Record of Decision

Garland Creosoting Site
Longview, Gregg County, Texas

CERCLIS # TXD007330053

September 2006

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
SUPERFUND DIVISION

Declaration for the Record of Decision

Site Name and Location

Garland Creosoting Superfund Site
Longview, Gregg County, Texas
TXD007330053

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Garland Creosoting Superfund Site (Site), in Longview, Gregg County, Texas, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 USC §9601 et seq, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300 et seq, as amended. The Director of the Superfund Division, EPA Region 6 has been delegated the authority to approve this Record of Decision (ROD).

This Record of Decision (ROD) is based on the Administrative Record, which has been developed in accordance with Section 113 (k) of CERCLA, and which is available for review at the Longview Public Library in Longview, Texas, the U.S. Environmental Protection Agency (EPA) in Dallas, Texas, and the Texas Commission on Environmental Quality (TCEQ) in Austin, Texas. The Administrative Record Index (Appendix B to the ROD) identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

The State of Texas, through the TCEQ, concurs with the Selected Remedy.

Assessment of the Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of Selected Remedy

This ROD sets forth the selected remedy for the Site, which involves actions to address creosote contamination in soil and ground water. This is the only planned operable unit for the Site and the selected remedial action is intended to address all areas of concern at the Site. The selected remedy is a comprehensive approach for the Site and addresses all current and potential future risks caused by soil and ground water contamination.

Institutional controls will also be implemented to ensure future redevelopment of the Site is consistent with the long-term management of the waste contained at the Site and the acceptable risk levels remaining in the onsite soils and ground water. The major components of the selected remedy include:

- **Excavation and Containment of Soil**
  Excavation of contaminated soil exceeding the remedial goals and containment in an on-site Resource Conservation and Recovery Act (RCRA) containment cell

- **Installation of Ground Water Recovery Wells**
  Installation of ground water recovery wells to remove ground water contaminated with volatile organic compounds. The extracted ground water will be treated using the existing ground water treatment system.

- **Continued Operation of the Interceptor Collector Trenches (ICTs)**
  Operation of the ICTs to remove dense non-aqueous phase liquid (DNAPL) and contaminated ground water. The DNAPL is sent off-site for disposal at an approved hazardous waste disposal facility while the ground water is treated using the existing ground water treatment system. The ground water is treated to levels that permit the treated water to be discharged to an intermittent creek running along the southern edge of the property.

- **Monitored Natural Attenuation**
  Monitored natural attenuation (MNA) combines ground water sampling for contaminants and indicator parameters with data analysis and remedy evaluation. At the Garland Creosoting Site, MNA will include sampling of monitoring wells and evaluation of the ground water plume to monitor migration of the plume and ensure natural biodegradation processes are occurring. Wells will be selected during the design phase for monitoring to evaluate natural attenuation rates and demonstrate plume stability.

- **Technical Impracticability Waiver**
  Due to the presence of DNAPL and dissolved polycyclic aromatic hydrocarbons (PAHs) in the shallow water bearing zone, restoration of the PAH-contaminated ground water to its beneficial uses is technically impracticable within a reasonable time frame. Thus, a Technical Impracticability (TI) waiver to waive the maximum contaminant levels (MCLs) and ground water PRGs for the potential drinking water source is included as a component of the selected remedy. A TI zone (TIZ) for the contaminated ground water defines the area over which the TI waiver applies. A ground water monitoring program will be set up to verify that the PAH-contaminated ground water is managed within the TIZ.

- **Placement of Institutional Controls**
  In order to further protect human health and prevent future ground water use from the shallow water bearing zone, EPA will implement institutional controls (ICs) at the site. ICs will be implemented to restrict the future use of the Site to commercial/ industrial land use. ICs will also be implemented for the TIZ to restrict future ground water use. If the owner of the affected property is unable or unwilling to implement a deed restriction in accordance with applicable state rule, the state will implement a deed notice in accordance with applicable state rule.
  During the performance of routine ground water monitoring activities at the Site, a Site evaluation will be conducted to ensure that there is no use of the contaminated ground water.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The selected remedy addresses a principal threat at the Site through the removal and disposal of non-aqueous phase liquid source material in the aquifer. Treatment to reduce toxicity and mobility is achieved under the selected remedy through operation of the ICTs and ground water recovery wells.

Because the remedy will result in hazardous substances remaining on-site above health-based concentration levels, a review will be conducted within five years of commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. The five year reviews will continue no less often than every five years as long as the Site contains contamination above levels that allow for unlimited use and unrestricted exposure.

Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations (see Section 7 - Chemicals of Concern)
- Baseline risk represented by the Chemicals of Concern (see Section 7 – Risk Characterization)
- Cleanup levels established for Chemicals of Concern and the basis for the levels (see Section 8 – Remedial Action Objectives, and Section 12 – Expected Outcomes of the Selected Remedy)
- How source materials constituting principal threats are addressed (see Section 11 – Principal Threat Wastes)

- Current and reasonably anticipated future land assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD (see Section 6 – Current and Potential Future Land and Resource Use)
- Potential land and ground water use that will be available at the Site as a result of the Selected Remedy (see Section 12 – Expected Outcome of the Selected Remedy)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see Section 12 – Summary of the Estimated Remedy Cost)
- Decisive factor(s) that led to selecting the remedy (see Section 12 – Summary of the Rationale for the Selected Remedy)

Authorizing Signature

By: Pamela Phillips, Acting
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Date: 9/15/06

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ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
B(a)P	Benzo(a)pyrene
BERA	Baseline Ecological Risk Assessment
CEI	Compliance Evaluation Inspection
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CME	Compliance Monitoring Evaluation
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CRDD	Cost Recovery Decision Document
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid
DWBZ	Deep Water Bearing Zone
EcoSSL	Ecological Soil Screening Level
EE/CA	Engineering Evaluation Cost Analysis
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESD	Explanation of Significant Difference
FS	Feasibility Study
GAC	Granulated Activated Carbon
HHRA	Human Health Risk Assessment
HI	Hazard Index
HPAH	High Molecular Weight Polycyclic Aromatic Hydrocarbon
HQ	Hazard Quotient
IC	Institutional Control
ICT	Interceptor Collector Trench
LOAEL	Lowest Observed Adverse Effects Level
LPAH	Low Molecular Weight Polycyclic Aromatic Hydrocarbon
MCL	Maximum Contaminant Level
mg/L	Milligram per Liter
MNA	Monitored Natural Attenuation
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	No Observed Adverse Effects Level
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PF	Problem Formulation
PRG	Preliminary Remediation Goal
QCF	Queen City Formation
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act

ACRONYMS (continued)

RfD	Reference Dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SLERA	Screening Level Ecological Risk Assessment
SMDP	Scientific Management Decision Point
SWBZ	Shallow Water Bearing Zone
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TDWR	Texas Department of Water Resources
TI	Technical Impracticability
TIZ	Technical Impracticability Zone
TNRCC	Texas Natural Resource Conservation Commission
TOC	Total Organic Carbon
TRV	Toxicity Reference Value
TWC	Texas Water Commission
UCL	Upper Confidence Level

Decision Summary for the Record of Decision

SECTION 1
Site Name, Location, and Description

The Garland Creosoting Superfund Site is located in Longview, Gregg County, Texas and the National Superfund electronic database identification number is TXD007330053. Garland Creosoting is an abandoned creosote wood treating facility located on 12 acres at 3915 Garland Road in Longview, Texas. The Site is about 0.5 miles south of Interstate Highway 20, and a small section (0.24 acre) is located west of State Highway 149. A Site location map is provided on Figure 1-1.

The Site is bounded by Garland Road to the east, State Highway 149 to the west, industrial facilities to the north, and industrial facilities, wooded land, and homes to the south. An intermittent creek runs east to west through the southern portion of the property. The nearest residents are located south/southwest of the intermittent creek, approximately 0.1 mile away. An estimated 200 people live within ½ mile of the Site and the population within a 4 mile radius of the Site is approximately 500. The Site contained 11 aboveground storage tanks of various sizes, a processing building, an office building, a laboratory, two smaller storage buildings, a mulching building, two pole-stripping buildings, and 10 to 20 fifty-five-gallon drums. In addition, five contiguous surface impoundments were in the southwestern portion of the Site, and a sixth impoundment was southeast of these. Remaining aboveground features include the office building, laboratory and a ground water treatment unit. The primary belowground features are the former surface impoundments. Figure 1-2 shows the Site features.

The EPA is the lead agency for Site activities, with support from the TCEQ. EPA did not issue Special Notice for conduct of the Remedial Investigation and Feasibility Study. After reviewing the circumstances at this Site, the Site attorney, enforcement officer and project manager agreed that Special Notice should be waived because the sole proprietor of Garland Creosoting was deceased and had previously filed Chapter 7 Bankruptcy and no other parties have been identified. A Cost Recovery Decision Document issued March 11, 2004, concluded that EPA would not pursue cost recovery at Garland Creosoting. Therefore, Superfund trust money will be used for any further cleanup activity at the Site.

SECTION 2
Site History And Enforcement Activities

History of Site Activities

Garland Creosoting began manufacturing creosote-treated wood products in 1960 and continued operations until declaring bankruptcy in February 1997. Six tanks were used to recycle waste creosote and waste generated during the wood preserving process. The waste from the tanks was placed in one of five unlined surface impoundments. Downgradient of the five impoundments is a sixth impoundment, which was used as a containment pond in the event of a release from the wastewater treatment process.

Garland Creosoting discontinued using the impoundments in 1985 and began discharging wastewater, by permit, to the City of Longview's wastewater collection and treatment system. In October 1981, a fire at the plant caused the company to cease operations for a period of seven months. The fire originated in the treatment cylinder area and burned the raw creosote storage tanks. Contaminated soil was contained in the containment pond, and later pumped to impoundment 1.

In 1986, Garland Creosoting was required by the Texas Water Commission (now TCEQ) to close impoundments 1 through 5. Creosote-contaminated ground water, found during a series of subsurface investigations, resulted in the installation of 12 ground water monitoring wells between 1985 and 1989. DNAPL was identified in 5 of the 12 wells. Because of the ground water contamination, the impoundments were closed as landfills in November 1989. The water was removed from the impoundments, and the creosote sludges and contaminated soil were capped in place. In June 1990, Garland Creosoting was issued a permit for post-closure care of the closed impoundments. A separate corrective action program was implemented under the closure permit to address the ground water contamination. The corrective action was implemented through a Compliance Plan incorporated into the post-closure permit. This Compliance Plan authorized Garland Creosoting to install, operate, and monitor a ground water recovery system to address contamination. A ground water recovery trench (French Drain) was installed along impoundments 1 through 5. The passive collection system channeled dissolved and free-phase creosote to a sump; the contents were pumped to the wastewater treatment system. When Garland Creosoting declared bankruptcy in 1997, the ground water treatment system was shut down.

History of Federal and State Investigations and Removal Actions

After the treatment system was shut down, the Texas Natural Resource Conservation Commission (TNRCC) [now TCEQ] observed a dark, oily discharge emanating from the sump of the ground water recovery trench during a Site investigation on May 13, 1997. The discharge was observed to flow downslope into the unnamed tributary that passes through the southwestern

corner of the Site. Dark staining was likewise observed on the ground in several locations, with stressed vegetation present downslope of impoundment 1 and along the on-site portion of the drainage pathway.

On May 23, 1997, TNRCC requested that a state-led emergency response effort be initiated to abate the ongoing discharges and stabilize the Site. Code 3, Inc. (Code 3), an environmental services firm, began an emergency response action on May 30, 1997, by pumping the recovered ground water from the ground water recovery trench sump into tanks. During the cleanup effort, several previously unidentified areas of creosote-saturated soil and storage vessels were discovered: (1) a section of creosote-saturated soil that encompassed approximately 1,400 square feet of land running from the ground water recovery trench sump to the edge of the intermittent creek; (2) active creosote seeps for approximately 100 yards along the banks of the intermittent creek; and (3) 10 55-gallon drums of hazardous waste labeled K001, dated "15 November 1996".

Code 3 collected one waste sample from impoundment 1 and one liquid sample of the ground water in the sump on June 2, 1997. These limited sampling data indicated the presence of several PAHs, halogenated phenols, and other organic compounds in the impoundment and ground water, including: acenaphthene, 2,4-dimethylphenol, fluorene (impoundment 1 only), phenanthrene, phenol, cresols, and naphthalene.

In November 1997, TNRCC collected seven sediment samples from the unnamed tributary and Iron Bridge Creek to better define and characterize the extent of contamination. PAHs, halogenated phenols, and other organic compounds were identified in the samples collected onsite and in the surface waters draining the Site.

An action memorandum to address the source materials in containers and the impoundments at the Site was signed on September 1, 1999. A time-critical removal action was initiated on October 12, 1999. The primary objectives of the time-critical removal action were: (1) disposal of the contents of all onsite aboveground storage tanks; (2) demolition, decontamination, and removal of the tanks, vertical structures and buildings, retort vessels, and the associated piping; and (3) excavation and disposal of creosote-contaminated soil and sludge from the on-site waste pond, the impoundments, and the creosoting process area. Contaminated soils were excavated near the process area structures and in impoundments 1, 2, and 3. Excavation continued until either 1 foot of clean soil or ground water was encountered. The contaminated soils were staged pending further action.

On February 1, 2000, EPA and its contractor remobilized to the Site to complete the removal action. The remaining activities consisted of off-site disposal of a portion of the stockpiled soils. Because of cost considerations, 3,000 to 3,500 cubic yards of stockpiled soils was returned to the excavated area of impoundment 3 after it had been lined with polyethylene sheeting. Polyethylene sheeting was spread over the waste, which was then recapped with 1 to 2 feet of clean soil from the Site and brought back to grade. Similar action was taken on 600 to 800 cubic yards of excavated and staged soil on area of concern (AOC) 1. This soil was removed from the

pressure treating building and related process operations. Impoundments 4, 5, and 6 were not addressed during the removal action because of funding limitations.

EPA initiated an engineering evaluation/cost analysis (EE/CA) in October 2000. As part of the EE/CA investigation, two pumping wells (PW-1 and PW-2) and two observation wells (OW-1 and OW-2) were installed to characterize the shallow and deep aquifers and geologic formations at the Site. The EE/CA recommended construction of ICTs along the southern border of the property north of the unnamed tributary to prevent migration of creosote from the Site. The ICTs would be used to capture on-site contaminated ground water and DNAPL. The captured ground water would be piped to the on-site water treatment plant for treatment and discharge to the unnamed tributary. Recovered DNAPL would be sent to an off-site hazardous waste disposal facility.

In 2001, EPA and the U.S. Army Corps of Engineers contracted Shaw Environmental Inc. (Shaw, formerly IT Corporation) to prepare a design package and construct the ICT recommended by the EE/CA. Shaw installed the ICT between February and May 2003. Shaw installed two ICTs along the southern border of the property, replaced the existing ground water treatment plant, constructed a new waste cell, and regraded the Site. The old French drain installed in 1990 is shown as ICT #1. The two ICTs constructed during the removal action are shown as ICT #2 and ICT #3. The ground water treatment system consists of storage and separator tanks, an air stripper, and two granular activated carbon (GAC) vessels. The waste cell was constructed above surface impoundment 4 and contains drummed and stockpiled soil from construction of the ICTs.

The ICTs and ground water treatment system have been operating since May 2003. Maintenance and operation include daily operation of the gradient control system; monthly tasks such as air stripper cleaning, changing compressor oil, gauging ground water and DNAPL levels, and sampling the system effluent. Quarterly tasks include cleaning the oil/water separator, acid-washing the transfer pumps, and replacing the GAC vessels. As of the end of March 2006, the system had treated 7,523,640 gallons of ground water at an average discharge rate of 4.9 gallons per minute (gpm).

EPA authorized a Remedial Investigation/Feasibility Study (RI/FS) for the Site on August 23, 2000. Tetra Tech began the field effort for the RI in June 2001. Based on a review of the preliminary findings, Tetra Tech concluded that the extent of ground water contamination to the west and southwest had not been fully delineated. Tetra Tech therefore remobilized in October 2002 to collect the supplemental data needed. Data compilation and analysis, a summary of the risk assessment, and conclusions from both investigations were presented in the RI report.

History of Enforcement Activities

Regulatory actions taken by the State of Texas regulatory agencies and the EPA are listed below.

State of Texas Regulatory Agencies

August 1984: A compliance agreement was executed between Garland Creosoting and the Texas Department of Water Resources (TDWR). The agreement required a ground water monitoring system for the surface impoundments.
October 1984: A hydrogeological investigation was conducted by TDWR, which led to TDWR drafting a ground water monitoring system plan in January 1985.
May 1986 and February 1989: Agreed Orders were issued to Garland Creosoting; both orders were closed in 1994.
November 1989: Closure certification for five of the six surface impoundments was submitted to the Texas Water Commission (TWC)
June 1990: TWC issued the GCC Site a permit for post-closure care of the closed surface impoundments. The permit required the facility to conduct a RCRA facility investigation (RFI) that included soil and ground water assessment. The permit incorporated a Compliance Plan for operation of a ground water recovery and monitoring system to abate the release of creosote from the closed surface impoundments.
January 1991: Phase I RFI Work Plan was submitted to the TWC.
June 1991: Ground water Quality Assessment Plan was submitted to the TWC (revised December 1991).
January 1992: Phase I RFI report was submitted to the TWC.
November 1992: A Ground-Water Quality Assessment Plan and an Implementation Report was submitted to the TWC.
October 1993: Phase II RFI Work Plan was submitted to the TNRCC.
August 1994: A modification was issued to the Compliance Plan that approved the installation of two new wells in addition to the ten wells previously installed. The Compliance Plan required that all twelve on-site monitoring wells be sampled and analyzed semi-annually for total organic carbon (TOC).
January 1995: Final Phase II RFI Work" Plan report submitted to the TNRCC.
May 1996: TNRCC staff conducted a compliance monitoring evaluation (CME) inspection in which deficiencies in ground water sampling field operations were recorded and areas of concern were identified.
February 1997: Garland Creosoting filed for Chapter 7 bankruptcy.
May 1997: TNRCC staff conducted a Compliance Evaluation Inspection (CEI) at the Site. The facility had been shut down, and the assets of the operator were being sold. During the inspection, ongoing discharges were observed. One discharge was emanating from the ground water recovery system collection sump and flowing into the intermittent creek. In addition, water from the treatment building was flowing out of the building through the tank area and into one of the surface impoundments. Ten drums of K001 waste were being stored in an unsecured shed on Site. (EPA waste code K001 is described as bottom-sediment sludge from the treatment of wastewater from wood-preserving processes that use creosote and/or pentachlorophenol.) Additionally, creosote waste was present in tanks, sumps and the abandoned wastewater treatment system.
November 1997: TNRCC completed a Preliminary Hazard Assessment Report.

United States Environmental Protection Agency (Region 6)
August 1984: A "Superfund Site Strategy Recommendation" for the Site was issued by the EPA. The document recommended "no further remedial action planned" and that the Site be referred to TDWR for possible assessment. This action occurred because the Site was an active site under RCRA jurisdiction.
October 1984: Potential contaminants were identified in a memorandum entitled "Potential Hazardous Waste Site Identification," which listed known or potential contaminants at the Site.
December 1984: An EPA contractor conducted a RCRA 3012 preliminary assessment at the Site. The report noted that TDWR enforcement was ongoing and that the potential for impacting the intermittent creek appeared significant.
July 1986: A second RCRA 3012 Site inspection was conducted with limited sampling. One soil and one sediment sample were collected. Analytical results indicated the presence of creosote near the existing structure (drip pad) and in the intermittent creek.
April 1999: Removal assessment activities were initiated. The EPA Superfund Technical Assistance and Response Team contractor conducted on-site reconnaissance inspections on April 19 and 28, May 24, and June 14, 1999, with EPA staff. Site surveying activities occurred May 3 and 4, 1999, and sampling of sources and soil took place June 7 through 10, 1999.
July 1999: Garland Creosoting was proposed for listing on the National Priorities List (NPL) in the *Federal Register* on July 22, 1999.
October 1999: Final listing of Garland Creosoting on the NPL was on October 22, 1999.

EPA issued a memorandum to the Site file on June 15, 2000, documenting EPA's decision not to issue Special Notice for the RI/FS at the Garland Creosoting Site. After reviewing the circumstances at this Site, the Site attorney, enforcement officer and project manager agreed that Special Notice should be waived because the sole proprietor of Garland Creosoting is deceased and had previously filed Chapter 7 Bankruptcy and no other parties have been identified. A Cost Recovery Decision Document (CRDD) was issued on March 11, 2004. The CRDD documented EPA's decision to not pursue cost recovery at Garland Creosoting.

SECTION 3
Community Participation

The RI/FS reports and Proposed Plan for the Garland Creosoting Site were made available to the public on July 19, 2006. The documents are in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region 6, at the TCEQ offices in Austin, Texas, and at the Longview Public Library in Longview, Texas. The notice of the availability of these documents was published in the Longview News Journal on July 18, 2006. A public comment period was held from July 19, 2006 to August 17, 2006. A formal public meeting was held on August 3, 2006, at the Longview Public Library to present the Proposed Plan and answer questions on the remedial alternatives. The EPA did not receive comments

during the public meeting but received written comments during the comment period. Responses to the comments are included in the responsiveness summary of this document (Appendix A).

SECTION 4
Scope And Role of Operable Unit

There is only one planned operable unit for the Site and the actions proposed in this plan are intended to address all areas of concern at the Site. The scope of the remedial action is to implement a remedy to prevent exposure to contaminated soils and ground water. Exposure to contaminated soil and ground water poses a future potential risk to human health because EPA's acceptable risk range is exceeded. This action addresses principal threats at the Site through the removal and disposal of soil in the former impoundments and non-aqueous phase liquid in the aquifer. A time-critical removal action conducted in 1999 addressed areas of contaminated soil and above-ground equipment. An interceptor collector trench (ICT) and ground water treatment system was installed as part of a non-time critical removal action (NTCRA) conducted in 2003.

SECTION 5
Site Characteristics

Overview of the Site

The Garland Creosoting Site is an abandoned wood treating facility located on approximately 12 acres at 3915 Garland Road in Longview, Gregg County, Texas. The Site is about ½ mile south of Interstate Highway 20 and is bound by Garland Road to the east and State Highway 149 to the west. An Unnamed Tributary that discharges into Iron Bridge Creek (approximately 1,800 feet southwest of the Site) runs from east to west through the southern portion of the Site. Iron Bridge Creek discharges into the Sabine River approximately 1 ¾ miles downstream of the confluence of the Unnamed Tributary and Iron Bridge Creek. According to the Texas Parks and Wildlife Department, Iron Bridge Creek and the Sabine River are heavily used for fishing. In addition, wetlands extend from the confluence of the Unnamed Tributary and the Iron Bridge Creek to the Sabine River.

During the creosote wood-treating process, K001 wastes and sludges were produced. According to the Hazard Ranking System Documentation Record, five of the six surface impoundments (1, 2, 3, 4, and 5) were used for the evaporation of wood preserving wastewater. These impoundments contained K001 creosote sludges (which are a listed hazardous waste) from the treatment of wastewater.

A time-critical removal action conducted by EPA in 1999 removed aboveground sources of contamination, including tanks and drums, and parts of the former surface impoundments. A few aboveground features remain at the Site subsequent to the removal action. The features include an asphalt parking lot, a laboratory building, an office building, and a ground water treatment plant. The primary belowground features at the Site are the former impoundments and the interceptor collector trenches installed in 2003, and the french drain. Other belowground features include two natural gas lines, an abandoned raw water line, and a sanitary sewer line.

Surface elevations vary from approximately 297 feet above mean seal level (msl) along the northern portion of the Site to approximately 265 feet msl along the southern portion of the Site. The southern portion of the Site is bound by the unnamed tributary. Because of the slope of the property, all surface runoff is directed towards the unnamed tributary.

Site Geology

The geologic units of interest investigated during the RI were the Queen City Formation (QCF) and Recklaw Formations. A review of the Geologic Atlas of Texas, Tyler Sheet, indicates that sediments of the QCF are exposed at the surface throughout the Site. The QCF overlies the Recklaw Formation and crops out over 90 percent of Gregg County.

The QCF at the Site consists of a complex sequence of interbedded clays, silts, and sands, which can be laterally discontinuous over relatively short distances. The stratigraphy has been broken into the Upper Clay, the Silt/Sand Unit, and the Glauconitic Clay. Each of these units is described below.

Upper Clay

The Upper Clay ranges in thickness between a few feet in the western portion of the Site to more than 14 feet to the east. Silt content within the clay ranges from 10 percent at the top to 75 percent at the bottom of the interval. Overall porosity and permeability of the shallow clay unit appear to be low.

Silt/Sand Unit

The Upper Clay is underlain by the silt/sand unit, which is the uppermost water bearing zone at the Site. The unit ranges in thickness from 4 feet along the western boundary of the Site to 14 feet in the east. The unit is predominantly silt in the eastern portion of the Site, while the base of the unit in the west is a fine grained sand.

Glauconitic Clay

The silt/sand unit is underlain by green clay that takes its color from the presence of the mineral glauconite. The unit appears to be acting as a barrier to ground water flow, as evidenced by the clay's slightly moist condition just inches below the contact with the overlying saturated silt/sand unit.

Site Hydrogeology

The first saturated unit, known as the shallow water-bearing zone (SWBZ), at the Site is encountered in the silt/sand unit of the Queen City Formation. The depth to ground water is approximately 12 feet bgs in the northern portion of the Site. Closer to the unnamed tributary, the depth to water is approximately 7 feet bgs. The aquifer is not uniform in its thickness; instead, it decreases from its initial 16 feet in the eastern part of the Site to just 4 feet in the west. Ground water flow in the SWBZ is to the south-southwest.

In 1986, EPA published the final draft of the "Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy". The guidelines divided ground water into three categories:

I Special ground water
II Ground water currently and potentially used as a source for drinking water
III Ground water not used as a source of drinking water.

Water may be designated Class III as a result of natural water quality (for example, total dissolved solids [TDS] that exceed 10,000 milligrams per liter [mg/L]) or the inability of an aquifer to provide a sufficient yield to supply a family with a useable supply of potable water. The sufficient yield criterion has been set at 150 gallons per day. This criterion has also been adopted by the State of Texas (30 Texas Administrative Code [TAC] § 350.52).

Pump test results and the performance of the ICTs suggest that the SWBZ is capable of producing more than 150 gallons per day. This potential production rate, coupled with a TDS concentration less than 10,000 mg/L, indicates that the SWBZ is a Class II aquifer at the Site.

A second, deep water-bearing zone (DWBZ) is found within the underlying Reklaw Formation at a depth of approximately 52 to 75 feet bgs. The DWBZ ranges from a poorly graded medium- to coarse-grained sand to a poorly graded gravel and is under confined conditions. The DWBZ lies relatively flat beneath the Site, with ground water flow to the south.

Surface Water Hydrology

Regional surface water hydrology includes Lake Cherokee, Lake Fork, and the Sabine River, which are the largest sources of surface water in the county. The Sabine River, which flows from northwest to southeast, is located 2 miles south of the Site. Lake Cherokee is the largest lake in the county and is located 5 miles southeast of the Site. The City of Longview derives 88 percent of its raw water from surface water sources.

The only significant surface water feature at the Site is the unnamed tributary, which bounds the property to the south. There are two drainage ditches on the Site that feed storm water runoff to the unnamed tributary. About 1800 feet south of the Site, the unnamed tributary connects with Iron Bridge Creek, which eventually flows to the Sabine River.

Conceptual Site Model

The Conceptual Site Model (CSM) is a three-dimensional "picture" of site conditions that illustrates contaminant sources, release mechanisms, exposure pathways, migration routes, and potential human and ecological receptors. It documents current and potential future site conditions and shows what is known about human and environmental exposure through contaminant release and migration to potential receptors. The development of a CSM is an iterative task and is developed early in the site investigation process. As additional site data are collected, the model may be revised and refined to reflect the available data.

Conceptual Site Models for human and ecological receptors were initially developed in the May 2001 Field Sampling Plan. An updated CSM for human receptors was included in the December 2003 Human Health Risk Assessment. The final CSM for ecological receptors was included in the September 2003 Baseline Ecological Risk Assessment. Figure 5-1 presents the human health CSM and Figure 5-2 presents the CSM for ecological receptors.

Sampling Strategy

Previous investigations at the Site conducted from 1983 to 1997 indicated the presence of creosote contaminants in the soil and ground water. Five areas of concern (AOCs) were identified at the Site according to the processes that were undertaken in the areas. Figure 5-3 presents the location of the AOCs relative to the Site. The five AOCs investigated were:

AOC 1 Pressure Treating Building and Tank Area
The pressure treating building, drip pad and tanks are located in the northwest corner of the facility. Contamination of soil and ground water in this area is a result of free-product spills and drips onto the soil. Also, between 600 and 800 cubic yards of soil scheduled to be removed during the time critical removal action were left in AOC 1.

AOC 2 Surface Impoundments
The treated wastewater was sent to one of the five impoundments were the water was evaporated. Wastes in the impoundments included creosote sludge and liquids. A sixth impoundment was built for spill prevention and containment. Contamination in AOC 2 is the result of DNAPL migrating into the soils underlying the impoundments and the SWBZ.

AOC 3 Suspected Drip Pad
The suspected drip pad is located immediately south of the gate on the east end of the property. Treated wood may have been staged at this location and allowed to dry prior to shipping.

AOC 4 Roadways
The northern portion of Site includes a series of dirt roads from the gate along the eastern edge of the Site to the pressure treating building, and along the edge of the impoundments. Contamination may have been caused by dust suppression activities at the Site.

AOC 5 Unnamed Tributary

An unnamed tributary (intermittent creek) runs along the southern edge of the property. This tributary, when flowing, empties into Iron Bridge Creek. Surface runoff is the suspected source of contaminants in the tributary.

The RI field sampling was conducted in two phases. The first phase was conducted from June 4, 2001, to July 11, 2001. During this phase, surface and subsurface soil samples were collected using hand augers or a Geoprobe®. Soil samples were collected from 111 grid sampling locations. At every grid node sampled, surface soil and shallow soil samples (0 – 6 inches and 6 inches to 2 feet) were collected. In AOCs 1 and 2, additional soil samples were collected to the base of the first aquifer. In addition to the grid samples, 29 judgmental soil samples were collected. Thirteen sediment and surface water samples were also collected from the unnamed tributary. Ground water samples were collected from existing wells where DNAPL was not present. New monitoring wells were not installed during Phase 1 to allow time for reviewing the newly collected data.

The second phase of the field investigation was performed between October 14 and 31, 2002. During this phase, four ground monitor wells and one temporary well were installed, and samples were collected from all of the wells. In addition, soil samples were collected from 18 Geoprobe® borings. The soil sampling locations and monitoring wells are shown on Figure 5-4, while Figure 5-5 shows sediment and surface water sampling locations.

Nature and Extent of Soil Contamination

The following table presents a summary of the sampling results for surface soil and shallow soil (0 – 2 feet) in the different AOCs. In addition, PAH sample results were also calculated as benzo(a)pyrene [B(a)P] equivalents to take into account the additive effects of the carcinogenic PAHs. Seven PAHs (chrysene, benzo(k)fluoranthene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene) are considered carcinogens. B(a)P equivalents are the sum of the relative carcinogenic levels for each carcinogenic PAH. Figures 5-6 through 5-8 present the B(a)P equivalent soil concentrations in AOCs 1, 2, and 3.

Summary of Soil Sampling (0 - 2 feet below ground surface)

	AOC 1		AOC 2		AOC 3		AOC 4	
Contaminant	Average Concentration mg/kg	Maximum Concentration mg/kg	Average Concentration mg/kg	Maximum Concentration mg/kg	Average Concentration mg/kg	Maximum Concentration mg/kg	Average Concentration mg/kg	Maximum Concentration mg/kg
Benzo(a)anthracene	36	597	2.2	58	4.5	120	2.3	22
Benzo(a)pyrene	12.8	206	1.3	27	1.9	32	1.1	9
Benzo(b)fluoranthene	19.9	307	2.5	46	3.7	46	2.6	12
Benzo(k)fluoranthene	9.8	137	1.4	22	2.7	37	1.6	8.6

Chrysene	43.9	753	2.8	62	6.5	150	3.6	32
Dibenzo(a,h)anthracene	3.0	18	0.4	5.1	0.5	4	0.6	1.8
Indeno(1,2,3-cd)pyrene	4.8	56.2	0.9	14	1.1	9.3	0.8	8.2
Carbazole	47.1	1200	0.7	26	5.3	220	5.3	220
Naphthalene	125	3500	1.4	39.9	25.6	1200	0.6	3.5

In the former impoundments, soil samples were collected from two sample intervals. The sample intervals were 2 to 4 feet and 4 to 8 feet. The range of concentrations for soil samples collected in the two sampling intervals is presented in the following table. Former impoundment 6 has a top and bottom liner which appears to be effective in preventing contaminants from migrating out of the impoundment.

Summary of Soil Sampling - Former Impoundments

	1	2	3	4	5	6
Contaminant	**Concentration Range mg/kg**	**Concentration Range mg/kg**	**Concentration Range mg/kg**	**Concentration Range mg/kg**	**Concentration Range mg/kg**	**Concentration Range mg/kg**
Benzo(a)anthracene	86	4.3 - 370	5 - 760	0.2 - 450	0.1 - 7.3	8 - 2,600
Dibenzofuran	300	0.5 - 690	5.4 - 1,600	0.5 - 570	0.4 - 2.4	0.5 - 4,700
Naphthalene	2,500	.65 - 4,500	23 - 14,000	0.4 - 3,800	0.1 - 2.5	0.6 - 9,500
Carbazole	140	5.3 - 890	4 - 3,100	0.1 - 580	0.1 - 6.3	0.6 - 14,000

Nature and Extent of Ground Water Contamination

During the Phase 1 investigation, ground water samples were collected from the existing monitoring wells. Based on a review of the data collected in Phase 1, two additional shallow monitoring wells and two deep monitoring wells were installed during Phase 2 of the RI. In addition, a temporary well was installed along the right-of-way of State Highway 149.

A dissolved-phase naphthalene plume is observed in the SWBZ and extends off site. Volatile organic chemicals (VOCs) detected in the SWBZ include five chlorinated organic compounds (1,2-dichlorobenzene, 1,4-dichlorobenzene, *cis*-1,2-dichloroethene, trichloroethene, and vinyl chloride). The VOCs are not thought to be related to past wood treating operations at the Site. Figures 5-9 and 5-10 present the dissolved phase naphthalene and vinyl chloride ground water plumes.

The following table presents a summary of the dissolved phase concentrations from the ground water investigation.

Summary of Ground Water Sampling		
Contaminant	**Average Concentration µg/L**	**Maximum Concentration µg/L**
Benzo(a)anthracene	5.0	25
Dibenzofuran	68.9	239
Naphthalene	1,250	4,190
Pentachlorophenol	3.9	16.4
1,2-dichloroethane	0.9	8.3
Trichloroethene	1.0	2.6
Vinyl Chloride	23.9	83.6
1,4-dichlorobenzene	0.7	1.5

Nature and Extent of DNAPL Contamination

Contaminants have migrated from the process area and surface impoundments into the SWBZ. The contaminants are present as DNAPL as well as dissolved in the ground water. A DNAPL is a liquid that is denser than water and does not dissolve or mix easily in water. In the presence of water a DNAPL forms a separate phase from the water. DNAPL was discovered in six of 16 monitoring wells during the RI: MW-2, MW-5, MW-8, OW-2, piezometer PZ-6, and PW-2. Evaluation of the ground water data suggests that the DNAPL thickness ranges between 2 and 15 inches, and encompasses an area of about 1 acre. Based on Site conditions, it is estimated that there is more than 35,700 gallons of DNAPL present in the SWBZ. The extent of DNAPL is shown on Figures 5-9 and 5-10.

Surface Water and Sediment Sampling

During the RI, surface water and sediment samples were collected from the unnamed intermittent creek that flows along the south side of the Garland Creosoting Site. Thirteen surface water and sediment samples were collected during Phase 1 and two additional samples were collected during the Phase 2 investigation. The highest concentrations of PAHs were reported from sample SD14. This sample is located near the outfall for the former wastewater treatment plant. The following table presents a summary of the sampling results from the sediment and surface water investigation.

Summary of Sediment and Surface Water Sampling				
	Sediment		**Surface Water**	
Contaminant	**Average Concentration mg/kg**	**Maximum Concentration mg/kg**	**Average Concentration µg/L**	**Maximum Concentration µg/L**
Benzo(a)anthracene	0.56	2.4	2	2
Benzo(a)pyrene	0.25	0.9	not detected	
Benzo(b)fluoranthene	0.32	1.3	1	1

Benzo(k)fluoranthene	0.29	1.3	not detected	
Chrysene	0.54	2.3	2	2
Dibenzo(a,h)anthracene	0.04	0.2	not detected	
Indeno(1,2,3-cd)pyrene	0.12	0.46	not detected	
Carbazole	0.29	0.58	not detected	
Naphthalene	2.6	20	4.83	29

SECTION 6
Current and Potential Future Land and Resource Use

The 12-acre Garland Creosoting Site is currently inactive and has been abandoned since bankruptcy proceedings in 1997. The nearest residences are located approximately one mile south of the Site across the unnamed intermittent creek. State Highway 149 borders the western edge of the Site while light industry borders the Site to the north and south. Texas Eastman Company's wildlife refuge is located east of the Site. The Site is surrounded by an 8 foot chain-link fence, which has locking gates to restrict access to the Site.

Based on conversations with officials of the City of Longview, the most likely future land use of the area surrounding the Site is high intensity retail business. Figure 6-1 shows the anticipated future land use around the area of the Site. Therefore, the mostly land use for the Site is commercial/industrial.

The ground water at the Site is not used as a drinking water source. Based on criteria established by the State of Texas, the ground water beneath the Garland Site is considered a potential water supply. However, the high iron content and low pH of most of this water render it unusable unless treated. There are no private or public drinking water wells located within 1 mile of the Site. The City of Longview derives 88 percent of its drinking water from surface water sources.

SECTION 7
Summary of Site Risks

A Human Health Risk Assessment and Baseline Ecological Risk Assessment were performed to estimate the probability and magnitude of potential adverse health and ecological effects from exposure to contaminants associated with the Site assuming no remedial action is taken. The risk assessments provide the basis for taking action and identify the contaminants and exposure pathways that need to be addressed by the remedial action.

Human Health Risk Assessment

The Human Health Risk Assessment (HHRA), which was prepared following EPA's Risk Assessment Guidance for Superfund (RAGS) parts A through E, was completed in December 2003. The risk assessment followed a four step process: 1) hazard identification, which identified those hazardous substances which, given the specifics of the Site were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances, and 4) risk characterization and uncertainty analysis, which used the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the Site, including carcinogenic and noncarcinogenic risks and a discussion of the uncertainty in the risk estimates.

CHEMICALS OF CONCERN

Chemicals of Concern (COCs) are chemicals that exceeded screening criteria and required further evaluation in the HHRA. Any chemical related to historical creosoting operations was not screened out and was considered a COC. The historically associated chemicals included the following:

Acenaphthene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene	Naphthalene
Acenaphthylene	Benzo(g,h,i)jperylene	Fluoranthene	Phenanthrene
Anthracene	Benzo(k)fluroanthene	Fluorene	Pyrene
Benzo(a)anthracene	Chrysene	Indeno(1,2,3-cd)pyrene	Carbazole
Benzo(a)pyrene	Dibenzofuran	2-Methylnaphthalene	

In the HHRA, EPA used a concentration for each COC to calculate the risk. This concentration, called the exposure point concentration, is a statistically-derived number based on all the sampling data for the Site. Generally, the 95 percent upper confidence limit (UCL) on the arithmetic mean concentration for a chemical is used as the exposure point concentration. The 95 percent UCL on the arithmetic mean is defined as a value that, when calculated repeatedly for randomly drawn subsets of the Site data, equals or exceeds the true mean 95 percent of the time. Tables 7-1 through 7-10 contain the exposure point concentrations used to evaluate the reasonable maximum exposure scenario (RME) used in the baseline risk assessment for the chemicals of concern.

EXPOSURE ASSESSMENT

The exposure assessment consists of characterizing the potentially exposed receptors, identifying exposure pathways, and quantifying exposure. An exposure pathway usually includes the following: (1) a source and means of contaminant release; (2) a transport medium (e.g., air, ground water, etc.); (3) a point of contact with the medium (i.e., receptor); and (4) an intake route (e.g., inhalation, ingestion, etc.). The conceptual site model developed for the Site (as described in Section 5) was used in determining the appropriate exposure pathways for the risk assessment.

As described previously, the Site is inactive and has been abandoned since bankruptcy proceedings in 1997. Garland Creosoting is located in an industrial area with the nearest residences located approximately one mile away. An 8 foot fence, which has locking gates surrounds the Site to restrict access to the Site. Based on the City of Longview's future land use map, the Site's most likely future land use is commercial/industrial.

Possible exposure scenarios evaluated in the risk assessment were a future off-site resident, future on-site outdoor industrial worker, and on-site recreational visitor. The following table presents the most likely exposure scenarios for the Garland Creosoting Site.

Receptor	**Exposure Medium**	**Exposure Route**
Off-site Resident	Soil All AOCs	Inhalation of VOCs and Particulates
On-site Recreational Visitor	Soil AOC 1 AOC 2 AOC 3 AOC 4	Incidental Ingestion
		Dermal Contact
		Inhalation of VOCs and Particulates
	Sediment	Incidental Ingestion
		Dermal Contact
	Surface Water	Incidental Ingestion
		Dermal Contact
On-site Industrial Worker	Soil AOC 1 AOC 2 AOC 3 AOC 4 Impoundments	Incidental Ingestion
		Dermal Contact
		Inhalation of VOCs and Particulates
	Shallow Ground Water	Incidental Ingestion
		Dermal Contact

TOXICITY ASSESSMENT

In determining the potential for non-cancer effects, a hazard quotient (HQ) is calculated by dividing the daily intake level by the reference dose (RfD) or other suitable benchmark. Reference doses have been developed by EPA, and they represent a level to which an individual may be exposed that is not expected to result in any deleterious effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. A HQ less than or equal to 1 ($\leq$ 1) indicates that a receptor's dose of a single contaminant is less than the RfD, and that noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g. liver) within or across those media to which the same individual may reasonably be exposed. An HI $\leq$ 1 indicates that toxic noncarcinogenic

effects are unlikely. A summary of the noncarcinogenic toxicity data relevant to the chemicals of concern is presented in Tables 7-11 and 7-12.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying a daily intake level with the chemical specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g. 1×10^{-6} for 1 in 1,000,000) and indicate (using this example), that an average individual is not likely to have greater that a one in a million chance of developing cancer over 70 years as a result of site-related exposure to the compound at the stated concentration. All risks estimated represent an "excess lifetime cancer risk" - or the additional cancer risk on top of that which we all face from other causes such as cigarette smoke or exposure to ultraviolet radiation from the sun. The chance of an individual developing cancer from all other (non-site related) causes has been estimated to be as high as one in three. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances. A summary of the cancer toxicity data relevant to the chemicals of concern is presented in Tables 7-13 and 7-14.

RISK CHARACTERIZATION

The final step of the risk assessment process is risk characterization. Risk characterization combines the exposure assessment with the toxicity assessment. The toxicity assessment evaluates the relationship between a dose of a chemical and the predicted occurrence of an adverse health effect. In the risk assessment, toxic effects are separated into two categories: cancer effects and noncancer effects. For noncancer effects, the risk is expressed as a HI. A HI greater than 1 indicates a potential for adverse effects. Potential cancer effects are characterized in terms of the excess chance of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. An excess cancer risk of 1×10^{-6} is used by EPA as a starting point for determining remediation goals. Acceptable exposure levels for carcinogens are generally at concentrations that represent an excess cancer risk of between 1×10^{-4} and 1×10^{-6}. The hazards and/or cancer risk presented in the risk characterization should be viewed along with uncertainties that exist in the data, assumptions, methods and endpoints that are being studied. The risk characterization results are fully presented on Tables 7-15 through 7-27. A summary of the estimated cancer and non-cancer risks are presented in the following tables.

Summary of Cancer Risk - Human Health Risk Assessment

	Cancer Risk						
Receptor	**AOC 1**	**AOC 2**	**AOC 3**	**AOC 4**	**AOC 5**	**Impoundments**	**SWBZ**
Outdoor Worker	2.8 E-04	2.2E-05	3.6E-05	2.0E-05	NA	5.9E-03	3.5E-04

Off-site Resident	1.3E-08				NA	NA	NA
Recreational Visitor	4.8E-05	3.8E-06	6.1E-06	3.4E-06	Sediment 1.5E-06 Surface Water 2.2E-05	1.0E-03	NA

Summary of Non-Cancer Risk - Human Health Risk Assessment

	Hazard Index						
Receptor	**AOC 1**	**AOC 2**	**AOC 3**	**AOC 4**	**AOC 5**	**Impoundments**	**SWBZ**
Outdoor Worker	1.2	0.054	0.37	0.055	NA	10	3.9
Off-site Resident	2				NA	NA	NA
Recreational Visitor	0.24	0.02	0.06	0.02	Sediment 0.023 Surface Water 1.1	1.7	NA

UNCERTAINTY ANALYSIS

The risks/hazards determined in the HHRA are the results of conditional estimates given multiple assumptions for exposure, toxicity, and other variables. Therefore, uncertainty is inherent to the risk assessment process. The uncertainty analysis identifies the relative contribution to overall uncertainty from each assumption or data point used in the risk assessment. The purpose of the uncertainty analysis is to provide decision makers with additional information on the assumptions and data used in the HHRA and the implications and limitations of these assumptions. Uncertainty in a risk assessment is generally derived from three primary sources: 1) accurate characterization and representation of Site contamination and conditions; 2) accurate assessment of potential exposure; and 3) known (or unknown) health effects related to the chemicals and the relevance of these toxicities at the estimated exposures.

For selection of COCs, residential land use was assumed, although the most likely future use of the property is commercial/industrial. This measure should have overestimated risks by conservatively retaining COCs. Arsenic and iron, which are naturally occurring, were retained as COCs in soil based on exceedances of their screening values. Neither arsenic nor iron is believed to be related to former creosoting operations at the Site. The maximum detected concentration of arsenic on-site was 14.4 mg/kg which is within the ranger of naturally occurring arsenic in EPA Region 6 soils (1.1 to 16.7 mg/kg). The soil at the Site has a high iron content as evidenced by the presence of iron nodules. While the maximum concentrations of iron exceeded

the screening value, iron concentrations are most likely entirely attributable to the iron-rich soil present at the Site and not to past creosoting operations. The exposure assessment used readily available, standardized exposure parameters wherever possible, and cited from EPA's Risk Assessment Guidance for Superfund and the Exposure Factors Handbook. These estimates are expected to conservatively overpredict risks for most people.

Ecological Risk Assessment

Based on the process set forth in the *Ecological Risk Assessment Guidance for Superfund* (ERAGS), a Screening Level Ecological Risk Assessment (SLERA) is followed by scientific and management decision points (SMDP) to help focus the next steps of the ecological risk assessment (ERA) process. The first SMDP determines whether or not a further ERA is needed. Since several hazard quotients exceeded unity based on the maximum detected contaminant of potential concern (COPC) concentrations, the SLERA results indicated that a Baseline Ecological Risk Assessment (BERA) was needed for at least some chemicals. EPA summarized the subsequent BERA approach in a Technical Direction Memorandum dated October 22, 2001. The Technical Direction Memorandum noted that during June and July 2001, an extensive RI media (soil, sediment, surface water) sampling program was undertaken to expand upon the EPA 1999 removal assessment (upon which the SLERA was based). The BERA Problem Formulation (PF) was based on the RI data. The BERA PF dated March 22, 2002, was approved on April 29, 2002, and is the "roadmap" for the BERA.

Identification of Chemicals of Concern

The initial list of COPCs identified in Steps 1 and 2 of the ERAGS process included all contaminants detected or suspected to be at the Site based on the historical database through 2000. However, the RI data contained much more information for soil, sediment, and surface water at the Site. All COPCs that were believed to be related to historic creosoting operations were retained, but other COPCs not thought to be related to former wood treating operations were screened against available media benchmarks and/or evaluated for gradients leaving AOCs at the Site.

Benchmarks provided in state *Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas* and available EPA ecological soil screening levels (EcoSSLs) were compared to maximum detected RI contaminant concentrations to establish the BERA COCs for each media. No historically-related contaminants (i.e., PAHs present in creosote) were excluded from the COC list, even if they were present below ecological benchmarks, thus ensuring that cumulative ecological impacts could be evaluated for all media. For bioaccumulative contaminants detected at relatively low concentrations and for contaminants that were not believed to be historically related to Site operations, a gradient analysis was performed to establish whether these contaminants should be considered COCs in the BERA. The RI media data evaluation process revealed the existence of two "hot spots" (JS02 and JS16) in surface soils at the Site. These two areas were assessed separately as ecological hot spots, and were thus not included in the database for establishing the site-wide COC list. Tables 7-28 through 7-33 show

the occurrence, distribution and selection of COCs for the Site. The COCs remaining for the Site (simply based on gradient and the toxicity screen) are:

- Soil COCs are PAHs, carbazole, and dibenzofuran (plus hot spots JS16 and JS02)
- Sediment COCs are PAHs, carbazole, and dibenzofuran
- Surface water COCs are PAHs

EXPOSURE ASSESSMENT

Ecological receptors can contact COCs through several pathways, which were evaluated based on site-specific data for soil, as well as, contaminant fate and transport mechanisms (see Figure 5-2 – Ecological Receptors Conceptual Site Model). The habitats present at the Site are comprised mainly of upland shrub-scrub areas, with a small area of riparian vegetation, upland forest, and shrub-scrub. The semiaquatic ecosystem, while mostly dry during the Site visit, most closely resembles a moss-lichen wetland, but may provide habitat for tadpoles, phytoplankton, and macroinvertebrates. The BERA established that the Unnamed Tributary is upland habitat, with the exception of the ponded water at the bottom of the treated ground water discharge pipe in the southwest corner of the Site. The "sediment" samples collected from the Unnamed Tributary (an intermittent stream that does not afford habitat for true aquatic receptors such as sediment invertebrates, fish, or piscivorous animals) are essentially moist soil samples. The terrestrial areas provide foraging, roosting, nesting, and hunting habitat for mammals, birds, amphibians, and small reptiles.

Depending on the receptor being evaluated, the following exposure pathways are reasonably anticipated to be complete and were quantitatively evaluated in the BERA:

- Terrestrial herbivorous and omnivorous mammals and birds may be exposed through ingestion of contaminated drinking water and through incidental ingestion of contaminated sediment and soil. Each consumer will also be evaluated for secondary or indirect dietary exposure through contaminated food items.
- Soil infauna (earthworms) and other terrestrial invertebrates may be exposed through direct contact with contaminated soils.
- In the small perennial pool that occurs at SD01 (at the end of the treated discharge pipe in the Unnamed Tributary), aquatic receptors may be exposed to contaminated sediment and surface water through direct contact and incidental ingestion.

Representative receptors at the Site can be broadly classified as:

- Soil invertebrates (e.g., detritivores)
- Soil vegetation
- Benthic invertebrates (e.g., detritivores), where perennial water cover exists
- Aquatic (water column) invertebrates (e.g., filter-feeding detritivores and predators), where perennial water cover exists
- Aquatic vegetation (e.g., floating plants, benthic algae, and phytoplankton), where perennial water cover exists
- Amphibians

- Reptiles
- Mammals (herbivores, omnivores, and carnivores)
- Birds (herbivores, omnivores, and carnivores)

Because of the diverse nature of the ecological receptors at Garland Creosoting, each receptor has a different mode of exposure. These differing modes of exposure were evaluated in the BERA, with specific related assessment endpoints and measurement endpoints that addressed risk to each receptor class.

ECOLOGICAL EFFECTS ASSESSMENT

To assess ecological risks, assessment and measurement endpoints were identified. Assessment endpoints represent potentially significant ecological impacts and are selected based on the ecosystems, communities, and species that are of concern at the Site. For each assessment endpoint, one or more measurement endpoints are selected to integrate modeled or field data with the individual assessment endpoint.

Based on the review of historical information and observations made during a site visit, the following assessment endpoints were chosen to evaluate potential risk to ecological communities at the Site.

- Protection of omnivorous mammals that may ingest contaminated food (i.e., invertebrates and plants), surface water, and sediment from potentially lethal, mutagenic, reproductive, systemic, or general adverse toxic effects of PAHs
- Protection of herbivorous mammals that may ingest contaminated forage, surface water, and soil from potentially lethal, mutagenic, reproductive, systemic, or general adverse toxic effects of PAHs
- Protection of omnivorous birds that may ingest contaminated food (i.e., seeds, invertebrates, and insects), surface water, sediment, and soil from potentially lethal, mutagenic, reproductive, systemic, or general adverse toxic effects of PAHs
- Protection of herbivorous birds that may ingest contaminated food (i.e., seeds, berries, herbaceous and/or rooted aquatic vegetation), surface water, sediment, and soil from potentially lethal, mutagenic, reproductive, systemic, or general adverse toxic effects of PAHs
- Protection of omnivorous amphibians/reptiles exposed to contaminated surface water and sediment from potential adverse toxic effects of PAHs
- Maintenance of the benthic macroinvertebrate community structure and function
- Maintenance of soil (invertebrate and plant) communities' structure and function

ECOLOGICAL RISK CHARACTERIZATION

Potential risks to ecological receptors were assessed by a chemical-specific comparison of maximum estimated daily doses or medium-specific concentrations with toxicity reference value

(TRV). This comparison, expressed as a HQ, was performed only for individual COCs for benthic invertebrates (in sediments of the perennial pool occurring near location SD01 in the Unnamed Tributary). Low-molecular-weigh PAHs (LPAHs) and high-molecular-weight PAHs (HPAHs) were additively grouped for all other media communities and mammalian and avian measurement endpoint receptors. This grouping was a conservative measure that provided for the summation of PAH-derived risks, which is appropriate due to the additive toxic effects of most PAHs.

Soil Invertebrate Community
Site-wide concentrations of soil COCs, both on site and in the Unnamed Tributary, did not present final screening HQs greater than unity for the soil invertebrate community. The on site HQs are presented in Table 7-34 (LOAEL-based HQ) and the Unnamed Tributary HQs are presented in Table 7-35 (NOAEL-based HQ). Therefore, there is no risk to the soil invertebrate community for the majority of the Site. Hot spot area JS02 presents an unacceptable soil invertebrate risk for LPAHs, carbazole, and dibenzofuran, while hot spot area JS16 presents an unacceptable soil invertebrate risk for chromium.

Plant Community
Site-wide concentrations of soil COPCs both on site and in the Unnamed Tributary did not present final screening HQs greater than unity for the plant community (see Tables 7-34 and 7-35); therefore, it is concluded that no risk to the plant community exists for Site COCs except hot spot JS16.

Upper Trophic Level Receptors
As applicable, consideration was given to whether (1) COCs were below EPA EcoSSLs; (2) home range assumptions could be refined; (3) bioaccumulation assumptions could be refined (by use of recent experience at other EPA Region 6 Superfund creosoting sites); (4) TRVs were adequately precise to make a determination regarding toxicity; and (5) HQs were above both NOAEL- and LOAEL-based TRVs. No NOAEL-based HQ exceedances were calculated for any upper trophic level species (see Table 7-36).

Sediment Community at SD01
As confirmed by site-specific toxicity testing and chemical-based HQ, the perennial pool sediments at SD01 are statistically significantly toxic, such that maintenance of the structure and function of the lower trophic levels receptors using the pond ecosystem (including sediment-dwelling organisms) are likely to be adversely affected.

Basis for Action

The risk assessment showed potential noncarcinogenic hazard indices greater than one, and cumulative excess carcinogenic risks exceeding 1×10^{-4} to a future outdoor worker exposed to contaminated soil in AOC 1 and the former impoundments and shallow ground water. Also, there is a potential risk to ecological receptors at “hot spots” JS02, JS16 and SD01. It is the EPA's current judgment that the selected remedy identified in this ROD is necessary to protect

the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

SECTION 8
Remedial Action Objectives

Remedial action objectives (RAOs) are established to support the evaluation of remedial alternatives for areas with the potential for unacceptable risk as identified in the risk assessment. The RAOs are established by specifying contaminants, media of concern, potential exposure pathways, and remediation goals. There are no known current receptor pathways; therefore, no immediate risk is posed for current receptors.

Media of concern at the Garland Creosoting Site are surface soil, subsurface soil, and shallow ground water and are described below.

AOC 1 (Former pressure treating building, tanks, and drip pad) – Shallow soils (less than 2 feet bgs) pose an unacceptable cancer risk to the outdoor worker.

AOC 1 (JS02, JS03, and JS16) – These stockpiles were identified as "hot spots" in the RI report. These hot spots consist of soil that was stockpiled on plastic sheeting during the time-critical removal action and will be addressed along with other soils in AOC 1.

AOC 2 (Former Impoundments and Waste Cell Above Impoundment 4) –The hypothetical risk associated with excavation of soils both in and underlying the impoundments pose a realistic exposure pathway to the future outdoor worker. The risk associated with this hypothetical exposure scenario was deemed unacceptable. Also, contaminants within the impoundments may be a continuing source of contamination to ground water. The material found in a waste cell above impoundment 4 will be addressed along with the soil in the impoundments. In addition, surface soil at hot spots K-17, K-19, and JS-30 contain elevated concentrations of PAHs.

AOC 3 (D-8 and F-8) - Although surface soil in AOC 3 does not pose an unacceptable risk to human health or the environment, surface soil at hot spots D-8 and F-8 contains elevated concentrations of PAHs. This contamination is believed to be associated with past operations at the Site.

Shallow Water Bearing Zone (DNAPL and Dissolved-phase) – The shallow aquifer poses an unacceptable cancer risk to future outdoor workers because of the presence of vinyl chloride and benzo(a)anthracene. In addition, a naphthalene plume in AOC 2 has the potential to affect off-site ground water and surface water. Although naphthalene is not a human health risk driver for a future industrial worker, this plume will be addressed along with the dissolved-phase

contamination. DNAPL in the SWBZ is a continuing source of ground water contamination and will also be addressed.

Restoration of contaminated ground water is one of the primary objectives of the Superfund program. The NCP states that, "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the Site," [Section 300.430(a)(1)(iii)(F)]. Generally, restoration levels in the Superfund program are established by ARARs, such as federal or state standards for drinking water quality, unless ARARs have not been promulgated for the particular COCs. Under CERCLA, an alternative selected to address contamination at a Site must achieve the ARARs identified for the action or provide a basis for waiving the ARARs. ARARs may be waived for any of six reasons, including where compliance with the requirement is technically impracticable from an engineering perspective [Section 121(d)(4) of CERCLA and Section 00.430(f)(1)(ii)(C) of the NCP]. The primary considerations for evaluating the technical impracticability of achieving ARARs are engineering feasibility and reliability.

EPA's "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (EPA 1993) states that many factors can inhibit ground water restoration, including contaminant-related factors. The guidance states, "the presence of NAPL contamination, and in particular DNAPL contamination, may have a significant impact on site investigations and the ability to restore contaminated portions of the subsurface to required cleanup levels." The guidance specifies the following components as necessary for a TI evaluation:

Specific ARARs or media standards for which TI determinations are sought

Under the EPA ground water protection strategy, EPA has classified the aquifer beneath the site as Class II, ground water that could be a source for drinking water in the future. Thus, maximum contaminant levels (MCL) and non-zero maximum contaminant level goals (MCLG), established under the Safe Drinking Water Act, would be potential ARARs in accordance with CERCLA Section 121(d)(2)(A)(ii).

Although other chemicals of concern (COC) exist in ground water at the site (including vinyl chloride), the TI waiver includes only contamination associated with creosote DNAPL. The TI waiver encompasses dissolved-phase PAHs that are associated to the creosote contamination. A technical impracticability waiver is proposed for the MCLs for pentachlorophenol and benzo(a)pyrene

Spatial area over which the TI decision will apply

The proposed TI zone horizontally encompasses the Garland Creosoting site and areas that are captured by the existing ICT system. This zone includes ground water beneath the entire site and off-site areas west and south of the site. The horizontal extent of the TI zone is shown on Figure 8-1. Vertically, the proposed TI zone extends throughout the SWBZ to the glauconitic clay layer that underlies the SWBZ. The TI zone includes DNAPL in the SWBZ and a corresponding

plume of PAHs. Although the TI zone encompasses a plume of vinyl chloride, remediation of vinyl chloride is not evaluated for technical impracticability.

Conceptual model that describes site geology, hydrogeology, sources of ground water contamination, fate, and transport

The ground water conceptual model is described in Section 5 of the ROD. Figure 8-2 presents the conceptual model that describes the site geology and hydrogeology.

An evaluation of the restoration potential, including predictive analysis of the timeframes to attain required cleanup levels and a demonstration that no other remedial technologies could be capable of achieving ground water restoration

Restoration of the aquifer is not practicable while DNAPL persists in the subsurface because it is a continuing source of ground water contamination. The FS evaluated thermally enhanced removal of the DNAPL as a source removal technology. This technology would heat the subsurface and increase the mobility of the DNAPL, which would then be collected by the ICT. However, as stated in the EPA TI guidance, "DNAPLs often are particularly difficult to locate and remove from the subsurface." The location of DNAPL contamination has been characterized in the RI to the extent possible. Even with more extensive investigations, however, it may not be possible to adequately delineate the extent of DNAPL at the site. DNAPL is also difficult to remove because residual DNAPL may persist in the aquifer after treatment. Therefore, although treatment of the DNAPL may reduce the volume of contamination in the ground water, it is not likely that all of the DNAPL will be removed and that the ground water will be restored to MCLs within a reasonable timeframe. It is likely that the ICT would be required to operate indefinitely to contain the ground water contamination.

Where ground water ARARs are waived at a Superfund site based on technical impracticability, EPA's general expectations are to (1) prevent further migration of the contaminated ground water plume, (2) prevent exposure to the contaminated ground water, and (3) evaluate further risk reduction measures as appropriate. These expectations are met by the existing removal action (the ICT) and the remedial alternatives selected in the ROD. Migration of the ground water plume is effectively contained by the ICT system. In addition, ICs will be implemented to prevent the use of ground water as a source of drinking water (preventing exposure to contaminated ground water).

Cost estimates of the proposed remedy options

The cost estimate for operation of the ICT and other ground water remedial alternatives is presented in Section 9 of the ROD and the Feasibility Study.

Based on the TI analysis in the FS, the ground water alternatives would not effectively treat ground water contaminated with creosote contaminants to federal drinking water MCLs. EPA, after discussion with the TCEQ, believes it would be technically impracticable to restore contaminated ground water in the SWBZ to federal and state drinking water standards for

creosote-related chemicals. Appendix B of the Garland Creosoting Feasibility Study contains a detailed "Evaluation of Technical Impracticability of Ground Water Restoration".

Considering the Site conditions, the RAOs for the Garland Creosoting Site include the following:

- In AOC 1, prevent or reduce the potential for exposure of the future outdoor worker to contaminated soil (0 to 2 feet bgs) by achieving a remediation goal for soil of 2.3 mg/kg equivalent concentration of B(a)P, 960 mg/kg for carbazole, and 190 mg/kg for naphthalene.
- Remove DNAPL and DNAPL-laden soils from the former impoundments that pose an unacceptable risk to the future outdoor worker in the event that soil in the impoundments is brought to the surface. In addition, this RAO would entail removing elevated concentrations of contaminants at the hot spots near soil samples K-17, K-19, JS-30, D-8 and F-8 to the maximum extent practicable.
- Prevent or reduce the potential for exposure of ecological receptors to on-site contaminated soil by removing stockpiled soil at JS02 and JS16.
- Prevent or mitigate the potential for exposure of the future outdoor worker to ground water contamination in the SWBZ by achieving a remediation goal of 5 µg/L for 1,2-dichloroethane, 5 µg/L for trichloroethene, 2 µg/L for vinyl chloride, and 75 µg/L for 1,4-dichlorobenzene.
- Implement or continue the operation of engineering controls to prevent off-site migration of contaminated ground water (naphthalene) and DNAPL to the intermittent creek.

SECTION 9
Description of Alternatives

The remedial alternatives described below were developed to address the remedial action objectives and goals for the Site. Five remedial alternatives were developed for the containment, excavation, treatment, or disposal of contaminated soil. Likewise, five remedial alternatives were developed for the removal, treatment, and monitoring of DNAPL and dissolved-phase contamination in ground water. These alternatives are analyzed in more detail in the FS, which is part of the Administrative Record.

The NCP requires development of a range of alternatives that address principal threats posed by the Site, but that vary in the degree of treatment used and the quantities and characteristics of untreated wastes that must be managed. Alternatives were developed to address the RAOs within an acceptable time frame. These alternatives were formulated so that the Site will be useful for commercial/industrial purposes. To the maximum extent feasible, the alternatives minimize the need for long-term management. The no action alternative has been retained as a baseline for comparison, as required by the NCP.

Common Elements of Remedial Alternatives

Institutional controls (IC) are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and protect the integrity of a remedy by limiting use of the land or resource (i.e., ground water). ICs can be used in all stages of the remedial process to accomplish various remedial objectives. ICs should be "layered" or implemented in series to provide overlapping assurances of protection against contamination. Some examples of ICs include zoning, restrictive covenants, prohibition of drilling, easements, and deed notices.

Institutional controls are proposed in all of the alternatives to protect the remedy that is constructed, ensure that the land continues to be used for industrial purposes, and prevent potential exposure to contaminated ground water. Where ICs are required as an element of the implemented remedy, if the owner of the affected property is unable or unwilling to implement a deed restriction in accordance with applicable state rule, the state will implement a deed notice in accordance with applicable state rule. In addition to a deed restriction implemented by a property owner or a deed notice implemented by the state, EPA may implement additional forms of ICs under the "layered" concept described above.

The specific objectives of the planned ICs are:

- Ensure that the land use for the site remain commercial/industrial.
- Notify potential purchases of the property that the site is a former Superfund site
- Include restrictions in the deed that ensure that remedy constructed is protected
- Implement ICs (deed notice and restrictive covenants) for the TI Zone to prevent the potential exposure to the contaminated ground water in the SWBZ. The ICs will eliminate the potential exposure pathway by preventing construction of water supply wells within the TI Zone.
- Restrict the use of ground water onsite until such time that the ground water PRGs are reached
- Ensure that wells completed in deeper water bearing zones are properly constructed such that contamination in the SWBZ cannot be transported to deeper water bearing zones.

Soil Alternatives

The alternatives for soil address PAHs, carbazole, and naphthalene in surface soils and stockpiled soil (hot spots JS02, JS03, and JS16) in AOC 1; soils in the impoundments in AOC 2; and surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8. Soil and waste from the waste cell above impoundment 4 is also included in the remedial alternatives. The total soil volume requiring remediation is approximately 22,000 cubic yards.

Alternative S-1: No Further Action
Estimated Implementation Time: 0 months
Estimated Capital Cost: $0

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

The NCP, 40 C.F.R. § 300.430(e)(6) requires that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, EPA would take no action at the Site to prevent exposure to the contaminants remaining at the Site.

Alternative S-2: Consolidation and Institutional Controls
Estimated Implementation Time: 8 months
Estimated Capital Cost: $3,160,000
Estimated Annual O&M Costs: $51,000
Estimated Present Worth (7%): $3,830,000

Containment Components of Remedy

- Soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4 will be consolidated.
- The consolidated soil will be placed in an on-site RCRA waste cell in the general area of impoundments 1 through 3. The waste cell will consist of an impermeable bottom liner to prevent contaminated soil from impacting the ground water and an impermeable cap to prevent surface water from reaching the consolidated material. The cap would also prevent exposure of the outdoor worker to the contaminated material. The unit will include a leachate collection system to collect water from inside the unit and direct it to a sump that will be emptied periodically.

Operation and Maintenance Components of Remedy

- Methane monitoring wells and passive methane vents will be installed in the unit and on the perimeter of the waste to monitor methane generated by the contaminated soil.
- Ground water monitoring wells will also be installed around the consolidation unit to monitor ground water concentrations.
- Operation and maintenance (O&M) includes annual inspection of the cap, gas sampling, and periodic repair of the cap.
- The remedy will be reviewed every 5 years to ensure its effectiveness.

Institutional Control Components of Remedy

- ICs will be implemented to protect future workers at the Site, protect the integrity of the consolidation unit and protect the future land use as commercial/industrial.

Alternative S-3: Solidification/Stabilization and Institutional Controls
Estimated Implementation Time: 4 months
Estimated Capital Cost: $4,960,000
Estimated Annual O&M Costs: $35,000

Estimated Present Worth (7%): $5,380,000

Treatment Components of Remedy

- Soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4 will be excavated.
- The soil will be mixed in-situ with binding agents to: (1) decrease the permeability of the contaminated material, (2) encapsulate and adsorb the contaminants, or (3) incorporate the contaminants into the crystalline structure of the material. Immobilization is a presumptive remedy ("Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites", December 1995) for the treatment of contaminants at wood treater sites. A pilot test will be conducted to evaluate binding agents and test the leachability of the treated soil.

Containment Components of Remedy

- This solidified soils will be used to backfill the excavated areas of the Site.
- Two feet of soil will be placed over the treated soil to prevent dermal exposure to the treated material and to allow vegetation to grow on the surface.

Operation and Maintenance Components of Remedy

- O&M includes annual inspections of the soil cover.
- The remedy will be inspected annually and reviewed every 5 years to ensure its effectiveness.

Institutional Control Components of Remedy

- ICs will be implemented to protect future workers at the Site, protect the future land use of commercial/industrial and to prevent exposure of future workers to the stabilized soil.

Alternative S-4: Thermal Desorption and Institutional Controls
Estimated Implementation Time: 12 months
Estimated Capital Cost: $8,370,000
Estimated Annual O&M Costs: $51,000
Estimated Present Worth (7%): $9,040,000

Treatment Components of Remedy

- Soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4 will be excavated and stockpiled.
- The soil will be fed into an on-site, mobile low temperature thermal desporption (LTTD) system for treatment. The system will heat the soil to 300 to 1000 ^{o}F, vaporizing the contaminants from the soil. Thermal desorption is a presumptive remedy ("Presumptive

Remedies for Soils, Sediments, and Sludges at Wood Treater Sites", December 1995) for the treatment of organic contaminants at wood treater sites.

- The vaporized organic contaminants will be collected and treated. The concentration of contaminants in the treated soil will be tested, and the soil will be put through the system again, if necessary, to meet the PRGs.

Containment Components of Remedy

- The treated soil will be placed in an on-site RCRA waste cell in the general area of impoundments 1 through 3. The waste cell will consist of an impermeable bottom liner to prevent contaminated soil from impacting the ground water and an impermeable cap to prevent surface water from reaching the consolidated material. The cap would also prevent exposure of the outdoor worker to the contaminated material. The unit will include a leachate collection system to collect water from inside the unit and direct it to a sump that will be emptied periodically.

Operation and Maintenance Components of Remedy

- O&M includes annual inspection of the cap, gas sampling, and periodic repair of the cap.

Institutional Control Components of Remedy

- ICs will be implemented to protect future workers at the Site, protect the integrity of the waste cell and protect the future land use as commercial/industrial.

Alternative S-5: Incineration, Disposal at Subtitle C Landfill and Institutional Controls
Estimated Implementation Time: 3 months
Estimated Capital Cost: $18,110,000
Estimated Annual O&M Costs: $25,000
Estimated Present Worth (7%): $18,400,000

Treatment Components of Remedy

- Soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4 will be excavated and stockpiled.
- The soil will be transported to an off-site incineration facility. The incineration facility will heat the soil to over 1000 ºF, causing the volatilization, combustion, and destruction of the contaminants. Incineration is a presumptive remedy ("Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites", December 1995) for the treatment of organic contaminants at wood treater sites.
- After treatment, the soil will be disposed of at a Subtitle C landfill, in accordance with applicable federal, state, and local laws.

Operation and Maintenance Components of Remedy

- The Site will be backfilled with clean fill material and the surface will be graded and revegetated. O&M includes annual inspection of the soil cover.
- The remedy will be reviewed every 5 years to ensure its effectiveness.

Institutional Control Components of Remedy

- ICs will be implemented to protect future workers at the Site and protect the future land use as commercial/industrial.

Ground Water Alternatives

The ground water alternatives address (1) source removal or containment of DNAPL in the SWBZ that may be a continuing source of ground water contamination; and (2) dissolved-phase contamination that poses a potentially unacceptable risk to human health or that may affect off-site ground water. The dissolved-phase contamination includes the plume of vinyl chloride and naphthalene.

As discussed earlier, restoration of the SWBZ for creosote related contaminants (e.g., naphthalene) is not technically practicable while DNAPL persists in the aquifer because it is a continuing source of ground water contamination. Based on a technical impracticability evaluation included in the FS, EPA proposes to waive federal drinking water MCLs for creosote-related contaminants in the SWBZ. The vinyl chloride plume, which is not believed to be associated with Site activities, is not included in the ARARs waiver. Based on the analysis in the FS, the ground water alternatives would not effectively treat ground water contaminated with creosote contaminants to federal drinking water MCLs. EPA, after discussion with the TCEQ, believes it will be technically impracticable to restore contaminated ground water in the SWBZ to federal and state drinking water standards for creosote-related chemicals.

Monitored natural attenuation (MNA) is a component of each of the remedial alternatives. MNA relies on natural processes to achieve the remedial action objectives. Natural attenuation includes a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in ground water. These processes include biodegradation, dispersion, dilution, sorption, and volatilization; and chemical or biological stabilization, transformation, or destruction of contaminants.

MNA of the dissolved-phase plume of vinyl chloride will include monitoring the concentrations of dissolved COCs and evaluating the protectiveness of the remedy on an ongoing basis. Vinyl chloride may biodegrade under anaerobic or aerobic conditions. The potential for natural attenuation of vinyl chloride at Garland Creosoting has not been rigorously evaluated in this FS; however, data for certain parameters typically assessed for MNA were reviewed. A more complete evaluation is necessary to ascertain whether concentrations of contaminants are likely to be reduced to levels less than MCLs within a time frame that is reasonable compared to

other alternatives. The data reviewed for this FS included analytical results for metals, total and ferrous iron, sulfide, Eh, dissolved oxygen, pH, and organic compounds in samples of ground water collected from monitoring wells at the GCC Site. Data for Eh and pH show that ground water lies in the stability field for ferrous iron, indicating a moderately to highly reducing environment. Such an environment is favorable for anaerobic dehalogenation of chlorinated solvents; however, the spatial and temporal coverage of the data were insufficient to definitively state that anaerobic natural attenuation was occurring within the plume. More data are needed to evaluate whether anaerobic natural attenuation is occurring.

Alternative GW-1: No Further Action
Estimated Implementation Time: 0 months
Estimated Capital Cost: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth (7%): $0

Under the no action alternative, no further remedial actions will be conducted at the Site. Operation of the ICT and treatment system will cease. No attempts will be made to monitor or control ground water contamination or DNAPL migration from the Site.

Alternative GW-2: Active Collection Using Existing ICTs and Treatment, MNA, and ICs
Estimated Implementation Time: 0 months
Estimated Capital Cost: $300,000
Estimated Annual O&M Costs:$200,000
Estimated Present Worth (7%): $2,790,000

Treatment Components of Remedy

- The ICT will collect contaminated ground water and DNAPL, which is migrating toward the trench, and pump it to the ground water treatment system. The DNAPL will be removed from the ground water by gravity separation in two tanks and in the oil-water separator. The DNAPL will be held in a storage tank until it is drained with a vacuum pump and transported to an approved disposal facility.

Monitored Natural Attenuation Component of Remedy

- The MNA component will include sampling of monitoring wells and evaluation of the ground water plume to monitor plume migration and ensure natural biodegradation process are occurring.

Institutional Control Components of Remedy

- The ICs will prevent use of ground water at the Site, protect ground water monitoring features and the ICT system, and prevent the industrial worker from exposure to ground water.

Operation and Maintenance Components of Remedy

- The concentration of vinyl chloride, naphthalene, and other MNA parameters will be monitored for 30 years. The product level in ground water monitoring wells in the DNAPL will be monitored to measure the product thickness and movement of the DNAPL. Additional wells will be added downgradient of the ICT for ground water sampling to demonstrate the effectiveness of the ICT. O&M includes operation of the ICT, ground water monitoring, and DNAPL sampling.

Alternative GW-3: Enhanced Collection Using Extraction Wells and Existing ICTs and Treatment, MNA, and ICs

Estimated Implementation Time: 12 months
Estimated Capital Cost: $790,000
Estimated Annual O&M Costs: $210,000
Estimated Present Worth (7%): $3,690,000

Treatment Components of Remedy

- The ICT will collect contaminated ground water and DNAPL, which is migrating toward the trench, and pump it to the ground water treatment system. The DNAPL will be removed from the ground water by gravity separation in two tanks and in the oil-water separator. The DNAPL will be held in a storage tank until it is drained with a vacuum pump and transported to an approved disposal facility.
- Installation of extraction wells in and around the vinyl chloride plume. The extraction wells will pipe the ground water to the existing treatment system. Based on the fate and transport analysis in the RI, the vinyl chloride should be captured by the extraction wells in approximately 2 to 5 years. The operation of the extraction wells will be evaluated approximately annually and operation may be terminated when it is determined that the vinyl chloride plume is stable and will likely achieve the restoration objective solely by MNA.

Monitored Natural Attenuation Component of Remedy

- The MNA component will include sampling of monitoring wells and evaluation of the ground water plume to monitor plume migration and ensure natural biodegradation process are occurring.

Institutional Control Components of Remedy

- The ICs will prevent use of ground water at the Site, protect ground water monitoring features and the ICT system, and prevent the industrial worker from exposure to ground water.

Operation and Maintenance Components of Remedy

- The concentration of vinyl chloride, naphthalene, and other MNA parameters will be monitored for 30 years. The product level in ground water monitoring wells in the DNAPL will be monitored to measure the product thickness and movement of the DNAPL. Additional wells will be added downgradient of the ICT for ground water sampling to demonstrate the effectiveness of the ICT. O&M includes operation of the ICT, ground water monitoring, and DNAPL sampling.

Alternative GW-4: Thermally Enhanced Removal, Active Collection Using Existing ICTs and Treatment, MNA, and ICs

Estimated Implementation Time: 12 months
Estimated Capital Cost: $2,000,000
Estimated Annual O&M Costs: $200,0000
Estimated Present Worth (7%): $4,500,000

Treatment Components of Remedy

- The ICT will collect contaminated ground water and DNAPL, which is migrating toward the trench, and pump it to the ground water treatment system. The DNAPL will be removed from the ground water by gravity separation in two tanks and in the oil-water separator. The DNAPL will be held in a storage tank until it is drained with a vacuum pump and transported to an approved disposal facility.
- Electrical resistance heating to accelerate the movement of DNAPL toward the ICT. A DNAPL characterization study is required to further define the extent of DNAPL in the SWBZ before remediation begins. The addition of the heated flushing will reduce the volume of DNAPL by increasing the mobility of the DNAPL so that it may be removed by the extraction wells and the ICT. Thermally enhanced removal of DNAPL will involve installation of heater wells, extraction wells, and temporary aboveground pre-treatment systems. It is assumed that thermally enhanced treatment will require 1 year.

Monitored Natural Attenuation Component of Remedy

- The MNA component will include sampling of monitoring wells and evaluation of the ground water plume to monitor plume migration and ensure natural biodegradation process are occurring.

Institutional Control Components of Remedy

- The ICs will prevent use of ground water at the Site, protect ground water monitoring features and the ICT system, and prevent the industrial worker from exposure to ground water.

Operation and Maintenance Components of Remedy

- The concentration of vinyl chloride, naphthalene, and other MNA parameters will be monitored for 30 years. The product level in ground water monitoring wells in the

DNAPL will be monitored to measure the product thickness and movement of the DNAPL. Additional wells will be added downgradient of the ICT for ground water sampling to demonstrate the effectiveness of the ICT. O&M includes operation of the ICT, ground water monitoring, and DNAPL sampling.

Alternative GW-5: In Situ Bioremediation, Thermally Enhanced Removal, Active Collection Using Existing ICTs and Treatment, MNA, and ICs

Estimated Implementation Time: 12 months
Estimated Capital Cost: $3,250,000
Estimated Annual O&M Costs : $180,000
Estimated Present Worth (7%): $5,530,000

Treatment Components of Remedy

- The ICT will collect contaminated ground water and DNAPL, which is migrating toward the trench, and pump it to the ground water treatment system. The DNAPL will be removed from the ground water by gravity separation in two tanks and in the oil-water separator. The DNAPL will be held in a storage tank until it is drained with a vacuum pump and transported to an approved disposal facility.
- Electrical resistance heating to accelerate the movement of DNAPL toward the ICT. A DNAPL characterization study is required to further define the extent of DNAPL in the SWBZ before remediation begins. The addition of the heated flushing will reduce the volume of DNAPL by increasing the mobility of the DNAPL so that it may be removed by the extraction wells and the ICT. Thermally enhanced removal of DNAPL will involve installation of heater wells, extraction wells, and temporary aboveground pre-treatment systems. It is assumed that thermally enhanced treatment will require 1 year.
- Addition of biological amendments for 1 year to stimulate biodegradation of vinyl chloride and decrease the time required to achieve the MCL. It is assumed that bioremediation will reduce the vinyl chloride levels such that concentrations will meet the PRGs after 5 years of MNA.

Monitored Natural Attenuation Component of Remedy

- The MNA component will include sampling of monitoring wells and evaluation of the ground water plume to monitor plume migration and ensure natural biodegradation process are occurring.

Institutional Control Components of Remedy

- The ICs will prevent use of ground water at the Site, protect ground water monitoring features and the ICT system, and prevent the industrial worker from exposure to ground water.

Operation and Maintenance Components of Remedy

- The concentration of vinyl chloride, naphthalene, and other MNA parameters will be monitored. The product level in ground water monitoring wells in the DNAPL will be monitored to measure the product thickness and movement of the DNAPL. Additional wells will be added downgradient of the ICT for ground water sampling to demonstrate the effectiveness of the ICT. The remedy will be reviewed every 5 years to ensure its effectiveness. O&M includes operation of the ICT, ground water monitoring, and DNAPL sampling.

Expected Outcome of Remedial Alternatives

The anticipated future use of the Site is for commercial/industrial activity. After the remedy for the soil is built, the majority of the Site would be available for commercial/industrial use. The area of the Site where the containment cell will be located would not be able to be built on. Once the ground water beneath the Site is cleaned up to the PRGs it would be available for use. Given the quality of the shallow ground water in the area of the Site and the availability of publicly supplied water, it is unlikely that ground water beneath the Site would be used. The SWBZ ground water within the TI Zone will be restricted from private and industrial use.

SECTION 10
Comparative Analysis of Alternatives

The EPA uses nine NCP criteria to evaluate remedial alternatives for the cleanup of a release. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The threshold criteria are overall protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs). The balancing criteria are used to weigh major tradeoffs among alternatives. The five balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. The modifying criteria are State acceptance and community acceptance. Following is a comparative analysis of the remedial alternatives.

1. **Overall Protection of Human Health and the Environment** *determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.*

Soil Alternatives:

With the exception of the No Action alternative, all of the proposed remedial actions can meet the RAOs. Alternatives S-5 and S-4 provide the greatest level of overall protection since the source material would be treated and disposed of on-site or off-site. Alternatives S-3 provides protection since the mobility of the contaminants is reduced and prevents exposure to a future industrial worker. Alternative S-2 is protective since the Site waste is contained and prevents exposure to a future industrial worker.

Ground Water Alternatives:
Alternatives GW-2 through 5 provides adequate protection of human health and the environment. All of the alternatives provide for control of the exposure route through institutional controls and ground water monitoring to evaluate the effectiveness of natural attenuation in achieving the Remedial Goals. All of the alternatives also combine physical extraction and treatment of the contaminated ground water to contain and restore part or all of the COCs. Since there is no current exposure route or expected demand for water from the SWBZ, the level of overall protection to human health and the environment provided by Alternatives GW-2 through GW-5 is similar. Alternative GW-1 does not provide a means for monitoring the reduction in contaminant concentrations in the ground water and does not provide adequate protection of human health and the environment.

2. **Compliance with Applicable, Relevant and Appropriate Requirements (ARARs)**
evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the Site or whether a waiver is justified.
Soil Alternatives:
With the exception of Alternative S-1 (No Further Action) , all of the proposed remedial actions will comply with ARARs

Ground Water Alternatives:
Restoration of the SWBZ is technically impracticable while DNAPL persists in the aquifer because it is a continuing source of ground water contamination. DNAPL is difficult to locate in the subsurface, and residual DNAPL may persist in the aquifer indefinitely, even with thermally enhanced treatment. Therefore, the ground water alternatives would not effectively treat ground water to federal drinking water MCLs. The FS evaluated the technical impracticability of ground water restoration. This evaluation proposed to waive federal drinking water MCLs for creosote-related contaminants in the SWBZ. The vinyl chloride plume, which is not believed to be associated with Site activities, is not included in the proposed ARARs waiver.

According to EPA guidance, the goal of restoring contaminated ground water within a reasonable time frame will be modified after an evaluation of technical impracticability. EPA's general expectations in areas where restoration is found to be technically impracticable and ARARs are waived are to (1) prevent further migration of the contaminated ground water plume, (2) prevent exposure to the contaminated ground water, and (3) evaluate further risk reduction measures as appropriate.

These expectations are met by ground water alternatives GW-2, GW-3, GW-4, and GW-5. All of these alternatives include operation of the existing ICT and treatment system. This system has been operating since 2003 and is effectively containing DNAPL and dissolved-phase contamination at GCC. In addition, these alternatives include ICs that prevent the exposure of human receptors to ground water by restricting the use of the ground water as a source of drinking water and MNA of the vinyl chloride plume. Alternatives GW-2 through 5 are expected to achieve the chemical-specific ARARs for ground water based on the MCLs for

contaminants in drinking water. For the area within the TI waiver zone, the MCLs are waived for all of the alternatives.

All of the alternatives would have to meet the substantive requirements of the RCRA program for off-site transportation and disposal of hazardous waste from the treatment systems. Alternative 1 would not provide a means to verify the achievement of ARARs at the Site.

3. **Long-term Effectiveness and Permanence** *considers the ability of an alternative to maintain reliable protection of human health and the environment over time.*

Soil Alternatives:

The long-term effectiveness of Alternatives S-2, S-3 and S-4 depends on continued maintenance and monitoring. The consolidation unit would need to be maintained and monitored to protect the integrity of the impermeable cap and bottom liner, which prevent contamination from leaching to ground water and prevent exposure of future users to contaminated soil. Similarly, the soil cover in Alternative S-3 would need to be maintained to prevent exposure of future users to the solidified material. Alternative S-5 would not require long-term maintenance because the contaminated soil would be treated or removed from the Site. All soil alternatives would require ICs to protect the future land use as commercial/industrial.

Ground Water Alternatives:

Alternatives GW-2 through GW-5 would reduce the long-term risks to future users and the environment because DNAPL and dissolved-phase contamination in ground water would be extracted and natural degradation of contamination would be monitored. The effectiveness of Alternative GW-2 would depend only on the ability of the ICT to capture contamination in ground water and MNA to monitor the ground water contamination. Alternative GW-3 increases long-term effectiveness by using extraction wells to remediate the vinyl chloride plume. Alternatives GW-4 and GW-5 include enhanced methods of extracting DNAPL with thermal treatment. This treatment would reduce the volume of DNAPL at the Site; however, it is likely that DNAPL will persist in the ground water even after thermal treatment. Alternative GW-5 includes biological treatment to reduce concentrations of vinyl chloride.

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.*

Soil Alternatives:

Alternatives S-4 and S-5 would reduce the mobility, toxicity, and volume of contaminated soil by treating the soil with thermal desorption or incineration. Alternatives S-2 and S-3 would prevent the contamination from affecting ground water or mobilizing off site, but would not reduce the toxicity or volume of the contamination through treatment. While Alternative S-3 decreases the mobility of contaminants it would increase the volume of contaminated material because binding agents would be added to the contaminated soil.

Ground Water Alternatives:
The dissolved-phase ground water contamination does not represent a principal or low level threat at this Site. Therefore, treatment to reduce the toxicity, mobility, or volume of the dissolved-phase contamination in the ground water is not necessarily appropriate at this Site to achieve the remedial action objectives and goals. All of the alternatives include some level of DNAPL reduction through the removal of contaminants from the extracted ground water followed by off-site disposal.

5. **Short-term Effectiveness** *considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.*
Soil Alternatives:
The short-term effectiveness of the alternatives for soil would result in minimal risk to Site workers from exposure to the excavated material. In addition, Alternative S-5 would expose the community to minimal risks because contaminated soil would be transported off site. All alternatives for soil would require a relatively short period to implement. Incineration would require the shortest duration because the soil would be excavated and removed from the Site and would not require time for treatment or construction of a consolidation unit.

Ground Water Alternatives:
All of the alternatives for ground water would result in minimal risks to Site workers, the community, and the environment during implementation and construction. Operation of the ICT and treatment system, ground water monitoring, installation of extraction wells, in situ bioremediation, and thermally enhanced removal would not cause significant risks to human or ecological receptors. The duration of the alternatives for ground water would be essentially the same.

6. **Implementability** *considers the technical and administrative feasibility of implementing the alternative, such as relative availability of goods and services.*
Soil Alternatives:
All of the alternatives for soil are implementable at the Site. Consolidation, solidification, thermal desorption, and incineration are all proven technologies, and materials and vendors are available. However, solidification agents that effectively immobilize PAHs may be proprietary and a pilot test will be required to evaluate binding agents and test the leachability of the treated soil. Alternative S-4 would require a pilot test to evaluate system variables such as temperature and effectiveness of off-gas treatment. Alternative S-5 would not require further monitoring because the contaminated soil would be incinerated and disposed of off-site.

Ground Water Alternatives:
Alternatives GW-2 through 5 are both technically feasible to implement and can be accomplished with existing technology. The existing ICT and ground water treatment system has been operating since 2003 and has been effective at capturing and treating ground water and DNAPL. Thermally enhanced removal, and in situ bioremediation are proven technologies, and

material and vendors are available. Implementation issues are further expanded under Alternatives GW-4 and 5 with the thermal enhancement of the ground water collection system.

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.*
Soil Alternatives:
The present worth costs for the remedial alternatives are $3,830,000 for S-2, $5,380,000 for S-3, $9,040,000 for S-4, and $18,400,000 for S-5.
Ground Water Alternatives:
Alternatives 2, 3, 4 and 5 present worth costs are $2,790,000, $3,690,000, $4,500,000 and $5,530,000 respectively.

8. **State/Support Agency Acceptance** *considers whether the State agrees with U.S. EPA's analysis and recommendations of the RI/FS and the Proposed Plan.*
The State of Texas, through the TCEQ supports or does not support the selected remedial alternatives (Alternative S-2 for soil and GW-3 for ground water) [see Appendix A].

9. **Community Acceptance** *considers whether the local community agrees with U.S. EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.*
EPA received one written comment during the 30-day public comment period. No comments were received during the public meeting held August 3, 2006.

SECTION 11
Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, non-aqueous phase liquids in ground water may be viewed as source material. Principal threat wastes are those materials considered to be 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. Non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure.

The creosote contamination in the former impoundments is considered a "principal threat waste" because the chemicals of concern are found at concentrations that pose a significant risk.

The DNAPL in ground water is also considered "principal threat waste" because it a potential source material for leaching creosote constituents into the ground water.

SECTION 12
The Selected Remedy

Summary of the Rationale for the Selected Remedy

In selecting the remedial action for the Garland Creosoting Site, EPA compared the remedial alternatives against the nine evaluation criteria and the ability for the selected remedy to achieve the RAOs. The selected remedy is Alternative S-2 for soil and Alternative GW-3 for ground water.

Soil Remedy

Of the five balancing criteria, implementability, cost, and short-term effectiveness are the criteria that influenced the Agency's selection of Alternative S-2 as the remedial alternative for the soil. Alternative S-2 is the easiest remedy to implement because no pilot test is required, no treatment systems such as a thermal desorption unit are necessary, and no off-site transportation of waste is required. The short-term effectiveness of the proposed remedy is similar to the other alternatives. Since a pilot test is necessary for alternative S-3, the time frame for this alternative could be substantially longer than estimated. The only alternative with a shorter implementation timeframe is alternative S-5. While achieving overall protection of human health and the environment and complying with ARARs, Alternative S-2 is significantly less expensive than Alternatives S-4 and S-5. The cost difference between the selected alternative and Alternatives S-4 and S-5 is between $5,210,000 and $14,570,000.

Ground Water Remedy

Long-term effectiveness, implementability, and short-term effectiveness are the criteria that influenced EPA's selection of Alternative GW-3 for the ground water. Alternative GW-3 is as protective in the long-term as Alternatives GW-4 and GW-5, and is more effective than Alternative GW-2 since the additional extraction wells physically remove the vinyl chloride to reduce the plume concentration. Even though thermally enhanced recovery of DNAPL is implementable under Alternatives GW-4 and GW-5, DNAPL is difficult to locate in the subsurface and the process will need constant adjustment. GW-3 is much easier to implement since installation and operation of recovery wells is easy to accomplish at the Site. Other than Alternative GW-2, GW-3 takes the least time to implement. Alternatives GW-4 and GW-5 take more time to implement than GW-3 since a DNAPL delineation study is required before thermally enhanced DNAPL removal can begin. This treatment would further reduce the volume of DNAPL at the Site; however, it is likely that a significant amount of DNAPL will persist in the ground water even after thermally enhanced DNAPL removal. Also, approximately 849 injections on 10 to 15 foot intervals would be required for in-situ bioremediation under Alternative GW-5. As discussed above, the preferred ground water alternative proposes to waive

federal drinking water MCLs as remedial action goals for creosote-related contaminants in the SWBZ. The vinyl chloride plume, which is not believed to be associated with Site activities, is not included in the proposed ARARs waiver.

Description of the Selected Remedy

Alternative S-2 involves ICs and consolidation of soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4. Confirmation samples will be collected following excavation of the soil in AOC 1. The excavated area of AOC 1 will be backfilled with clean material. If the levels of contaminants in the confirmation samples are greater than the remediation goals for AOC 1, EPA will place an institutional control on the area. ICs will be implemented to protect future workers at the Site, protect the integrity of the consolidation unit and protect the future land use as commercial/industrial. Contaminated soil will be excavated, and documentation samples will be collected. The contaminated soil will be consolidated in the impoundment area, in the general area of impoundments 1 through 3. The consolidation unit will consist of an impermeable bottom liner to prevent contaminated soil from affecting the ground water and an impermeable cap to prevent surface water from reaching the consolidated soil. The cap will also prevent exposure of the outdoor worker to the contaminated material. The unit will include a leachate collection system that will collect water from inside the unit and direct it to a sump that will be emptied periodically. Methane monitoring wells and passive methane vents will be installed in the unit and on the perimeter of the waste to monitor methane generated by the contaminated soil. Ground water monitoring wells will also be installed around the consolidation unit to monitor concentrations in ground water.

Alternative GW-3 includes extraction of ground water by installing extraction wells in and around the plume of vinyl chloride, MNA of the dissolved-phase contamination, continued operation of the existing ICT and treatment system, and ICs. The ICs will prevent use of ground water at the Site, protect ground water monitoring features and the ICT system, and prevent the industrial worker from exposure to ground water. Ground water samples will be collected before the extraction wells are installed to assess the current locations and concentrations of vinyl chloride. Wells will be installed approximately 100 feet apart perpendicular to the ground water flow. Dedicated pumps in the extraction wells will be connected to a common header that conveys the extracted ground water to the treatment system.

The ICT will collect contaminated ground water and DNAPL, which is migrating toward the trench, and pump it to the ground water treatment system. The DNAPL will be removed from the ground water by gravity separation in two tanks and in the oil-water separator. The DNAPL will be held in a storage tank until it is drained with a vacuum pump and transported to an approved disposal facility. MNA of the dissolved-phase plumes of vinyl chloride and naphthalene will include monitoring the concentrations of dissolved COCs and evaluating the protectiveness of the remedy on an ongoing basis. The product level in ground water monitoring wells in the area of DNAPL will be monitored to measure the product thickness and movement of the DNAPL.

Additional wells will be added downgradient of the ICT for ground water sampling to demonstrate the effectiveness of the ICT.

Because the remedy will result in hazardous substances remaining on-site above health-based concentration levels, a review will be conducted within five years of commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. The five year reviews will continue no less often than every five years as long as the Site contains contamination above levels that allow for unlimited use and unrestricted exposure.

The selected remedy may change somewhat as a result of the remedial design and construction processes. Changes to the remedy described in this Record of Decision will be documented in a technical memorandum in the Administrative Record for the Site, an Explanation of Significant Differences (ESD) or an Amendment to the Record of Decision, as appropriate.

Summary of the Estimated Remedy Costs

Tables 12-1 and 12-2 show the estimated cost for the selected soil and ground water remedy. The cost summary is based on the capital and annual operating and maintenance cost to implement the remedy. The information in the cost summary 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 new information and data collected during the engineering design of the remedial alternative. Changes in cost for the selected remedy may be documented in the form of a memorandum to the file, an ESD, or an Amendment to the ROD depending upon NCP requirements for the change in question. Net present values are estimated using a discount rate of 7%. The accuracy of the cost estimates shall be within +50 percent to -30 percent.

Expected Outcomes of the Selected Remedy

Available Land Uses

The expected outcome of the selected remedy is that the contaminated soils will no longer present an unacceptable risk to future industrial workers via ingestion, inhalation, or dermal exposure. Once the soils are remediated, the property will be suitable for redevelopment as an industrial property. The remedial action for soil is expected to achieve the remedial action objectives in approximately 8 months.

Available Ground Water Uses

The remedy will be protective for ground water at the Site which is contaminated with organics. Extraction wells which will be installed in the organic plume will reduce the ground water concentrations of organics below the MCL. Ground water that is contaminated with creosote compounds will not be available for use. Due to the presence of DNAPL in the SWBZ, it is technically impracticable to remediate creosote-contaminated ground water to its beneficial use.

Based on the TI evaluation presented in the FS, EPA is waiving the MCLs for the creosote-contaminated ground water and designating a TI zone. The TI zone horizontally encompasses the Garland Creosoting Site and areas that are captured by the existing ICT system. This zone includes ground water beneath the entire Site and off-site areas west and south of the Site. The TI zone includes a DNAPL plume and a corresponding plume of PAHs. See Figure 8-1. Although the TI zone encompasses a plume of vinyl chloride, remediation of vinyl chloride is not included as part of the TI waiver.

Final Cleanup Levels

Soil cleanup levels for the COCs in soil exhibiting an unacceptable cancer risk have been established such that they are protective of human health. The remedial goal for B(a)P equivalents is set at 2.3 mg/kg based on a future industrial worker cancer risk of 1×10^{-5} considering exposures via ingestion, inhalation, and dermal contact. Likewise, the remedial goal for carbazole is set at 960 mg/kg based on a future industrial worker cancer risk of 1×10^{-5} considering exposures via ingestion, inhalation, and dermal contact. The remediation goal for naphthalene is set at 190 mg/kg based on a future industrial worker non-cancer HI of 1. The remediation goals for the organic ground water plume, which are the MCLs, are 5 µg/L for 1,2-dichloroethane, 5 µg/L for trichloroethene, 2 µg/L for vinyl chloride, and 75 µg/L for 1,4-dichlorobenzene.

SECTION 13
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 remedy at this Site will adequately protect human health and the environment by eliminating, reducing or controlling exposures to human receptors through treatment, engineering controls and institutional controls. Consolidation of soil at AOC 1, the soil in the impoundments at AOC 2, surface soil in hot spots K-17, K-19, JS-30, D-8 and F-8, and soil and waste from the waste cell above impoundment 4 in an on-site cell will protect a future industrial worker from exposure to Site soils. After the on-site cell is constructed, the potential risk to a future industrial worker will be within EPA's acceptable risk range for carcinogenic chemicals and below the HI of 1 for noncarcinogens. Furthermore, the installation of extraction wells in

the area of organic contamination in the SWBZ, will reduce the levels of 1,2-dichloroethane, vinyl chloride, trichloroethene, and 1,4-dichlorobenzene to their MCLs. Since the Site is currently vacant, there are no unacceptable threats to human health or the environment at this time.

Placement of institutional controls on the Site property and ground water will be used to:

- Ensure that the land use for the site remains commercial/industrial.
- Notify potential purchasers of the property that the site is a former Superfund site
- Include restrictions in the deed that ensure the remedy constructed is protected
- Implement ICs (deed notice and restrictive covenants) for the TI Zone to prevent the potential exposure to the contaminated ground water in the SWBZ. The ICs will eliminate the potential exposure pathway by preventing construction of water supply wells within the TI Zone.
- Restrict the use of ground water onsite until such time that the ground water PRGs are reached
- Ensure that wells completed in deeper water bearing zones are properly constructed such that contamination in the SWBZ cannot be transported to deeper water bearing zones.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all Federal and any more stringent State ARARs that pertain to the Site. Section 121(d) of CERCLA states that remedial actions must attain or exceed ARARs. ARARs are derived from both Federal and State environmental laws and includes regulations, standards, criteria, or limitations not promulgated under Federal or State laws. State standards that constitute ARARs are those laws that are promulgated, substantive in nature, more stringent than Federal requirements, consistently applied and identified by the State in a timely manner. The ARARs are divided into 3 categories: 1) location-specific, 2) chemical-specific, and 3) action-specific. In addition to ARARs in determining the necessary level of cleanup for protection of health or the environment, EPA may also consider non-promulgated advisories or guidance issued by Federal or State government that are not legally binding. Such materials are identified in the remedy selection process as to-be-considered (TBC). The ARARs identified for selected alternatives are presented in Table 13-1.

Cost Effectiveness

In the Lead Agency's judgment, the selected remedy is cost-effective because the remedy's costs are proportional to its overall effectiveness (see 40 CFR 300.430(f)(1)(ii)(D)). This determination was made by evaluating the overall effectiveness of those alternatives that satisfy the threshold criteria (i.e., that are protective of human health and the environment and comply with all Federal and any more stringent ARARs, or as appropriate, waive ARARs). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination--long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. The overall effectiveness of each alternative then was

compared to the alternative's costs to determine cost-effectiveness. The relationship of the overall effectiveness of the selected remedial alternative was determined to be proportional to its costs and hence represents a reasonable value for the money to be spent.

The present worth cost of Remedial Alternative S-2 at $3,830,000 is slight less than alternative S-3 ($5,380,000) but considerably less than the cost of Remedial Alternatives S-4, and S-5. The present worth costs of Alternatives S-4, and S-5 are $9,040,000, and $18,400,000 respectively. The present worth costs for alternatives GW-2, GW-3, GW-4, and GW-5 are $2,790,000, $3,690,000, $4,500,000, and $5,530,000 respectively. Alternative GW-3 has a present worth cost of $3,690,000 which is similar to the cost for the other alternatives. The relationship of the overall effectiveness of the selected 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

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. The selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, considering State and community acceptance, while also considering the statutory preference for treatment as a principal element.

Of the five balancing criteria, implementability, cost, and short-term effectiveness are the criteria that influenced the Agency's proposal of Alternative S-2 as the preferred remedial alternative for the soil. Alternative S-2 is the easiest remedy to implement because no pilot test is required, no treatment systems such as a thermal desorption unit are necessary, and no off-site transportation of waste is required. The short-term effectiveness of the proposed remedy is similar to the other alternatives. Since a pilot test is necessary for alternative S-3, the time frame for this alternatives could be substantially longer than estimated. The only alternative with a shorter implementation timeframe is alternative S-5. While achieving overall protection of human health and the environment and complying with ARARs, Alternative S-2 is significantly less expensive than Alternatives S-4 and S-5. The cost difference between the preferred alternative and Alternatives S-4 and S-5 is between $5,210,000 and $14,570,000.

Long-term effectiveness, implementability, and short-term effectiveness are the criteria that influenced EPA's proposal of Alternative GW-3 for the ground water. Alternative GW-3 is as protective in the long-term as Alternatives GW-4 and GW-5, and is more effective than Alternative GW-2 since the additional extraction wells physically remove the vinyl chloride to reduce the plume concentration. Even though thermally enhanced recovery of DNAPL is implementable under Alternatives GW-4 and GW-5, DNAPL is difficult to locate in the subsurface and the process will need constant adjustment. GW-3 is much easier to implement since installation and operation of recovery wells is easy to accomplish at the Site. Other than

Alternative GW-2, GW-3 takes the least time to implement. Alternatives GW-4 and GW-5 take more time to implement than GW-3 since a DNAPL delineation study is required before thermally enhanced DNAPL removal can begin. This treatment would reduce the volume of DNAPL at the Site; however, it is likely that a significant amount of DNAPL will persist in the ground water even after thermally enhanced DNAPL removal. Also, approximately 849 injections on 10 to 15 foot intervals would be required for in-situ bioremediation under Alternative GW-5.

Preference for Treatment as a Principal Element

The creosote contamination in the former impoundments is considered a "principal threat waste" because the chemicals of concern are found at concentrations that pose a significant risk. The DNAPL in ground water is also considered "principal threat waste" because it a potential source material for leaching creosote constituents into the ground water. The DNAPL in the SWBZ will be recovered to the maximum extent practicable using the interceptor collector trenches. Although ground water contaminated with organics is not considered a principal threat waste, treatment to reduce toxicity and mobility is achieved by the installation of recovery wells. Therefore, the statutory preference for treatment is satisfied.

Five-Year Review Requirements

Because the remedy will result in hazardous substances remaining on-site above health-based concentration levels, a review will be conducted within five years of commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. The five year reviews will continue no less often than every five years as long as the Site contains contamination above levels that allow for unlimited use and unrestricted exposure.

SECTION 14
Documentation of Significant Changes

The Proposed Plan for the Garland Creosoting Site was released for public comment on July 19, 2006. The Proposed Plan identified Alternative S-2 (Consolidation and Institutional Controls) and GW-3 (Enhanced Collection Using Extraction Wells and Existing ICTs and Treatment, MNA, and ICs) as the preferred alternative for the Site. EPA reviewed all written and oral comments submitted during the public comment period and determined that no significant changes to the remedies, as originally identified in the Proposed Plan, were necessary or appropriate.

Figure 1-1
Site Location Map

Figure 1-2
Site Features

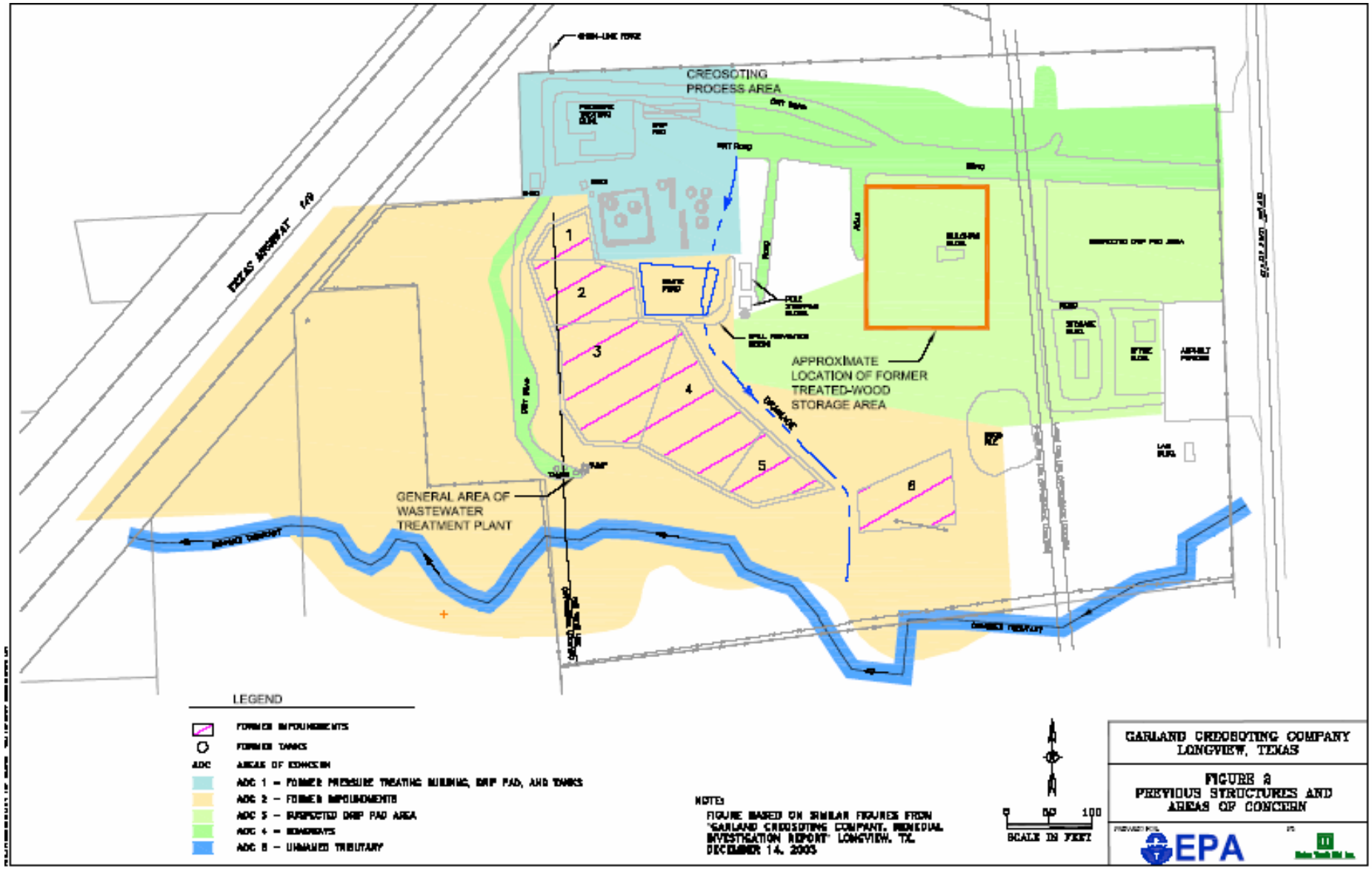

Figure 5-1
Conceptual Site Model – Human Health

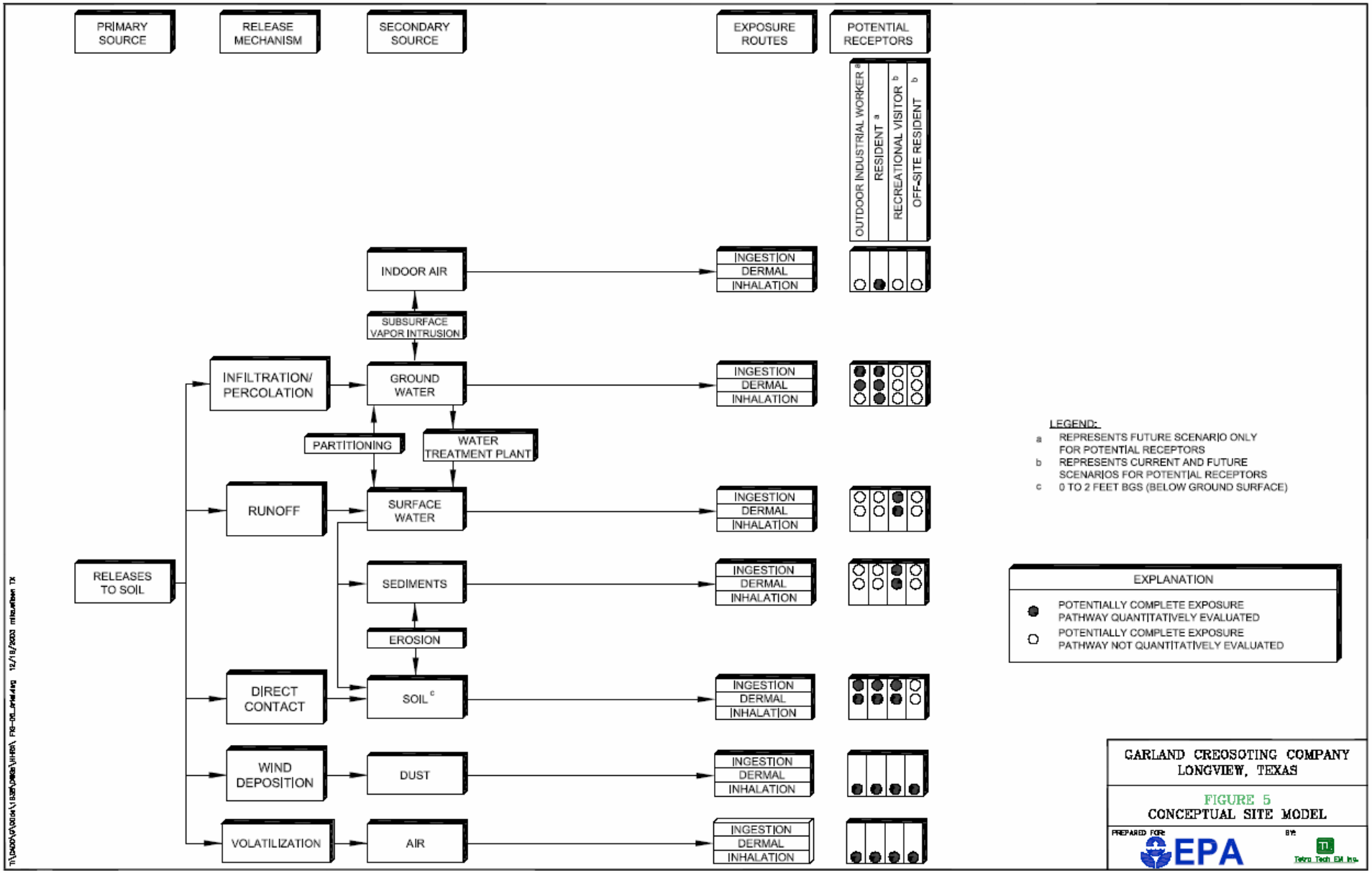

Figure 5-2 Terrestrial Ecosystem Conceptual Site Model

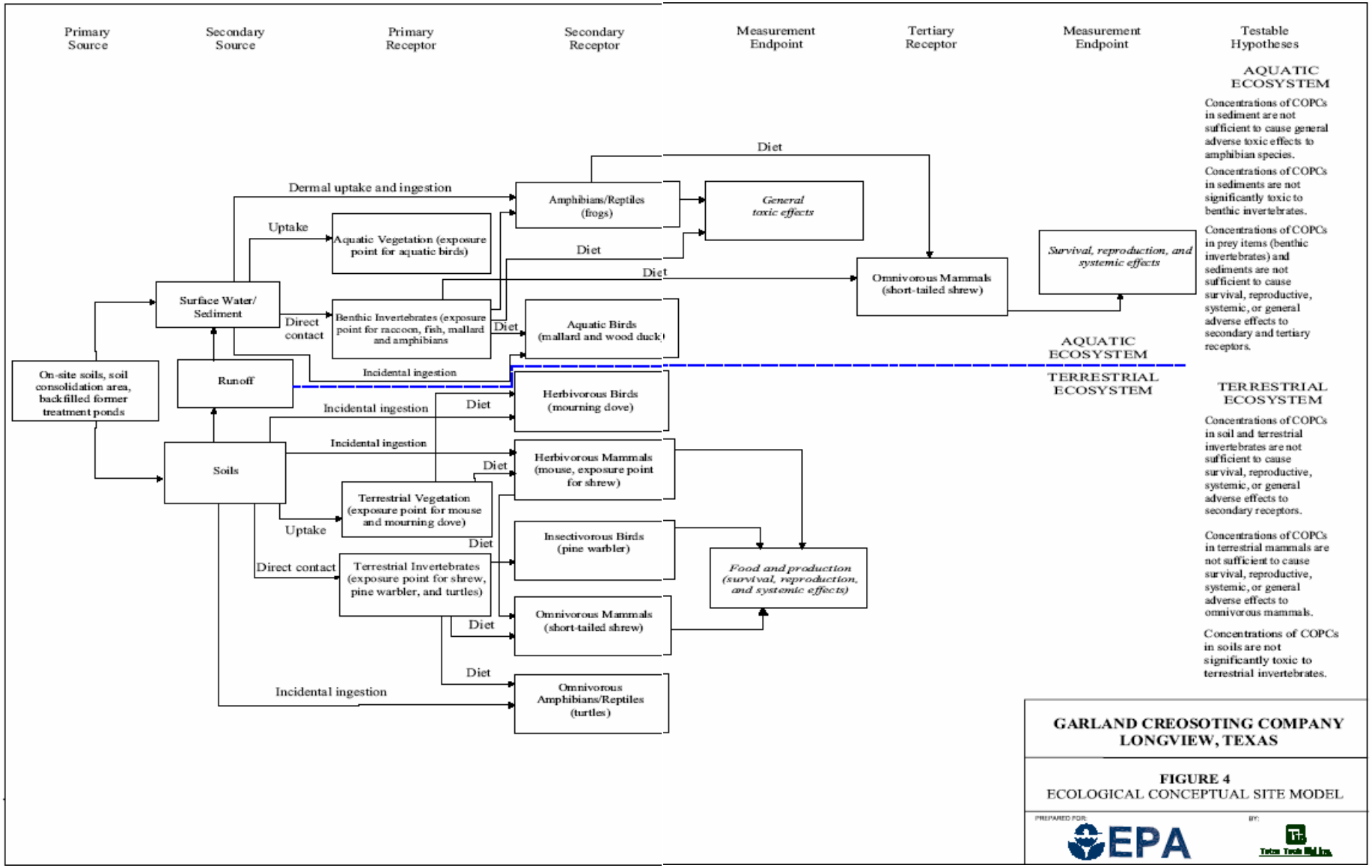

Figure 5-3 Location of Areas of Concern

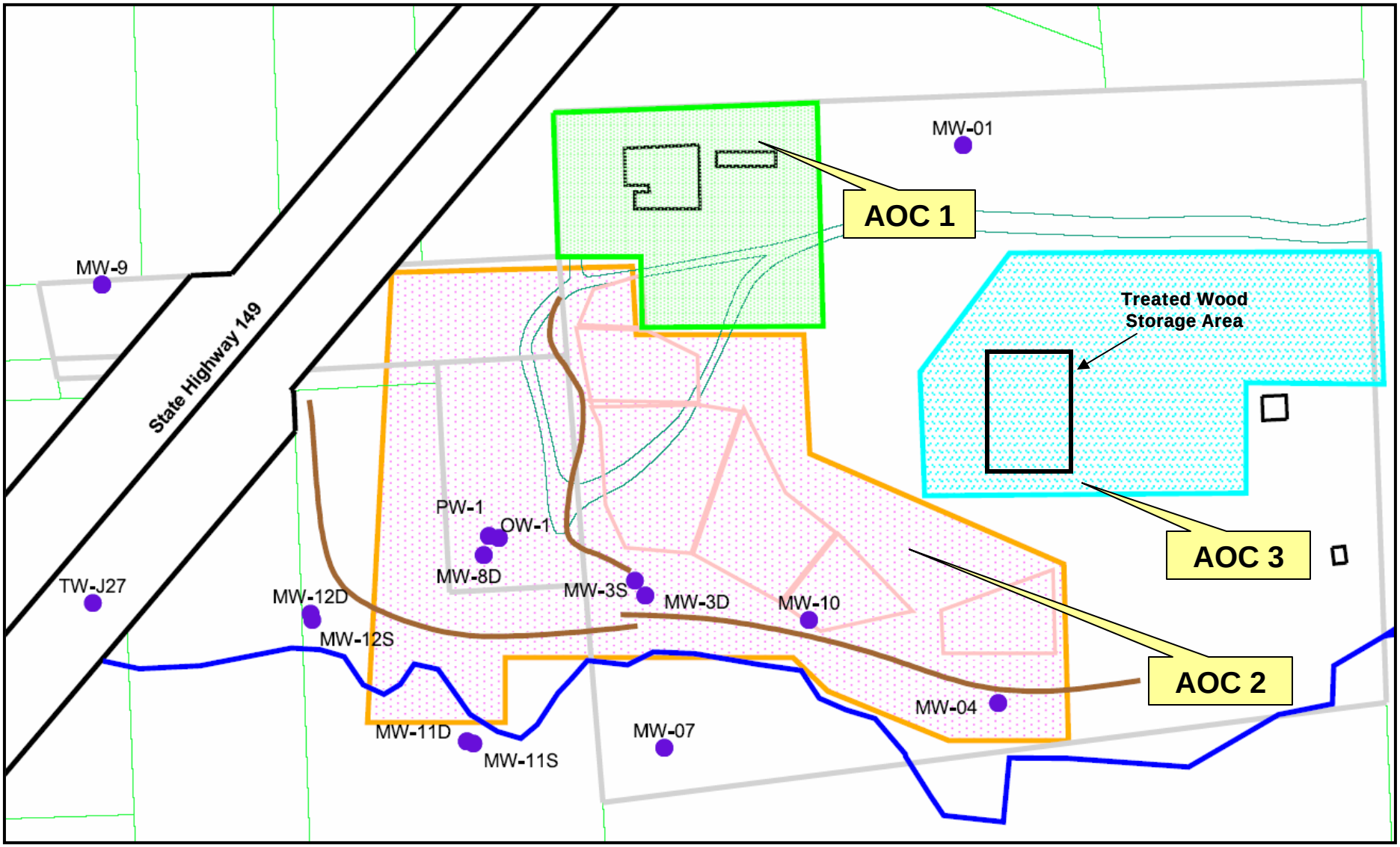

Figure 5-4 Soil Boring and Well Locations

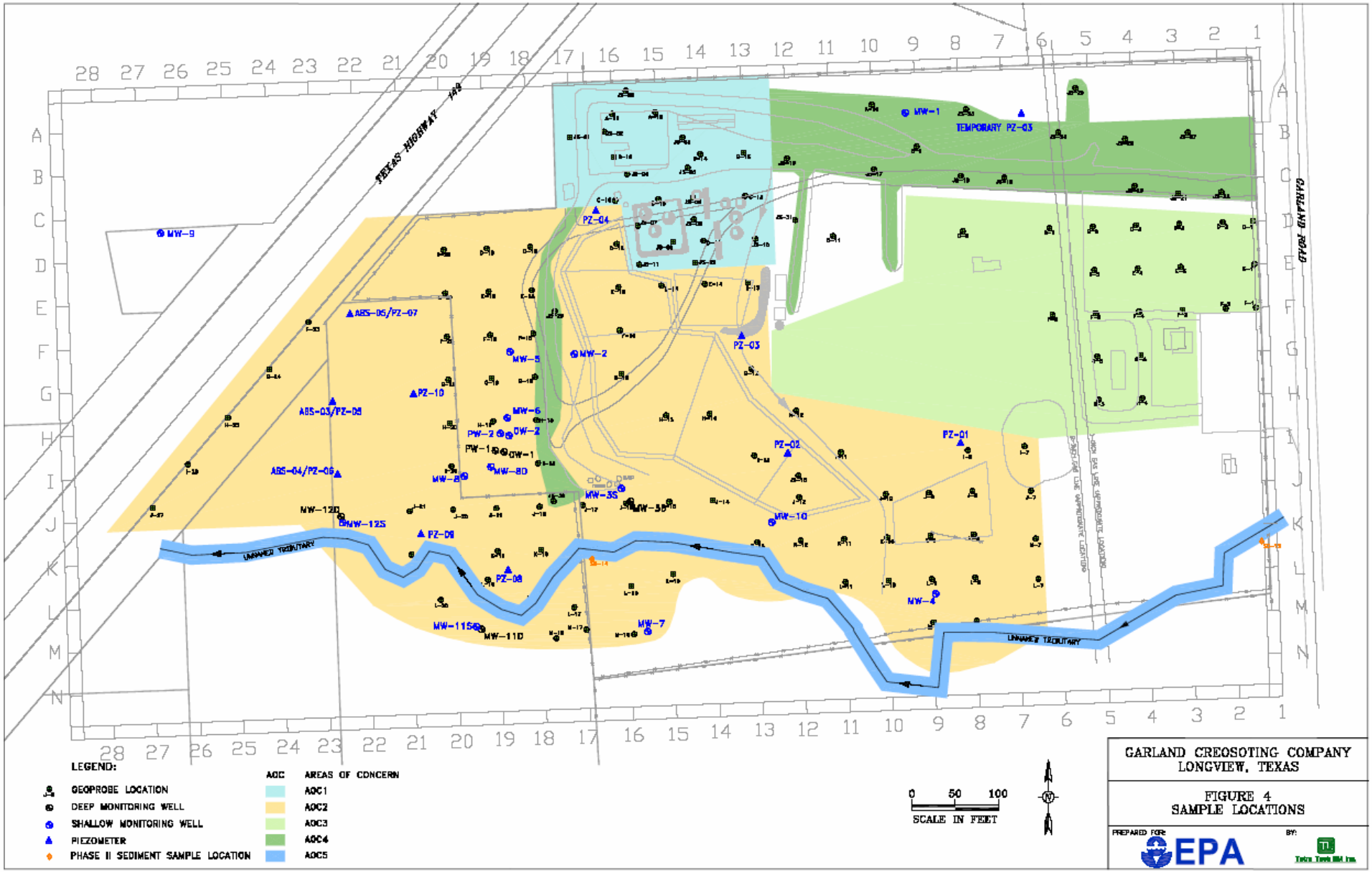

Figure 5-5 - Sediment and Surface Water Sampling Locations

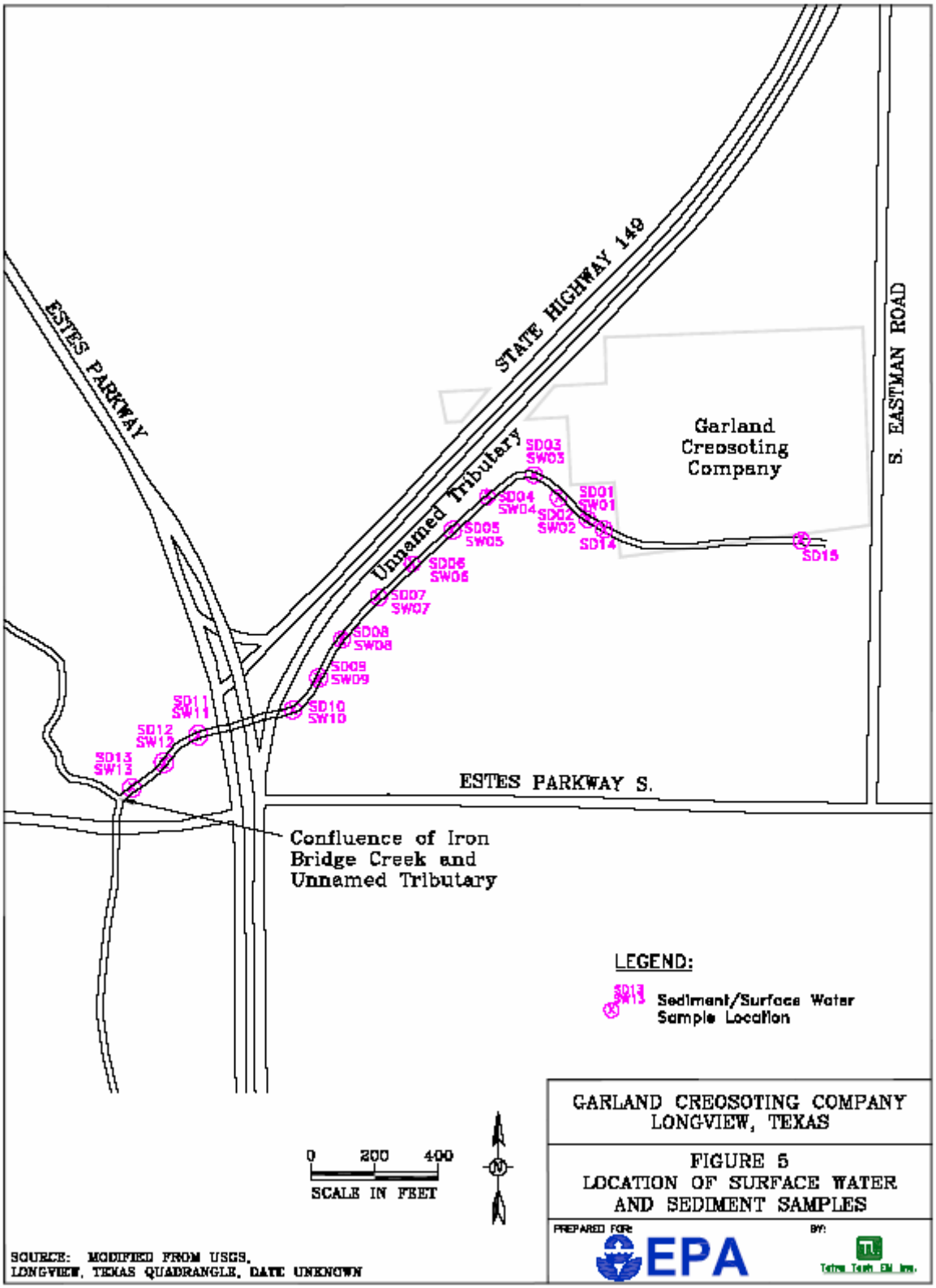

Figure 5-6

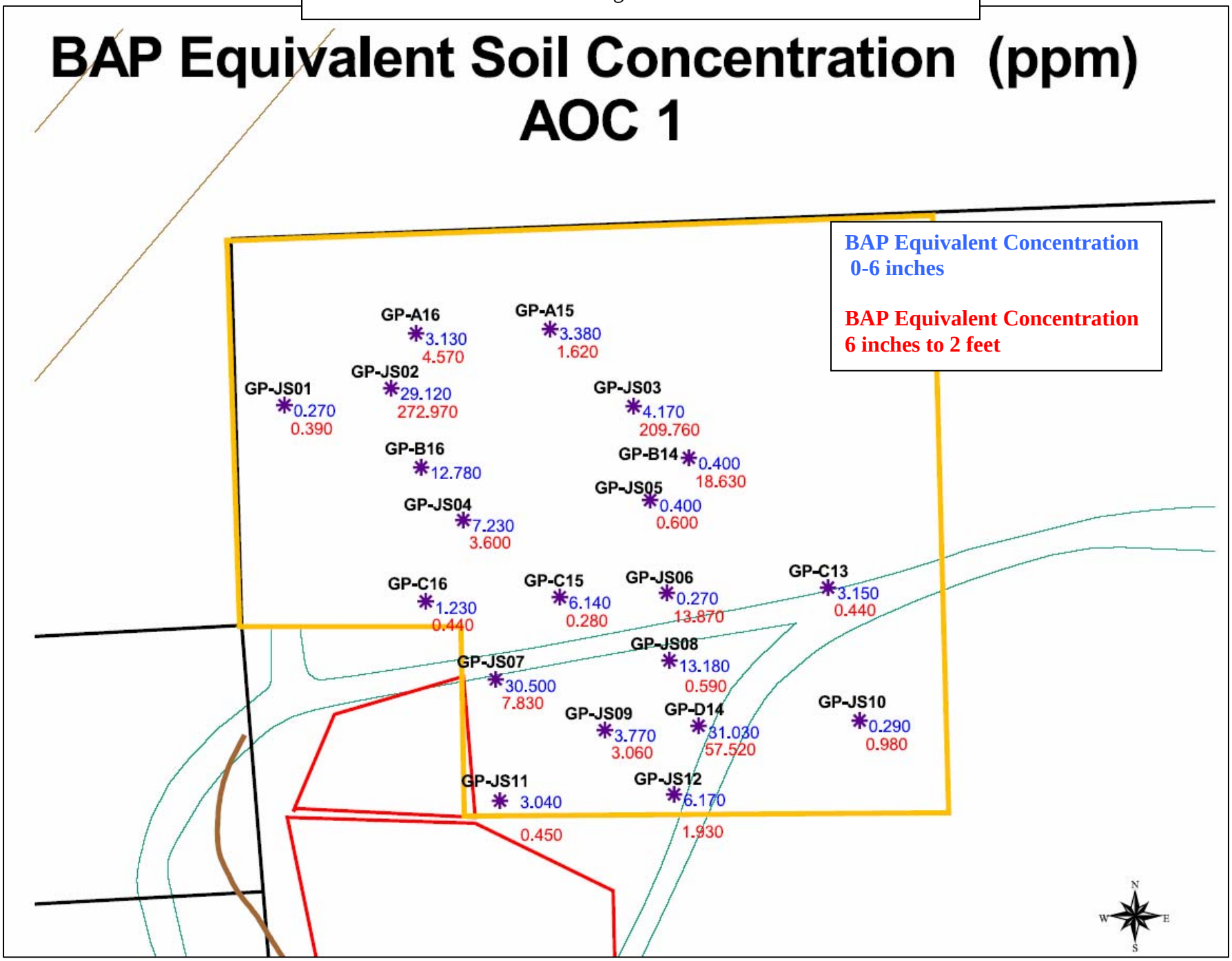
BAP Equivalent Soil Concentration (ppm)
AOC 1
BAP Equivalent Concentration
0-6 inches
BAP Equivalent Concentration
6 inches to 2 feet
GP-A16
3.130
4.570
GP-A15
3.380
1.620
GP-JS02
29.120
272.970
GP-JS01
0.270
0.390
GP-JS03
4.170
209.760
GP-B16
12.780
GP-B14
0.400
18.630
GP-JS05
0.400
0.600
GP-JS04
7.230
3.600
GP-C16
1.230
0.440
GP-C15
6.140
0.280
GP-JS06
0.270
13.870
GP-C13
3.150
0.440
GP-JS08
13.180
0.590
GP-JS07
30.500
7.830
GP-JS09
3.770
3.060
GP-D14
31.030
57.520
GP-JS10
0.290
0.980
GP-JS11
3.040
0.450
GP-JS12
6.170
1.930
N
W
E
S

Figure 5-7

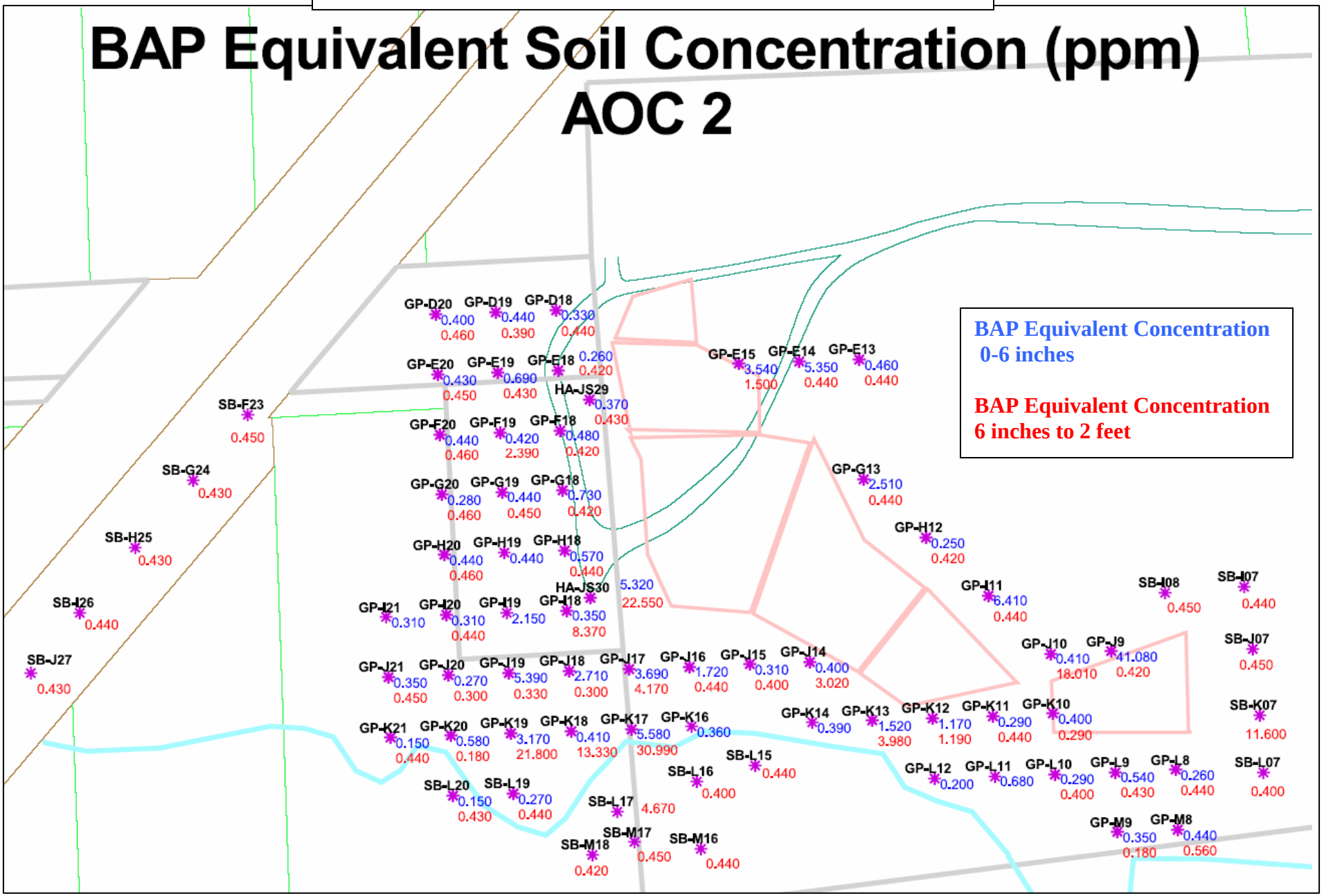
BAP Equivalent Soil Concentration (ppm)
AOC 2
BAP Equivalent Concentration
0-6 inches
BAP Equivalent Concentration
6 inches to 2 feet
GP-D20 0.400 0.460
GP-D19 0.440 0.390
GP-D18 0.330 0.440
GP-E20 0.430 0.450
GP-E19 0.690 0.430
GP-E18 0.260 0.420
GP-E15 3.540 1.500
GP-E14 5.350 0.440
GP-E13 0.460 0.440
HA-JS29 0.370 0.430
SB-F23 0.450
GP-F20 0.440 0.460
GP-F19 0.420 2.390
GP-F18 0.480 0.420
SB-G24 0.430
GP-G20 0.280 0.460
GP-G19 0.440 0.450
GP-G18 0.730 0.420
GP-G13 2.510 0.440
GP-H12 0.250 0.420
SB-H25 0.430
GP-H20 0.440 0.460
GP-H19 0.440
GP-H18 0.570 0.440
HA-JS30 5.320 22.550
SB-I26 0.440
GP-I21 0.310
GP-I20 0.310 0.440
GP-I19 2.150
GP-I18 0.350 8.370
GP-I11 6.410 0.440
SB-I08 0.450
SB-I07 0.440
SB-J27 0.430
GP-J21 0.350 0.450
GP-J20 0.270 0.300
GP-J19 5.390 0.330
GP-J18 2.710 0.300
GP-J17 3.690 4.170
GP-J16 1.720 0.440
GP-J15 0.310 0.400
GP-J14 0.400 3.020
GP-J10 0.410 18.010
GP-J9 41.080 0.420
SB-J07 0.450
GP-K21 0.150 0.440
GP-K20 0.580 0.180
GP-K19 3.170 21.800
GP-K18 0.410 13.330
GP-K17 5.580 30.990
GP-K16 0.360
GP-K14 0.390
GP-K13 1.520 3.980
GP-K12 1.170 1.190
GP-K11 0.290 0.440
GP-K10 0.400 0.290
SB-K07 11.600
SB-L15 0.440
SB-L16 0.400
GP-L12 0.200
GP-L11 0.680
GP-L10 0.290 0.400
GP-L9 0.540 0.430
GP-L8 0.260 0.440
SB-L07 0.400
SB-L20 0.150 0.430
SB-L19 0.270 0.440
SB-L17 4.670
SB-M17 0.450
SB-M16 0.440
SB-M18 0.420
GP-M9 0.350 0.180
GP-M8 0.440 0.560

Figure 5-8

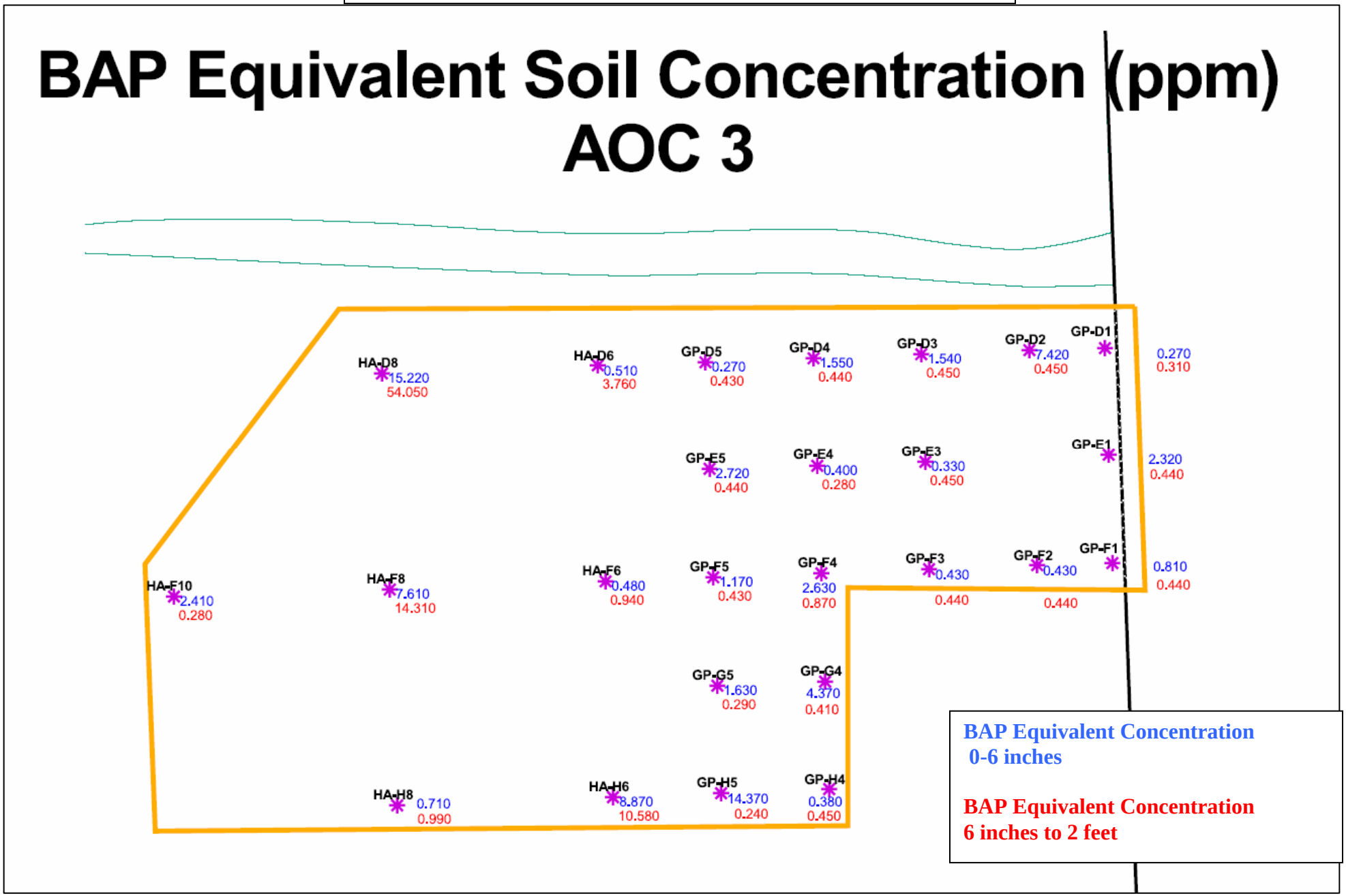
BAP Equivalent Soil Concentration (ppm)
AOC 3
HA-D8
15.220
54.050
HA-D6
0.510
3.760
GP-D5
0.270
0.430
GP-D4
1.550
0.440
GP-D3
1.540
0.450
GP-D2
7.420
0.450
GP-D1
0.270
0.310
GP-E5
2.720
0.440
GP-E4
0.400
0.280
GP-E3
0.330
0.450
GP-E1
2.320
0.440
HA-F10
2.410
0.280
HA-F8
7.610
14.310
HA-F6
0.480
0.940
GP-F5
1.170
0.430
GP-F4
2.630
0.870
GP-F3
0.430
0.440
GP-F2
0.430
0.440
GP-F1
0.810
0.440
GP-G5
1.630
0.290
GP-G4
4.370
0.410
HA-H8
0.710
0.990
HA-H6
8.870
10.580
GP-H5
14.370
0.240
GP-H4
0.380
0.450
BAP Equivalent Concentration
0-6 inches
BAP Equivalent Concentration
6 inches to 2 feet

Figure 5-9 – Pre-ICT Distribution of DNAPL and Naphthalene in the Shallow Water Bearing Zone

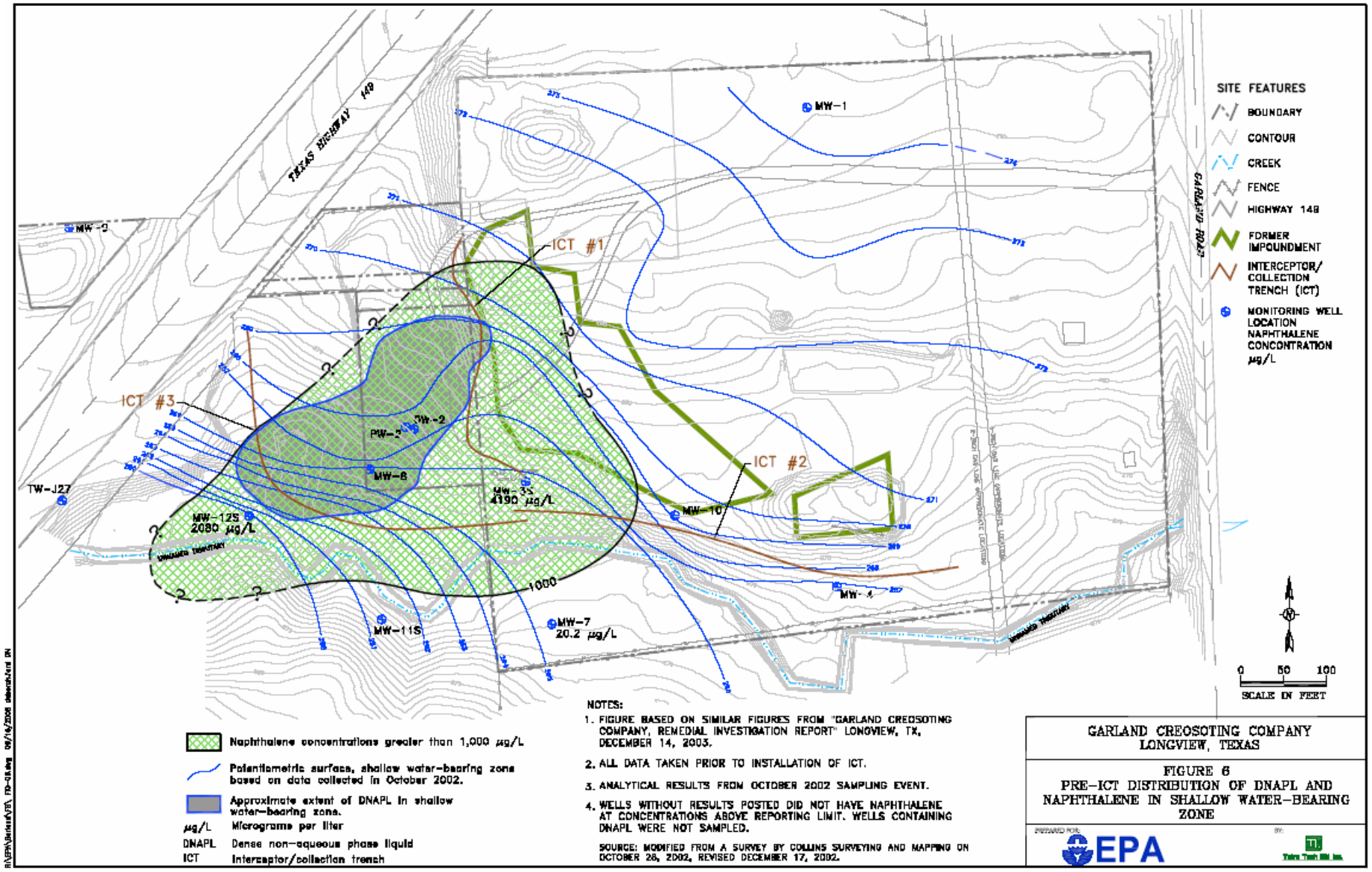

Figure 5-10 – Pre-ICT Distribution of DNAPL and Vinyl Chloride in the Shallow Water Bearing Zone

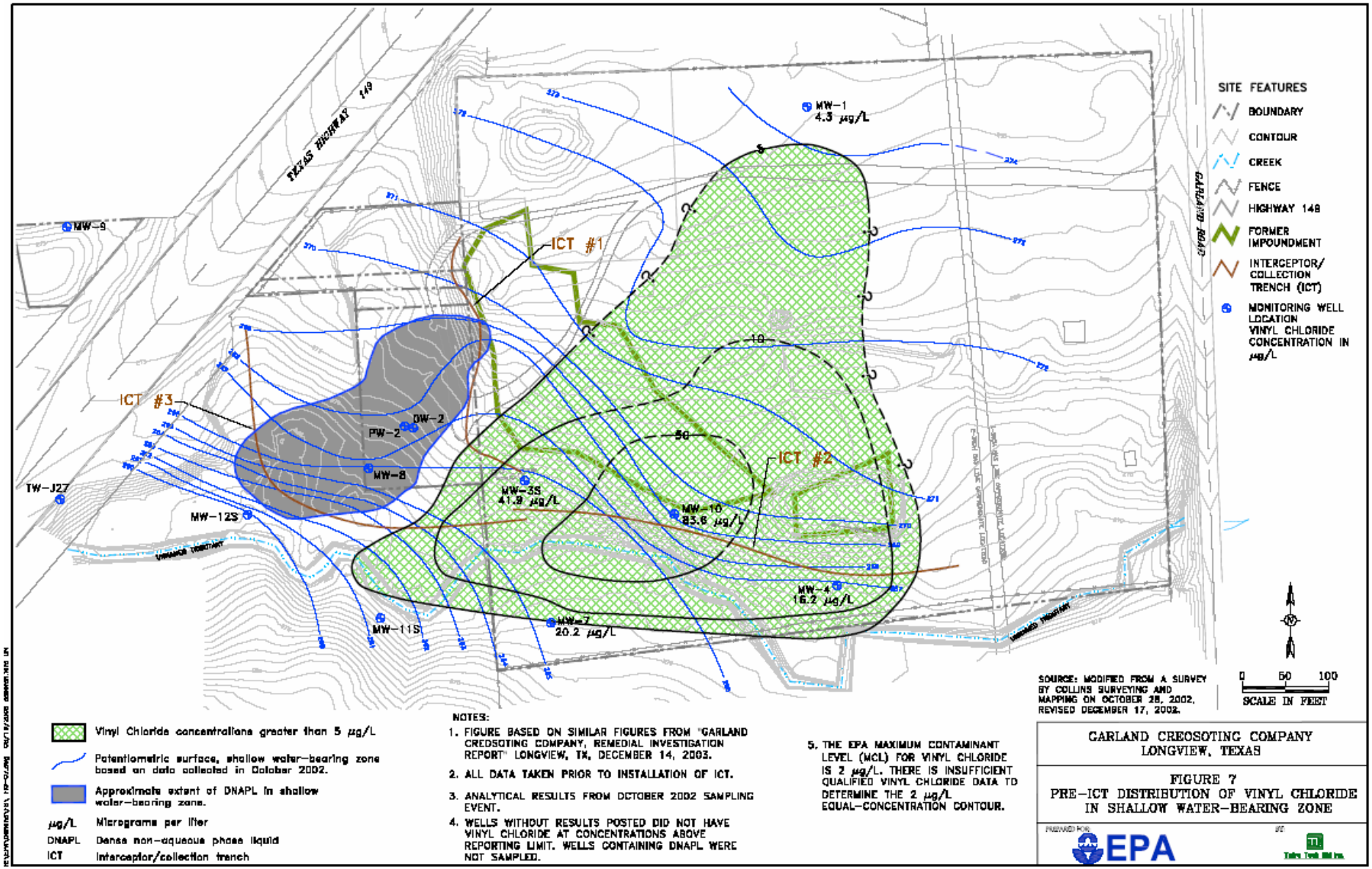

Figure 6-1 – Anticipated Future Land Use

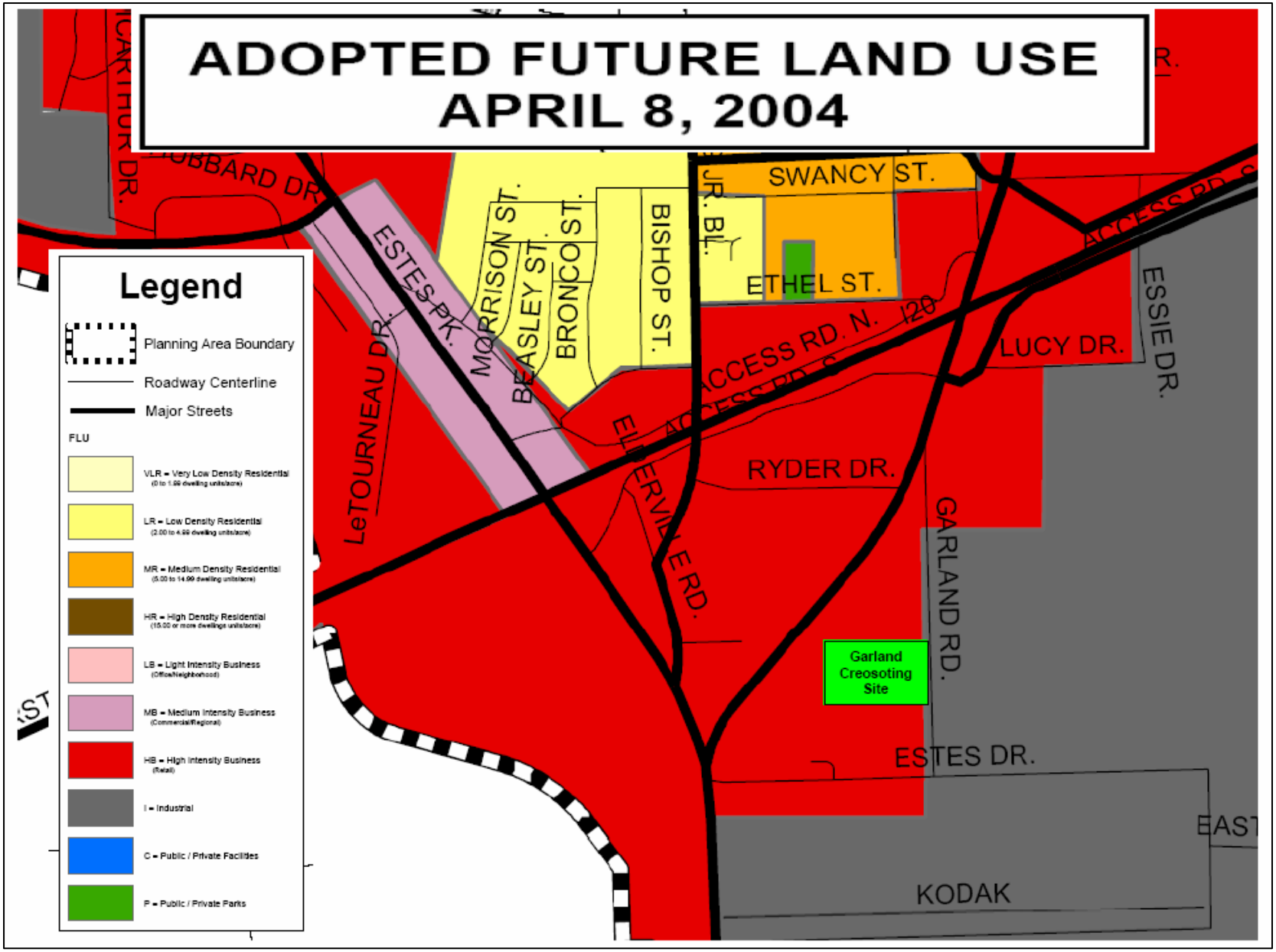

Figure 8-1
Horizontal Extent of TI Zone

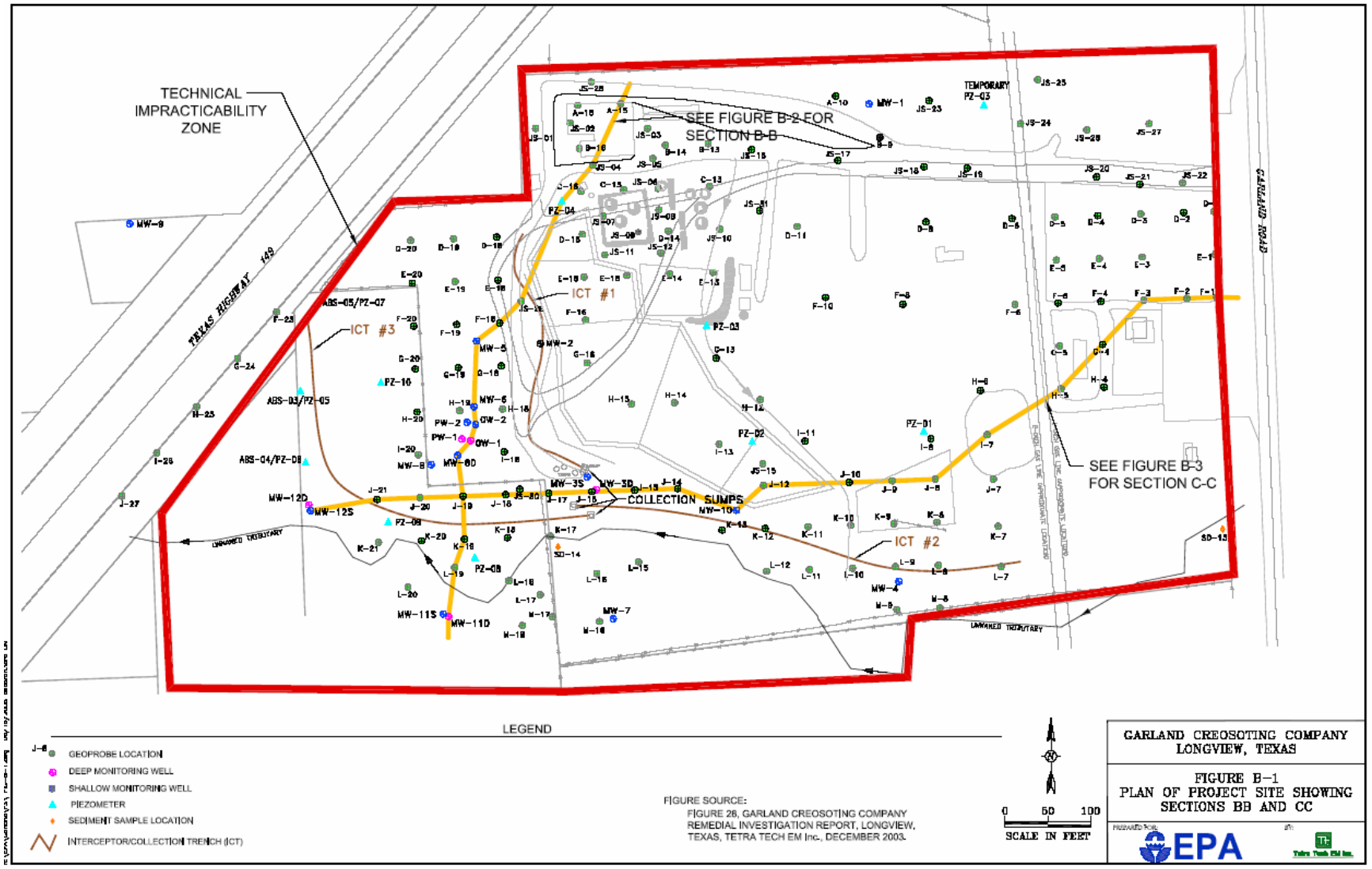

Figure 8-2

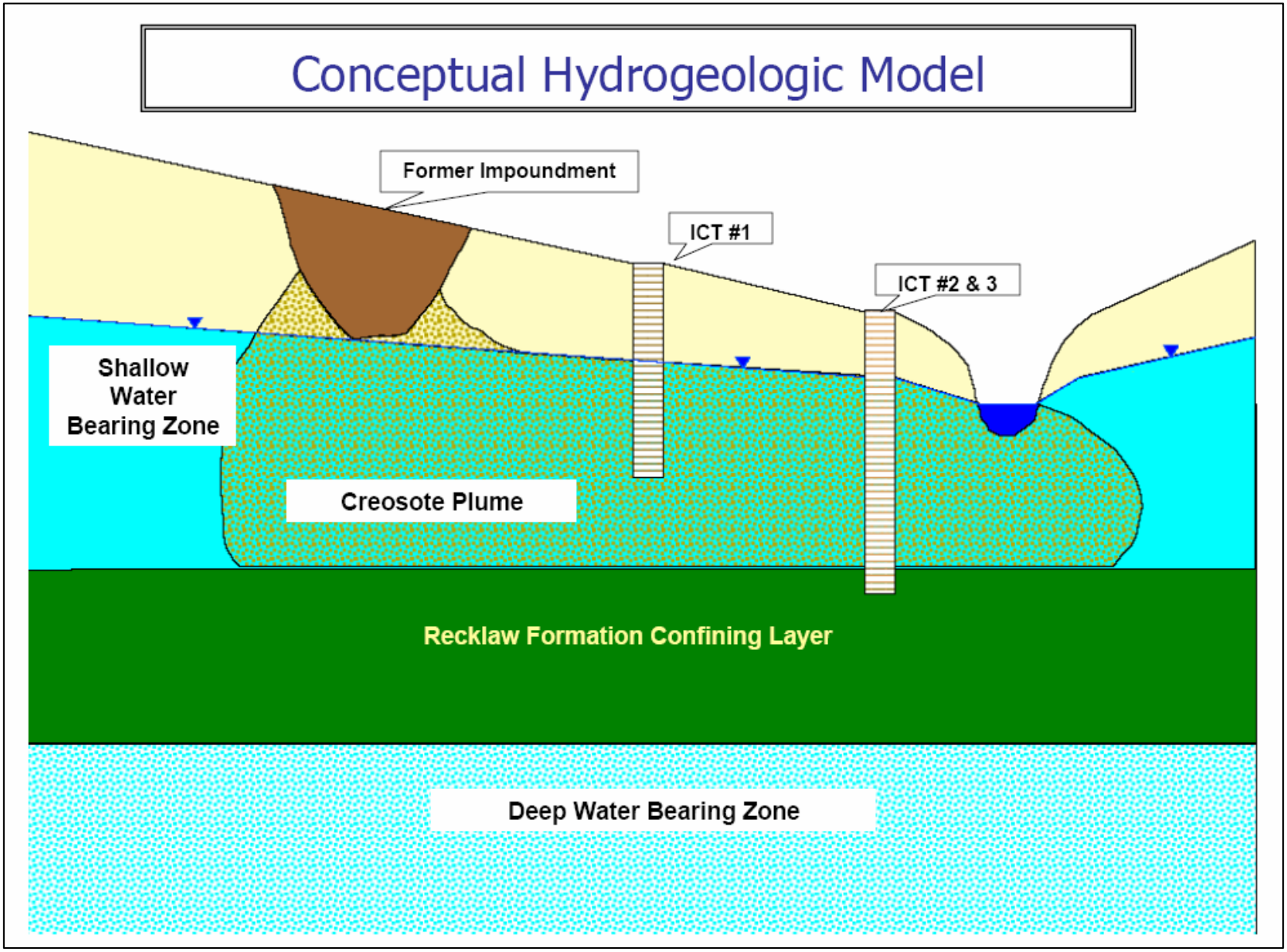
Conceptual Hydrogeologic Model
Former Impoundment
ICT #1
ICT #2 & 3
Shallow Water Bearing Zone
Creosote Plume
Recklaw Formation Confining Layer
Deep Water Bearing Zone

Table 7-1
Chemicals of Concern – All Areas of Concern

Summary of Chemicals of Concern
Medium Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Soil (0-2 feet bgs)
Exposure Medium: Surface Soil
Exposure Point: Outdoor Air – All Areas of Concern

Chemical of Concern	Concentration Detected		Units	Frequency of Detection	RME		Central Tendency	
	Min	Max			Exposure Point Concentration	Statistical Measure	Exposure Point Concentration	Statistical Measure
2-METHYLNAPHTHALENE	0.04	600	mg/kg	54 / 283	10.1	95% UCL-ST	10.1	95% UCL-ST
ACENAPTHENE	0.04	1100	mg/kg	82 / 283	22.8	95% UCL-ST	22.8	95% UCL-ST
ACENAPTHYLENE	0.04	11	mg/kg	75 / 283	3.1	95% UCL-ST	3.1	95% UCL-ST
ACETOPHENONE	0.04	1.9	mg/kg	21 / 283	1.9	Max	1.9	Max
ANTHRACENE	0.04	1900	mg/kg	169 / 283	57	95% UCL-CNP	57	95% UCL-CNP
BENZO(A)ANTHRACENE	0.004	597	mg/kg	193 / 283	20.4	95% UCL-CNP	20.4	95% UCL-CNP
BENZO(A)PYRENE	0.006	206	mg/kg	188 / 283	7.4	95% UCL-CNP	7.4	95% UCL-CNP
BENZO(B)FLUORANTHENE	0.008	307	mg/kg	212 / 283	11.5	95% UCL-CNP	11.5	95% UCL-CNP
BENZO(G,H,I)PERYLENE	0.009	46.9	mg/kg	163 / 283	2.5	95% UCL-CNP	2.5	95% UCL-CNP
BENZO(K)FLUORANTHENE	0.005	137	mg/kg	201/ 284	5.8	95% UCL-CNP	5.8	95% UCL-CNP
CARBAZOLE	0.04	1200	mg/kg	140 / 283	16.6	95% UCL-ST	16.6	95% UCL-ST
CHRYSENE	0.005	753	mg/kg	214 / 283	25.3	95% UCL-CNP	25.3	95% UCL-CNP
DIBENZO(A,H)ANTHRACENE	0.04	18	mg/kg	128 / 283	1.2	95% UCL-ST	1.2	95% UCL-ST
DIBENZOFURAN	0.04	700	mg/kg	76 / 283	13.3	95% UCL-ST	13.3	95% UCL-ST
FLUROANTHENE	0.01	3120	mg/kg	212 / 283	111	95% UCL-CNP	111	95% UCL-CNP
FLUROENE	0.04	1100	mg/kg	94 / 283	18.2	95% UCL-ST	18.2	95% UCL-ST
INDENO(1,2,3-CD)PYRENE	0.02	56.2	mg/kg	188 / 283	2.8	95% UCL-CNP	2.8	95% UCL-CNP
NAPHTHALENE	0.04	3500	mg/kg	79 / 283	48.7	95% UCL-ST	48.7	95% UCL-ST
PHENANTHRENE	0.03	4400	mg/kg	149 / 284	133	95% UCL-CNP	133	95% UCL-CNP
PYRENE	0.009	3390	mg/kg	213 / 283	99.6	95% UCL-CNP	99.6	95% UCL-CNP
ARSENIC	0.5	13.6	mg/kg	148 / 276	2.8	95% UCL-CNP	2.8	95% UCL-CNP
IRON	33.4	49100	mg/kg	276 / 276	12000	95% UCL-CNP	12000	95% UCL-CNP
THALLIUM	0.8	6.8	mg/kg	37 / 276	1	95% UCL-ST	1	95% UCL-ST

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-2
Chemicals of Concern – Hot Spots JS02/JS03 Area of Concern 1

Summary of Chemicals of Concern
Medium Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Soil (0-2 feet bgs)
Exposure Medium: Surface Soil
Exposure Point: Area of Concern 1 - Hot Spots JS02/JS03

Chemical of Concern	Concentration Detected		Units	Frequency of Detection	RME		Central Tendency	
	Min	Max			Exposure Point Concentration	Statistical Measure	Exposure Point Concentration	Statistical Measure
2-METHYLNAPHTHALENE	57	600	mg/kg	4 / 5	600	Max	600	Max
ACENAPTHENE	340	1100	mg/kg	4 / 5	1100	Max	1100	Max
ACENAPTHYLENE	0.009	11	mg/kg	4 / 5	11	Max	11	Max
ANTHRACENE	3.4	1900	mg/kg	5 / 5	1900	Max	1900	Max
BENZO(A)ANTHRACENE	3	597	mg/kg	5 / 5	597	Max	597	Max
BENZO(A)PYRENE	2.6	206	mg/kg	5 / 5	206	Max	206	Max
BENZO(B)FLUORANTHENE	5.4	307	mg/kg	5 / 5	307	Max	307	Max
BENZO(K)FLUORANTHENE	2.6	137	mg/kg	5 / 5	137	Max	137	Max
CARBAZOLE	0.3	1200	mg/kg	5 / 5	1200	Max	1200	Max
CHRYSENE	6.8	753	mg/kg	5 / 5	753	Max	753	Max
DIBENZO(A,H)ANTHRACENE	0.5	18	mg/kg	3 / 5	18	Max	18	Max
DIBENZOFURAN	77	700	mg/kg	4 / 5	700	Max	700	Max
FLUROANTHENE	1.9	3120	mg/kg	5 / 5	3120	Max	3120	Max
FLUROENE	0.07	1100	mg/kg	5 / 5	1100	Max	1100	Max
INDENO(1,2,3-CD)PYRENE	1.8	56.2	mg/kg	5 / 5	56.2	Max	56.2	Max
NAPHTHALENE	0.05	3500	mg/kg	5 / 5	3500	Max	3500	Max
PHENANTHRENE	0.1	4400	mg/kg	5 / 5	4400	Max	4400	Max
PYRENE	3.4	3390	mg/kg	5 / 5	3390	Max	3390	Max
ARSENIC	7.2	7.2	mg/kg	1 / 5	7.2	Max	7.2	Max

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-3
Chemicals of Concern –Area of Concern 1

Summary of Chemicals of Concern
Medium Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Soil (0-2 feet bgs)
Exposure Medium: Surface Soil
Exposure Point: Area of Concern 1

Chemical of Concern	Concentration Detected		Units	Frequency of Detection	RME		Central Tendency	
	Min	Max			Exposure Point Concentration	Statistical Measure	Exposure Point Concentration	Statistical Measure
2-METHYLNAPHTHALENE	0.1	600	mg/kg	17 / 42	54.7	95% UCL-ST	54.7	95% UCL-ST
ACENAPTHENE	0.04	1100	mg/kg	24 / 42	250	95% UCL-CNP	250	95% UCL-CNP
ACENAPTHYLENE	0.07	110	mg/kg	20 / 42	11	Max	11	Max
ANTHRACENE	0.04	1900	mg/kg	35 / 42	438	95% UCL-C	438	95% UCL-C
BENZO(A)ANTHRACENE	0.04	597	mg/kg	35 / 42	119	95% UCL-C	119	95% UCL-C
BENZO(A)PYRENE	0.06	206	mg/kg	35 / 42	32.7	95% UCL-C	32.7	95% UCL-C
BENZO(B)FLUORANTHENE	0.07	307	mg/kg	36 / 42	103	95% UCL-LM	103	95% UCL-LM
BENZO(G,H,I)PERYLENE	0.04	47	mg/kg	28 / 42	10.4	95% UCL-C	10.4	95% UCL-C
BENZO(K)FLUORANTHENE	0.08	137	mg/kg	35 / 42	29.7	95% UCL-C	29.7	95% UCL-C
CARBAZOLE	0.07	1200	mg/kg	31 / 42	183	95% UCL-CNP	183	95% UCL-CNP
CHRYSENE	0.04	753	mg/kg	37 / 42	388	95% UCL-LM	388	95% UCL-LM
DIBENZO(A,H)ANTHRACENE	0.05	18	mg/kg	25 / 42	7.82	95% UCL-CNP	7.82	95% UCL-CNP
DIBENZOFURAN	0.04	700	mg/kg	22 / 42	122	95% UCL-CNP	122	95% UCL-CNP
FLUROANTHENE	0.04	3120	mg/kg	39 / 42	3120	Max	3120	Max
FLUROENE	0.04	1100	mg/kg	28 / 42	176	95% UCL-CNP	176	95% UCL-CNP
INDENO(1,2,3-CD)PYRENE	0.04	56	mg/kg	33 / 42	13	95% UCL-C	13	95% UCL-C
NAPHTHALENE	0.04	3500	mg/kg	29 / 42	521	95% UCL-CNP	521	95% UCL-CNP
PHENANTHRENE	0.05	4400	mg/kg	33 / 42	764	95% UCL-CNP	764	95% UCL-CNP
PYRENE	0.04	3390	mg/kg	40 / 42	3390	Max	3390	Max
ARSENIC	2.8	7.8	mg/kg	18 / 41	3.66	95% UCL-ST	3.66	95% UCL-ST
IRON	6650	33600	mg/kg	41 / 41	18000	95% UCL-ST	18000	95% UCL-ST
THALLIUM	1.2	6.8	mg/kg	11 / 41	2.17	95% UCL-ST	2.17	95% UCL-ST

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-4
Chemicals of Concern – Area of Concern 2

Summary of Chemicals of Concern
Medium Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Soil (0-2 feet bgs)
Exposure Medium: Surface Soil
Exposure Point: Area of Concern 2

Chemical of Concern	Concentration Detected		Units	Frequency of Detection	RME		Central Tendency	
	Min	Max			Exposure Point Concentration	Statistical Measure	Exposure Point Concentration	Statistical Measure
2-METHYLNAPHTHALENE	0.04	34	mg/kg	19 / 106	1.84	95% UCL-ST	1.84	95% UCL-ST
ACENAPTHENE	0.04	430	mg/kg	38 / 106	13.5	95% UCL-ST	13.5	95% UCL-ST
ACENAPTHYLENE	0.04	5	mg/kg	26 / 106	0.84	95% UCL-ST	0.84	95% UCL-ST
ANTHRACENE	0.04	70	mg/kg	68 / 106	6.45	95% UCL-CNP	6.45	95% UCL-CNP
BENZO(A)ANTHRACENE	0.04	58	mg/kg	73 / 106	5.84	95% UCL-CNP	5.84	95% UCL-CNP
BENZO(A)PYRENE	0.01	27	mg/kg	69 / 106	2.9	95% UCL-CNP	2.9	95% UCL-CNP
BENZO(B)FLUORANTHENE	0.01	46	mg/kg	78 / 106	5.4	95% UCL-CNP	5.4	95% UCL-CNP
BENZO(G,H,I)PERYLENE	0.01	10	mg/kg	62 / 106	1.4	95% UCL-CNP	1.4	95% UCL-CNP
BENZO(K)FLUORANTHENE	0.01	22	mg/kg	73 / 106	3.1	95% UCL-CNP	3.1	95% UCL-CNP
CARBAZOLE	0.04	26	mg/kg	40 / 106	1.1	95% UCL-ST	1.1	95% UCL-ST
CHRYSENE	0.01	62	mg/kg	79 / 106	6.9	95% UCL-CNP	6.9	95% UCL-CNP
DIBENZO(A,H)ANTHRACENE	0.04	5.1	mg/kg	48 / 106	0.58	95% UCL-ST	0.58	95% UCL-ST
DIBENZOFURAN	0.04	700	mg/kg	31 / 106	6.99	95% UCL-ST	6.99	95% UCL-ST
FLUROANTHENE	0.01	670	mg/kg	73 / 106	48.6	95% UCL-CNP	48.6	95% UCL-CNP
FLUROENE	0.04	250	mg/kg	41 / 106	8.2	95% UCL-ST	8.2	95% UCL-ST
INDENO(1,2,3-CD)PYRENE	0.02	14	mg/kg	68 / 106	1.8	95% UCL-CNP	1.8	95% UCL-CNP
NAPHTHALENE	0.04	39.9	mg/kg	37 / 106	2.23	95% UCL-ST	2.23	95% UCL-ST
PHENANTHRENE	0.04	990	mg/kg	51 / 106	34.9	95% UCL-ST	34.9	95% UCL-ST
PYRENE	0.01	420	mg/kg	72 / 106	31.9	95% UCL-CNP	31.9	95% UCL-CNP
ARSENIC	0.05	8.2	mg/kg	34 / 68	2.92	95% UCL-CNP	2.92	95% UCL-CNP
IRON	1580	39400	mg/kg	68 / 68	11400	95% UCL-CNP	11400	95% UCL-CNP

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-5
Chemicals of Concern – Area of Concern 3

Summary of Chemicals of Concern
Medium Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Soil (0-2 feet bgs)
Exposure Medium: Surface Soil
Exposure Point: Area of Concern 3

Chemical of Concern	Concentration Detected		Units	Frequency of Detection	RME		Central Tendency	
	Min	Max			Exposure Point Concentration	Statistical Measure	Exposure Point Concentration	Statistical Measure
2-METHYLNAPHTHALENE	0.09	210	mg/kg	6 / 58	12.1	95% UCL-ST	12.1	95% UCL-ST
ACENAPTHENE	0.05	330	mg/kg	11 / 58	18.6	95% UCL-ST	18.6	95% UCL-ST
ACENAPTHYLENE	0.04	2.9	mg/kg	18 / 58	1.3	95% UCL-ST	1.3	95% UCL-ST
ACETOPHENONE	0.04	1.9	mg/kg	8 / 58	1.1	95% UCL-ST	1.1	95% UCL-ST
ANTHRACENE	0.04	340	mg/kg	33 / 58	38.7	95% UCL-CNP	38.7	95% UCL-CNP
BENZO(A)ANTHRACENE	0.04	120	mg/kg	36 / 58	15.3	95% UCL-CNP	15.3	95% UCL-CNP
BENZO(A)PYRENE	0.04	32	mg/kg	39 / 58	4.5	95% UCL-C	4.5	95% UCL-C
BENZO(B)FLUORANTHENE	0.04	46	mg/kg	44 / 58	8.5	95% UCL-CNP	8.5	95% UCL-CNP
BENZO(G,H,I)PERYLENE	0.05	7.3	mg/kg	38 / 58	1.5	95% UCL-C	1.5	95% UCL-C
BENZO(K)FLUORANTHENE	0.04	37	mg/kg	41 / 58	6.5	95% UCL-CNP	6.5	95% UCL-CNP
CARBAZOLE	0.04	220	mg/kg	33 / 58	24.4	95% UCL-CNP	24.4	95% UCL-CNP
CHRYSENE	0.04	150	mg/kg	45 / 58	15.1	95% UCL-C	15.1	95% UCL-C
DIBENZO(A,H)ANTHRACENE	0.04	4	mg/kg	27 / 58	0.8	95% UCL-ST	0.8	95% UCL-ST
DIBENZOFURAN	0.08	210	mg/kg	9 / 58	12	95% UCL-ST	12	95% UCL-ST
FLUROANTHENE	0.04	660	mg/kg	46 / 58	79.2	95% UCL-CNP	79.2	95% UCL-CNP
FLUROENE	0.05	250	mg/kg	11 / 58	14.2	95% UCL-ST	14.2	95% UCL-ST
INDENO(1,2,3-CD)PYRENE	0.05	9.3	mg/kg	39 / 58	2.3	95% UCL-C	2.	95% UCL-C
NAPHTHALENE	0.1	1200	mg/kg	6 / 58	65.8	95% UCL-ST	65.8	95% UCL-ST
PHENANTHRENE	0.04	970	mg/kg	31 / 58	107	95% UCL-CNP	107	95% UCL-CNP
PYRENE	0.04	450	mg/kg	46 / 58	56.5	95% UCL-CNP	56.5	95% UCL-CNP
ARSENIC	0.6	13.6	mg/kg	29 / 58	2.9	95% UCL-C	2.9	95% UCL-C
IRON	670	34600	mg/kg	58 / 58	10800	95% UCL-LM	10800	95% UCL-LM

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-6
Chemicals of Concern – Area of Concern 4

Summary of Chemicals of Concern Medium Specific Exposure Point Concentrations								
Scenario Timeframe: Current/Future **Medium: Soil (0-2 feet bgs)** **Exposure Medium: Surface Soil** **Exposure Point: Area of Concern 4**								
Chemical of Concern	**Concentration Detected**		**Units**	**Frequency of Detection**	**RME**		**Central Tendency**	
	Min	**Max**			**Exposure Point Concentration**	**Statistical Measure**	**Exposure Point Concentration**	**Statistical Measure**
2-METHYLNAPHTHALENE	0.05	4.8	mg/kg	10 / 52	0.84	95% UCL-ST	0.84	95% UCL-ST
ACENAPTHENE	0.05	34	mg/kg	13 / 52	3	95% UCL-ST	3	95% UCL-ST
ACENAPTHYLENE	0.04	3	mg/kg	15 / 52	1.22	95% UCL-ST	1.22	95% UCL-ST
ANTHRACENE	0.07	40	mg/kg	35 / 52	6.5	95% UCL-CNP	6.5	95% UCL-CNP
BENZO(A)ANTHRACENE	0.03	22	mg/kg	41 / 52	5.3	95% UCL-CNP	5.3	95% UCL-CNP
BENZO(A)PYRENE	0.04	9	mg/kg	41 / 52	2.3	95% UCL-CNP	2.3	95% UCL-CNP
BENZO(B)FLUORANTHENE	0.06	12	mg/kg	46 / 52	4.7	95% UCL-CNP	4.7	95% UCL-CNP
BENZO(G,H,I)PERYLENE	0.03	4.1	mg/kg	32 / 52	1.4	95% UCL-CNP	1.4	95% UCL-CNP
BENZO(K)FLUORANTHENE	0.05	8.6	mg/kg	45 / 52	3	95% UCL-CNP	3	95% UCL-CNP
CARBAZOLE	0.05	220	mg/kg	32 / 52	1.7	95% UCL-CNP	1.7	95% UCL-CNP
CHRYSENE	0.04	32	mg/kg	45 / 52	11	95% UCL-LM	11	95% UCL-LM
DIBENZO(A,H)ANTHRACENE	0.04	1.8	mg/kg	31 / 52	0.78	95% UCL-C	0.78	95% UCL-C
DIBENZOFURAN	0.08	700	mg/kg	12 / 52	1.6	95% UCL-ST	1.6	95% UCL-ST
FLUROANTHENE	0.04	82	mg/kg	47 / 52	19.7	95% UCL-CNP	19.7	95% UCL-CNP
FLUROENE	0.07	36	mg/kg	15 / 52	3.1	95% UCL-ST	3.1	95% UCL-ST
INDENO(1,2,3-CD)PYRENE	0.04	8.2	mg/kg	41 / 52	1.7	95% UCL-C	1.7	95% UCL-C
NAPHTHALENE	0.04	3.5	mg/kg	9 / 52	0.85	95% UCL-ST	0.85	95% UCL-ST
PHENANTHRENE	0.04	69	mg/kg	30 / 52	15.5	95% UCL-CNP	15.5	95% UCL-CNP
PYRENE	0.04	77	mg/kg	47 / 52	23.6	95% UCL-LM	23.6	95% UCL-LM
ARSENIC	0.7	8.5	mg/kg	25 / 52	2.6	95% UCL-ST	2.6	95% UCL-ST
IRON	600	38200	mg/kg	52 / 52	14400	95% UCL-LM	14400	95% UCL-LM

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-7
Chemicals of Concern – Sediment Area of Concern 5

Summary of Chemicals of Concern Medium Specific Exposure Point Concentrations								
Scenario Timeframe: Current/Future **Medium: Sediment (0-0.5 feet bgs)** **Exposure Medium: Sediment** **Exposure Point: Unnamed Tributary – Area of Concern 5**								
Chemical of Concern	**Concentration Detected**		**Units**	**Frequency of Detection**	**RME**		**Central Tendency**	
	Min	**Max**			**Exposure Point Concentration**	**Statistical Measure**	**Exposure Point Concentration**	**Statistical Measure**
2-METHYLNAPHTHALENE	0.02	3.2	mg/kg	13 / 15	3.2	Max	3.2	Max
ACENAPTHENE	0.1	5.7	mg/kg	14 / 15	5.7	Max	5.7	Max
ACENAPTHYLENE	0.005	0.07	mg/kg	9 / 15	0.07	Max	0.07	Max
ANTHRACENE	0.007	1.1	mg/kg	15 / 15	1.1	Max	1.1	Max
BENZO(A)ANTHRACENE	0.01	2.4	mg/kg	15 / 15	2.4	Max	2.4	Max
BENZO(A)PYRENE	0.01	0.9	mg/kg	15 / 15	0.9	Max	0.9	Max
BENZO(B)FLUORANTHENE	0.02	1.3	mg/kg	15 / 15	1.05	95% UCL-LM	1.05	95% UCL-LM
BENZO(G,H,I)PERYLENE	0.008	0.22	mg/kg	14 / 15	0.11	95% UCL-ST	0.11	95% UCL-ST
BENZO(K)FLUORANTHENE	0.01	1.3	mg/kg	15 / 15	1.05	95% UCL-LM	1.05	95% UCL-LM
CARBAZOLE	0.05	0.58	mg/kg	10 / 15	0.39	95% UCL-C	0.39	95% UCL-C
CHRYSENE	0.02	2.3	mg/kg	15 / 15	2.06	95% UCL-LM	2.06	95% UCL-LM
DIBENZO(A,H)ANTHRACENE	0.006	0.22	mg/kg	12 / 15	0.1	95% UCL-C	0.1	95% UCL-C
DIBENZOFURAN	0.06	2.2	mg/kg	14 / 15	2.2	Max	2.2	Max
FLUROANTHENE	0.03	6.9	mg/kg	15 / 15	6.9	Max	6.9	Max
FLUROENE	0.09	3.1	mg/kg	14 / 15	3.1	Max	3.1	Max
INDENO(1,2,3-CD)PYRENE	0.02	0.46	mg/kg	14 / 15	0.3	95% UCL-LM	0.3	95% UCL-LM
NAPHTHALENE	0.02	20	mg/kg	14 / 15	20	Max	20	Max
PHENANTHRENE	0.01	8.2	mg/kg	15 / 15	8.2	Max	8.2	Max
PYRENE	0.03	7	mg/kg	15 / 15	7	Max	7	Max
ARSENIC	0.9	6.72	mg/kg	9 / 15	5.75	95% UCL-C	5.75	95% UCL-C

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-8
Chemicals of Concern – Impoundments

Summary of Chemicals of Concern Medium Specific Exposure Point Concentrations								
Scenario Timeframe: Future **Medium: Soil** **Exposure Medium: Soil** **Exposure Point: Impoundments**								
Chemical of Concern	**Concentration Detected**		**Units**	**Frequency of Detection**	**RME**		**Central Tendency**	
	Min	**Max**			**Exposure Point Concentration**	**Statistical Measure**	**Exposure Point Concentration**	**Statistical Measure**
2-METHYLNAPHTHALENE	0.2	2800	mg/kg	22 / 29	1200	95% UCL-CNP	1200	95% UCL-CNP
ACENAPTHENE	0.08	6300	mg/kg	25 / 29	1650	95% UCL-ST	1650	95% UCL-ST
ACENAPTHYLENE	0.07	150	mg/kg	16 / 29	47.3	95% UCL-CNP	47.3	95% UCL-CNP
ANTHRACENE	0.02	25000	mg/kg	29 / 29	25000	Max	25000	Max
BENZO(A)ANTHRACENE	0.06	2600	mg/kg	29 / 29	2600	Max	2600	Max
BENZO(A)PYRENE	0.05	850	mg/kg	29 / 29	850	Max	850	Max
BENZO(B)FLUORANTHENE	0.2	1000	mg/kg	29 / 29	1000	Max	1000	Max
BENZO(G,H,I)PERYLENE	0.05	430	mg/kg	27 / 29	430	Max	430	Max
BENZO(K)FLUORANTHENE	0.09	1200	mg/kg	29 / 29	1200	Max	1200	Max
CARBAZOLE	0.09	14000	mg/kg	2 / 29	14000	Max	14000	Max
CHRYSENE	0.1	4200	mg/kg	29 / 29	4200	Max	4200	Max
DIBENZO(A,H)ANTHRACENE	0.06	200	mg/kg	23 / 29	61.1	95% UCL-CNP	61.1	95% UCL-CNP
DIBENZOFURAN	0.06	4700	mg/kg	25 / 29	1810	95% UCL-CNP	1810	95% UCL-CNP
FLUROANTHENE	0.2	15000	mg/kg	28 / 29	4070	95% UCL-ST	4070	95% UCL-ST
FLUROENE	0.04	7400	mg/kg	28 / 29	7400	Max	7400	Max
INDENO(1,2,3-CD)PYRENE	0.05	580	mg/kg	27 / 29	580	Max	580	Max
NAPHTHALENE	0.06	14000	mg/kg	25 / 29	5220	95% UCL-CNP	5220	95% UCL-CNP
PHENANTHRENE	0.2	20000	mg/kg	27 / 29	20000	Max	20000	Max
PYRENE	0.1	10000	mg/kg	28 / 29	10000	Max	10000	Max
ARSENIC	1.8	1.8	mg/kg	1 / 4	1.77	95% UCL-ST	1.77	95% UCL-ST

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-9
Chemicals of Concern – Surface Water

Summary of Chemicals of Concern Medium Specific Exposure Point Concentrations								
Scenario Timeframe: Current/Future **Medium: Surface Water** **Exposure Medium: Surface Water** **Exposure Point: Surface Water Unnamed Tributary**								
Chemical of Concern	**Concentration Detected**		**Units**	**Frequency of Detection**	**RME**		**Central Tendency**	
	Min	**Max**			**Exposure Point Concentration**	**Statistical Measure**	**Exposure Point Concentration**	**Statistical Measure**
2-METHYLNAPHTHALENE	2	2	µg/L	1 / 15	2	Max	2	Max
ACENAPTHENE	1	8	µg/L	13 / 15	4.64	95% UCL-LM	4.64	95% UCL-LM
BENZO(A)ANTHRACENE	2	2	µg/L	1 / 15	2	Max	2	Max
BENZO(B)FLUORANTHENE	1	1	µg/L	1 / 15	1	Max	1	Max
CHRYSENE	2	2	µg/L	1 / 15	2	Max	2	Max
DIBENZOFURAN	1	4	µg/L	7 / 15	2.56	95% UCL-ST	2.56	95% UCL-ST
FLUROANTHENE	1	5	µg/L	10 / 15	2.92	95% UCL-ST	2.92	95% UCL-ST
FLUROENE	1	4	µg/L	9 / 15	2.61	95% UCL-ST	2.61	95% UCL-ST
NAPHTHALENE	1	29	µg/L	8 / 15	13.9	95% UCL-CNP	13.9	95% UCL-CNP
PHENANTHRENE	1	5	µg/L	9 / 15	3.14	95% UCL-ST	3.14	95% UCL-ST
PYRENE	1	3	µg/L	10 / 15	3.06	95% UCL-CNP	3.06	95% UCL-CNP
THALLIUM	4	8.9	µg/L	8 / 15	8.9	95% UCL-CNP	8.9	95% UCL-CNP
BENZENE	4	30	µg/L	3 / 3	30	Max	30	Max
VINYL CHLORIDE	1	1	µg/L	2 / 3	1	Max	1	Max

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-10
Chemicals of Concern – Shallow Water Bearing Zone

Summary of Chemicals of Concern Medium Specific Exposure Point Concentrations								
Scenario Timeframe: Future **Medium: Ground water** **Exposure Medium: Ground water** **Exposure Point: Shallow Water Bearing Zone – Tap Water**								
Chemical of Concern	**Concentration Detected**		**Units**	**Frequency of Detection**	**RME**		**Central Tendency**	
	Min	**Max**			**Exposure Point Concentration**	**Statistical Measure**	**Exposure Point Concentration**	**Statistical Measure**
2,4-DIMETHYLPHENOL	236	1280	µg/L	2 / 5	305	Mean	305	Mean
2-METHYLNAPHTHALENE	134	282	µg/L	2 / 5	83.8	Mean	83.8	Mean
ACENAPTHENE	1.5	192	µg/L	3 / 5	60.1	Mean	60.1	Mean
ACETOPHENONE	5	12.5	µg/L	2 / 5	11.5	Mean	11.5	Mean
ANTHRACENE	1.6	1.58	µg/L	1 / 5	1.58	Max	1.58	Max
BENZO(A)ANTHRACENE	25	25	µg/L	1 / 5	5.04	Mean	5.04	Mean
CARBAZOLE	184	278	µg/L	2 / 5	93.9	Mean	93.9	Mean
DIBENZOFURAN	7	239	µg/L	3 / 5	68.9	Mean	68.9	Mean
FLUROANTHENE	0.5	254	µg/L	3 / 5	51.3	Mean	51.3	Mean
FLUROENE	76	165	µg/L	2 / 5	48.4	Mean	48.4	Mean
NAPHTHALENE	2080	4190	µg/L	2 / 5	1250	Mean	1250	Mean
PHENANTHRENE	0.7	379	µg/L	3 / 9	90.4	Mean	90.4	Mean
PYRENE	0.2	169	µg/L	3 / 5	34.1	Mean	34.1	Mean
ARSENIC	14.4	68.8	µg/L	3 / 5	28.3	Mean	28.3	Mean
IRON	6250	84400	µg/L	5 / 5	53600	Mean	53600	Mean
PENTACHLOROPHENOL	1.5	16.4	µg/L	2 / 5	3.88	Mean	3.88	Mean
1,2-DICHLOROETHANE	1.6	8.3	µg/L	2 / 5	0.96	Mean	0.96	Mean
1,4-DICHLOROBENZENE	1.5	1.5	µg/L	1 / 5	0.7	Mean	0.7	Mean
BENZENE	1.2	1.5	µg/L	5 / 5	3.26	Mean	3.26	Mean
CIS-1,2-DICHLOROETHENE	1.5	75.3	µg/L	3 / 5	20.5	Mean	20.5	Mean
TRICHLOROETHENE	1.1	2.6	µg/L	2 / 5	1.04	Mean	1.04	Mean
VINYL CHLORIDE	4.3	83.6	µg/L	4 / 5	23.9	Mean	23.9	Mean

95% UCL-ST = 95% UCL Student's t-test
95% UCL-CNP = 95% UCL Chebyshev statistic, non-parametric distribution
95% UCL-C = 95% UCL Chebyshev statistic, lognormal distribution
95% UCL-LM = 95% UCL Land's method

Table 7-11
Non-Cancer Toxicity Data – Oral/Dermal

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
1,2-Dichloroethane	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	Kidney, Death	1000	EPA 6 MSSL-N	02/18/03
1,4-Dichlorobenzene	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	--	--	EPA 6 MSSL-N	02/18/03
2,4-Dimethylphenol	Chronic	2.00E-02	mg/kg-d	1.00E+00	2.00E-02	mg/kg-d	Blood	3000	IRIS	12/10/03
2-Methylnaphthalene	Chronic	2.00E-02	mg/kg-d	1.00E+00	2.00E-02	mg/kg-d	Body Weight	3000	NCEA	08/00
Acenaphthene	Chronic	6.00E-02	mg/kg-d	1.00E+00	6.00E-02	mg/kg-d	Liver	3000	IRIS	04/08/03
Acenaphthylene	Chronic	6.00E-02	mg/kg-d	1.00E+00	6.00E-02	mg/kg-d	Liver	N/A	MADEP	09/95
Acetophenone	Chronic	1.00E-01	mg/kg-d	1.00E+00	1.00E-01	mg/kg-d	NOAEL	3000	IRIS	04/08/03
Anthracene	Chronic	3.00E-01	mg/kg-d	1.00E+00	3.00E-01	mg/kg-d	NOAEL	3000	IRIS	04/08/03
Arsenic	Chronic	3.00E-04	mg/kg-d	1.00E+00	3.00E-04	mg/kg-d	Skin	3	IRIS	04/08/03
Benzene	Chronic	4.00E-03	mg/kg-d	1.00E+00	4.00E-03	mg/kg-d	Blood	3000	IRIS	05/01/03
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	Kidney	N/A	MADEP	09/95
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-ethylhexyl)phthalate	Chronic	2.00E-02	mg/kg-d	1.00E+00	3.80E-03	mg/kg-d	Liver	1000	IRIS	04/08/03
Carbazole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 7-11, continued
Non-Cancer Toxicity Data – Oral/Dermal

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
cis-1,2-Dichloroethene	Chronic	1.00E-02	mg/kg-d	1.00E+00	1.00E-02	mg/kg-d	Blood	3000	HEAST	07/01/97
Dibenzo(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzofuran	Chronic	4.00E-03	mg/kg-d	1.00E+00	4.00E-03	mg/kg-d	Kidney	3000	EPA 6 MSSL-N	02/18/03
Fluoranthene	Chronic	4.00E-02	mg/kg-d	1.00E+00	4.00E-02	mg/kg-d	Liver & Kidney	3000	IRIS	04/08/03
Fluorene	Chronic	4.00E-02	mg/kg-d	1.00E+00	4.00E-02	mg/kg-d	Blood	3000	IRIS	04/08/03
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	Chronic	3.00E-01	mg/kg-d	1.00E+00	3.00E-01	mg/kg-d	Nutrition	N/A	EPA 6 MSSL-N	02/18/03
Naphthalene	Chronic	2.00E-02	mg/kg-d	1.00E+00	2.00E-02	mg/kg-d	Body Weight	3000	IRIS	04/08/03
Pentachlorophenol	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	--	--	IRIS	12/10/03
Phenanthrene	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	Kidney	N/A	MADEP	09/95
Pyrene	Chronic	3.00E-02	mg/kg-d	1.00E+00	3.00E-02	mg/kg-d	Kidney	3000	IRIS	04/08/03
Thallium	Chronic	8.00E-05	mg/kg-d	1.00E+00	8.00E-05	mg/kg-d	Liver	3000	IRIS[a]	04/08/03
Trichloroethene	Chronic	3.00E-04	mg/kg-d	1.00E+00	3.00E-04	mg/kg-d	Liver, Kidney, Fetus	3000	EPA 6 MSSL-N	02/18/03
Vinyl chloride	Chronic	3.00E-03	mg/kg-d	1.00E+00	3.00E-03	mg/kg-d	Liver	30	IRIS	04/08/03

Table 7-12
Non-Cancer Toxicity Data – Inhalation

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
1,2-Dichloroethane	Chronic	5.0E-03	mg/m^3	1.4E-03	mg/kg-d	GI, Liver	3000	EPA 6 MSSL-N	02/18/03
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg-d	Liver	100	IRIS	12/10/2003
2,4-Dimethylphenol	Chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg-d	Blood	N/A	EPA 6 MSSL-R	N/A
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthene	Chronic	2.10E-01	mg/m^3	6.00E-02	mg/kg-d	Liver	N/A	EPA 6 MSSL-R	2/18/03
Acenaphthylene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acetophenone	Chronic	2.00E-05	mg/m^3	5.71E-06	mg/kg-d	NOAEL	N/A	EPA 6 MSSL-W	2/18/03
Anthracene	Chronic	1.05E+00	mg/m^3	3.00E-01	mg/kg-d	NOAEL	N/A	EPA 6 MSSL-R	2/18/03
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	Chronic	3.00E-02	mg/m^3	1.71E-03	mg/kg-d	Blood	N/A	IRIS	5/01/03
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-ethylhexyl)phthalate	Chronic	7.00E-02	mg/m^3	2.00E-02	mg/kg-d	Liver	N/A	EPA 6 MSSL	2/18/03
Carbazole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,2-Dichloroethene	Chronic	3.5E-02	mg/m^3	1.00E-02	mg/kg-d	Blood	N/A	EPA 6 MSSL-R	2/18/03

Table 7-12, continued
Non-Cancer Toxicity Data – Inhalation

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
Dibenzo(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzofuran	Chronic	1.40E-02	mg/m^3	4.00E-03	mg/kg-d	Kidney	N/A	EPA 6 MSSL-R	2/18/03
Fluoranthene	Chronic	1.40E-01	mg/m^3	4.00E-02	mg/kg-d	Liver & Kidney	3000	EPA 6 MSSL-R	2/18/03
Fluorene	Chronic	1.40E-01	mg/m^3	4.00E-02	mg/kg-d	Blood	3000	EPA 6 MSSL-R	2/18/03
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	3.00E-03	mg/m^3	8.57E-04	mg/kg-d	Nasal	3000	IRIS	04/08/03
Pentachlorophenol	Chronic	1.05E-01	mg/m^3	3.00E-02	mg/kg-d	Kidney, Liver	100	EPA 6 MSSL-R	2/18/03
Phenanthrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pyrene	Chronic	1.05E-01	mg/m^3	3.00E-02	mg/kg-d	Kidney	N/A	EPA 6 MSSL-R	2/18/03
Thallium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethene	Chronic	4.0E-02	mg/m^3	1.00E-02	mg/kg-d	NS, Liver, Endocri	1000	EPA 6 MSSL-N	02/18/03
Vinyl chloride	Chronic	1.0E-01	mg/m^3	2.86E-02	mg/kg-d	Liver	30	IRIS	4/08/03

Table 7-13
Cancer Toxicity Data – Oral/Dermal

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Cancer Guideline Description	Source	Date (MM/DD/YY) (3)
1,2-Dichloroethane	9.10E-02	1.00E+00	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	12/10/03
1,4-Dichlorobenzene	2.40E-02	1.00E+00	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/01/97
2,4-Dimethylphenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Acetophenone	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Anthracene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Arsenic	1.50E+00	1.00E+00	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	04/08/03
Benzene	1.50E-02	1.00E+00	1.50E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS[a]	04/15/02
Benzene	5.50E-02	1.00E+00	5.50E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS[b]	04/15/02
Benzo(a)anthracene	7.31E-01	1.00E+00	7.31E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Benzo(a)pyrene	7.30E+00	1.00E+00	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	04/08/03
Benzo(b)fluoranthene	7.30E-01	1.00E+00	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Benzo(k)fluoranthene	7.30E-02	1.00E+00	7.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Bis(2-ethylhexyl)phthalate	1.40E-02	1.00E+00	7.37E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	04/08/03
Carbazole	2.00E-02	1.00E+00	2.86E-02	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	07/97
Chrysene	7.30E-03	1.00E+00	7.30E-03	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	D	IRIS	12/10/03
Dibenzo(a,h)anthracene	7.30E+00	1.00E+00	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03

Table 7-13, continued
Cancer Toxicity Data – Oral/Dermal

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Cancer Guideline Description	Source	Date (MM/DD/YY) (3)
Dibenzofuran	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Fluoranthene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Fluorene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Indeno(1,2,3-cd)pyrene	7.30E-01	1.00E+00	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Pentachlorophenol	1.20E-01	1.00E+00	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	12/10/03
Phenanthrene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Pyrene	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Thallium	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Trichloroethene	4.00E-01	1.00E+00	7.20E-01	$(mg/kg\text{-}day)^{-1}$	B1	EPA 6 MSSL-N	02/18/03
Vinyl chloride (adult only)	7.20E-01	1.00E+00	7.20E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/08/03
Vinyl chloride	1.50E+00	1.00E+00	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	04/08/03

Table 7-14
Cancer Toxicity Data – Inhalation

Chemical of Potential Concern	Unit Risk	Units	Adjustment Factor (1)	Inhalation Cancer Slope Factor	Units	Cancer Guideline Description	Source	Date (MM/DD/YY) (2)
1,2-Dichloroethane	2.6E-05	$(ug/m^3)^{-1}$	3,500	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	12/10/03
1,4-Dichlorobenzene	6.3E-06	$(ug/m^3)^{-1}$	3,500	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	EPA 6 MSSL-R	02/18/03
2,4-Dimethylphenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Acetophenone	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Anthracene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Arsenic	4.30E-03	$(ug/m^3)^{-1}$	3,500	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	04/08/03
Benzene	2.20E-06	$(ug/m^3)^{-1}$	3,500	7.70E-03	$(mg/kg\text{-}day)^{-1}$	A	IRIS[a]	04/08/03
Benzene	7.80E-06	$(ug/m^3)^{-1}$	3,500	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS[b]	04/08/03
Benzo(a)anthracene	8.80E-05	$(ug/m^3)^{-1}$	3,500	3.08E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Benzo(a)pyrene	8.80E-04	$(ug/m^3)^{-1}$	3,500	3.08E+00	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Benzo(b)fluoranthene	8.80E-05	$(ug/m^3)^{-1}$	3,500	3.08E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Benzo(k)fluoranthene	8.80E-06	$(ug/m^3)^{-1}$	3,500	3.08E-02	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Bis(2-ethylhexyl)phthalate	4.00E-06	$(ug/m^3)^{-1}$	3,500	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-R	02/18/03
Carbazole	5.70E-06	$(ug/m^3)^{-1}$	3,500	2.00E-02	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-R	02/18/03
Chrysene	8.8E-07	$(ug/m^3)^{-1}$	3,500	3.08E-03	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	N/A	D	IRIS	12/10/03
Dibenzo(a,h)anthracene	8.8E-04	$(ug/m^3)^{-1}$	3,500	3.08E+00	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03

Table 7-14, continued
Cancer Toxicity Data - Inhalation

Chemical of Potential Concern	Unit Risk	Units	Adjustment Factor (1)	Inhalation Cancer Slope Factor	Units	Cancer Guideline Description	Source	Date (MM/DD/YY) (2)
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Fluoranthene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Fluorene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Indeno(1,2,3-cd)pyrene	8.8E-05	$(ug/m^3)^{-1}$	3,500	3.08E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	04/08/03
Pentachlorophenol	3.4E-05	$(ug/m^3)^{-1}$	3,500	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	EPA 6 MSSL-N	02/18/03
Phenanthrene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Pyrene	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Thallium	N/A	N/A	N/A	N/A	N/A	D	IRIS	04/08/03
Trichloroethene	1.1E-01	$(ug/m^3)^{-1}$	3,500	4.00E-01	$(mg/kg\text{-}day)^{-1}$	B1	EPA 6 MSSL-N	02/18/03
Vinyl chloride (adult only)	4.40E-06	$(ug/m^3)^{-1}$	3,500	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	04/08/03
Vinyl chloride	8.80E-06	$(ug/m^3)^{-1}$	3,500	6.00E-03	$(mg/kg\text{-}day)^{-1}$	A	IRIS	04/08/03

Table 7-15
Risk Characterization – Site-Wide Soil, Future Off-Site Resident

Scenario Timeframe:	Future
Receptor Population:	Off-site Resident
Receptor Age:	Adult
Carcinogenic risk calculated using age-adjusted factors	

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Inhalation	2-METHYLNAPHTHALENE	–	–	–	–	–	–	–	–	–	–
Site-wide		(Airborne	ACENAPHTHENE	–	–	–	–	–	Liver	–	5.8E-04	–	5.8E-04
(0-2 feet)		Particulates	ACENAPHTHYLENE	–	–	–	–	–	–	–	–	–	–
		and	ACETOPHENONE	–	–	–	–	–	NOAEL	–	1.6E+00	–	1.6E+00
		Vapors)	ANTHRACENE	–	–	–	–	–	NOAEL	–	7.4E-05	–	7.4E-05
			ARSENIC	–	4.8E-09	–	–	4.8E-09	–	–	–	–	–
			BENZO(A)ANTHRACENE	–	7.2E-10	–	–	7.2E-10	–	–	–	–	–
			BENZO(A)PYRENE	–	2.6E-09	–	–	2.6E-09	–	–	–	–	–
			BENZO(B)FLUORANTHENE	–	4.0E-10	–	–	4.0E-10	–	–	–	–	–
			BENZO(G,H,I)PERYLENE	–	–	–	–	–	–	–	–	–	–
			BENZO(K)FLUORANTHENE	–	2.0E-11	–	–	2.0E-11	–	–	–	–	–
			CARBAZOLE	–	3.8E-11	–	–	3.8E-11	–	–	–	–	–
			CHRYSENE	–	4.4E-09	–	–	4.4E-09	–	–	–	–	–
			DIBENZO(A,H)ANTHRACENE	–	4.2E-10	–	–	4.2E-10	–	–	–	–	–
			DIBENZOFURAN	–	–	–	–	–	Kidney	–	1.4E-03	–	1.4E-03
			FLUORANTHENE	–	–	–	–	–	Liver & Kidney	–	5.7E-07	–	5.7E-07
			FLUORENE	–	–	–	–	–	Blood	–	4.6E-04	–	4.6E-04
			INDENO(1,2,3-CD)PYRENE	–	1.0E-10	–	–	1.0E-10	–	–	–	–	–
			IRON	–	–	–	–	–	–	–	–	–	–
			NAPHTHALENE	–	–	–	–	–	Nasal	–	3.6E-01	–	3.6E-01
			PHENANTHRENE	–	–	–	–	–	–	–	–	–	–
			PYRENE	–	–	–	–	–	Kidney	–	2.9E-04	–	2.9E-04
			THALLIUM	–	–	–	–	–	–	–	–	–	–
			Chemical Total	–	1.3E-08	–	–	1.3E-08		–	2.0E+00	–	2.0E+00
		Exposure Point Total						1.3E-08					2.0E+00
	Exposure Medium Total							1.3E-08					2.0E+00
Soil Total								1.3E-08					2.0E+00
Receptor Total							Receptor Risk Total	1.3E-08				Receptor HI Total	2.0E+00

Notes:

AOC	Area of concern
bgs	Below ground surface
HI	Hazard Index
NOAEL	No observed adverse effects level

Total Organ 2 (Liver) HI Across All Media =	5.8E-04
Total Organ 3 (Nasal) HI Across All Media =	3.6E-01
Total Organ 4 (Kidney) HI Across All Media =	1.7E-03
Total Organ 7 (Blood) HI Across All Media =	4.6E-04
Total Organ 8 (NOAEL) HI Across All Media =	1.6E+00

Table 7-16
Risk Characterization – Area of Concern 1, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	2.4E-03	--	--	2.4E-03
AOC 1			ACENAPHTHENE	--	--	--	--	--	Liver	3.0E-03	--	--	3.0E-03
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	1.6E-04	--	--	1.6E-04
			ANTHRACENE	--	--	--	--	--	NOAEL	1.3E-03	--	--	1.3E-03
			ARSENIC	1.7E-06	--	3.4E-07	--	2.1E-06	Skin	1.1E-02	--	2.1E-03	1.3E-02
			BENZO(A)ANTHRACENE	2.7E-05	--	2.3E-05	--	5.1E-05	--	--	--	--	--
			BENZO(A)PYRENE	7.5E-05	--	6.4E-05	--	1.4E-04	--	--	--	--	--
			BENZO(B)FLUORANTHENE	2.4E-05	--	2.0E-05	--	4.4E-05	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	3.1E-04	--	2.0E-04	5.1E-04
			BENZO(K)FLUORANTHENE	6.8E-07	--	5.8E-07	--	1.3E-06	--	--	--	--	--
			CARBAZOLE	1.1E-06	--	1.1E-06	--	2.2E-06	--	--	--	--	--
			CHRYSENE	8.9E-07	--	7.7E-07	--	1.7E-06	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.8E-05	--	1.5E-05	--	3.3E-05	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	2.7E-02	--	--	2.7E-02
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	6.9E-02	--	5.9E-02	1.3E-01
			FLUORENE	--	--	--	--	--	Blood	3.9E-03	--	--	3.9E-03
			INDENO(1,2,3-CD)PYRENE	3.0E-06	--	2.6E-06	--	5.5E-06	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	5.3E-02	--	--	5.3E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	2.3E-02	--	--	2.3E-02
			PHENANTHRENE	--	--	--	--	--	Kidney	2.2E-02	--	--	2.2E-02
			PYRENE	--	--	--	--	--	Kidney	1.0E-01	--	--	1.0E-01
			THALLIUM	--	--	--	--	--	Liver	2.4E-02	--	--	2.4E-02
			Chemical Total	1.5E-04	--	1.3E-04	--	2.8E-04		3.4E-01	--	6.1E-02	4.0E-01
		Exposure Point Total						2.8E-04					4.0E-01
	Exposure Medium Total							2.8E-04					4.0E-01

Table 7-16, continued
Risk Characterization – Area of Concern 1, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 1		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	1.1E-03	--	1.1E-03
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	1.2E-04	--	1.2E-04
		Vapors)	ARSENIC	--	8.7E-10	--	--	8.7E-10	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	5.8E-10	--	--	5.8E-10	--	--	--	--	--
			BENZO(A)PYRENE	--	1.6E-09	--	--	1.6E-09	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	5.0E-10	--	--	5.0E-10	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	1.4E-11	--	--	1.4E-11	--	--	--	--	--
			CARBAZOLE	--	5.8E-11	--	--	5.8E-11	--	--	--	--	--
			CHRYSENE	--	9.3E-09	--	--	9.3E-09	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	3.8E-10	--	--	3.8E-10	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	2.7E-03	--	2.7E-03
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	3.5E-06	--	3.5E-06
			FLUORENE	--	--	--	--	--	Blood	--	9.5E-04	--	9.5E-04
			INDENO(1,2,3-CD)PYRENE	--	6.3E-11	--	--	6.3E-11	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	8.3E-01	--	8.3E-01
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	2.1E-03	--	2.1E-03
			THALLIUM	--	--	--	--	--	--	--	--	--	--
			Chemical Total	--	1.3E-08	--	--	1.3E-08		--	8.3E-01	--	8.3E-01
		Exposure Point Total						1.3E-08					8.3E-01
	Exposure Medium Total							1.3E-08					8.3E-01
Soil Total								2.8E-04					1.2E+00

Table 7-17
Risk Characterization – Area of Concern 2, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	8.1E-05	--	--	8.1E-05
AOC 2			ACENAPHTHENE	--	--	--	--	--	Liver	2.0E-04	--	--	2.0E-04
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	1.2E-05	--	--	1.2E-05
			ANTHRACENE	--	--	--	--	--	NOAEL	1.9E-05	--	--	1.9E-05
			ARSENIC	1.4E-06	--	2.7E-07	--	1.7E-06	Skin	8.6E-03	--	1.7E-03	1.0E-02
			BENZO(A)ANTHRACENE	1.3E-06	--	1.2E-06	--	2.5E-06	--	--	--	--	--
			BENZO(A)PYRENE	6.7E-06	--	5.7E-06	--	1.2E-05	--	--	--	--	--
			BENZO(B)FLUORANTHENE	1.2E-06	--	1.1E-06	--	2.3E-06	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	4.1E-05	--	2.7E-05	6.8E-05
			BENZO(K)FLUORANTHENE	7.0E-08	--	6.0E-08	--	1.3E-07	--	--	--	--	--
			CARBAZOLE	6.9E-09	--	6.5E-09	--	1.3E-08	--	--	--	--	--
			CHRYSENE	1.6E-08	--	1.4E-08	--	3.0E-08	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.3E-06	--	1.1E-06	--	2.5E-06	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	1.5E-03	--	--	1.5E-03
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	1.1E-03	--	9.2E-04	2.0E-03
			FLUORENE	--	--	--	--	--	Blood	1.8E-04	--	--	1.8E-04
			INDENO(1,2,3-CD)PYRENE	4.0E-07	--	3.5E-07	--	7.5E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	3.3E-02	--	--	3.3E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	9.8E-05	--	--	9.8E-05
			PHENANTHRENE	--	--	--	--	--	Kidney	1.0E-03	--	--	1.0E-03
			PYRENE	--	--	--	--	--	Kidney	9.4E-04	--	--	9.4E-04
			Chemical Total	1.2E-05	--	9.8E-06	--	2.2E-05		4.7E-02	--	2.6E-03	5.0E-02
		Exposure Point Total						2.2E-05					5.0E-02
	Exposure Medium Total							2.2E-05					5.0E-02

Table 7-17, continued
Risk Characterization – Area of Concern 2, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 2		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	7.3E-05	--	7.3E-05
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	1.8E-06	--	1.8E-06
		Vapors)	ARSENIC	--	7.0E-10	--	--	7.0E-10	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	2.8E-11	--	--	2.8E-11	--	--	--	--	--
			BENZO(A)PYRENE	--	1.4E-10	--	--	1.4E-10	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	2.6E-11	--	--	2.6E-11	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	1.5E-12	--	--	1.5E-12	--	--	--	--	--
			CARBAZOLE	--	3.5E-13	--	--	3.5E-13	--	--	--	--	--
			CHRYSENE	--	1.7E-10	--	--	1.7E-10	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	2.8E-11	--	--	2.8E-11	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	1.6E-04	--	1.6E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	5.4E-08	--	5.4E-08
			FLUORENE	--	--	--	--	--	Blood	--	4.4E-05	--	4.4E-05
			INDENO(1,2,3-CD)PYRENE	--	8.6E-12	--	--	8.6E-12	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	3.5E-03	--	3.5E-03
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	2.0E-05	--	2.0E-05
			Chemical Total	--	1.1E-09	--	--	1.1E-09		--	3.8E-03	--	3.8E-03
		Exposure Point Total						1.1E-09					3.8E-03
	Exposure Medium Total							1.1E-09					3.8E-03
Soil Total								2.2E-05					5.4E-02

Table 7-18
Risk Characterization – Area of Concern 3, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil AOC 3 0 to 2 feet bgs	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	5.3E-04	--	--	5.3E-04
			ACENAPHTHENE	--	--	--	--	--	Liver	2.7E-04	--	--	2.7E-04
			ACENAPHTHYLENE	--	--	--	--	--	Liver	1.9E-05	--	--	1.9E-05
			ACETOPHENONE	--	--	--	--	--	NOAEL	1.0E-05	--	--	1.0E-05
			ANTHRACENE	--	--	--	--	--	NOAEL	1.1E-04	--	--	1.1E-04
			ARSENIC	1.4E-06	--	2.7E-07	--	1.7E-06	Skin	8.6E-03	--	1.7E-03	1.0E-02
			BENZO(A)ANTHRACENE	3.5E-06	--	3.0E-06	--	6.5E-06	--	--	--	--	--
			BENZO(A)PYRENE	1.0E-05	--	8.8E-06	--	1.9E-05	--	--	--	--	--
			BENZO(B)FLUORANTHENE	2.0E-06	--	1.7E-06	--	3.6E-06	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	4.5E-05	--	3.0E-05	7.4E-05
			BENZO(K)FLUORANTHENE	1.5E-07	--	1.3E-07	--	2.8E-07	--	--	--	--	--
			CARBAZOLE	1.5E-07	--	1.4E-07	--	3.0E-07	--	--	--	--	--
			CHRYSENE	3.5E-08	--	3.0E-08	--	6.4E-08	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.8E-06	--	1.5E-06	--	3.3E-06	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	2.6E-03	--	--	2.6E-03
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	1.7E-03	--	1.5E-03	3.2E-03
			FLUORENE	--	--	--	--	--	Blood	3.1E-04	--	--	3.1E-04
			INDENO(1,2,3-CD)PYRENE	5.3E-07	--	4.6E-07	--	9.9E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	3.2E-02	--	--	3.2E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	2.9E-03	--	--	2.9E-03
			PHENANTHRENE	--	--	--	--	--	Kidney	3.1E-03	--	--	3.1E-03
			PYRENE	--	--	--	--	--	Kidney	1.7E-03	--	--	1.7E-03
			Chemical Total	2.0E-05	--	1.6E-05	--	3.6E-05		5.2E-02	--	3.2E-03	5.5E-02
		Exposure Point Total						3.6E-05					5.5E-02
	Exposure Medium Total							3.6E-05					5.5E-02

Table 7-18, continued
Risk Characterization – Area of Concern 3, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 3		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	1.0E-04	--	1.0E-04
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ACETOPHENONE	--	--	--	--	--	NOAEL	--	2.1E-01	--	2.1E-01
		Vapors)	ANTHRACENE	--	--	--	--	--	NOAEL	--	1.1E-05	--	1.1E-05
			ARSENIC	--	7.0E-10	--	--	7.0E-10	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	7.5E-11	--	--	7.5E-11	--	--	--	--	--
			BENZO(A)PYRENE	--	2.2E-10	--	--	2.2E-10	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	4.2E-11	--	--	4.2E-11	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	3.1E-12	--	--	3.1E-12	--	--	--	--	--
			CARBAZOLE	--	7.7E-12	--	--	7.7E-12	--	--	--	--	--
			CHRYSENE	--	3.6E-10	--	--	3.6E-10	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	3.8E-11	--	--	3.8E-11	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	2.7E-04	--	2.7E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	8.8E-08	--	8.8E-08
			FLUORENE	--	--	--	--	--	Blood	--	7.7E-05	--	7.7E-05
			INDENO(1,2,3-CD)PYRENE	--	1.1E-11	--	--	1.1E-11	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	1.0E-01	--	1.0E-01
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	3.6E-05	--	3.6E-05
			Chemical Total	--	1.5E-09	--	--	1.5E-09		--	3.2E-01	--	3.2E-01
		Exposure Point Total						1.5E-09					3.2E-01
	Exposure Medium Total							1.5E-09					3.2E-01
Soil Total								3.6E-05					3.7E-01

Table 7-19
Risk Characterization – Area of Concern 4, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	3.7E-05	--	--	3.7E-05
AOC 4			ACENAPHTHENE	--	--	--	--	--	Liver	4.4E-05	--	--	4.4E-05
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	1.8E-05	--	--	1.8E-05
			ANTHRACENE	--	--	--	--	--	NOAEL	1.9E-05	--	--	1.9E-05
			ARSENIC	1.2E-06	--	2.4E-07	--	1.5E-06	Skin	7.6E-03	--	1.5E-03	9.1E-03
			BENZO(A)ANTHRACENE	1.2E-06	--	1.0E-06	--	2.3E-06	--	--	--	--	--
			BENZO(A)PYRENE	5.3E-06	--	4.6E-06	--	9.9E-06	--	--	--	--	--
			BENZO(B)FLUORANTHENE	1.1E-06	--	9.3E-07	--	2.0E-06	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	4.0E-05	--	2.6E-05	6.6E-05
			BENZO(K)FLUORANTHENE	6.9E-08	--	5.9E-08	--	1.3E-07	--	--	--	--	--
			CARBAZOLE	1.0E-08	--	9.9E-09	--	2.0E-08	--	--	--	--	--
			CHRYSENE	2.5E-08	--	2.2E-08	--	4.7E-08	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.8E-06	--	1.5E-06	--	3.3E-06	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	3.4E-04	--	--	3.4E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	4.3E-04	--	3.7E-04	8.1E-04
			FLUORENE	--	--	--	--	--	Blood	6.8E-05	--	--	6.8E-05
			INDENO(1,2,3-CD)PYRENE	3.8E-07	--	3.3E-07	--	7.1E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	4.2E-02	--	--	4.2E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	3.7E-05	--	--	3.7E-05
			PHENANTHRENE	--	--	--	--	--	Kidney	4.6E-04	--	--	4.6E-04
			PYRENE	--	--	--	--	--	Kidney	6.9E-04	--	--	6.9E-04
			Chemical Total	1.1E-05	--	8.7E-06	--	2.0E-05		5.2E-02	--	1.9E-03	5.4E-02
		Exposure Point Total						2.0E-05					5.4E-02
	Exposure Medium Total							2.0E-05					5.4E-02

Table 7-19, continued
Risk Characterization – Area of Concern 4, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	–	–	–	–	–	–	–	–	–	–
AOC 4		(Airborne	ACENAPHTHENE	–	–	–	–	–	Liver	–	1.6E-05	–	1.6E-05
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	–	–	–	–	–	–	–	–	–	–
		and	ANTHRACENE	–	–	–	–	–	NOAEL	–	1.8E-06	–	1.8E-06
		Vapors)	ARSENIC	–	6.2E-10	–	–	6.2E-10	–	–	–	–	–
			BENZO(A)ANTHRACENE	–	2.6E-11	–	–	2.6E-11	–	–	–	–	–
			BENZO(A)PYRENE	–	1.1E-10	–	–	1.1E-10	–	–	–	–	–
			BENZO(B)FLUORANTHENE	–	2.3E-11	–	–	2.3E-11	–	–	–	–	–
			BENZO(G,H,I)PERYLENE	–	–	–	–	–	–	–	–	–	–
			BENZO(K)FLUORANTHENE	–	1.5E-12	–	–	1.5E-12	–	–	–	–	–
			CARBAZOLE	–	5.2E-13	–	–	5.2E-13	–	–	–	–	–
			CHRYSENE	–	2.6E-10	–	–	2.6E-10	–	–	–	–	–
			DIBENZO(A,H)ANTHRACENE	–	3.8E-11	–	–	3.8E-11	–	–	–	–	–
			DIBENZOFURAN	–	–	–	–	–	Kidney	–	3.5E-05	–	3.5E-05
			FLUORANTHENE	–	–	–	–	–	Liver & Kidney	–	2.2E-08	–	2.2E-08
			FLUORENE	–	–	–	–	–	Blood	–	1.7E-05	–	1.7E-05
			INDENO(1,2,3-CD)PYRENE	–	8.1E-12	–	–	8.1E-12	–	–	–	–	–
			IRON	–	–	–	–	–	–	–	–	–	–
			NAPHTHALENE	–	–	–	–	–	Nasal	–	1.3E-03	–	1.3E-03
			PHENANTHRENE	–	–	–	–	–	–	–	–	–	–
			PYRENE	–	–	–	–	–	Kidney	–	1.5E-05	–	1.5E-05
			Chemical Total	–	1.1E-09	–	–	1.1E-09		–	1.4E-03	–	1.4E-03
		Exposure Point Total						1.1E-09					1.4E-03
	Exposure Medium Total							1.1E-09					1.4E-03
Soil Total								2.0E-05					5.5E-02

Table 7-20
Risk Characterization – Impoundments, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil AOC 2 Impoundments	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	5.3E-02	--	--	5.3E-02
			ACENAPHTHENE	--	--	--	--	--	Liver	2.4E-02	--	--	2.4E-02
			ACENAPHTHYLENE	--	--	--	--	--	Liver	6.9E-04	--	--	6.9E-04
			ANTHRACENE	--	--	--	--	--	NOAEL	7.3E-02	--	--	7.3E-02
			ARSENIC	8.3E-07	--	1.6E-07	--	1.0E-06	Skin	5.2E-03	--	1.0E-03	6.2E-03
			BENZO(A)ANTHRACENE	6.0E-04	--	5.1E-04	--	1.1E-03	--	--	--	--	--
			BENZO(A)PYRENE	2.0E-03	--	1.7E-03	--	3.6E-03	--	--	--	--	--
			BENZO(B)FLUORANTHENE	2.3E-04	--	2.0E-04	--	4.3E-04	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	1.3E-03	--	8.3E-04	2.1E-03
			BENZO(K)FLUORANTHENE	2.8E-05	--	2.4E-05	--	5.1E-05	--	--	--	--	--
			BIS(2-ETHYLHEXYL)PHTHALAT	1.4E-07	--	4.8E-07	--	6.2E-07	Liver	1.4E-03	--	4.8E-03	6.2E-03
			CARBAZOLE	8.8E-05	--	8.3E-05	--	1.7E-04	--	--	--	--	--
			CHRYSENE	9.6E-06	--	8.3E-06	--	1.8E-05	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.4E-04	--	1.2E-04	--	2.6E-04	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	4.0E-01	--	--	4.0E-01
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	9.0E-02	--	7.7E-02	1.7E-01
			FLUORENE	--	--	--	--	--	Blood	1.6E-01	--	--	1.6E-01
			INDENO(1,2,3-CD)PYRENE	1.3E-04	--	1.1E-04	--	2.5E-04	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Body Weight	2.3E-01	--	--	2.3E-01
			PHENANTHRENE	--	--	--	--	--	Kidney	5.9E-01	--	--	5.9E-01
			PYRENE	--	--	--	--	--	Kidney	2.9E-01	--	--	2.9E-01
			Chemical Total	3.2E-03	--	2.7E-03	--	5.9E-03		1.9E+00	--	8.4E-02	2.0E+00
		Exposure Point Total						5.9E-03					2.0E+00
	Exposure Medium Total							5.9E-03					2.0E+00

Table 7-20
Risk Characterization – Impoundments, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 2		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	8.9E-03	--	8.9E-03
Impoundments		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	7.0E-03	--	7.0E-03
		Vapors)	ARSENIC	--	4.2E-10	--	--	4.2E-10	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	1.3E-08	--	--	1.3E-08	--	--	--	--	--
			BENZO(A)PYRENE	--	4.1E-08	--	--	4.1E-08	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	4.9E-09	--	--	4.9E-09	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	5.9E-10	--	--	5.9E-10	--	--	--	--	--
			BIS(2-ETHYLHEXYL)PHTHALAT	--	7.0E-12	--	--	7.0E-12	Liver	--	7.0E-08	--	7.0E-08
			CARBAZOLE	--	4.4E-09	--	--	4.4E-09	--	--	--	--	--
			CHRYSENE	--	1.0E-07	--	--	1.0E-07	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	3.0E-09	--	--	3.0E-09	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	4.1E-02	--	4.1E-02
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	4.5E-06	--	4.5E-06
			FLUORENE	--	--	--	--	--	Blood	--	4.0E-02	--	4.0E-02
			INDENO(1,2,3-CD)PYRENE	--	2.8E-09	--	--	2.8E-09	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	8.3E+00	--	8.3E+00
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	6.3E-03	--	6.3E-03
			Chemical Total	--	1.7E-07	--	--	1.7E-07		--	8.4E+00	--	8.4E+00
		Exposure Point Total						1.7E-07					8.4E+00
	Exposure Medium Total							1.7E-07					8.4E+00
Soil Total								5.9E-03					1.0E+01
Receptor Total							Receptor Risk Total	5.9E-03				Receptor HI Total	1.0E+01

Notes:

AOC	Area of concern
bgs	Below ground surface
HI	Hazard Index
NOAEL	No observed adverse effects level

Total Organ 1 (Nasal) HI Across All Media =	8.3E+00
Total Organ 2 (Kidney) HI Across All Media =	1.5E+00
Total Organ 3 (Liver) HI Across All Media =	2.1E-01
Total Organ 4 (Body Weight) HI Across All Media =	2.8E-01
Total Organ 5 (Blood) HI Across All Media =	2.0E-01
Total Organ 6 (NOAEL) HI Across All Media =	8.0E-02
Total Organ 7 (Skin) HI Across All Media =	6.2E-03

Table 7-21
Risk Characterization – Shallow Water Bearing Zone, Future Industrial Outdoor Worker

Scenario Timeframe:	Future
Receptor Population:	Industrial Worker (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Ground Water	Ground	Tap Water	2,4-DIMETHYLPHENOL	--	--	--	--	--	Blood	1.3E-01	--	8.6E-03	1.4E-01
Shallow	Water	(oral/dermal)	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	3.7E-02	--	1.9E-02	5.5E-02
Aquifer		Shallow	ACENAPHTHENE	--	--	--	--	--	Liver	8.8E-03	--	8.0E-03	1.7E-02
		Aquifer	ACETOPHENONE	--	--	--	--	--	NOAEL	1.0E-03	--	2.5E-05	1.0E-03
			ANTHRACENE	--	--	--	--	--	NOAEL	4.6E-05	--	6.2E-05	1.1E-04
			BENZO(A)ANTHRACENE	1.2E-05	--	6.7E-05	--	7.9E-05	--	--	--	--	--
			CARBAZOLE	5.9E-06	--	1.7E-06	--	7.6E-06	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	1.5E-01	--	1.2E-01	2.7E-01
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	1.1E-02	--	2.6E-02	3.7E-02
			FLUORENE	--	--	--	--	--	Blood	1.1E-02	--	7.3E-03	1.8E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	5.5E-01	--	1.6E-01	7.1E-01
			PENTACHLOROPHENOL	1.5E-06	--	8.1E-06	--	9.6E-06	--	1.1E-03	--	6.3E-03	7.4E-03
			PHENANTHRENE	--	--	--	--	--	Kidney	2.7E-02	--	3.3E-02	6.0E-02
			PYRENE	--	--	--	--	--	Kidney	1.0E-02	--	2.2E-02	3.2E-02
			ARSENIC	1.3E-04	--	3.3E-07	--	1.3E-04	Skin	8.3E-01	--	2.1E-03	8.3E-01
			IRON	--	--	--	--	--	Nutrition	1.6E+00	--	3.9E-03	1.6E+00
			1,2-DICHLOROETHANE	2.7E-07	--	5.8E-09	--	2.8E-07	Kidney, Death	2.8E-04	--	5.9E-06	2.9E-04
			1,4-DICHLOROBENZENE	5.3E-08	--	1.6E-08	--	6.8E-08	--	2.1E-04	--	6.0E-05	2.7E-04
			BENZENE	1.5E-07	--	1.0E-08	--	1.6E-07	Blood	7.2E-03	--	4.8E-04	7.7E-03
			CIS-1,2-DICHLOROETHENE	--	--	--	--	--	Blood	1.8E-02	--	6.9E-04	1.9E-02
			TRICHLOROETHENE	1.3E-06	--	1.7E-07	--	1.5E-06	Liver, Kidney, Fetus	3.1E-02	--	2.2E-03	3.3E-02
			VINYL CHLORIDE	1.1E-04	--	2.6E-06	--	1.2E-04	Liver	7.0E-02	--	1.6E-03	7.2E-02
			Chemical Total	2.7E-04	--	8.0E-05	0.0E+00	3.5E-04		3.5E+00	--	4.2E-01	3.9E+00
		Exposure Point Total						3.5E-04					3.9E+00
	Exposure Medium Total							3.5E-04					3.9E+00
Ground water - Shallow Aquifer								3.5E-04					3.9E+00
Receptor Total							Receptor Risk Total	3.7E-04				Receptor HI Total	3.9E+00

Notes:

AOC	Area of concern
bgs	Below ground surface
HI	Hazard Index
NOAEL	No observed adverse effects level

GROUND WATER (Shallow Aquifer)	
Total Organ 2 (Liver) HI Across All Media =	1.6E-01
Total Organ 4 (Kidney) HI Across All Media =	4.3E-01
Total Organ 5 (Nutrition) HI Across All Media =	1.6E+00
Total Organ 6 (Skin) HI Across All Media =	8.3E-01
Total Organ 7 (Blood) HI Across All Media =	1.9E-01
Total Organ 8 (NOAEL) HI Across All Media =	1.1E-03
Total Organ9 (Body Weight) HI Across All Media =	7.7E-01

Table 7-22
Risk Characterization – Area of Concern 1, Recreational Visitor

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	8.4E-04	--	--	8.4E-04
AOC 1			ACENAPHTHENE	--	--	--	--	--	Liver	1.0E-03	--	--	1.0E-03
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	5.6E-05	--	--	5.6E-05
			ANTHRACENE	--	--	--	--	--	NOAEL	4.5E-04	--	--	4.5E-04
			ARSENIC	2.4E-07	--	7.2E-08	--	3.1E-07	Skin	3.7E-03	--	1.1E-03	4.9E-03
			BENZO(A)ANTHRACENE	3.8E-06	--	4.9E-06	--	8.7E-06	--	--	--	--	--
			BENZO(A)PYRENE	1.0E-05	--	1.4E-05	--	2.4E-05	--	--	--	--	--
			BENZO(B)FLUORANTHENE	3.3E-06	--	4.3E-06	--	7.5E-06	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	1.1E-04	--	1.1E-04	2.1E-04
			BENZO(K)FLUORANTHENE	9.5E-08	--	1.2E-07	--	2.2E-07	--	--	--	--	--
			CARBAZOLE	1.6E-07	--	2.3E-07	--	3.9E-07	--	--	--	--	--
			CHRYSENE	1.2E-07	--	1.6E-07	--	2.8E-07	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	2.5E-06	--	3.2E-06	--	5.7E-06	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	9.3E-03	--	--	9.3E-03
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	2.4E-02	--	3.1E-02	5.5E-02
			FLUORENE	--	--	--	--	--	Blood	1.3E-03	--	--	1.3E-03
			INDENO(1,2,3-CD)PYRENE	4.1E-07	--	5.4E-07	--	9.5E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	1.8E-02	--	--	1.8E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	8.0E-03	--	--	8.0E-03
			PHENANTHRENE	--	--	--	--	--	Kidney	7.8E-03	--	--	7.8E-03
			PYRENE	--	--	--	--	--	Kidney	3.5E-02	--	--	3.5E-02
			THALLIUM	--	--	--	--	--	Liver	8.3E-03	--	--	8.3E-03
			Chemical Total	2.1E-05	--	2.7E-05	--	4.8E-05		1.2E-01	--	3.2E-02	1.5E-01
		Exposure Point Total						4.8E-05					1.5E-01
	Exposure Medium Total							4.8E-05					1.5E-01

Table 7-22, continued
Risk Characterization – Area of Concern 1, Recreational Visitor

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 1		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	1.3E-04	--	1.3E-04
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	1.4E-05	--	1.4E-05
		Vapors)	ARSENIC	--	3.9E-11	--	--	3.9E-11	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	2.6E-11	--	--	2.6E-11	--	--	--	--	--
			BENZO(A)PYRENE	--	7.2E-11	--	--	7.2E-11	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	2.3E-11	--	--	2.3E-11	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	6.5E-13	--	--	6.5E-13	--	--	--	--	--
			CARBAZOLE	--	2.6E-12	--	--	2.6E-12	--	--	--	--	--
			CHRYSENE	--	4.2E-10	--	--	4.2E-10	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	1.7E-11	--	--	1.7E-11	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	3.1E-04	--	3.1E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	3.9E-07	--	3.9E-07
			FLUORENE	--	--	--	--	--	Blood	--	1.1E-04	--	1.1E-04
			INDENO(1,2,3-CD)PYRENE	--	2.9E-12	--	--	2.9E-12	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	9.3E-02	--	9.3E-02
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	2.4E-04	--	2.4E-04
			THALLIUM	--	--	--	--	--	--	--	--	--	--
			Chemical Total	--	6.0E-10	--	--	6.0E-10		--	9.4E-02	--	9.4E-02
		Exposure Point Total						6.0E-10					9.4E-02
	Exposure Medium Total							6.0E-10					9.4E-02
Soil Total								4.8E-05					2.4E-01
Receptor Total							Receptor Risk Total	4.8E-05				Receptor HI Total	2.4E-01

Table 7-23
Risk Characterization – Area of Concern 2, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil AOC 2 0 to 2 feet bgs	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	2.8E-05	--	--	2.8E-05
			ACENAPHTHENE	--	--	--	--	--	Liver	6.9E-05	--	--	6.9E-05
			ACENAPHTHYLENE	--	--	--	--	--	Liver	4.3E-06	--	--	4.3E-06
			ANTHRACENE	--	--	--	--	--	NOAEL	6.6E-06	--	--	6.6E-06
			ARSENIC	1.9E-07	--	5.7E-08	--	2.5E-07	Skin	3.0E-03	--	8.9E-04	3.9E-03
			BENZO(A)ANTHRACENE	1.9E-07	--	2.4E-07	--	4.3E-07	--	--	--	--	--
			BENZO(A)PYRENE	9.3E-07	--	1.2E-06	--	2.1E-06	--	--	--	--	--
			BENZO(B)FLUORANTHENE	1.7E-07	--	2.2E-07	--	3.9E-07	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	1.4E-05	--	1.4E-05	2.9E-05
			BENZO(K)FLUORANTHENE	9.7E-09	--	1.3E-08	--	2.2E-08	--	--	--	--	--
			CARBAZOLE	9.6E-10	--	1.4E-09	--	2.3E-09	--	--	--	--	--
			CHRYSENE	2.2E-09	--	2.9E-09	--	5.1E-09	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	1.8E-07	--	2.4E-07	--	4.2E-07	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	5.3E-04	--	--	5.3E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	3.7E-04	--	4.8E-04	8.5E-04
			FLUORENE	--	--	--	--	--	Blood	6.2E-05	--	--	6.2E-05
			INDENO(1,2,3-CD)PYRENE	5.6E-08	--	7.3E-08	--	1.3E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	1.2E-02	--	--	1.2E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	3.4E-05	--	--	3.4E-05
			PHENANTHRENE	--	--	--	--	--	Kidney	3.6E-04	--	--	3.6E-04
			PYRENE	--	--	--	--	--	Kidney	3.3E-04	--	--	3.3E-04
			Chemical Total	1.7E-06	--	2.1E-06	--	3.8E-06		1.6E-02	--	1.4E-03	1.8E-02
		Exposure Point Total						3.8E-06					1.8E-02
	Exposure Medium Total							3.8E-06					1.8E-02

Table 7-23, continued
Risk Characterization – Area of Concern 2, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 2		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	8.3E-06	--	8.3E-06
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	2.0E-07	--	2.0E-07
		Vapors)	ARSENIC	--	3.1E-11	--	--	3.1E-11	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	1.3E-12	--	--	1.3E-12	--	--	--	--	--
			BENZO(A)PYRENE	--	6.4E-12	--	--	6.4E-12	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	1.2E-12	--	--	1.2E-12	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	6.7E-14	--	--	6.7E-14	--	--	--	--	--
			CARBAZOLE	--	1.6E-14	--	--	1.6E-14	--	--	--	--	--
			CHRYSENE	--	7.5E-12	--	--	7.5E-12	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	1.3E-12	--	--	1.3E-12	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	1.8E-05	--	1.8E-05
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	6.1E-09	--	6.1E-09
			FLUORENE	--	--	--	--	--	Blood	--	5.0E-06	--	5.0E-06
			INDENO(1,2,3-CD)PYRENE	--	3.9E-13	--	--	3.9E-13	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	4.0E-04	--	4.0E-04
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	2.3E-06	--	2.3E-06
			Chemical Total	--	5.0E-11	--	--	5.0E-11		--	4.3E-04	--	4.3E-04
		Exposure Point Total						5.0E-11					4.3E-04
	Exposure Medium Total							5.0E-11					4.3E-04
Soil Total								3.8E-06					1.8E-02
Receptor Total							Receptor Risk Total	3.8E-06				Receptor HI Total	1.8E-02

Table 7-24
Risk Characterization – Area of Concern 3, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Trespasser/Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	1.8E-04	--	--	1.8E-04
AOC 3			ACENAPHTHENE	--	--	--	--	--	Liver	9.5E-05	--	--	9.5E-05
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	6.5E-06	--	--	6.5E-06
			ACETOPHENONE	--	--	--	--	--	NOAEL	3.5E-06	--	--	3.5E-06
			ANTHRACENE	--	--	--	--	--	NOAEL	3.9E-05	--	--	3.9E-05
			ARSENIC	1.9E-07	--	5.8E-08	--	2.5E-07	Skin	3.0E-03	--	8.9E-04	3.9E-03
			BENZO(A)ANTHRACENE	4.9E-07	--	6.4E-07	--	1.1E-06	--	--	--	--	--
			BENZO(A)PYRENE	1.4E-06	--	1.9E-06	--	3.3E-06	--	--	--	--	--
			BENZO(B)FLUORANTHENE	2.7E-07	--	3.5E-07	--	6.3E-07	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	1.6E-05	--	1.6E-05	3.1E-05
			BENZO(K)FLUORANTHENE	2.1E-08	--	2.7E-08	--	4.7E-08	--	--	--	--	--
			CARBAZOLE	2.1E-08	--	3.0E-08	--	5.2E-08	--	--	--	--	--
			CHRYSENE	4.8E-09	--	6.3E-09	--	1.1E-08	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	2.5E-07	--	3.2E-07	--	5.7E-07	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	9.1E-04	--	--	9.1E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	6.1E-04	--	7.9E-04	1.4E-03
			FLUORENE	--	--	--	--	--	Blood	1.1E-04	--	--	1.1E-04
			INDENO(1,2,3-CD)PYRENE	7.4E-08	--	9.7E-08	--	1.7E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	1.1E-02	--	--	1.1E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	1.0E-03	--	--	1.0E-03
			PHENANTHRENE	--	--	--	--	--	Kidney	1.1E-03	--	--	1.1E-03
			PYRENE	--	--	--	--	--	Kidney	5.8E-04	--	--	5.8E-04
			Chemical Total	2.8E-06	--	3.4E-06	--	6.1E-06		1.8E-02	--	1.7E-03	2.0E-02
		Exposure Point Total						6.1E-06					2.0E-02
	Exposure Medium Total							6.1E-06					2.0E-02

Table 7-24, continued
Risk Characterization – Area of Concern 3, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Trespasser/Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 3		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	1.1E-05	--	1.1E-05
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ACETOPHENONE	--	--	--	--	--	NOAEL	--	2.4E-02	--	2.4E-02
		Vapors)	ANTHRACENE	--	--	--	--	--	NOAEL	--	1.2E-06	--	1.2E-06
			ARSENIC	--	3.1E-11	--	--	3.1E-11	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	3.4E-12	--	--	3.4E-12	--	--	--	--	--
			BENZO(A)PYRENE	--	9.9E-12	--	--	9.9E-12	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	1.9E-12	--	--	1.9E-12	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	1.4E-13	--	--	1.4E-13	--	--	--	--	--
			CARBAZOLE	--	3.5E-13	--	--	3.5E-13	--	--	--	--	--
			CHRYSENE	--	1.6E-11	--	--	1.6E-11	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	1.7E-12	--	--	1.7E-12	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	3.0E-05	--	3.0E-05
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	9.9E-09	--	9.9E-09
			FLUORENE	--	--	--	--	--	Blood	--	8.7E-06	--	8.7E-06
			INDENO(1,2,3-CD)PYRENE	--	5.1E-13	--	--	5.1E-13	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	1.2E-02	--	1.2E-02
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	4.0E-06	--	4.0E-06
			Chemical Total	--	6.6E-11	--	--	6.6E-11		--	3.6E-02	--	3.6E-02
		Exposure Point Total						6.6E-11					3.6E-02
	Exposure Medium Total							6.6E-11					3.6E-02
Soil Total								6.1E-06					5.5E-02
Receptor Total							Receptor Risk Total	6.1E-06				Receptor HI Total	5.5E-02

Table 7-25
Risk Characterization – Area of Concern 4, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	On-site Soil	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	1.3E-05	--	--	1.3E-05
AOC 4			ACENAPHTHENE	--	--	--	--	--	Liver	1.5E-05	--	--	1.5E-05
0 to 2 feet bgs			ACENAPHTHYLENE	--	--	--	--	--	Liver	6.2E-06	--	--	6.2E-06
			ANTHRACENE	--	--	--	--	--	NOAEL	6.6E-06	--	--	6.6E-06
			ARSENIC	1.7E-07	--	5.1E-08	--	2.2E-07	Skin	2.6E-03	--	7.9E-04	3.4E-03
			BENZO(A)ANTHRACENE	1.7E-07	--	2.2E-07	--	3.9E-07	--	--	--	--	--
			BENZO(A)PYRENE	7.4E-07	--	9.6E-07	--	1.7E-06	--	--	--	--	--
			BENZO(B)FLUORANTHENE	1.5E-07	--	2.0E-07	--	3.5E-07	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	1.4E-05	--	1.4E-05	2.8E-05
			BENZO(K)FLUORANTHENE	9.6E-09	--	1.2E-08	--	2.2E-08	--	--	--	--	--
			CARBAZOLE	1.5E-09	--	2.1E-09	--	3.5E-09	--	--	--	--	--
			CHRYSENE	3.5E-09	--	4.6E-09	--	8.1E-09	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	2.5E-07	--	3.3E-07	--	5.8E-07	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	1.2E-04	--	--	1.2E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	1.5E-04	--	2.0E-04	3.5E-04
			FLUORENE	--	--	--	--	--	Blood	2.4E-05	--	--	2.4E-05
			INDENO(1,2,3-CD)PYRENE	5.3E-08	--	6.9E-08	--	1.2E-07	--	--	--	--	--
			IRON	--	--	--	--	--	Nutrition	1.5E-02	--	--	1.5E-02
			NAPHTHALENE	--	--	--	--	--	Body Weight	1.3E-05	--	--	1.3E-05
			PHENANTHRENE	--	--	--	--	--	Kidney	1.6E-04	--	--	1.6E-04
			PYRENE	--	--	--	--	--	Kidney	2.4E-04	--	--	2.4E-04
			Chemical Total	1.5E-06	--	1.8E-06	--	3.4E-06		1.8E-02	--	1.0E-03	1.9E-02
		Exposure Point Total						3.4E-06					1.9E-02
	Exposure Medium Total							3.4E-06					1.9E-02

Table 7-25, continued
Risk Characterization – Area of Concern 4, Recreational Visitor

Scenario Timeframe:	Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Air	Inhalation	2-METHYLNAPHTHALENE	--	--	--	--	--	--	--	--	--	--
AOC 4		(Airborne	ACENAPHTHENE	--	--	--	--	--	Liver	--	1.8E-06	--	1.8E-06
0 to 2 feet bgs		Particulates	ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
		and	ANTHRACENE	--	--	--	--	--	NOAEL	--	2.0E-07	--	2.0E-07
		Vapors)	ARSENIC	--	2.8E-11	--	--	2.8E-11	--	--	--	--	--
			BENZO(A)ANTHRACENE	--	1.2E-12	--	--	1.2E-12	--	--	--	--	--
			BENZO(A)PYRENE	--	5.1E-12	--	--	5.1E-12	--	--	--	--	--
			BENZO(B)FLUORANTHENE	--	1.0E-12	--	--	1.0E-12	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	--	--	--	--	--
			BENZO(K)FLUORANTHENE	--	6.6E-14	--	--	6.6E-14	--	--	--	--	--
			CARBAZOLE	--	2.4E-14	--	--	2.4E-14	--	--	--	--	--
			CHRYSENE	--	1.2E-11	--	--	1.2E-11	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	--	1.7E-12	--	--	1.7E-12	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	--	3.9E-06	--	3.9E-06
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	--	2.5E-09	--	2.5E-09
			FLUORENE	--	--	--	--	--	Blood	--	1.9E-06	--	1.9E-06
			INDENO(1,2,3-CD)PYRENE	--	3.7E-13	--	--	3.7E-13	--	--	--	--	--
			IRON	--	--	--	--	--	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Nasal	--	1.5E-04	--	1.5E-04
			PHENANTHRENE	--	--	--	--	--	--	--	--	--	--
			PYRENE	--	--	--	--	--	Kidney	--	1.7E-06	--	1.7E-06
			Chemical Total	--	4.9E-11	--	--	4.9E-11		--	1.6E-04	--	1.6E-04
		Exposure Point Total						4.9E-11					1.6E-04
	Exposure Medium Total							4.9E-11					1.6E-04
Soil Total								3.4E-06					1.9E-02
Receptor Total							Receptor Risk Total	3.4E-06				Receptor HI Total	1.9E-02

Table 7-26
Risk Characterization – Sediment Unnamed Tributary, Recreational Visitor

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment Unnamed Tributary	Sediment	Unnamed Tributary	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	1.4E-04	--	--	1.4E-04
			ACENAPHTHENE	--	--	--	--	--	Liver	8.4E-05	--	--	8.4E-05
			ACENAPHTHYLENE	--	--	--	--	--	Liver	1.0E-06	--	--	1.0E-06
			ANTHRACENE	--	--	--	--	--	NOAEL	3.2E-06	--	--	3.2E-06
			ARSENIC	3.8E-07	--	1.1E-07	--	4.9E-07	Skin	1.7E-02	--	3.3E-03	2.0E-02
			BENZO(A)ANTHRACENE	7.7E-08	--	1.0E-07	--	1.8E-07	--	--	--	--	--
			BENZO(A)PYRENE	2.9E-07	--	3.7E-07	--	6.6E-07	--	--	--	--	--
			BENZO(B)FLUORANTHENE	3.3E-08	--	4.3E-08	--	7.7E-08	--	--	--	--	--
			BENZO(G,H,I)PERYLENE	--	--	--	--	--	Kidney	3.3E-06	--	2.2E-06	5.5E-06
			BENZO(K)FLUORANTHENE	3.4E-09	--	4.4E-09	--	7.7E-09	--	--	--	--	--
			CARBAZOLE	3.4E-10	--	4.9E-10	--	8.3E-10	--	--	--	--	--
			CHRYSENE	6.6E-10	--	8.5E-10	--	1.5E-09	--	--	--	--	--
			DIBENZO(A,H)ANTHRACENE	3.1E-08	--	4.0E-08	--	7.2E-08	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	4.8E-04	--	--	4.8E-04
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	1.5E-04	--	1.3E-04	2.8E-04
			FLUORENE	--	--	--	--	--	Blood	6.8E-05	--	--	6.8E-05
			INDENO(1,2,3-CD)PYRENE	9.5E-09	--	1.2E-08	--	2.2E-08	--	--	--	--	--
			NAPHTHALENE	--	--	--	--	--	Body Weight	8.8E-04	--	--	8.8E-04
			PHENANTHRENE	--	--	--	--	--	Kidney	2.4E-04	--	--	2.4E-04
			PYRENE	--	--	--	--	--	Kidney	2.1E-04	--	--	2.1E-04
			Chemical Total	8.2E-07	--	6.9E-07	--	1.5E-06		1.9E-02	--	3.5E-03	2.3E-02
		Exposure Point Total						1.5E-06					2.3E-02
	Exposure Medium Total							1.5E-06					2.3E-02
Sediment Total								1.5E-06					2.3E-02

Table 7-27
Risk Characterization – Surface Water Unnamed Tributary, Recreational Visitor

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Unnamed Tributary	2-METHYLNAPHTHALENE	--	--	--	--	--	Body Weight	8.8E-04	--	8.4E-04	1.7E-03
			ACENAPHTHENE	--	--	--	--	--	Liver	6.8E-04	--	7.4E-04	1.4E-03
			BENZENE	3.6E-08	--	1.7E-07	--	2.1E-07	Blood	6.6E-02	--	1.0E-02	7.6E-02
			BENZO(A)ANTHRACENE	3.2E-08	--	1.1E-05	--	1.1E-05	--	--	--	--	--
			BENZO(B)FLUORANTHENE	1.6E-08	--	1.0E-05	--	1.0E-05	--	--	--	--	--
			CHRYSENE	3.2E-10	--	1.1E-07	--	1.1E-07	--	--	--	--	--
			DIBENZOFURAN	--	--	--	--	--	Kidney	5.6E-03	--	7.1E-03	1.3E-02
			FLUORANTHENE	--	--	--	--	--	Liver & Kidney	6.4E-04	--	3.5E-03	4.1E-03
			FLUORENE	--	--	--	--	--	Blood	5.8E-04	--	9.7E-04	1.5E-03
			NAPHTHALENE	--	--	--	--	--	Body Weight	6.1E-03	--	4.0E-03	1.0E-02
			PHENANTHRENE	--	--	--	--	--	Kidney	9.2E-04	--	2.3E-03	3.2E-03
			PYRENE	--	--	0.0E+00	--	0.0E+00	Kidney	9.0E-04	--	4.9E-03	5.8E-03
			THALLIUM	--	--	0.0E+00	--	0.0E+00	Liver	9.8E-01	--	8.4E-03	9.9E-01
			VINYL CHLORIDE	3.3E-08	--	5.7E-08	--	9.0E-08	Liver	2.9E-03	--	1.7E-04	3.1E-03
			Chemical Total	1.2E-07	--	2.2E-05	--	2.2E-05		1.1E+00	--	4.3E-02	1.1E+00
		Exposure Point Total						2.2E-05					1.1E+00
	Exposure Medium Total							2.2E-05					1.1E+00
Surface Water Total								2.2E-05					1.1E+00
Receptor Total							Receptor Risk Total	2.3E-05				Receptor HI Total	1.1E+00

Table 7-28
Occurrence and Distribution of COCs – Sediments Unnamed Tributary

Scenario Timeframe: Current/Future Ecological Exposures
Medium: Sediment in Intermittent Stream
Exposure Medium: Sediment (Evaluated as Terrestrial Habitat)
Exposure Point: Biologically-Active Depth Sediment (0 to 6 inches bgs)

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Screening Toxicity Value (3)	Screening Toxicity Value Source (3)	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
91576	2-METHYLNAPHTHALENE	1.60E-02		3.20E+00	LJ	mg/kg	SD09-0.0-0.5	13/15	1.00E-02 - 3.10E-02	3.20E+00	--	--	YES	HIST
106445	4-METHYLPHENOL	5.40E-02	LJ	5.40E-02	LJ	mg/kg	SD09-0.0-0.5	1/15	4.00E-01 - 4.30E-01	5.40E-02	--	--	NO	IFD, GRA, BCRDL
83329	ACENAPHTHENE	1.00E-01		5.70E+00	D	mg/kg	SD09-0.0-0.5	14/15	3.10E-02 - 3.10E-02	5.70E+00	2.0E+01	TNRCC 2001	YES	HIST
208968	ACENAPHTHYLENE	4.60E-03	LJ	6.80E-02	LJ	mg/kg	SD09-0.0-0.5	9/15	1.00E-02 - 4.20E-01	6.80E-02	--	--	YES	HIST
67641	ACETONE	5.00E-03	LJ	5.00E-03	LJ	mg/kg	SD01-0.0-0.5D	1/3	1.30E-02 - 1.30E-02	5.00E-03	--	--	NO	IFD, GRA, BCRDL
7429905	ALUMINUM	5.01E+02		8.85E+03		mg/kg	SD10-0.0-0.5	15/15	-- --	8.85E+03	5.0E+01	TNRCC 2001	NO	EPA 2000
120127	ANTHRACENE	6.90E-03	LJ	1.10E+00		mg/kg	SD05-0.0-0.5	15/15	-- --	1.10E+00	--	--	YES	HIST
7440382	ARSENIC	9.44E-01	B	6.72E+00		mg/kg	SD10-0.0-0.5	9/15	9.56E-01 - 9.92E-01	6.72E+00	3.7E+01	EPA 2000a	NO	GRA
7440393	BARIUM	4.84E+00		4.66E+01		mg/kg	SD10-0.0-0.5	15/15	-- --	4.66E+01	5.0E+02	TNRCC 2001	NO	Tetra Tech 2001
56553	BENZO(A)ANTHRACENE	1.40E-02	LJ	2.40E+00		mg/kg	SD06-0.0-0.5	15/15	-- --	2.40E+00	--	--	YES	HIST
50328	BENZO(A)PYRENE	9.60E-03	LJ	9.00E-01		mg/kg	SD06-0.0-0.5	15/15	-- --	9.00E-01	--	--	YES	HIST
205992	BENZO(B)FLUORANTHENE	1.60E-02	LJ	1.30E+00		mg/kg	SD06-0.0-0.5	15/15	-- --	1.30E+00	--	--	YES	HIST
191242	BENZO(G,H,I)PERYLENE	8.10E-03	LJ	2.20E-01		mg/kg	SD10-0.0-0.5	14/15	3.20E-02 - 3.20E-02	2.20E-01	--	--	YES	HIST
207089	BENZO(K)FLUORANTHENE	1.30E-02	LJ	1.30E+00		mg/kg	SD06-0.0-0.5	15/15	-- --	1.30E+00	--	--	YES	HIST
7440417	BERYLLIUM	2.15E-01	B	2.86E-01	B	mg/kg	SD10-0.0-0.5	3/15	7.16E-01 - 7.94E-01	2.86E-01	1.0E+01	TNRCC 2001	NO	GRA
92524	BIPHENYL	5.20E-02	LJ	9.60E-01		mg/kg	SD09-0.0-0.5	9/15	4.00E-01 - 4.20E-01	9.60E-01	--	--	NO	GRA
117817	BIS(2-ETHYLHEXYL)PHTHALATE	1.10E-01	LJ	4.40E+00	J^	mg/kg	SD01-0.0-0.5D	3/15	4.00E-01 - 4.30E-01	4.40E+00	--	--	NO	GRA
7440702	CALCIUM	7.39E+01	B	1.00E+04		mg/kg	SD11-0.0-0.5	15/15	-- --	1.00E+04	--	--	NO	NUT
86748	CARBAZOLE	5.20E-02	LJ	5.80E-01		mg/kg	SD09-0.0-0.5	10/15	4.00E-01 - 4.20E-01	5.80E-01	--	--	YES	HIST
7440473	CHROMIUM	1.53E+00		1.44E+01		mg/kg	SD10-0.0-0.5	15/15	-- --	1.44E+01	2.4E+01	EPA 2000a	NO	GRA
218019	CHRYSENE	1.80E-02	LJ	2.30E+00		mg/kg	SD06-0.0-0.5	15/15	-- --	2.30E+00	--	--	YES	HIST
7440484	COBALT	3.96E-01	B	3.16E+00		mg/kg	SD10-0.0-0.5	10/15	1.91E+00 - 1.99E+00	3.16E+00	2.0E+01	TNRCC 2001	NO	GRA
7440508	COPPER	4.26E-01	B	1.58E+00	B	mg/kg	SD10-0.0-0.5	3/15	1.91E+00 - 1.99E+00	1.58E+00	6.1E+01	EPA 2000a	NO	GRA
53703	DIBENZO(A,H)ANTHRACENE	5.80E-03	LJ	2.20E-01	LJ	mg/kg	SD06-0.0-0.5	12/15	3.10E-02 - 4.20E-01	2.20E-01	--	--	YES	HIST
132649	DIBENZOFURAN	5.60E-02	LJ	2.20E+00		mg/kg	SD09-0.0-0.5	14/15	4.10E-01 - 4.10E-01	2.20E+00	--	--	YES	HIST
206440	FLUORANTHENE	3.40E-02		6.90E+00	J	mg/kg	SD06-0.0-0.5	15/15	-- --	6.90E+00	--	--	YES	HIST
86737	FLUORENE	8.50E-02		3.10E+00		mg/kg	SD06-0.0-0.5	14/15	3.10E-02 - 3.10E-02	3.10E+00	3.0E+01	TNRCC 2001	YES	HIST
193395	INDENO(1,2,3-CD)PYRENE	2.30E-02		4.60E-01		mg/kg	SD06-0.0-0.5	14/15	3.10E-02 - 3.10E-02	4.60E-01	--	--	YES	HIST
7439896	IRON	9.96E+02		1.55E+04		mg/kg	SD10-0.0-0.5	15/15	-- --	1.55E+04	--	--	YES	QUAL, NUT
7439921	LEAD	1.72E+00		1.92E+01		mg/kg	SD11-0.0-0.5	15/15	-- --	1.92E+01	5.0E+01	TNRCC 2001	NO	GRA
7439954	MAGNESIUM	2.73E+01	B	4.37E+02		mg/kg	SD10-0.0-0.5	15/15	-- --	4.37E+02	--	--	NO	GRA
7439965	MANGANESE	4.84E+00		1.40E+02		mg/kg	SD10-0.0-0.5	15/15	-- --	1.40E+02	5.0E+02	TNRCC 2001	NO	GRA
91203	NAPHTHALENE	1.80E-02		2.00E+01	D	mg/kg	SD09-0.0-0.5	14/15	3.10E-02 - 3.10E-02	2.00E+01	--	--	YES	HIST
7440020	NICKEL	5.25E-01	B	5.53E+00		mg/kg	SD10-0.0-0.5	15/15	-- --	5.53E+00	3.0E+01	TNRCC 2001	NO	GRA
85018	PHENANTHRENE	1.40E-02	LJ	8.20E+00	D	mg/kg	SD06-0.0-0.5	15/15	-- --	8.20E+00	--	--	YES	HIST
7440097	POTASSIUM	5.99E+01	B	4.76E+02		mg/kg	SD10-0.0-0.5	2/15	1.91E+02 - 1.99E+02	4.76E+02	--	--	NO	NUT
129000	PYRENE	3.40E-02		7.00E+00		mg/kg	SD06-0.0-0.5	15/15	-- --	7.00E+00	--	--	YES	HIST
7782492	SELENIUM	1.18E+00		1.98E+00		mg/kg	SD10-0.0-0.5	5/15	9.56E-01 - 9.94E-01	1.98E+00	1.0E+00	TNRCC 2001	NO	GRA
7440224	SILVER	1.96E-01	B	2.87E-01	B	mg/kg	SD09-0.0-0.5	3/15	9.56E-01 - 9.96E-01	2.87E-01	2.0E+00	TNRCC 2001	NO	GRA
7440622	VANADIUM	2.24E+00	B	3.60E+01		mg/kg	SD10-0.0-0.5	15/15	-- --	3.60E+01	2.0E+00	TNRCC 2001	NO	GRA
7440666	ZINC	4.70E+00		3.87E+01		mg/kg	SD12-0.0-0.5	15/15	-- --	3.87E+01	1.2E+02	EPA 2000a	NO	GRA

Table 7-29
Occurrence and Distribution of COCs – Surface Water Unnamed Tributary

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water in Unnamed Tributary

CAS Number	Chemical	Minimum Concentration (1) (ug/L)	Minimum Qualifier	Maximum Concentration (1) (ug/L)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (ug/L)	Screening Value Source	Potential ARAR/TBC (ug/L)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (3)
105679	2,4-DIMETHYLPHENOL	1.00E+00	LJ	1.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	1.00E+00	--	2.10E+02	TNRCC 2001	--	--	NO	BSL, IFD, GRA, BCRDL
78933	2-BUTANONE	3.00E+00	LJ	4.00E+00	LJ	SW-01D	2/3	5.00E+00 - 5.00E+00	4.00E+00	--	8.48E+04	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
91576	2-METHYLNAPHTHALENE	2.00E+00	LJ	2.00E+00	LJ	SW-08	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	1.30E+02	TNRCC 2001	--	--	YES	HIST (BSL)
95487	2-METHYLPHENOL	1.00E+00	LJ	1.00E+00	LJ	SW-02	2/15	5.00E+00 - 5.00E+00	1.00E+00	--	1.12E+03	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
83329	ACENAPHTHENE	1.00E+00	LJ	8.00E+00		SW-08	13/15	5.00E+00 - 5.00E+00	8.00E+00	--	2.30E+01	TNRCC 2001	4.70E-02	TNRCC 1998	YES	HIST (BSL)
67641	ACETONE	6.00E+00	J	8.00E+00		SW-01D	3/3	-- --	8.00E+00	--	2.02E+05	TNRCC 2001	--	--	NO	BSL
7429905	ALUMINUM	2.05E+01	LJv	8.67E+01	LJv	SW-08	15/15	-- --	8.67E+01	--	9.91E+05	TNRCC 2000			YES	BSL
7440393	BARIUM	1.01E+02	L	1.31E+02	L	SW-02	15/15	-- --	1.31E+02	--	4.00E+00	TNRCC 2001	--	--	NO	GRA, BCRDL
71432	BENZENE	4.00E+00		3.00E+01		SW-01	3/3	-- --	3.00E+01	--	1.30E+02	TNRCC 2001	--	--	NO	BSL
56553	BENZO(A)ANTHRACENE	2.00E+00	LJ	2.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	3.46E+01	TNRCC 2001	8.39E-01	TNRCC 1998	YES	HIST (BSL)
205992	BENZO(B)FLUORANTHENE	1.00E+00	LJ	1.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	1.00E+00	--	--	--	4.80E+01	TNRCC 1998	YES	HIST
117817	BIS(2-ETHYLHEXYL)PHTHALATE	1.00E+00	LJ	1.00E+00	LJ	SW-02	2/15	5.00E+00 - 5.00E+00	1.00E+00	--	7.00E+00	TNRCC 2001	2.58E+02	TNRCC 1998	NO	BSL, GRA, BCRDL
7440702	CALCIUM	1.69E+04		2.17E+04		SW-02	15/15	-- --	2.17E+04	--	--	--	--	--	NO	NUT
7440473	CHROMIUM	8.20E-01	LJ	8.20E-01	LJ	SW-08	1/15	8.00E-01 - 8.00E-01	8.20E-01	--	1.06E+01	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
218019	CHRYSENE	2.00E+00	LJ	2.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	7.00E+00	TNRCC 2001	--	--	YES	HIST (BSL)
156592	CIS-1,2-DICHLOROETHENE	6.00E+00		6.00E+00		SW-01D	2/3	1.00E+00 - 1.00E+00	6.00E+00	--	1.40E+04	TNRCC 2001	--	--	NO	BSL
7440484	COBALT	1.30E+00	L	2.40E+00	LJv	SW-02	9/15	1.00E+00 - 1.00E+00	2.40E+00	--	1.50E+03	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
7440508	COPPER	1.20E+00	LJv	1.20E+00	LJv	SW-01	1/15	8.00E-01 - 8.00E-01	1.20E+00	--	9.57E+03	TNRCC 2000 (4)			YES	BSL
132649	DIBENZOFURAN	1.00E+00	LJ	4.00E+00	LJ	SW-08	7/15	5.00E+00 - 5.00E+00	4.00E+00	--	9.40E+01	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
100414	ETHYLBENZENE	5.00E-01	LJ	4.00E+00		SW-01D	3/3	-- --	4.00E+00	--	2.18E+03	TNRCC 2001	--	--	NO	BSL
206440	FLUORANTHENE	1.00E+00	LJ	5.00E+00		SW-02	10/15	5.00E+00 - 5.00E+00	5.00E+00	--	6.16E+00	TNRCC 2001	5.40E+01	TNRCC 1998	YES	HIST (BSL)
86737	FLUORENE	1.00E+00	LJ	4.00E+00	LJ	SW-08	9/15	5.00E+00 - 5.00E+00	4.00E+00	--	1.10E+01	TNRCC 2001	4.70E+01	TNRCC 1998	YES	HIST (BSL)
7439896	IRON	3.11E+03		5.87E+03		SW-05	15/15	-- --	5.87E+03	--	1.00E+03	TNRCC 2001	--	--	YES	QUAL, NUT
7439954	MAGNESIUM	3.58E+03	L	4.99E+03	L	SW-02	15/15	-- --	4.99E+03	--	--	--	--	--	NO	NUT, GRA, BCRDL
7439965	MANGANESE	1.51E+02		4.04E+02		SW-09	15/15	-- --	4.04E+02	--	1.20E+02	TNRCC 2001	--	--	NO	NUT, GRA
7439976	MERCURY	7.60E-01		7.60E-01		SW-05	1/15	2.00E-01 - 2.00E-01	7.60E-01	--	2.40E+03	TNRCC 2000			YES	BSL
91203	NAPHTHALENE	1.00E+00	LJ	2.90E+01		SW-08	8/15	5.00E+00 - 5.00E+00	2.90E+01	--	4.90E+02	TNRCC 2001	4.70E+01	TNRCC 1998	YES	HIST (BSL)
85018	PHENANTHRENE	1.00E+00	LJ	5.00E+00		SW-02	9/15	5.00E+00 - 5.00E+00	5.00E+00	--	3.00E+01	TNRCC 2000	4.70E+01	TNRCC 1998	YES	HIST (BSL)
108952	PHENOL	1.00E+00	LJ	3.00E+00	LJ	SW-01D	4/15	5.00E+00 - 5.00E+00	3.00E+00	--	1.10E+02	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
7440097	POTASSIUM	1.39E+03	L	3.80E+03	L	SW-09	15/15	-- --	3.80E+03	--	--	--	--	--	NO	NUT
129000	PYRENE	1.00E+00	LJ	4.00E+00	LJ	SW-02	10/15	5.00E+00 - 5.00E+00	4.00E+00	--	7.00E+00	TNRCC 2001	4.80E+01	TNRCC 1998	YES	HIST (BSL)
7440235	SODIUM	1.05E+04		1.57E+04		SW-03	15/15	-- --	1.57E+04	--	--	--	--	--	NO	NUT
7440280	THALLIUM	4.00E+00	L	8.90E+00	L	SW-11	8/15	3.90E+00 - 3.90E+00	8.90E+00	--	4.00E+01	TNRCC 2001	--	--	NO	BSL, GRA, BCRDL
108883	TOLUENE	2.00E+00		2.00E+01		SW-01	3/3	-- --	2.00E+01	--	2.90E+03	TNRCC 2001	--	--	NO	BSL
79016	TRICHLOROETHENE	5.00E-01	LJ	5.00E-01	LJ	SW-01D	1/3	1.00E+00 - 1.00E+00	5.00E-01	--	1.11E+03	TNRCC 2001	6.90E+01	TNRCC 1998	NO	BSL, GRA, BCRDL
75014	VINYL CHLORIDE	1.00E+00		1.00E+00		SW-01D	2/3	1.00E+00 - 1.00E+00	1.00E+00	--	--	--	--	--	NO	GRA
1330207	XYLENE (TOTAL)	3.00E+00		2.40E+01		SW-01D	3/3	-- --	2.40E+01	--	1.34E+03	TNRCC 2001	--	--	NO	BSL
7440666	ZINC	7.10E+00	L	2.10E+01		SW-01	15/15	-- --	2.10E+01	--	6.35E+04	TNRCC 2000 (5)			YES	BSL

Table 7-30
Occurrence and Distribution of COCs – Surface Soil Hot Spot JS02

Scenario Timeframe: Current and Future Ecological Exposures
Medium: Soil at JS02 Organic Hot Spot Only
Exposure Medium: Soil
Exposure Point: 0 to 0.5 feet bgs

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)		Screening Toxicity Value Source (3)	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
78933	2-BUTANONE	7.30E-02		7.30E-02		mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 - 1.00E-02	7.30E-02	--	--		--	NO	VOC; NTX
91576	2-METHYLNAPHTHALENE	5.70E+01		8.90E+01		mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	8.90E+01	--	--		--	YES	HIST
108101	4-METHYL-2-PENTANONE	5.00E-03	LJ	5.00E-03	LJ	mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 - 1.00E-02	5.00E-03	--	--		--	NO	VOC, BCRDL
83329	ACENAPHTHENE	3.40E+02	D	3.60E+02		mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	3.60E+02	--	2.0E+01	P	TNRCC 2001	YES	HIST
208968	ACENAPHTHYLENE	2.70E+00	LJ	7.10E+00	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	7.10E+00	--	--		--	YES	HIST
67641	ACETONE	2.30E-01	B	2.30E-01	B	mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 1.00E-02	2.30E-01	--	--		--	NO	VOC; NTX
7429905	ALUMINUM	3.06E+03		4.93E+03		mg/kg	HA-JS02-0.0-0.5	2/2	-- * --	4.93E+03	--	5.0E+01	P	TNRCC 2001	NO	Tetra Tech 2001d
120127	ANTHRACENE	2.50E+02		4.10E+02	D	mg/kg	HA-JS02-0.0-0.5	2/2	1.00E+01 1.00E+01	4.10E+02	--	--		--	YES	HIST
7440382	ARSENIC	7.20E+00		7.20E+00		mg/kg	HA-JS02-0.0-0.5	1/2	-- --	7.20E+00	--	3.7E+01	P	EPA 2000a	NO	BSL
7440393	BARIUM	3.48E+01	L	3.74E+01	L	mg/kg	HA-JS02-0.0-0.5D	2/2	-- --	3.74E+01	--	5.0E+02	P	TNRCC 2001	NO	Tetra Tech 2001d
71432	BENZENE	1.20E-02	LJ	1.20E-02	LJ	mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 1.00E-02	1.20E-02	--	--		--	NO	VOC
56553	BENZO(A)ANTHRACENE	5.40E+01	Jv	1.30E+02	J^	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	1.30E+02	--	--		--	YES	HIST
50328	BENZO(A)PYRENE	1.70E+01		3.40E+01	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	3.40E+01	--	--		--	YES	HIST
205992	BENZO(B)FLUORANTHENE	3.00E+01	Jv	6.90E+01	J^	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	6.90E+01	--	--		--	YES	HIST
191242	BENZO(G,H,I)PERYLENE	5.40E+00	LJ	1.10E+01	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	1.10E+01	--	--		--	YES	HIST
207089	BENZO(K)FLUORANTHENE	1.80E+01		4.20E+01	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	4.20E+01	--	--		--	YES	HIST
92524	BIPHENYL	1.40E+01		2.70E+01	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	2.70E+01	--	--		--	NO	BCRDL
7440702	CALCIUM	1.10E+03		1.70E+03		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.70E+03	--	--		--	NO	NUT
86748	CARBAZOLE	6.30E+01		1.20E+02		mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 1.00E+01	1.20E+02	--	--		--	YES	HIST
7440473	CHROMIUM	1.20E+01		1.73E+01		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.73E+01	--	2.4E+01	P	EPA 2000a[a]	NO	BSL
218019	CHRYSENE	6.00E+01	Jv	1.50E+02	J^	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 1.00E+01	1.50E+02	--	--		--	YES	HIST
7440484	COBALT	8.90E-01	L	1.10E+00	L	mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.10E+00	--	2.0E+01	P	EPA 2000a	NO	BSL
7440508	COPPER	5.20E+00	L	8.90E+00		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	8.90E+00	--	6.1E+01	I	EPA 2000a	NO	GRA
53703	DIBENZO(A,H)ANTHRACENE	2.90E+00	LJ	2.90E+00	LJ	mg/kg	HA-JS02-0.0-0.5	1/2	1.00E+01 1.00E+01	2.90E+00	--	--		--	YES	HIST
132649	DIBENZOFURAN	7.70E+01	Jv	1.90E+02	J^	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	1.90E+02	--	--		--	YES	HIST
100414	ETHYLBENZENE	8.50E-02		8.50E-02		mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 - 1.00E-02	8.50E-02	--	--		--	NO	VOC
206440	FLUORANTHENE	7.50E+02	D	9.60E+02	D	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	9.60E+02	--	--		--	YES	HIST
86737	FLUORENE	2.60E+02	LJ	2.80E+02		mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	2.80E+02	--	3.0E+01	I	TNRCC 2001	YES	HIST
193395	INDENO(1,2,3-CD)PYRENE	5.80E+00	LJ	1.20E+01	LJ	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	1.20E+01	--	--		--	YES	HIST
7439896	IRON	1.67E+04		1.86E+04		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.86E+04	--	--		--	YES	QUAL, NUT
7439921	LEAD	1.07E+01		2.07E+01		mg/kg	HA-JS02-0.0-0.5D	2/2	-- --	2.07E+01	--	5.0E+01	P	TNRCC 2001	NO	BSL
7439954	MAGNESIUM	2.29E+02	L	2.99E+02	L	mg/kg	HA-JS02-0.0-0.5	2/2	-- --	2.99E+02	--	--		--	NO	NUT
7439965	MANGANESE	4.59E+01		5.04E+01		mg/kg	HA-JS02-0.0-0.5D	2/2	-- --	5.04E+01	--	5.0E+02	P	TNRCC 2001	NO	BSL
7439976	MERCURY	2.40E-01		4.70E-01		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	4.70E-01	--	1.0E-01	I	TNRCC 2001	YES	ASL
108872	METHYL CYCLOHEXANE	1.10E-02	LJ	1.10E-02	LJ	mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 1.00E-02	1.10E-02	--	--		--	NO	VOC
91203	NAPHTHALENE	4.10E+02		7.70E+02	D	mg/kg	HA-JS02-0.0-0.5	2/2	1.00E+01 - 1.00E+01	7.70E+02	--	--		--	NO	HIST
7440020	NICKEL	2.10E+00	L	3.20E+00	L	mg/kg	HA-JS02-0.0-0.5	2/2	-- --	3.20E+00	--	3.0E+01	P	TNRCC 2001	NO	BCRDL
85018	PHENANTHRENE	9.80E+02	BD	1.40E+03	BD	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	1.40E+03	--	--		--	YES	HIST
7440097	POTASSIUM	1.41E+02	L	1.84E+02	L	mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.84E+02	--	--		--	NO	NUT
129000	PYRENE	6.00E+02	D	7.20E+02	D	mg/kg	HA-JS02-0.0-0.5D	2/2	1.00E+01 - 1.00E+01	7.20E+02	--	--		--	YES	HIST
7440235	SODIUM	1.17E+02	L	1.24E+02	L	mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.24E+02	--	--		--	NO	NUT
108883	TOLUENE	8.80E-02		8.80E-02		mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 1.00E-02	8.80E-02	--	2.0E+02	P	TNRCC 2001	NO	VOC
79016	TRICHLOROETHENE	4.00E-03	LJ	4.00E-03	LJ	mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 1.00E-02	4.00E-03	--	--		--	NO	VOC
7440622	VANADIUM	1.94E+01		3.72E+01		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	3.72E+01	--	2.0E+00	P	TNRCC 2001	YES	ASL
1330207	XYLENE (TOTAL)	3.00E-01		3.00E-01		mg/kg	HA-JS02-0.0-0.5	1/1	1.00E-02 - 1.00E-02	3.00E-01	--	--		--	NO	VOC
7440666	ZINC	1.37E+01		1.98E+01		mg/kg	HA-JS02-0.0-0.5	2/2	-- --	1.98E+01	--	1.9E+02	P	EPA 2000a	NO	BSL
	LPAH	--		2.55E+03		mg/kg	--	NA	-- --	2.55E+03	--	2.0E+01	P	TNRCC 2001	YES	HIST, ASL
	HPAH	--		2.13E+03		mg/kg	--	NA	-- --	2.13E+03	--	2.2E+01	P	TNRCC 2001	YES	HIST, ASL

Table 7-31
Occurrence and Distribution of COCs – Surface Soil Hot Spot JS16

Scenario Timeframe: Current and Future Ecological Exposures
Medium: Soil at JS16 Inorganic Hot Spot Only
Exposure Medium: Soil
Exposure Point: 0 to 0.5 feet bgs

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)		Screening Toxicity Value Source (3)	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
208968	ACENAPHTHYLENE	9.40E-02	LJ	9.40E-02	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	9.40E-02	--	--		--	YES	HIST
7429905	ALUMINUM	3.39E+03		3.39E+03		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	3.39E+03	--	5.0E+01	P	TNRCC 2001	NO	Tetra Tech 2001d
120127	ANTHRACENE	1.10E+00		1.10E+00		mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	1.10E+00	--	--		--	YES	HIST
7440360	ANTIMONY	2.00E+00	L	2.00E+00	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	2.00E+00	--	5.0E+00	P	EPA 2000a	NO	BCRDL
7440382	ARSENIC	6.80E+00		6.80E+00		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	6.80E+00	--	3.7E+01	P	EPA 2000a	NO	BSL
7440393	BARIUM	3.55E+01	L	3.55E+01	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	3.55E+01	--	5.0E+02	P	TNRCC 2001	NO	Tetra Tech 2001d
56553	BENZO(A)ANTHRACENE	1.90E-01	LJ	1.90E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	1.90E-01	--	--		--	YES	HIST
205992	BENZO(B)FLUORANTHENE	1.70E-01	LJ	1.70E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 3.30E-01	1.70E-01	--	--		--	YES	HIST
207089	BENZO(K)FLUORANTHENE	1.10E-01	LJ	1.10E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	1.10E-01	--	--		--	YES	HIST
7440417	BERYLLIUM	5.80E-01	LJ^	5.80E-01	LJ^	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	5.80E-01	--	1.0E+01	P	TNRCC 2001	NO	BCRDL
7440702	CALCIUM	9.98E+03		9.98E+03		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	9.98E+03	--	--		--	NO	NUT
86748	CARBAZOLE	2.10E-01	LJ	2.10E-01		mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	2.10E-01	--	--		--	YES	HIST
7440473	CHROMIUM	1.96E+02		1.96E+02		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.96E+02	--	--		--[a]	YES	ASL
218019	CHRYSENE	1.80E-01	LJ	1.80E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	1.80E-01	--	--		--	YES	HIST
7440484	COBALT	3.00E+00	L	3.00E+00	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	3.00E+00	--	2.0E+01	P	EPA 2000a	NO	BSL
7440508	COPPER	2.43E+01		2.43E+01		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	2.43E+01	--	6.1E+01	I	EPA 2000a	NO	BSL
53703	DIBENZO(A,H)ANTHRACENE	3.90E-02	LJ	3.90E-02	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 - 3.30E-01	3.90E-02	--	--		--	YES	HIST
206440	FLUORANTHENE	3.00E-01	LJ	3.00E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 3.30E-01	3.00E-01	--	--		--	YES	HIST
193395	INDENO(1,2,3-CD)PYRENE	4.10E-02	LJ	4.10E-02	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 3.30E-01	4.10E-02	--	--		--	YES	HIST
7439896	IRON	3.65E+04		3.65E+04		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	3.65E+04	--	--		--	YES	QUAL, NUT
7439921	LEAD	1.78E+01		1.78E+01		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.78E+01	--	5.0E+01	P	TNRCC 2001	NO	BSL
7439954	MAGNESIUM	1.30E+03		1.30E+03		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.30E+03	--	--		--	NO	NUT
7439965	MANGANESE	1.12E+03		1.12E+03		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.12E+03	--	5.0E+02	P	TNRCC 2001	YES	ASL
7439976	MERCURY	2.50E-01		2.50E-01		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	2.50E-01	--	1.0E-01	I	TNRCC 2001	YES	ASL
7440020	NICKEL	8.30E+00	L	8.30E+00	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	8.30E+00	--	3.0E+01	P	TNRCC 2001	NO	BSL, BCRDL
85018	PHENANTHRENE	1.10E-01	LJ	1.10E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 3.30E-01	1.10E-01	--	--		--	YES	HIST
7440097	POTASSIUM	1.39E+02	L	1.39E+02	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.39E+02	--	--		--	NO	NUT
129000	PYRENE	1.10E-01	LJ	1.10E-01	LJ	mg/kg	HA-JS16-0.0-0.5	1/1	3.30E-01 3.30E-01	1.10E-01	--	--		--	YES	HIST
7440224	SILVER	4.80E-01	L	4.80E-01	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	4.80E-01	--	2.0E+00	P	TNRCC 2001	NO	BCRDL
7440235	SODIUM	8.13E+01	L	8.13E+01	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	8.13E+01	--	--		--	NO	NUT
7440280	THALLIUM	1.40E+00	L	1.40E+00	L	mg/kg	HA-JS16-0.0-0.5	1/1	-- --	1.40E+00	--	1.0E+00	P	TNRCC 2001	YES	ASL, BCRDL
7440622	VANADIUM	4.86E+01		4.86E+01		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	4.86E+01	--	2.0E+00	P	TNRCC 2001	YES	ASL
7440666	ZINC	3.67E+01		3.67E+01		mg/kg	HA-JS16-0.0-0.5	1/1	-- --	3.67E+01	--	1.9E+02	P	EPA 2000a	NO	BSL
	LPAH	--		1.30E+00		mg/kg	--	NA	-- --	1.30E+00	--	2.0E+01	P	TNRCC 2001	NO	BSL
	HPAH	--		1.14E+00		mg/kg	--	NA	-- --	1.14E+00	--	2.2E+01	P	TNRCC 2001	NO	BSL

Table 7-32
Occurrence and Distribution of COCs – Sediment Hot Spot SD01

Scenario Timeframe: Current/Future Ecological Exposures
Medium: Sediment at SD01
Exposure Medium: Sediment (Evaluated as Aquatic Habitat)
Exposure Point: Biologically-Active Depth Sediment (0 to 6 inches bgs)

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Screening Toxicity Value (3)	Screening Toxicity Value Source (3)	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
91576	2-METHYLNAPHTHALENE	1.165E-01	LJ	1.165E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	1.00E-02 - 3.10E-02	1.165E-01	--	--	NO	NTX
83329	ACENAPHTHENE	3.800E-01	LJ	3.800E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	3.10E-02 - 3.10E-02	3.800E-01	--	--	NO	NTX
67641	ACETONE	5.000E-03	LJ	5.000E-03	LJ	mg/kg	SD01-0.0-0.5D	1/2	1.30E-02 - 1.30E-02	5.000E-03	--	--	NO	NTX
7429905	ALUMINUM	5.930E+02		5.930E+02		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	5.930E+02	--	--	NO	NTX
120127	ANTHRACENE	1.700E-01	LJ	1.700E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.700E-01	5.7E-02	TNRCC 2001	YES	ASL, HIST
7440393	BARIUM	6.190E+00		6.190E+00		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	6.190E+00	--	--	NO	NTX
56553	BENZO(A)ANTHRACENE	1.750E-01	LJ	1.750E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.750E-01	3.2E-02	TNRCC 2001	YES	ASL, HIST
50328	BENZO(A)PYRENE	7.600E-02	LJ	7.600E-02	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	7.600E-02	3.2E-02	TNRCC 2001	YES	ASL, HIST
205992	BENZO(B)FLUORANTHENE	1.050E-01	LJ	1.050E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.050E-01	--	--	NO	NTX
191242	BENZO(G,H,I)PERYLENE	3.400E-02	LJ/LJV	3.400E-02	LJ/LJV	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	3.20E-02 - 3.20E-02	3.400E-02	--	--	NO	NTX
207089	BENZO(K)FLUORANTHENE	9.350E-02	LJ	9.350E-02	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	9.350E-02	--	--	NO	NTX
92524	BIPHENYL	5.600E-02	LJ	5.600E-02	LJ	mg/kg	SD01-0.0-0.5	1/2	4.00E-01 - 4.20E-01	5.600E-02	--	--	NO	NTX
117817	BIS(2-ETHYLHEXYL)PHTHALATE	4.400E+00	J^	4.400E+00	J^	mg/kg	SD01-0.0-0.5D	1/2	4.00E-01 - 4.30E-01	4.400E+00	1.8E-01	TNRCC 2001	YES	ASL, HIST
7440702	CALCIUM	1.580E+02	B	1.580E+02	B	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.580E+02	--	--	NO	NUT
86748	CARBAZOLE	7.550E-02	LJ/LJ	7.550E-02	LJ/LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	4.00E-01 - 4.20E-01	7.550E-02	--	--	NO	NTX
7440473	CHROMIUM	1.670E+00		1.670E+00		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.670E+00	3.7E+01	TNRCC 2001	NO	BSL
218019	CHRYSENE	1.900E-01	LJ	1.900E-01	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.900E-01	5.7E-02	TNRCC 2002	YES	ASL, HIST
7440484	COBALT	3.960E-01	B	3.960E-01	B	mg/kg	SD01-0.0-0.5D	1/2	1.91E+00 - 1.99E+00	3.960E-01	--	--	NO	NTX
53703	DIBENZO(A,H)ANTHRACENE	1.100E-02		1.100E-02		mg/kg	SD01-0.0-0.5	1/2	3.10E-02 - 4.20E-01	1.100E-02	3.3E-02	TNRCC 2001	NO	BSL
132649	DIBENZOFURAN	2.300E-01	LJ/LJ	2.300E-01	LJ/LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	4.10E-01 - 4.10E-01	2.300E-01	--	--	NO	NTX
206440	FLUORANTHENE	8.900E-01	J/J	8.900E-01	J/J	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	8.900E-01	1.1E-01	TNRCC 2001	YES	ASL, HIST
86737	FLUORENE	3.950E-01	J/LJ	3.950E-01	J/LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	3.10E-02 - 3.10E-02	3.950E-01	7.7E-02	TNRCC 2001	YES	ASL, HIST
193395	INDENO(1,2,3-CD)PYRENE	4.850E-02	LJ	4.850E-02	LJ	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	3.10E-02 - 3.10E-02	4.850E-02	--	--	NO	BSL
7439896	IRON	1.110E+03		1.110E+03		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.110E+03	2.0E+04	TNRCC 2001	NO	QUAL, NUT
7439921	LEAD	2.360E+00		2.360E+00		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	2.360E+00	3.5E+01	TNRCC 2001	NO	BSL
7439954	MAGNESIUM	3.390E+01	B/B	3.390E+01	B/B	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	3.390E+01	--	--	NO	NTX
7439965	MANGANESE	7.560E+00		7.560E+00		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	7.560E+00	4.6E+02	TNRCC 2001	NO	BSL
91203	NAPHTHALENE	6.250E-01	J	6.250E-01	J	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	3.10E-02 - 3.10E-02	6.250E-01	1.8E-01	TNRCC 2001	YES	ASL, HIST
7440020	NICKEL	6.090E-01	B/B	6.090E-01	B/B	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	6.090E-01	1.8E+01	TNRCC 2001	NO	BSL
85018	PHENANTHRENE	1.300E+00	J	1.300E+00	J	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	1.300E+00	4.2E-02	TNRCC 2001	YES	ASL, HIST
129000	PYRENE	7.350E-01	J	7.350E-01	J	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	7.350E-01	5.3E-02	TNRCC 2001	YES	ASL, HIST
7440622	VANADIUM	2.780E+00	B	2.780E+00	B	mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	2.780E+00	--	--	NO	NTX
7440666	ZINC	6.695E+00		6.695E+00		mg/kg	(Avg) SD01-0.0-0.5D/SD01-0.0-0.5	2/2	-- --	6.695E+00	1.2E+02	TNRCC 2001	NO	BSL

Table 7-33
Occurrence and Distribution of COCs – Surface Water

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water in Unnamed Tributary

CAS Number	Chemical	Minimum Concentration (1) (ug/L)	Minimum Qualifier	Maximum Concentration (1) (ug/L)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background Value	Screening Toxicity Value (ug/L)	Screening Value Source	Potential ARAR/TBC (ug/L)	Potential ARAR/TBC Source	COPC Flag	Rationale for (3) Contaminant Deletion or Selection
105679	2,4-DIMETHYLPHENOL	1.00E+00	LJ	1.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	1.00E+00	--	NA	--	--	--	NO	NTX
78933	2-BUTANONE	3.00E+00	LJ	4.00E+00	LJ	SW-01D	2/3	5.00E+00 - 5.00E+00	4.00E+00	--	NA	--	--	--	NO	NTX
91576	2-METHYLNAPHTHALENE	2.00E+00	LJ	2.00E+00	LJ	SW-08	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	NA	--	--	--	NO	NTX
95487	2-METHYLPHENOL	1.00E+00	LJ	1.00E+00	LJ	SW-02	2/15	5.00E+00 - 5.00E+00	1.00E+00	--	NA	--	--	--	NO	NTX
83329	ACENAPHTHENE	1.00E+00	LJ	8.00E+00		SW-08	13/15	5.00E+00 - 5.00E+00	8.00E+00	--	NA	--	4.70E-02	TNRCC 1998	NO	NTX
67641	ACETONE	6.00E+00	J	8.00E+00		SW-01D	3/3	-- --	8.00E+00	--	NA	--	--	--	NO	NTX
7429905	ALUMINUM	2.05E+01	LJv	8.67E+01	LJv	SW-08	15/15	-- --	8.67E+01	--	NA	--			NO	NTX
7440393	BARIUM	1.01E+02	L	1.31E+02	L	SW-02	15/15	-- --	1.31E+02	--	NA	--	--	--	NO	NTX
71432	BENZENE	4.00E+00		3.00E+01		SW-01	3/3	-- --	3.00E+01	--	NA	--	--	--	NO	NTX
56553	BENZO(A)ANTHRACENE	2.00E+00	LJ	2.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	NA	--	8.39E-01	TNRCC 1998	NO	NTX
205992	BENZO(B)FLUORANTHENE	1.00E+00	LJ	1.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	1.00E+00	--	--	--	4.80E+01	TNRCC 1998	NO	NTX
117817	BIS(2-ETHYLHEXYL)PHTHALATE	1.00E+00	LJ	1.00E+00	LJ	SW-02	2/15	5.00E+00 - 5.00E+00	1.00E+00	--	NA	--	2.58E+02	TNRCC 1998	NO	NTX
7440702	CALCIUM	1.69E+04		2.17E+04		SW-02	15/15	-- --	2.17E+04	--	--	--	--	--	NO	NTX
7440473	CHROMIUM	8.20E-01	LJ	8.20E-01	LJ	SW-08	1/15	8.00E-01 - 8.00E-01	8.20E-01	--	NA	--	--	--	NO	NTX
218019	CHRYSENE	2.00E+00	LJ	2.00E+00	LJ	SW-02	1/15	5.00E+00 - 5.00E+00	2.00E+00	--	NA	--	--	--	NO	NTX
156592	CIS-1,2-DICHLOROETHENE	6.00E+00		6.00E+00		SW-01D	2/3	1.00E+00 - 1.00E+00	6.00E+00	--	NA	--	--	--	NO	NTX
7440484	COBALT	1.30E+00	L	2.40E+00	LJv	SW-02	9/15	1.00E+00 - 1.00E+00	2.40E+00	--	NA	--	--	--	NO	NTX
7440508	COPPER	1.20E+00	LJv	1.20E+00	LJv	SW-01	1/15	8.00E-01 - 8.00E-01	1.20E+00	--	NA	--			NO	NTX
132649	DIBENZOFURAN	1.00E+00	LJ	4.00E+00	LJ	SW-08	7/15	5.00E+00 - 5.00E+00	4.00E+00	--	NA	--	--	--	NO	NTX
100414	ETHYLBENZENE	5.00E-01	LJ	4.00E+00		SW-01D	3/3	-- --	4.00E+00	--	NA	--	--	--	NO	NTX
206440	FLUORANTHENE	1.00E+00	LJ	5.00E+00		SW-02	10/15	5.00E+00 - 5.00E+00	5.00E+00	--	1.10E+01	Appendix F	5.40E+01	TNRCC 1998	NO	BSL
86737	FLUORENE	1.00E+00	LJ	4.00E+00	LJ	SW-08	9/15	5.00E+00 - 5.00E+00	4.00E+00	--	NA	--	4.70E+01	TNRCC 1998	NO	NTX
7439896	IRON	3.11E+03		5.87E+03		SW-05	15/15	-- --	5.87E+03	--	NA	--	--	--	NO	NTX
7439954	MAGNESIUM	3.58E+03	L	4.99E+03	L	SW-02	15/15	-- --	4.99E+03	--	--	--	--	--	NO	NTX
7439965	MANGANESE	1.51E+02		4.04E+02		SW-09	15/15	-- --	4.04E+02	--	NA	--	--	--	NO	NTX
7439976	MERCURY	7.60E-01		7.60E-01		SW-05	1/15	2.00E-01 - 2.00E-01	7.60E-01	--	NA	--			NO	NTX
91203	NAPHTHALENE	1.00E+00	LJ	2.90E+01		SW-08	8/15	5.00E+00 - 5.00E+00	2.90E+01	--	NA	--	4.70E+01	TNRCC 1998	NO	NTX
85018	PHENANTHRENE	1.00E+00	LJ	5.00E+00		SW-02	9/15	5.00E+00 - 5.00E+00	5.00E+00	--	NA	--	4.70E+01	TNRCC 1998	NO	NTX
108952	PHENOL	1.00E+00	LJ	3.00E+00	LJ	SW-01D	4/15	5.00E+00 - 5.00E+00	3.00E+00	--	NA	--	--	--	NO	NTX
7440097	POTASSIUM	1.39E+03	L	3.80E+03	L	SW-09	15/15	-- --	3.80E+03	--	--	--	--	--	NO	NTX
129000	PYRENE	1.00E+00	LJ	4.00E+00	LJ	SW-02	10/15	5.00E+00 - 5.00E+00	4.00E+00	--	NA	--	4.80E+01	TNRCC 1998	NO	NTX
7440235	SODIUM	1.05E+04		1.57E+04		SW-03	15/15	-- --	1.57E+04	--	--	--	--	--	NO	NTX
7440280	THALLIUM	4.00E+00	L	8.90E+00	L	SW-11	8/15	3.90E+00 - 3.90E+00	8.90E+00	--	NA	--	--	--	NO	NTX
108883	TOLUENE	2.00E+00		2.00E+01		SW-01	3/3	-- --	2.00E+01	--	NA	--	--	--	NO	NTX
79016	TRICHLOROETHENE	5.00E-01	LJ	5.00E-01	LJ	SW-01D	1/3	1.00E+00 - 1.00E+00	5.00E-01	--	NA	--	6.90E+01	TNRCC 1998	NO	NTX
75014	VINYL CHLORIDE	1.00E+00		1.00E+00		SW-01D	2/3	1.00E+00 - 1.00E+00	1.00E+00	--	--	--	--	--	NO	NTX
1330207	XYLENE (TOTAL)	3.00E+00		2.40E+01		SW-01D	3/3	-- --	2.40E+01	--	NA	--	--	--	NO	NTX
7440666	ZINC	7.10E+00	L	2.10E+01		SW-01	15/15	-- --	2.10E+01	--	7.00E+04	Appendix F	--	--	NO	BSL

Table 7-34

LOAEL-BASED ECOLOGICAL HAZARD QUOTIENTS FOR THE TERRESTRIAL FOOD WEB
GARLAND CREOSOTING COMPANY

Contaminant	HQ_{TP}	TRV [TP]	HQ_{SI}	TRV [SI]	HQ_{HM}	TRV [MAMMAL] mg/kg-d	HQ_{HB}	TRV [BIRD] mg/kg-d	HQ_{OM}	TRV [MAMMAL] mg/kg-d	HQ_{OB}	TRV [BIRD] mg/kg-d
Semivolatile Organics (SVOC)												
Carbazole	NC	NA	NC	NA	0.04	5.42	NC	NA	***8***	5.42	NC	NA
Dibenzofuran	NC	NA	NC	NA	***1.7***	25	NC	NA	1.0	25	NC	NA
Polycyclic Aromatic Hydrocarbons (PAH)												
HPAH	***2.0***	22.14	***1.8***	25	0.0004	1833	0.004	196	0.01	1833	0.13	196
LPAH	0.5	20	0.02	500	0.01	142.9	0.002	512	***3.1***	142.9	***1.5***	512

Notes:
HB = Herbivorous bird feeding guild
HM = Herbivorous mammal feeding guild
HQ = Hazard quotient
LOAEL = Lowest observed adverse effects level
NA = Not available
NC = Not calculated
OM = Omnivorous mammal feeding guild
OB = Omnivorous bird feeding guild
OM = Omnivorous mammal feeding guild
SI = Soil invertebrates
TP = Terrestrial plants
TRV = Toxicity reference value
Daily doses are shown in Table H-3; exposure point concentrations are given in Table H-4.

Table 7-35

NOAEL-BASED ECOLOGICAL HAZARD QUOTIENTS FOR THE TERRESTRIAL FOOD WEB (SEDIMENTS OF THE UNNAMED TRIBUTARY)
GARLAND CREOSOTING COMPANY

Contaminant	HQ_{TP}	TRV [TP]	HQ_{SI}	TRV [SI]	HQ_{HM}	TRV [MAMMAL] mg/kg-d	HQ_{HB}	TRV [BIRD] mg/kg-d	HQ_{OM}	TRV [MAMMAL] mg/kg-d	HQ_{OB}	TRV [BIRD] mg/kg-d
Semivolatile Organics (SVOC)												
Carbazole	NC	NA	0.5	0.5	0.06	2.71	NC	NA	1	2.71	NC	NA
Dibenzofuran	NC	NA	0.9	2.2	0.1	12.8	NC	NA	***2.4***	12.8	NC	NA
Polycyclic Aromatic Hydrocarbons (PAH)												
HPAH	0.3	22.14	0.3	25	0.001	183.3	0.01	19.6	0.01	183.3	0.19	19.6
LPAH	0.6	20	0.02	500	0.11	71.4	0.12	51.2	0.8	71.4	***2.1***	51.2

Notes:
HB = Herbivorous bird feeding guild
HM = Herbivorous mammal feeding guild
HQ = Hazard quotient
NA = Not available
NC = Not calculated
NOAEL = No observed adverse effects level
OM = Omnivorous mammal feeding guild
OB = Omnivorous bird feeding guild
OM = Omnivorous mammal feeding guild
SI = Soil invertebrates
TP = Terrestrial plants
TRV = Toxicity reference value.
Daily doses are shown in Table H-7; exposure point concentrations are given in Table H-8.

Table 7-35

REFINED NOAEL-BASED ECOLOGICAL HAZARD QUOTIENTS (USING MAXIMUM SITE-SPECIFIC BAFS) FOR THE TERRESTRIAL FOOD WEB
GARLAND CREOSOTING COMPANY

Contaminant	HQ_{TP}	TRV [TP]	HQ_{SI}	TRV [SI]	HQ_{HM}	TRV [MAMMAL] mg/kg-d	HQ_{HB}	TRV [BIRD] mg/kg-d	HQ_{OM}	TRV [MAMMAL] mg/kg-d	HQ_{OB}	TRV [BIRD] mg/kg-d
Semivolatile Organics (SVOC)												
Carbazole	NC	NA	***2.4***	0.5	0.09	2.71	NC	NA	0	2.71	NC	NA
Dibenzofuran	NC	NA	0.3	2.2	0.0	12.8	NC	NA	0.1	12.8	NC	NA
Polycyclic Aromatic Hydrocarbons (PAH)												
HPAH	***2.0***	22.14	***1.8***	25	0.067	183.3	0.50	19.6	0.3	183.3	***5.97***	19.6
LPAH	0.5	20	0.02	500	0.04	71.4	0.05	51.2	0.0	71.4	0.2	51.2

Notes:
BAF = Bioaccumulation factor
HB = Herbivorous bird feeding guild
HM = Herbivorous mammal feeding guild
HQ = Hazard quotient
NA = Not available
NC = Not calculated
NOAEL = No observed adverse effects level
OM = Omnivorous mammal feeding guild
OB = Omnivorous bird feeding guild
OM = Omnivorous mammal feeding guild
SI = Soil invertebrates
TP = Terrestrial plants
TRV = Toxicity reference value

Table 7-36

REFINED NOAEL-BASED ECOLOGICAL HAZARD QUOTIENTS (USING MAXIMUM SITE-SPECIFIC BAFS) FOR THE TERRESTRIAL FOOD WEB
GARLAND CREOSOTING COMPANY

Contaminant	HQ_{TP}	TRV [TP]	HQ_{SI}	TRV [SI]	HQ_{HM}	TRV [MAMMAL] mg/kg-d	HQ_{HB}	TRV [BIRD] mg/kg-d	HQ_{OM}	TRV [MAMMAL] mg/kg-d	HQ_{OB}	TRV [BIRD] mg/kg-d
Semivolatile Organics (SVOC)												
Carbazole	NC	NA	***2.4***	0.5	0.09	2.71	NC	NA	0	2.71	NC	NA
Dibenzofuran	NC	NA	0.3	2.2	0.0	12.8	NC	NA	0.1	12.8	NC	NA
Polycyclic Aromatic Hydrocarbons (PAH)												
HPAH	***2.0***	22.14	***1.8***	25	0.067	183.3	0.50	19.6	0.3	183.3	***5.97***	19.6
LPAH	0.5	20	0.02	500	0.04	71.4	0.05	51.2	0.0	71.4	0.2	51.2

Table 12-1
Cost Estimate for the Soil Remedy

Description of Cost	Units	Unit Cost	Quantity	Cost
CAPITAL COSTS				
General Site Work				
Trailers	Month	$876.12	8	$7,008.96
Computer Equipment	Month	$899.94	8	$7,199.52
Portable Toilets	Month	$318.00	8	$2,544.00
Project Signs	Each	$576.00	2	$1,152.00
Utilities Hookup	LS	$10,841.73	1	$10,841.73
Monthly Utilities	Month	$1,014.43	8	$8,115.44
Site Security	Month	$10,155.76	8	$81,246.08
Air Monitoring	LS	$38,825.15	1	$38,825.15
Mobilization/Demobilization	LS	$195,738.27	1	$195,738.27
Site Clearing	Acre	$7,550.00	0.5	$3,775.00
Surveying	Acre	$1,790.00	6	$10,740.00
Stormwater Control	LF	$0.91	1275	$1,160.25
Road Base for Haul Road	CY	$27.20	230	$6,256.00
Subgrade for Haul Road	SY	$0.35	1350	$472.50
Remediation Activities				
Disposal of Empty Drums and Tanks	LS	$5,955.00	1	$5,955.00
Excavation of Contaminated Soil	CY	$17.09	35600	$608,404.00
Dust Control	Acre	$63.67	900	$57,303.00
LDPE Liner (stockpiling of soil)	SF	$1.38	71413	$98,549.94
Front End Loader	CY	$2.48	44500	$110,360.00
Relocation of Soil	CY	$3.43	44500	$152,635.00
Soil Cover	CY	$10.35	14600	$151,110.00
LDPE Liner for Waste Cell	SF	$1.76	88800	$156,288.00
Impermeable Cap for Waste Cell	SF	$4.00	88800	$355,200.00
Dewatering Wells (4 total)	LF	$40.00	60	$2,400.00
Backfilling Excavated Areas	CY	$3.08	44500	$137,060.00
Compacting	CY	$0.35	44500	$15,575.00
Abandon Monitoring Wells	LS	$2,545.21	1	$2,545.21
Gas Monitoring and Vent Units	Each	$5,131.15	7	$35,918.05
Monitoring Wells	Each	$3,210.80	5	$16,054.00
Decontamination Facilities	LS	$107,777.00	1	$107,777.00
Final Grading/Revegetation	LS	$82,419.00	1	$82,419.00
Analytical Testing	LS	$92,699.00	1	$92,699.00
Institutional Controls	LS	$49,000.00	1	$49,000.00
Construction Costs Subtotal				$2,612,327.10
Construction Management (7%)				$182,862.90
Project Management (6%)				$156,739.63
Engineering Design (8%)				$208,986.17
Total Capital Cost				$3,160,915.79

OPERATION & MAINTENANCE COST				
Annual Inspections	Year	$25,830.00	1	$25,830.00
Gas Sampling	Year	$4,089.00	1	$4,089.00
Landfill O&M	Year	$7,717.00	1	$7,717.00
Maintenance of cap (every 10 years)	Year	$10,800.00	1	$10,800.00
O&M Present Worth @ 7%				$671,000.00
Project Total				$3,831,915.79

Table 12-2
Cost Estimate for the Ground Water Remedy

Description of Cost	Units	Unit Cost	Quantity	Cost
CAPITAL COSTS				
General Site Work				
Mobilization/Demobilization	LS	$11,000.00	1	$11,000.00
Equipment	LS	$2,000.00	1	$2,000.00
Trailers	Month	$876.12	12	$10,513.44
Computer Equipment	Month	$899.94	12	$10,799.28
Project Sign	Each	$576.00	2	$1,152.00
Portable Toilets	Month	$318.00	12	$3,816.00
Utilities Hookup	LS	$10,841.73	1	$10,841.73
Monthly Utilities	Month	$5,000.00	12	$60,000.00
Vehicle	miles	$0.45	400	$180.00
Baseline Sampling	LS	$99,560.00	1	$99,560.00
Extraction Wells				
Mobilize/Demobilize Drilling Rig	LS	$3,899.00	1	$3,899.00
Site Work for Wells	LS	$25,000.00	1	$25,000.00
Guard Posts	Each	$57.36	40	$2,294.40
Casing	LF	$30.67	100	$3,067.00
Well Screen	LF	$43.73	150	$6,559.50
Bentonite Seal	Each	$180.10	10	$1,801.00
Well Plug	Each	$66.07	10	$660.70
Air Rotary	LF	$53.47	250	$13,367.50
Product Recovery Pumps	Each	$9,243.00	10	$92,430.00
Electrical Receptacle for Pump	Each	$306.23	10	$3,062.30
Pump Control Panel	Each	$4,597.00	3	$13,791.00
Electric Wire	LF	$0.98	4000	$3,920.00
Upgrades to Existing Electrical System	LS	$20,000.00	1	$20,000.00
Well Development	Each	$825.00	10	$8,250.00
Piping for VC Plume	LF	$33.90	2000	$67,800.00
Baseline DNAPL Sampling	LS	$51,868.00	1	$51,868.00
MNA Analysis and Report	LS	$55,400.00	1	$55,400.00
Subtotal				$583,032.85
Construction Management (10%)				$58,303.29
Project Management (9%)				$52,472.96
Engineering Design (15%)				$87,454.93
Total Capital Cost				$781,264.02
OPERATION & MAINTENANCE COST				
Extraction Wells and ICT (Years 1-10)	Year	$221,473.00	1	$221,473.00
ICT Only (Years 11-30)	Year	$161,473.00	1	$161,473.00
Annual GW Monitoring	Year	$67,215.00	1	$67,215.00
DNAPL Monitoring	Year	$21,070.00	1	$21,070.00
O&M Present Worth @ 7%				$2,895,000.00
Project Total				$3,676,264.02

Table 13-1
Potentially Applicable or Relevant and Appropriate Requirements

Standard, Requirement, Criteria, or Limitation	Citation	Description	Media	Rationale and Discussion
CHEMICAL SPECIFIC				
Safe Drinking Water Act	40 C.F.R. Part 141 40 C.F.R. Part 143	National Primary and Secondary Drinking Water Regulations	Ground Water	Ground water could serves as a potential source of potable water. Therefore the MCLs for 1,2-dichloroethane, vinyl chloride, trichloroethene, and 1,4-dichlorobenzene would be relevant and appropriate.
ACTION SPECIFIC				
CERCLA	40 C.F.R. 300.440	Applies to any remedial or removal action involving the off-site transfer of any hazardous substance, pollutant, or contaminant as defined under CERCLA sections 101 (14) and (33) (''CERCLA waste'') that is conducted by EPA, States, private parties, or other Federal agencies, that is Fund-financed and/or is taken pursuant to any CERCLA authority,	Soil, Ground Water	EPA will determine the acceptability of any facility selected for the treatment, storage, or disposal of CERCLA waste. EPA will determine if there are relevant releases or relevant violations at a facility prior to the facility's initial receipt of CERCLA waste.
RCRA	40 C.F.R. Part 262 Subsection B Texas Administrative Code; Title 30; Part 1; Chapter 335, Subchapter A	Manifest Requirements	Hazardous Waste	Required information for manifest forms for shipments of hazardous waste
RCRA	40 C.F.R. Part 262 Subsection C Texas Administrative Code; Title 30; Part 1; Chapter 335, Subchapter C	Pretransport Requirements	Hazardous Waste	Packaging, labeling, and other requirements for generators prior to shipment of hazardous waste
RCRA	40 CFR Part 268 Texas Administrative Code; Title 30, Part 1, Chapter 335, Subchapter O	Land Disposal Restrictions (LDRs): 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.	Soil	Soil at the site is an F034 and K001 hazardous waste and is subject to LDRs if placement occurs.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Media	Rationale and Discussion
RCRA	40 CFR Part 264 Subpart K Texas Administrative Code; Title 30, Part 1, Chapter 335, Subchapter F	Closure and post-closure of surface impoundments. The regulations in this subpart apply to owners and operators of facilities that use surface impoundments to treat, store, or dispose of hazardous waste.	Soil	The requirements would be relevant and appropriate for the consolidation of the surface impoundments that contain hazardous waste.
Clean Water Act	40 CFR Part 122 through 125 Texas Administrative Code; Title 30, Part 1, Chapters 305, 307 and 308	The National Pollutant Discharge Elimination System (NPDES) program is the national program for issuing, monitoring, and enforcing permits for direct discharges. 40 CFR Part 122 requires permits for the discharge of "pollutants" from any "point source" into "waters of the United States." Texas Regulation Title 30, Part 1, Section 305, 307 and 308 discusses the criteria and standards for the NPDES program.	Ground Water	Under the Superfund Program, an on-site discharge from a CERCLA site to surface water must meet the substantive NPDES requirements, but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process.
Transportation	49 C.F.R. Part 171	Hazardous materials that may be transported off site cannot be transported in interstate and intrastate commerce, except in accordance with the requirements of 49 CFR Part 171, Subpart C.	Hazardous Waste	Any off site transportation of hazardous waste will comply with these regulations, which contain packaging, placarding, labeling, and other shipping requirements.
Texas Administrative Code	30 TAC 111	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.	Air	Applicable during excavation and transport of soils, or any other activity that may generate airborne particulate matter at the Site.
CERCLA	CERCLA 121(d)(4)	This federal regulation allows EPA to waive compliance with ARARs in six circumstances. The third circumstance "Compliance with the ARAR requirements is technically impracticable from an engineering perspective" is considered to be applicable for the Site due to the presence of NAPL in the saturated zone and the nature and extent of the COCs in ground water.	Ground Water	Restoration of the SWBZ for creosote related contaminants is not technically practicable while DNAPL persists in the aquifer because it is a continuing source of ground water contamination. Based on the TI evaluation in the FS, federal drinking water MCLs for creosote-related contaminants in the SWBZ are waived.
LOCATION SPECIFIC – NO ARARS IDENTIFIED				

Appendix A

Responsiveness Summary

Garland Creosoting Superfund Site
Longview, Texas
Record of Decision
Responsiveness Summary

The Responsiveness Summary provides information about the views of the public, government agencies, and the support agency regarding both the remedial alternatives and general concerns about the site submitted during the public comment period. It also documents in the record how public comments were considered in the decision-making process and provides answers on behalf of EPA to the issues raised.

This Responsiveness Summary is prepared from written comments received during the public comment period on the Proposed Plan. The comment period ran from July 19, 2006, until August 17, 2006. A public meeting to discuss the proposed plan was held on August 3, 2006, at the Longview Public Library in Longview, Texas. A transcript of the meeting was prepared and is part of the Administrative Record.

TCEQ Comments

Comment 1

In the Proposed Plan, EPA proposes to remove the top two feet of soils from AOC-1 to address future industrial worker exposure risks. The analytical results of soil samples collected in AOC-1 indicate that the soil contaminant concentrations exceed the protective cleanup levels (PCLs) for human health for an industrial/commercial worker at depths greater than 2 feet. The TCEQ's regulations, Title 30, Texas Administrative Code, §350.4(a)(88), defines surface soils as 0-5' below ground surface (bgs) for industrial worker human health exposure pathways. Based on this criteria, the TCEQ does not believe that the remedy described in the proposed plan is protective of future industrial workers.

TCEQ requests that EPA acknowledge the potential for exposure of industrial workers to soil from ground surface to a depth of 5 feet bgs as required by Texas rule. The TCEQ further requests that EPA mitigate risks for future industrial workers by either 1) removal of soil in that depth range (3 to 5 feet bgs) which is contaminated above protective concentrations; or, 2) requiring the implementation of institutional control(s) to prevent exposure of future industrial workers to the contaminated soil from 3 to 5 feet bgs.

EPA Response:

EPA's preferred remedy for soil is protective for future industrial workers. In discussing Texas Risk Reduction Program standards (Title 30 Texas Administrative Code §350), it is important to note that a substantive standard of control should not to be confused with a process used to come up with a cleanup level. Thus, state regulations normally would not be considered as Applicable, Relevant and Appropriate Requirements (ARARs) where they address, as a procedural matter, a preferred method of conducting an affected property assessment, human health risk assessment, screening method, exposure pathway analysis, or other similar step in the remedy selection

process. EPA will consider IC requirements for any areas of the site where there is not unrestricted future land use at the site; however, any IC requirements will not specifically address soil at 3'-5' bgs in AOC-1 in the Proposed Plan as it is not a substantive standard of control.

Community Comments

There were no comments received from the community on the Proposed Plan.

Appendix B

Concurrence Letter

A copy of the concurrence letter from TCEQ will be placed here when it is received.

Appendix C

Administrative Record Index