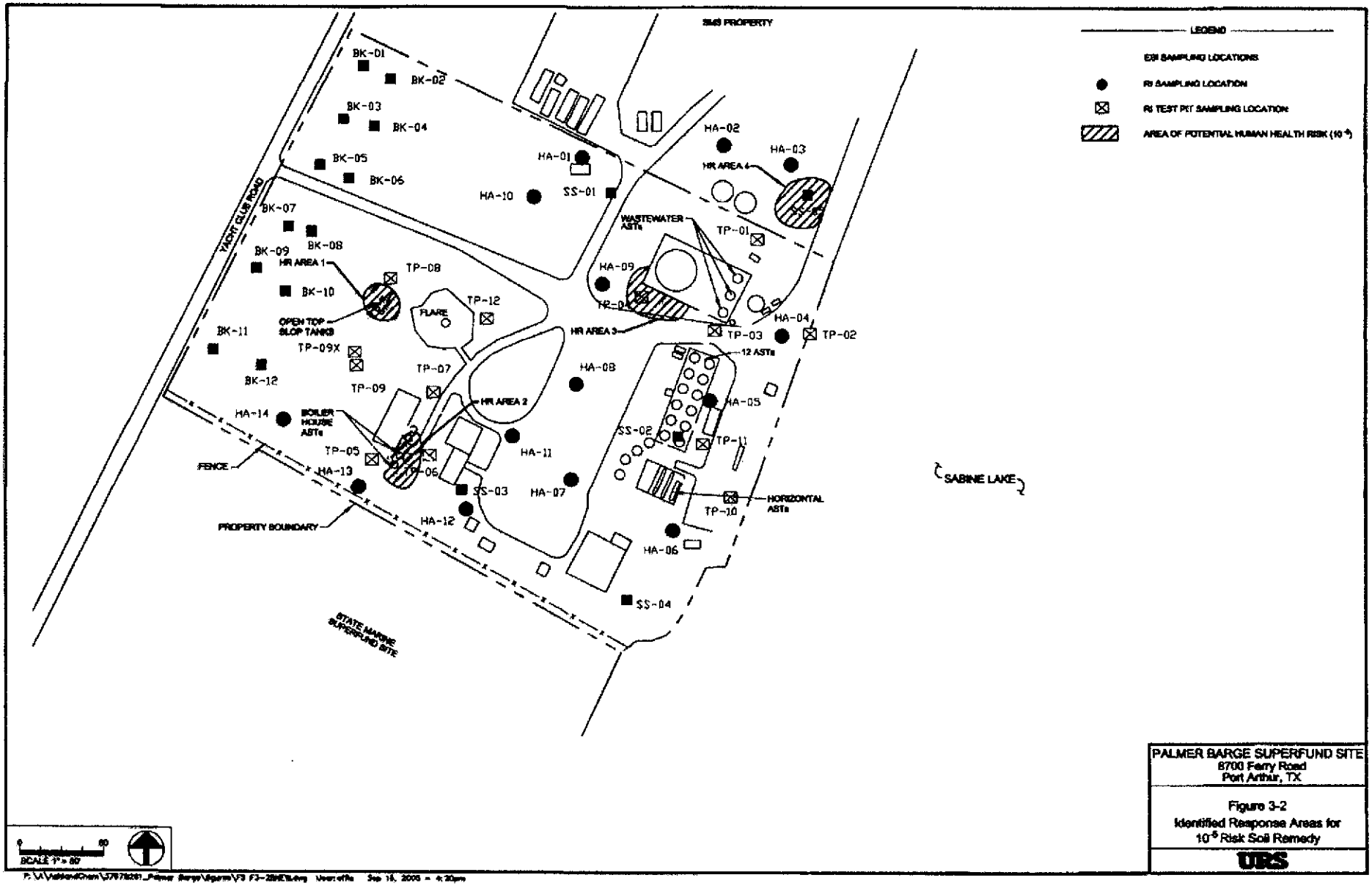
Feasibility Study Report
Palmer Barge Line Superfund Site
Port Arthur, Jefferson County, Texas

Palmer Barge Line Superfund Site

Scale	Drawn By	Date
As Shown	GEG	7/15/2005

1-1

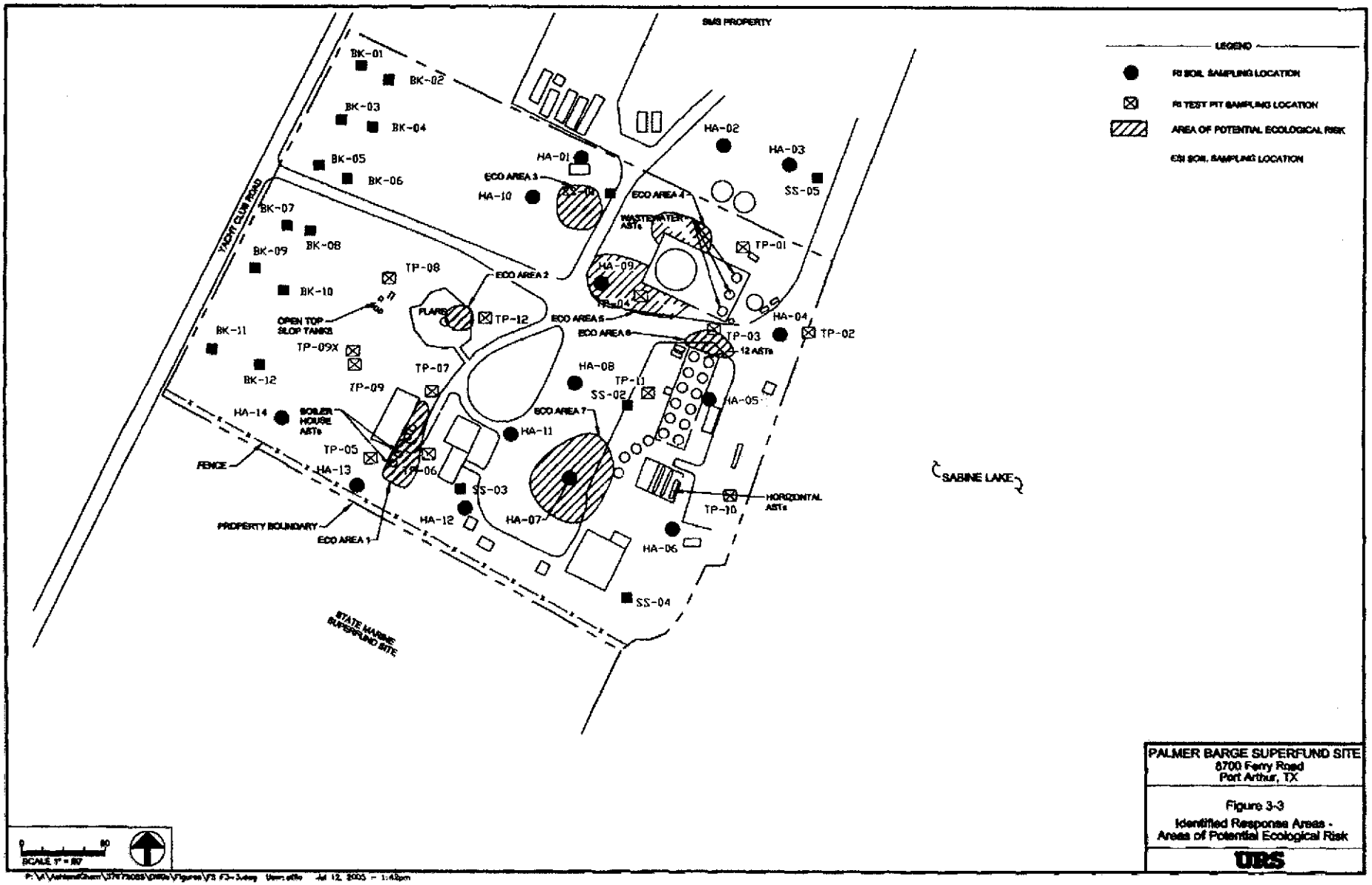

SMS PROPERTY
YACHT CLUB ROAD
WASTEWATER ASTs
OPEN TOP SLOP TANKS
FLARE
12 ASTs
BOILER HOUSE ASTs
FENCE
PROPERTY BOUNDARY
HORIZONTAL ASTs
SABINE LAKE
STATE MARINE SUPERFUND SITE
SCALE 1" = 80'
PALMER BARGE SUPERFUND SITE
8700 Ferry Road
Port Arthur, TX
Figure 1-2
Location of AOCs
URS



PALMER BARGE SUPERFUND SITE
8700 Ferry Road
Port Arthur, TX

Figure 3-2
Identified Response Areas for 10^{-5} Risk Soil Remedy

UBS


LEGEND
FSI SOIL SAMPLING LOCATION
FSI TEST PIT SAMPLING LOCATION
AREA OF POTENTIAL ECOLOGICAL RISK
ESI SOIL SAMPLING LOCATION
SMS PROPERTY
YACHT CLUB ROAD
BK-01
BK-02
BK-03
BK-04
BK-05
BK-06
BK-07
BK-08
BK-09
BK-10
BK-11
BK-12
HA-01
HA-02
HA-03
HA-04
HA-05
HA-06
HA-07
HA-08
HA-09
HA-10
HA-11
HA-12
HA-13
HA-14
SS-01
SS-02
SS-03
SS-04
SS-05
TP-01
TP-02
TP-03
TP-04
TP-05
TP-06
TP-07
TP-08
TP-09
TP-09X
TP-10
TP-11
TP-12
ECO AREA 1
ECO AREA 2
ECO AREA 3
ECO AREA 4
ECO AREA 5
ECO AREA 6
ECO AREA 7
WASTEWATER ASTs
OPEN TOP SLOP TANKS
FLARE
12 ASTs
BOILER HOUSE ASTs
HORIZONTAL ASTs
FENCE
PROPERTY BOUNDARY
STATE MARINE SUPERFUND SITE
SABINE LAKE
SCALE 1" = 80'
PALMER BARGE SUPERFUND SITE
8700 Ferry Road
Port Arthur, TX
Figure 3-3
Identified Response Areas -
Areas of Potential Ecological Risk
URS