Superfund Record of Decision

Conroe Creosoting Company
Conroe, Montgomery County, Texas

September 2003

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6

[This page intentionally left blank]

TABLE OF CONTENTS

025642

APPENDICES

LIST OF FIGURES

LIST OF TABLES

[This page intentionally left blank]

CONROE CREOSOTING COMPANY
CONROE, MONTGOMERY COUNTY, TEXAS
RECORD OF DECISION

DECLARATION

SITE NAME AND LOCATION

Conroe Creosoting Company
Conroe, Montgomery County, Texas
CERCLIS ID No. TXD008091951

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Conroe Creosoting Company Superfund Site (Site) in Conroe, Montgomery 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.

This decision was based on the Administrative Record, which has been developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9631(k), and which is available for review at the Montgomery County Memorial Library, 104 I-45 North, Conroe, Texas, at the Texas Commission on Environmental Quality (TCEQ) offices in Austin, Texas, and at the United States Environmental Protection Agency (EPA) Region 6 offices in Dallas, Texas. The Administrative Record Index (Appendix B to the Record of Decision) identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

The State of Texas concurs with the Selected Remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

This ROD sets forth the selected remedy for the Site, which includes natural attenuation of the hazardous substances in the ground water, no further action for the on-site soils and off-site sediments, and long-term maintenance of the Resource Conservation and Recovery Act (RCRA) vault constructed to contain the excavated soils and sediments. The selected remedy is a comprehensive approach for this Site that addresses all current and potential future risks caused by ground water contamination and implements institutional controls to ensure future site use is consistent with the acceptable risk levels in the on-site soils. The major components of this remedy are:

- A ground water monitoring program to track the effectiveness of natural attenuation processes in reducing contaminant concentrations in the Sand-1 aquifer as well as ensure that there is no exposure to contaminants above the drinking water limits;
- Placement of appropriate institutional controls to ensure that any future land owners will be notified that the land was a former Superfund site and hazardous substances remaining on-site in the ground water are above health-based concentration levels; prevent future installations of water supply wells at the Site; and restrict future redevelopment of the property to non-residential use based on contaminant concentrations remaining in the surface soils. EPA will attempt to negotiate an Administrative Order on Consent or other mechanism implementing a property easement and/or other appropriate controls with the landowner of the Site; and
- Long-term maintenance of the RCRA vault containing the contaminated soils and sediments excavated from the Site and adjacent Stewart's Creek.

STATUTORY DETERMINATIONS

The selected remedy for the ground water contamination 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, and is cost-effective. The 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 contamination in the ground water is not necessarily appropriate at this Site to achieve the remedial action objectives and goals. Under a time-critical removal action, EPA has addressed the principal threat wastes through the excavation and disposal of the contaminated soils and sediments in an on-site RCRA vault.

Since the selected remedy will not result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain remedial action objectives and cleanup levels, a policy review may be conducted within five years of the date of the Preliminary Close Out Report to ensure that the remedy is, or will be, protective of human health and the environment. The five year review will be a comprehensive review of both the ground water remedy and the RCRA vault containing contaminated soils and sediments constructed under the removal action. Pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), and as provided in the current guidance on Five Year Reviews [OSWER Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (June 2001)], EPA may conduct a policy five-year review by September 2008 (five years after the date of the Preliminary Close Out Report).

ROD 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 (COCs) and their respective concentrations (page 16).
- The baseline risk represented by the chemicals of concern (pages 17 and 19)
- Cleanup levels established for chemicals of concern and the basis for these levels (page 21).
- Source materials constituting principal threat wastes have not been identified in the ground water at this Site and are not addressed in this ROD (page 20).
- Current and potential future beneficial uses of ground water used in the ROD (page 14).
- Potential ground water use that will be available at the Site as a result of the Selected Remedy (page 33).
- 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 (page 32).
- Decisive factor(s) that led to selecting the remedy (page 30).

AUTHORIZING SIGNATURE

By: Myron O. Knudson   Date: 9/29/30

Myron O. Knudson, P.E., Director
Superfund Division
U.S. EPA Region 6

025650

RECORD OF DECISION
CONROE CREOSOTING SUPERFUND SITE
CONCURRENCE LIST

By: ______________________ Date: 9-29-2003
Vincent E. Malott
Remedial Project Manager

By: ______________________ Date: 9/29/03
Carlos Sanchez
Remedial Project Manager

By: ______________________ Date: 29 Sep 2003
Earl Hendrick
Remedial Project Manager

By: ______________________ Date: 9/29/03
Gustavo T. Chavarria, Chief
AR/TX Project Management Section

By: ______________________ Date: 9/29/03
John Hepola, Chief
AR/TX Branch

By: ______________________ Date: 9-29-03
I-Jung Chiang
Site Attorney

By: ______________________ Date: 09/29/03
Mark A. Peycke, Chief
Superfund Branch, Office of Regional Counsel

025651

THE DECISION SUMMARY

SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The Conroe Creosoting Company Superfund Site (Conroe Site), CERCLIS ID No. TXD008091951, is in Conroe , Montgomery County, Texas, approximately 40 miles north of Houston, Texas. The U.S. Environmental Protection Agency (EPA) is the lead agency for site activities and is issuing this Record of Decision (ROD). The Texas Commission on Environmental Quality (TCEQ) provided technical assistance to EPA. The source of monies for the removal activities and the Remedial Investigation (RI)/Feasibility Study (FS) is the Superfund.

The Conroe Site is an abandoned wood-treating facility located at 1776 E. Davis Street, Conroe, Montgomery County, Texas (Figure 1). The geographic center of the Conroe Site is Latitude 30.319 North and Longitude 95.435 West. The wood-treating facility occupies approximately 147 acres and operated from 1946 until March 1997. The Site is fenced and borders residential property to the east, State Highway 105 to the south, and forested land to the west and north. The facility consisted of two process areas, one tank area, two kilns, a re-work area, a vehicle maintenance shop, boiler, lumber shed, a pole machine, two fuel pumps, an office, a sales office, and a retail office along with several storage sheds and storage areas prior to a removal action conducted by the EPA (Figure 2). An on-site water supply well, located near the center of the Site, is completed to a depth of 165 feet.

The Conroe Site is bordered by Little Caney Creek to the east and Stewart's Creek to the west. Runoff from the Site flows via ditches in both easterly and westerly directions, with the primary flow occurring to the west. On the east side, the drainage flows into the Site pond which feeds Little Caney Creek. Little Caney Creek flows approximately 7.5 miles to its confluence with the West Fork of the San Jacinto River. Stewart's Creek, on the west side, flows approximately 6 miles to the confluence with the West Fork of the San Jacinto River.

SITE BACKGROUND AND ENFORCEMENT ACTIVITIES

Site History

Three wood preserving processes were used at the facility, including pentachlorophenol (PCP), creosote, and copper chromated arsenate (CCA). The PCP and creosote wood preserving processes used pressure to force a solution of PCP or creosote dissolved in diesel into the pore spaces of the wood. The CCA treatment process is water based and occurs at ambient pressures.

The treated wood was then allowed to dry on a drip pad. Treatment residues from these processes were scraped from the drying pad for shipment off-site. The facility was closed down by the Montgomery County Tax Assessor/Collector in March 1997, due to delinquent taxes. The Site's assets were sold by the county at an auction. The land, waste management units, and process units remained properties of Conroe Creosoting Company.

History of Federal and State Investigations

The Conroe facility was classified as a large quantity generator. Previous Compliance Evaluation Investigations were conducted by the Texas Commission on Environmental Quality (TCEQ), and its predecessor agencies, at the Conroe Creosoting Company in 1988, 1991, and 1993. Regulatory violations documented at the Site resulted in the issuance of Agreed Orders in 1994 and 1999 to the Conroe Creosoting Company. In 2000, the facility was referred to the Sate Attorney General's Office for noncompliance with the provisions of the 1999 Order.

On September 20, 1996, JHA Environmental Services, Inc. reported to Conroe Creosoting Company sample analysis results, indicating elevated levels of creosote compounds, arsenic, and chromium in soil and shallow groundwater. On March 22, 2001, heavily contaminated soil was documented by JHA Environmental Services in CCA, PCP, and creosote processing areas. On June 1, 2001, JHA Environmental Services prepared an inventory of the on-site tanks and cylinders and of the type of material that they contain or previously contained.

On March 22, 2001, the TCEQ inspectors observed leaking containers at the Site. The TCEQ conducted an Expanded Site Inspection (ESI) at the Conroe Site in November 2001. The ESI included the collection and analyses of water samples from private and municipal water wells which were non-detect for creosote compounds. The ESI report stated that a release of creosote was observed from the site into Stewart's Creek during their sampling activities. Surface impoundments containing waste were observed draining off-site via drainage canals at the Conroe Site. A drainage ditch running east to west, north of the process areas and south of the former maintenance shop, contained contaminated sediment. Runoff from the process area and drainage ditch flowed toward Stewart's Creek. Secondary containment areas which held contaminated water were observed to be cracked and/or broken in several areas, and the contaminated water was spilling out. Soil throughout the PCP and creosote process areas were heavily contaminated with semi-volatile organic compounds, pesticides, and inorganic contaminants. A waste inventory conducted on June 1, 2001, listed several cylinders and tanks containing CCA solution, creosote sludge, PCP solutions and solids, and tank bottoms. The total quantity of hazardous waste in the tanks and containers, other than drums, was estimated to be over 100,000 gallons. Approximately sixty-two (62) drums were stored in an on-site shed.

During the ESI sampling event, an alleged waste burial area was determined by TCEQ to be a hazardous waste dumping area.

History of CERCLA Enforcement Activities

EPA issued a General Notice letter to the Conroe Creosoting Company on July 2, 2002, for the removal action at the Site. The Company was unable to conduct the removal action based on a claim of inability-to-pay. A waiver of Special Notice letter for the RI/FS and RD/RA was issued to the Company on July 2, 2003. Information requests were sent to the company to obtain financial and operational information. A Superfund lien was filed on the Site property on November 12, 2002, pursuant to Section 107(l)(1) of CERCLA, 42 U.S.C. § 9607(l)(1).

National Priorities List

On April 30, 2003, EPA proposed to add the Conroe Creosoting Company Superfund Site to the National Priorities List (NPL) of Superfund sites. See Federal Register Listing (FRL-7490-4), Volume 68, Number 83, Pages 23094-23101, Proposed Rule No. 39. The Site was placed on the Superfund NPL on September 22, 2003.

COMMUNITY PARTICIPATION

EPA held open houses and workshops at nearby schools to update the community on activities at the Site on November 14, 2002, April 29, 2003, May 29, 2003, and June 26, 2003. The Remedial Investigation and Feasibility Study (RI/FS) reports and Proposed Plan for the Conroe Site were made available to the public on July 18, 2003. 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 Montgomery County Memorial Library in Conroe, Texas. The notice of the availability of these documents was published in the Conroe Courier on July 18, 2003. A public comment period was held from July 18, 2003, to August 18, 2003. A formal public meeting was held on July 31, 2003, at the Runyan Elementary School cafeteria to present the Proposed Plan and answer questions on the remedial alternatives. EPA's response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD.

REMOVAL ACTION

Removal Assessment

The Removal Assessment conducted in 2002 confirmed that 77 aboveground storage tanks and other vessels (4 surface water impoundments, 75 drums, and a laboratory with various-sized containers and jars) were present on-site. A total of 34 soil/sediment samples, 6 surface water samples, 5 dioxin/furan soil samples, and 44 waste liquid samples were collected during the removal assessment. Based on the analytical data received, an estimated 65,000 cubic yards of soil exceeded the EPA Region 6 Screening Guidance for arsenic, chromium, PCP, total creosote, or dioxin/furan compounds. An estimated total of 540,000 gallons of liquid, sludge, and contaminated water and approximately 11,000 pounds of copper and ammonia sulfate in a granular form were identified on-site.

An Off-site Assessment was conducted in 2002 and 2003 and documented in a report dated July 2003. The primary objective of the assessment was to determine the nature and extent of the site related wood treating contaminants in off-site drainage pathways including Stewart's Creek and Little Caney Creek. A total of 425 sediment samples were collected during the assessment. Two sample locations within Stewart's Creek exceeded the EPA Screening Values and were addressed during the removal action. Samples collected from Little Caney Creek indicated there was no potential threat to human health.

Removal Action

In September 2002, the EPA initiated a time-critical removal action of on-site structures and soils. All the contaminated material, soils, sediments, and solidified wastes were placed inside an on-site Resource Conservation Recovery Act (RCRA) vault. Several source areas were discovered during the removal action. The two process units along with the raw product contained within the tanks were primary sources. The Creosote/PCP Process Unit was demolished along with some of the on-site buildings as necessary to remove any contamination from within or under the buildings. The liquids and materials located within the tanks were solidified with fly ash and on-site soil. Seventeen buried pits of various size and depths were found across the Site. The solidified material along with the contaminated soil and sediment were stockpiled near the RCRA vault pending completion of the vault. Berms were created around all stockpiles to contain any storm water runoff due to excessive rain storms during the removal action. Water from the bermed areas was treated via the on-site water treatment system.

Additional sediment samples were collected from Stewart's Creek in April 2003. Upon analysis of the sediment data, EPA conducted a time-critical removal action within Stewart's

Creek in conjunction with the removal action taking place on-site. The Stewart's Creek removal action included approximately 1,000 stream feet of sediments from the probable point of entry into Stewart's Creek down to State Highway 105. South of Highway 105, approximately 1,500 stream feet of Stewart's Creek sediments were also removed.

RCRA Vault

The RCRA vault has a top surface area of 582 feet by 582 feet, with the bottom of the vault having a surface area of 492 feet by 480 feet. The side walls of the vault have a 2:1 slope. The base of the RCRA vault consists of 12 inches of compacted clay overlain by a secondary set of artificial liners consisting of a geo-composite clay, high density polyethylene (HDPE), a drainage net, and a geo-textile fabric (Figure 3). The secondary leachate collection system consists of a 6-inch pipe wrapped in a Geo-textile fabric running the length of the vault and covered with gravel to provide proper drainage. On top of the secondary liner is 12 inches of compacted clay overlain by the primary set of liners consisting of a Geo-composite clay, HDPE, drainage net, and a Geo-textile fabric. The primary leachate collection also consists of a 6-inch pipe wrapped in Geo-textile fabric running the length of the vault and covered with on-site sand to provide proper drainage. The leachate collection system satisfies the closure performance standards under 40 CFR 265. 111 and waives the requirements for ground water monitoring under 40 CFR 265.90. A total of 252,000 cubic yards of contaminated material was placed inside the vault. The waste was capped with 12 inches of compacted clay and a set of liners consisting of a Geo-composite clay, HDPE liner, drainage net, Geo-textile fabric, and another 12 inches of non-compacted clay. Six inches of topsoil with vegetative seed was placed on top of the clay.

Confirmation Sampling

Confirmation sampling of the surface soil was conducted across the Conroe Site following completion of the removal action (Figure 4). The sample data from the on-site confirmation samples were compared against the TCEQ screening levels. All the chemicals except 4-methylphenol were below the TCEQ screening levels for commercial/industrial exposure. The concentration of 4-methylphenol (0.31 mg/kg) was below the Region 6 screening level (10,000 mg/kg).

SCOPE AND ROLE OF RESPONSE ACTION

This response action is the final Site remedy and is intended to address the remaining threats to human health and the environment posed by the site ground water. The purpose of this response action is to minimize further migration of the contamination in the Sand-1 aquifer and restore the affected ground water to drinking water standards. The completed removal action has addressed the contaminated soils and sediments which were a principal threat waste and a potential long-term source of ground water contamination. This response action addresses the remaining Site risks that were not addressed by the removal action.

SITE CHARACTERISTICS

This section summarizes information obtained as part of the RI/FS activities at the Site.

Sources of Contamination

The Conroe facility operated for more than 50 years and prior facility operations used to treat the lumber included creosote, PCP, and CCA. Historical Site operations and waste management techniques included two process areas, one tank battery area, along with numerous disposal pits discovered during the removal excavations at the Site. The potential sources of ground water contamination at the Conroe Site were removed during the EPA removal action completed in September 2003.

Conceptual Site Model

The former tank battery and process area are the source of past releases to the soil and are the primary sources of potential ground water contamination. The primary surface contamination is located in the former creosote/PCP process area and the adjacent tank battery. While the diesel based PCP and creosote solutions migrated downward into the clay soils, there has been little or no migration into the Sand-1 aquifer.

Sampling Strategy

The RI was conducted in a phased approach to better utilize data and focus the ground water investigation. Phase I of the RI consisted of cone penetrometer testing (CPT) at 17 locations across the Conroe Site and geophysical logging of the on-site water well. CPT locations focused on former process areas that were likely to have impacted the ground water and the property boundaries of the Site. Thirteen CPT locations were screened using the ROST attachment, which uses laser-induced fluorescence to detect classes of petroleum, polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) in the subsurface sands and clays. If the ROST unit projected a fluorescence greater then 5 percent then those locations were characterized as a significant detection. As part of the Phase I RI, the U.S. Geological Survey conducted a resistivity survey orientated along the western, southern, and eastern boundaries of the Site in an effort to avoid the ongoing removal activities. The resistivity survey was used to assist in defining the site geology and target intervals for well installation. The Phase I investigation was completed between April and May 2003.

Based on the Phase I investigation results, Phase II of the RI focused on the installation of ground water monitoring wells to investigate the likely pathways for contaminant migration within the aquifer. A total of 24 monitoring wells were installed at the Site, with 20 of the wells installed in 10 well couplets in the Sand-1 aquifer (Figure 5). The shallow "A" wells have PVC casing with 15-foot long screens with 0.020-inch slots to monitor the potential occurrence of a light non-aqueous phase liquid (LNAPL). The deep "B" wells in the Sand-1 aquifer have 10-foot screens with the bottom set within the clay at the base of the Sand-1 aquifer to monitor the potential occurrence of a dense non-aqueous phase liquid (DNAPL). Three monitoring wells were installed in the Sand-2 aquifer to assess the potential for contaminant migration through the aquitard between the Sand-1 and Sand-2 units (Figure 5). Monitoring wells 12, 13, and 14 were installed at depths of 139 - 142 feet. The former water supply well located on-site is also completed in the Sand-2 aquifer at a depth of 150 - 165 feet.

Ground water sampling events were completed in May (2 events), July, and August 2003. Samples were collected using temporary pumps installed in the wells to conduct both low-flow sampling and conventional sampling following purging of 3 well volumes. Ground water samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and metals. The primary sample analyses was performed through both the Contract Lab Program (CLP) with preliminary sample collection in May performed through a subcontracted laboratories.

Aquifer Characteristics

Ground water is the major source of public and industrial water supplies in Montgomery County, Texas. Three aquifers, in order of increasing depth, furnish the ground water used in the County: the Chicot Aquifer, the Evangeline Aquifer, and the upper 300 feet of the Jasper Aquifer. The City of Conroe municipal supply wells are screened in the deeper Evangeline sands at a depth of 825 - 1190 feet. Single-user private supply wells located near the Conroe Site are screened in the shallow Chicot Aquifer at depths greater than 100 feet. A private water supply well located at the Conroe facility is screened at a depth of 150 - 165 feet.

The Site geology and hyrdrogeology is relatively uniform with a confining clay/silty clay layer present from the ground surface to approximately 60 feet below ground surface. Thin discontinuous layers of clayey silts and sand are present in the clay layer at certain locations. Underneath this clay layer is a 40-foot thick sand unit which is the uppermost water bearing sand of the Chicot Aquifer (Sand-1). The Sand-1 aquifer becomes coarser grained with depth with a gravelly sand at the bottom of the unit. A silty clay ranging in thickness from 10 - 20 feet separates the Sand-1 unit from the Sand-2 unit. The Sand-2 unit occurs at a fairly constant depth of 130 feet below ground surface.

The Sand-1 and Sand-2 units are confined aquifers with a ground water flow direction at the Conroe Site to the south-southwest and a gradient of 0.0022 ft/ft (Figures 6 - 9). There is a slight upward gradient between the Sand-2 and Sand-1 units. Aquifer tests were not conducted during the RI, but the Sand-1 unit appears to be a high yielding water bearing unit since substantial quantities of water were removed during development while never dewatering the wells. The average hydraulic conductivity values for the Chicot Aquifer in Harris County to the south is 500 gallons per day per square foot (167 feet/day). This average hydraulic conductivity value is likely much higher than the value for the Sand-1 aquifer. Total organic carbon (TOC) analysis of the Sand-1 unit indicated an average 1% concentration of organic material. This value appears to be unrealistic with TOC values likely to be much lower in the sands.

Nature and Extent of Ground Water Contamination

Ground water contamination was detected only in the Sand-1 aquifer. The principal contaminants detected in the ground water include naphthalene and PCP with maximum detected concentrations of 174 ug/L and 94 ug/L, respectively (Figures 10 - 13). The ground water contamination is located under the former tank battery and the adjacent creosote/PCP process area, which is the expected source of the ground water contamination. Well cluster 10 A/B and well 11A are the only wells indicating a consistent detection of PCP and naphthalene. Concentrations are listed in the following tables for each sampling event with concentrations fluctuating between sampling events.

Table 1
Summary of Pentachlorophenol Detections (µg/L) in Monitoring Wells

Monitoring Well	1st Sampling Event 5-14-03*	2nd Sampling Event 5-29-03	3rd Sampling Event 7/29/03	4th Sampling Event 8/25/03
10B	27.6	94	12/50	58
3A	ND	0.68	ND	ND
8A	ND	6.6	ND	ND

ND - non-detect
* non-validated data

Table 2
Summary of Naphthalene Detections ($\mu g/L$) in Monitoring Wells

Monitoring Well	1st Sampling Event 5-14-03*	2nd Sampling Event 5-29-03	3rd Sampling Event 7/29/03	4th Sampling Event 8/25/03
10A	ND	17	5.9	74
11A	158	174	97	89
8A	17	15	ND	ND

ND - non-detect
* non-validated data

Site contaminants were not detected in the Sand-2 unit. The three monitoring wells (12 - 14) were installed downgradient of the former tank battery and creosote/PCP process area, and the former water supply well is located adjacent to the process areas. While lead was detected in the initial samples from the former water supply well, the presence of lead is is likely related to the pump which had been left in the well since the facility operations closed in 1997.

Historical wood-treating operations are often a source of NAPLs in the ground water, which can produce dissolved plumes of PCP and PAHs, such as naphthalene. Two wells installed in or near the former tank battery and creosote/PCP process area detected strong chemical odors and oily staining at depths of 25 - 40 feet below ground surface in the upper clay unit. The Sand-1 well couplets were installed in the upper and lower sections of the unit in an effort to detect the presence of any LNAPL or DNAPL in the aquifer. A separate NAPL was not detected in the monitoring wells and the low dissolved phase concentrations do not indicate the presence of a separate NAPL in the ground water. The downward contaminant migration appears to have been attenuated in the clay unit resulting in a relatively low concentration dissolved plume in the Sand-1 unit.

The most frequently detected inorganic analyte in the ground water was chromium. Lesser amounts of barium and arsenic were also detected in association with the chromium detections. Chromium was detected above the Safe Drinking Water Act Maximum Contaminant Level (MCL) of 100 $\mu g/L$ in 13 of the 23 newly installed monitoring wells. Typical well construction involves the use of a cement-based mixture of bentonite and water in order to set the casing in place. The cement used at the Conroe Site was manufactured by TXI and consisted of Portland Type I/II cement supplied by the drilling subcontractor. A sample of the cement was collected and sent for laboratory analysis. Sample results from the cement contained 665 milligrams per kilogram (mg/kg) chromium. Based on this result from a standard well construction material, a full round of redevelopment and resampling (third groundwater field event) was completed between June 9 and June 27, 2003. As part of the resampling effort, three sequential ground water samples were collected from MW-9A. The first sample was collected immediately after the pump was started in an effort to collect "stagnant" water from within the well. The second and third samples were collected approximately two-thirds through the purge effort, and the third sample was collected at the completion of the well purge. Results from the initial "stagnant" sample collected from MW9A exhibited chromium at 252 $\mu g/L$. The second and third sample collected from the well were both below 5.3 $\mu g/L$. The results indicate that chromium concentrations in the well significantly decrease as "stagnant" well water is removed and replaced with formation water. The grout used in the well construction is the source of the chromium observed in the samples. Since chromium concentrations are decreasing with repeated sampling, the grout is not a long-term source of chromium contamination to the ground water.

Fate and Transport of Contamination

The physical properties of the contaminants influence the fate and transport mechanisms and the applicable remedial technologies. The primary contaminants in the ground water at the Conroe Site is a dissolved plume of naphthalene and pentachlorophenol. Lighter ringed PAHs such as naphthalene, which is a 2-ring PAH, and PCP can be used as a primary substrate for microbial growth under aerobic conditions. The principal mechanisms to attenuate the contaminant concentrations without treating the ground water include aerobic biodegradation. Reduction in naphthalene and PCP concentrations can also occur through anaerobic degradation and is likely to be assisted by a high TOC content in the aquifer. The remaining natural processes likely to occur in the aquifer include dilution and dispersion of the naphthalene and PCP as the plume migrates. All of these processes can produce a slow rate of decline in PCP and naphthalene concentrations. Conservative estimates of PCP transport predict the PCP plume to be relatively stable with little or no further migration of the plume. The predicted plume stability would minimize further impacts to the surrounding Sand-1 aquifer and promote the in-situ degradation process.

CURRENT AND POTENTIAL FUTURE LAND AND GROUND WATER USES

Past and current ground water use on the facility and in the nearby vicinity forms the basis for reasonable exposure assessment assumptions and risk characterization conclusions. Current ground water use is from wells screened in the Sand-2 aquifer. The private well located on the Conroe facility was a former water supply well screened in the Sand-2 aquifer. Private residences located east of the facility property (Figure 2) also utilize wells screened in the Sand-2 aquifer. However, there is no ground water usage immediately downgradient of the facility since the nearby business park (Figure 2) and private residences are connected to the City of Conroe public water supply system. There are two City of Conroe water supply wells located north and northwest of the facility with the closest well approximately 1 mile northwest of the facility. While the Sand-1 aquifer is not currently utilized as a water supply, the aquifer has the potential to supply drinking water. However, the limited thickness of the Sand-1 aquifer and the availability of the Sand-2 aquifer preclude the immediate use of the Sand-1 aquifer as a source of drinking water. Both the Sand-1 and Sand-2 aquifers have the potential for future beneficial use as a drinking water supply. The potential exposure scenario would be for a future site worker exposed to ground water pumped from the Sand-1 aquifer. This potential exposure scenario is consistent with future redevelopment of the Conroe property for industrial or commercial use.

EPA's Ground water Protection Strategy and Classification Guidelines define the various ground water classes based on the ground water use. There are no known populations currently obtaining drinking water from the Sand-1 aquifer. The former Conroe facility did obtain their water supply from an on-site well screened in the Sand-2 aquifer. Because the Sand-1 aquifer is not considered irreplaceable (i.e. no reasonable alternative source of drinking water would be available to substantial populations) nor ecologically vital to any habitat, the Class I classification can be eliminated. The Sand-1 aquifer does not have a total dissolved solids value of 10,000 mg/L or higher eliminating the Class III classification. The Sand-1aquifer is not currently being used, eliminating the Class IIA classification. However, there is potential for drinking, agriculture, or other beneficial uses, and the Sand-1 aquifer is best classified as Class IIB.

EXPOSURE PATHWAYS

Under current conditions, there is no exposure to any contaminants present in the ground water at the Site because the affected ground water is not directly in use and does not discharge to surface water. Since the Sand-1 aquifer has the potential for future use, exposures could occur to workers using the contaminated water. The potential exposure routes include ingestion and dermal contact by a future site worker

SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the Site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this Site. The risk assessment was completed using May 2003 analytical data reported for samples collected from the on-site ground water monitoring wells at the Conroe Site. The risk screening evaluation did not identify a human health risk based on a future site worker exposure scenario. While neither the PCP or naphthalene concentrations in the ground water exceeded the carcinogenic or non-carcinogenic risk levels for the potential exposure scenario, the PCP concentration did exceed the MCL of 1 μg/L under the Safe Drinking

Water Act. Other contaminants identified in the May sampling event and evaluated in the risk assessment were later determined to be absent in the ground water based on subsequent sampling events in July and August 2003. These contaminants included trichloroethene and the metals chromium and arsenic. The grout contamination identified in some of the monitoring wells is the source of the chromium and arsenic detected in the May sampling event and concentrations have since decreased below the respective MCLs of 0.1 mg/L and 0.010 mg/L in the July and August events. Table 3 lists the contaminants of concern (COCs) and the respective exposure point concentrations used in the risk assessment.

Table 3
Summary of Chemicals of Concern and
Ground Water Exposure Point Concentrations

Chemical of Concern	Maximum Concentration Detected (µg/L)	Exposure Point Concentration (µg/L)	Statistical Measure
Pentachlorophenol	94	2.7	Mean
Naphthalene	158	10.5	Mean

This table presents the chemicals of concern (COCs) and exposure point concentration for each of the COCs detected in ground water (*i.e.*, the concentration that will be used to estimate the exposure and risk from each COC in the soil). The table includes the range of concentrations detected for each COC, the exposure point concentration (EPC), and how the EPC was derived. The table indicates that PCP and naphthalene are the most frequently detected COCs in ground water at the site. The arithmetic mean was used to derive the exposure point concentrations for PCP and naphthalene.

Carcinogenic and noncarcinogenic risk estimates were calculated using a reasonable maximum exposure (RME) for a future site worker. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation: Risk = CDI x SF, where:

- Risk = a unitless probability (*e.g.*, 2×10^{-5}) of an individual's developing cancer
- CDI = chronic daily intake averaged over 70 years (mg/kg-day)
- SF = slope factor, expressed as (mg/kg-day)-1.

These risks are probabilities that usually are expressed in scientific notation (*e.g.*, 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure

025663

to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}. Table 4 lists the cancer toxicity data for each of the COCs and Table 5 summarizes the carcinogenic risk characterization.

Table 4
Cancer Toxicity Data Summary
Pathway: Ingestion, Inhalation

Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date
Pentachlorophenol	0.12	0.12	(mg/kg)/day	B2	IRIS	2003
Naphthalene	---	---	(mg/kg)/day	C	IRIS	2003

Key
— : No information available
IRIS: Integrated Risk Information System, U.S. EPA
HEAST: Health Effects Assessment Summary Tables

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - Indicates that limited human data are available
B2 - Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen

This table provides carcinogenic risk information which is relevant to the contaminants of concern in the ground water. One of the two COCs is considered carcinogenic via the oral and dermal route. Naphthalene is not a carcinogen.

Table 5
Ground Water Risk Characterization Summary - Carcinogens
Worker Scenario Based on Reasonable Maximum Exposure

Chemical of Concern	Primary Target Organ	Carcinogenic Hazard Quotient	
		Ingestion	Exposure Routes Total
Pentachlorophenol	Liver	1.13×10^{-6}	1.13×10^{-6}
		Total Hazard Quotient =	**1×10^{-6}**

Table 5 Ground Water Risk Characterization Summary - Carcinogens Worker Scenario Based on Reasonable Maximum Exposure
This table provides risk estimates for the significant routes of exposure. These risk estimates are based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the frequency and duration of an adult's exposure to ground water for 30 years, as well as the toxicity of the chemicals of concern. The total risk from direct exposure to contaminated ground water at this site to an adult worker is estimated to be 1×10^{-6}. The chemicals of concern contributing most to this risk level are pentachlorophenol. This risk level indicates that if no clean-up action is taken, an individual would not have an increased probability of developing cancer as a result of site-related exposure to the chemicals of concern.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (*e.g.*, life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic 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) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI < 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI > 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows: Non-cancer HQ = CDI/RfD, where:
CDI = Chronic daily intake
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (*i.e.*, chronic, subchronic, or short-term). Table 6 lists the COCs and their respective non-cancer toxicity data, and Table 7 summarizes the non-carcinogenic risk characterization.

Table 6
Non-Cancer Toxicity Data Summary

Chemical of Concern	Chronic Oral RfD Value (mg/kg-day)	Chronic Dermal RfD (mg/kg-day)	Primary Target Organ	Sources of RfD: Target Organ	Dates of RfD:
Pentachlorophenol	0.03	0.03	Liver/Kidney	IRIS	1993
Naphthalene	0.02	0.02	Body Weight	IRIS	1999

025665

Table 6 Non-Cancer Toxicity Data Summary					
Chemical of Concern	**Chronic Oral RfD Value (mg/kg-day)**	**Chronic Dermal RfD (mg/kg-day)**	**Primary Target Organ**	**Sources of RfD: Target Organ**	**Dates of RfD:**
Key IRIS: Integrated Risk Information System, U.S. EPA					
This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in ground water. Each of the COCs have toxicity data indicating their potential for adverse non-carcinogenic health effects in humans. The available toxicity data from chronic animal studies indicates that PCP primarily affects the liver and kidney.					

Table 7 Ground Water Risk Characterization Summary - Non-Carcinogens Worker Scenario Based on Reasonable Maximum Exposure				
Chemical of Concern	**Primary Target Organ**	**Non-Carcinogenic Hazard Quotient**		
		Ingestion	**Dermal**	**Exposure Routes Total**
Pentachlorophenol	Liver/Kidney	0.00088	0.00088	< 1
Naphthalene	Body Weight	0.00513	0.00513	< 1
			Total Hazard Index =	< 1
			Liver/Kidney Hazard Quotient =	**< 1**
This table provides hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance (RAGS) for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects. The estimated HI of < 1 indicates that the potential for adverse noncancer effects would no occur from exposure to contaminated ground water containing the chemicals of concern.				

Estimations of exposure and risk are subject to a number of uncertainties that may lead to either an overestimate or an underestimate of risk. Assumptions made in the risk assessment that are likely to overestimate risk include the use of a simplifying assumption that no contaminant loss would occur over the duration of the 30-year exposure. Overestimating risk can also occur through the use of conservative exposure factors, use of conservative exposure point concentrations, and the use of conservative RfDs and SFs. Factors that are likely to underestimate risk include errors associated with sampling and analysis that may result in lower sample concentrations and yield an underestimate of the true risk or hazard, and toxicity values that are not available for every chemical, for every exposure duration, or for all exposure routes.

Due to the depth below ground surface of the Sand-1 aquifer, the ground water does not discharge to any nearby surface water body. Therefore, there was little potential for significant exposure of wildlife to the contaminants.

It is the lead agency's current judgment that the Selected Remedy identified in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

PRINCIPAL AND LOW-LEVEL THREAT WASTES

Principal threat wastes are those source materials that are highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The source materials include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. Low level threat wastes are source materials that generally can be reliably contained and that would present only a low risk in the event of release. The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. At the Conroe Site, the EPA removal action has addressed the principal threat wastes comprised of contaminated soil, sludge, and waste at the former process areas. Contaminated ground water is neither a principal or low-level threat waste although a NAPL in the ground water may be considered a source material. A separate NAPL phase has not been detected in the monitoring wells, and thus, the remedial alternatives do not address a principal threat waste.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) were developed for the Conroe Site for those chemical and contaminant sources that pose a carcinogenic risk above EPA's target cancer risk range or non-carcinogenic hazard to human health and the environment based on site-specific risk calculations. RAOs are also defined such that Applicable or Relevant and Appropriate Requirements (ARARs) are met. The RAOs refer to specific sources, contaminants, pathways, and receptors. The EPA's removal action has addressed the soil and sediment contamination at this Site and has addressed the following RAOs:

- Prevent direct contact, ingestion, and inhalation of surface and subsurface soils that exceed human health based levels for the chemicals of concern.
- Prevent direct contact, ingestion, and inhalation of sediments in the drainage areas and creek that exceed human and ecological based levels for the chemicals of concern.

- Prevent the release of contaminants to surface and subsurface soils, surface water, and ground water. Protect off site ecological receptors by preventing off site contaminant migration as a result of on-site releases.

The existing contamination in the Sand-1 aquifer, which has the potential to form part of the local water supply for private residences as well as the City of Conroe, exceeds the MCL for PCP established under the Safe Drinking Water Act. The Sand-2 aquifer, which is a part of the local drinking water supply for nearby private residences as well as the City of Conroe, has not been contaminated. Thus, protecting the Sand-2 aquifer from contamination as well as returning the contaminated portion of the Sand-1 aquifer to its beneficial use forms the basis for the following site-wide RAOs.

- Minimize further migration of the contaminant plume in the Sand-1 aquifer and prevent migration of contaminants to the Sand-2 aquifer.
- Restoration of the ground water throughout the contaminant plume to its expected beneficial uses wherever practicable. This objective will require a much longer time frame to achieve with an optimum period of 10 years but may take up to 20 years.

While there is no current exposure to contaminated ground water above acceptable risk levels, monitoring of the ground water will be necessary to ensure Site conditions do not change, resulting in exposure to contaminated ground water that is above acceptable risk levels. The Remedial Goal for PCP in ground water is 1 μg/L based on the MCL established under the Federal Safe Drinking Water Act. While the chromium detected in some of the monitoring wells is above the corresponding MCL of 100 μg/L, the chromium is a product of the leachate originating from the grout used in the monitoring well construction. The chromium concentrations have significantly decreased between the May and August sampling events and the presence of chromium does not indicate a contaminant plume but rather a localized concentration around the wellbore. The remaining chromium in the wells is expected to decrease below the MCL based on the prior sampling events with no immediate or long-term threat of exposure.

DESCRIPTION OF REMEDIAL ALTERNATIVES

Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA, 42 U.S.C. § 9621, establishes several other statutory requirements and preferences, including: (1) a requirement that EPA's remedial action, when complete, must comply with all applicable, relevant, and appropriate federal and more stringent state environmental and facility siting standards, requirements, criteria or limitations, unless a waiver is invoked; (2) a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (3) a preference for remedies in which treatment permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances. Response alternatives were developed to be consistent with these statutory mandates.

Technology and Alternative Development and Screening

CERCLA and the National Contingency Plan (NCP) set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed to address the ground water contamination at the Conroe Site. In summary, three options involving increasing levels of active management of the ground water contamination were selected for detailed analysis.

Other potential remedial strategies and technologies typically considered at contaminated ground water sites were not selected for further evaluation due to the site characteristics. The use of engineering systems (e.g., slurry wall, permeable reactive walls) to control further contaminant migration or chemically destroy the contaminants was not considered due to the depth of the affected aquifer at 60 to 100 feet. Also, the utilization of injection wells to enhance the in-situ degradation of the contaminants to restore ground water to drinking water use was not considered as a single alternative but rather as an enhancement to other comprehensive alternatives.

Summary of Remedial Alternatives for Ground Water

Alternative 1: No Action
Estimated Capital Cost: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth: $0

Regulations governing the Superfund program NCP 300.430(e)(6), require that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, EPA would take no action at the Conroe Site to prevent exposure to the ground water contamination.

Alternative 2: Monitored Natural Attenuation
Estimated Capital Cost: $0
Estimated Annual Monitoring Costs: $23,000 - $84,000
Estimated Present Worth (7%): $442,000
Time Needed to Implement Remedy: 3 - 6 months

Alternative 2 includes a long-term ground water monitoring plan to track the effectiveness of the natural attenuation processes, including biodegradation and the physical processes of dilution and dispersion, to reduce contaminant concentrations below the remedial goals. The time to implement this remedy is not significant with only contracting procedures to follow for implementing a long-term monitoring plan. Additional monitoring wells would be installed as needed to evaluate unexpected changes in the plume boundaries. The alternative cost estimate is projected over a period of 20 years. Three separate ground water monitoring events conducted in May, July, and August 2003, indicate that only two well locations currently exceed the remedial goal for pentachlorophenol. The combination of these sampling events and the indirect lines of evidence indicate that natural attenuation has been ongoing at the Site.

The success of a monitored natural attenuation (MNA) remedy is dependent on the control of potential source areas. At this Site, the removal action has addressed the free product waste at the surface and at shallow depths in the surface soil. In addition, the existing monitoring system has not detected the presence of a NAPL in the Sand-1 aquifer. While the facility has operated for over 50 years, a widespread dissolved plume or a NAPL has not been detected in the Sand-1 aquifer. The absence of a NAPL in the ground water allows natural attenuation processes to maintain a somewhat stable plume boundary as evidenced by the relatively small PCP plume detected in the ground water.

The success of this alternative is also dependent on the degradation of the PCP plume under Site conditions. Ground water sampling activities indicate aerobic conditions in the Sand-1 aquifer which is conducive to degradation of the PCP plume, and there are no anticipated degradation products that would be more toxic than the PCP. In addition, the plume is predicted to be relatively stable with little or no further migration of the PCP. The predicted plume stability would minimize further impacts to the surrounding Sand-1 aquifer and promote the in-situ degradation process. Finally, there is no current or projected demand for the Sand-1 aquifer that would prevent the use of a natural attenuation remedy within a longer cleanup time frame. The availability of the Sand-2 aquifer with a greater production potential precludes any immediate demand for water production from the Sand-1 aquifer.

This Alternative has several potential advantages including the generation of smaller volume of remediation wastes, reduction of the potential for cross-media transfer of contaminants commonly associated with ex-situ treatment, reduction of the risk of human exposure to contaminants, contaminated media, and other hazards, and reduction of disturbances to ecological receptors. In addition, there is less intrusion for future redevelopment of the property.

Institutional controls would be implemented to prevent exposure to contaminated ground water above acceptable risk levels during the remedial action activities under this alternative. Access to the Site and potential future uses would be limited through the use of a property easement or other restrictive mechanisms. The restrictions would prohibit future use of the Sand-1 aquifer until the remedial goals have been attained across the Site and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and PCP during the well installation process.

EPA also recommends that remedies employing MNA be evaluated to determine the need for including one or more contingency measures that would be capable of achieving remediation objectives if natural attenuation cannot attain cleanup levels. EPA believes that contingency measures should generally be included as part of a MNA remedy which has been selected based primarily on predictive analyses rather than documented trends of decreasing contaminant concentrations. For this Site, contingency measures would include the use of an oxygen (either air or a liquid additive) and/or nutrient delivery system to enhance the natural degradation of the PCP. The delivery system would utilize existing monitoring wells or specific injection wells to deliver the additives to the Sand-1 aquifer. One or more criteria may be used to trigger the contingency remedy including:

- Contaminant concentrations are not decreasing at a sufficiently rapid rate to meet the remediation objectives; and
- Contaminant concentrations in ground water at specified locations exhibit an increasing trend not originally predicted during remedy selection.

Alternative 3: Ground Water Pump and Treat

Estimated Capital Cost: $135,000
Estimated Annual Operation & Maintenance Costs: $54,500
Estimated Present Worth (7%) for System: $518,000
Estimated Annual Monitoring Costs: $23,000 - $84,000
Estimated Present Worth (7%) for Monitoring Costs: $442,000
Total Estimated Present Worth (7%) for Alternative 3: $960,000
Time Needed to Implement Remedy: 12 - 18 months

In Alternative 3, the ground water would be restored to drinking water quality through extraction and treatment to meet the final cleanup levels throughout the entire plume. Ground water will be pumped from one or more wells screened in the Sand-1 interval at an estimated total rate of 10 to 20 gallons per minute. An aquifer test and a ground water flow model would be performed during the design phase to verify aquifer parameters and appropriate well locations. However, for estimating purposes, two extraction wells have been proposed near monitoring wells MW-10 and 11. The ground water pumping will provide hydraulic control and maximize the mass removal from the contaminant plume. For cost estimating purposes, the system is predicted to operate for 10 years or less after which time the system efficiency is expected to decline due to declining concentrations in the ground water. Ground water monitoring may continue until natural attenuation processes reduce any remaining concentrations to remedial goals.

The extracted ground water would be treated through a granular activated carbon (GAC) unit to remove the organic contaminants. The organic contaminants in the ground water adsorb onto the carbon particles and the treated water exits the GAC unit. Pretreatment of the extracted ground water through a bag filter would be necessary to remove suspended particles and prevent clogging of the pores along the carbon granule surfaces. Disposal of the spent carbon granules will be accomplished through off-site disposal or regeneration at a permitted facility. The use of a GAC unit is a presumptive treatment component for organic contamination identified in EPA's ground water presumptive strategy, "Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites," October 1996, OSWER Directive Number 9283.1-12.

Disposal of the treated ground water may be accomplished via discharge into the adjacent Stewart's Creek. A single-walled PVC pipeline would be used to transport the water to Stewart's Creek located along the western boundary of the existing facility. The treated water will be required to meet the discharge standards under the National Pollutant Discharge Elimination System (NPDES).

Institutional controls would be implemented to prevent exposure to contaminated ground water above acceptable risk levels during the remedial action activities under this alternative. Access to the Site and potential future uses would be limited through the use of a property easement or other restrictive mechanisms. The restrictions would prohibit future use of the Sand-1 aquifer until the remedial goals have been attained across the Site and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and PCP during the well installation process.

COMPARATIVE ANALYSIS OF ALTERNATIVES

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

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

Alternative 2 (Monitored Natural Attenuation) and Alternative 3 (Ground Water Pump and Treat) provide adequate protection of human health and the environment. Alternative 2 provides for control of this exposure route through institutional controls and ground water monitoring to evaluate the effectiveness of natural attenuation in achieving the Remedial Goals. Alternative 3 achieves this goal through the physical extraction and treatment of the contaminated ground water combined with institutional controls. Since there is no current exposure route or expected demand for water from the Sand-1 aquifer, the level of overall protection to human health and the environment provided by Alternative 2 is comparable to the level provided by the ground water pump and treat system in Alternative 3. Alternative 1 does not provide a means for monitoring the reduction in contaminant concentrations in the ground water. Alternative 1 does not provide adequate protection of human health and the environment.

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

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a State in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

ARARs are divided into chemical-specific, action-specific, and location-specific categories. Chemical-specific requirements include promulgated health- or risk-based standards, numerical values, or methodologies that, when applied to site-specific conditions, establish the acceptable amount or concentration of a contaminant that may be detected or discharged in the environment. Action-specific requirements include technology or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants, and contaminants. There were no location-specific ARARs pertinent to the Conroe Site.

Alternatives 2 and 3 are both expected to achieve the chemical-specific ARARs for ground water based on the MCLs for contaminants in drinking water. Alternative 3 would also have to meet the action-specific ARAR for the NPDES permitting program including the development of the discharge limitations to Stewart's Creek and the monitoring of the discharge. Alternative 1 would not provide a means to verify the achievement of ARARs at the Site.

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

Alternatives 2 and 3 will both be able to provide the same long-term effectiveness and permanence. Both alternatives include long-term monitoring to verify that contaminant levels achieve the Remedial Goals for the ground water and institutional controls to prevent exposure to potential receptors.

4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

The 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 contamination in the ground water is not necessarily appropriate at this Site to achieve the remedial action objectives and goals. Alternative 3 will achieve the reduction through the removal of organic contaminants from the extracted ground water followed by off-site disposal.

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

Implementation of Alternatives 1 and 2 would not affect the levels of risk to the community or Site workers. There would be no significant changes to the current status of the Site. Alternative 3 poses some short-term risk to workers during the construction phase and to personnel during routine operation and maintenance. Typical health and safety protocols will minimize potential exposure to hazardous substances.

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

Alternative 2 would be the simplest to implement from a technical perspective by requiring only the implementation of a long-term ground water monitoring plan. Alternative 2 would rely on the existing monitoring system, with modifications as necessary over time. Implementation of Alternative 3 is technically feasible and can be accomplished following the completion of remedial design plans for the construction of the system. The general expertise is available in the industry to design, construct, and operate a ground water extraction system. Similarly, the equipment necessary for the treatment system are also readily available in the industry. Implementation issues are further expanded under Alternative 3 with the administrative requirements for transportation and off-site disposal of the granular activated carbon from the treatment process and the additional permitting for discharge of treated water into Stewart's Creek.

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.

The significant cost increase between Alternatives 2 and 3 is due to the additional capital costs and O&M costs for the ground water pump and treat system. Both alternatives share the same ground water monitoring costs. Cost summaries are found in the following table.

Table 8 Present Worth Cost Analysis of the Alternatives			
Remedial Alternative	**Capital Cost**	**Total O&M Cost**	**Present Worth Cost**
Alternative 1	$0	$0	$0
Alternative 2	$0	$442,000	$442,000
Alternative 3	$135,000	$825,000	$960,000

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

The State of Texas, through the Texas Commission on Environmental Quality, supports Alternative 2 (see Appendix A).

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

EPA did not receive oral comments from the community in support of, or in opposition to, the preferred alternative at the Public Meeting held on July 31, 2003. EPA did not receive any written comments on the Proposed Plan during the public comment period held from July 18, 2003 through August 18, 2003.

SELECTED REMEDY

The selected remedy for the ground water is Alternative 2, Monitored Natural Attenuation. The long-term goal of this remedial action is the restoration of ground water to its beneficial use, which at this Site, is a potential drinking water source. Based on information obtained during the remedial investigation and on a careful analysis of all remedial alternatives, EPA and the State of Texas believe that the selected remedy will achieve this goal.

The removal action conducted from September 2002 through September 2003 has addressed the contaminated soils and sediments exceeding risk-based levels. The contaminated materials were placed in an on-site RCRA vault for long-term storage and management. Approximately 252,000 cubic yards of contaminated soils and sediments were placed in the on-site RCRA cell.

Summary of the Rationale for the Selected Remedy

The reliance on natural attenuation processes to control the ground water plume is based on the historical plant operations and resulting extent of contamination, potential future use of the aquifer and surrounding land use, and anticipated institutional controls for the site property. Based on the ground water monitoring data collected between May and August 2003, the ground water contamination is confined to a relatively small area around the former tank battery and PCP/creosote pressure treating area. The monitoring data confirms that after 50 years of operation at the former creosote facility, the ground water contamination is relatively stagnant with no significant accumulation of PCP outside of well cluster 10 A/B. The success of either the Monitored Natural Attenuation alternative or the Pump and Treat alternative is ultimately dependent on the removal of the pits and process areas containing liquid wastes. Further significant migration of liquid wastes downward through the upper 60 feet of clay has been reduced or eliminated through the removal action at the Conroe Site. The contaminant concentrations are expected to decrease in the aquifer within a reasonable time frame. As a result, there is limited practicality to implementing a ground water extraction system to achieve a reduction in risk that can be achieved through natural attenuation processes and at significantly less cost.

The contaminated ground water at the Site poses a potential threat to human health if the Sand-1 aquifer is developed as a private drinking water supply. However, the existing ground water contamination does not pose a current or near-term threat to the surrounding private water supply wells which are screened in the Sand-2 aquifer and institutional controls will prevent future well installation at the property. The existing water supply well on the facility that is screened in the Sand-2 aquifer is unaffected by the site operations.

Description of the Selected Remedy

The Selected Remedy will achieve the remedial action objectives of: 1) minimizing further migration of the contaminant plume in the Sand-1 aquifer and preventing migration of contaminants to the Sand-2 aquifer; and 2) restoring the ground water throughout the contaminant plume to its expected beneficial uses wherever practicable. The Selected Remedy consists of the following components:

- A ground water monitoring program to track the contaminant concentrations, evaluate the effectiveness of the natural attenuation processes, and ensure there is no human exposure above the drinking water limits. Included in this component is the installation of additional monitoring wells, if necessary.

- Placement of institutional controls to prevent exposure to contaminated ground water above acceptable risk levels during the remedial action activities under this alternative. Access to the Site and potential future uses would be limited through the use of a property easement or other restrictive mechanisms. The restrictions would prevent future use of the Sand-1 aquifer until the remedial goals have been attained across the Site and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and PCP during the well installation process. EPA will attempt to negotiate an Administrative Order on Consent implementing a property easement and/or other appropriate controls with the landowner of the Site. The institutional control with the existing landowner will be filed with the appropriate property records office. 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 prior to attainment of the remediation goals.

The selected remedy is considered more cost effective because the same degree of protectiveness to human health is realized at a much lower cost. No risks were identified to existing off-site residents. Since there are no known populations currently obtaining drinking water from the Sand-1 aquifer, the most likely potential receptors were determined to be future industrial workers who would utilize on-site wells to obtain water for drinking or other uses. Potential risks from Site contaminants were only identified under the hypothetical future industrial worker. Although this scenario is possible, it may not be likely considering the existing Site can obtain drinking water from the City of Conroe.

An annual remedy evaluation will be performed which will incorporate data from the ground water monitoring program. This information will be used to refine the estimated time frame for achieving the ground water cleanup goals, the need for further remedy refinements, and risk communication with the community. Consideration of the contaminants remaining in the Sand-1 aquifer will also be included in the annual evaluation to determine if further investigation or remedial action is necessary to prevent delays in the ground water cleanup.

Remedies employing MNA typically utilize one or more contingency measures that would be capable of achieving remediation objectives. EPA believes that contingency measures should generally be included as part of a MNA remedy which has been selected based primarily on predictive analyses rather than documented trends of decreasing contaminant concentrations. For this Site, contingency measures would include the use of an oxygen (either air or a liquid additive) and/or nutrient delivery system to enhance the natural degradation of the PCP. The delivery system would utilize existing monitoring wells or specific injection wells to deliver the additives to the Sand-1 aquifer. One or more criteria may be used to trigger the contingency remedy including:

- Contaminant concentrations are not decreasing at a sufficiently rapid rate to meet the remediation objectives; and
- Contaminant concentrations in ground water at specified locations exhibit an increasing trend not originally predicted during remedy selection.

Summary of Estimated Remedy Costs

The cost estimate summary in the following table is based on the best available information regarding the anticipated scope of the remedial alternative. The Present Worth Cost Analysis for the remedy is $442,000 based on a 7% discount factor and a 20-year period to account for the uncertainties associated with ground water cleanup. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a ROD Amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 9
Annual O&M Cost Estimate for Selected Remedy

Description of Capital Costs	Units	Unit Cost	Events	Cost
Project Plan Development	LS	$20,000	1	$20,000
Annual Well Maintenance	LS	$1,000	1	$1,000
Annual Ground Water Sampling (Years 1- 2)				
• Project Management	LS	$12,000	1	$12,000
• Personnel	LS	$10,000	4	$40,000
• Equipment Costs	LS	$2,500	4	$10,000
• Sample Management	LS	$1500	4	$6000
• Data Evaluation	LS	$4000	4	$16,000
• Total Annual Costs				$84,000*
Annual Ground Water Sampling (Years 3- 5)				
• Project Management	LS	$12,000	1	$12,000
• Personnel	LS	$10,000	2	$20,000
• Equipment Costs	LS	$2,500	2	$5,000
• Sample Management	LS	$1500	2	$3,000
• Data Evaluation	LS	$4000	2	$8,000
• Total Annual Costs				$48,000*

Table 9
Annual O&M Cost Estimate for Selected Remedy

Description of Capital Costs	Units	Unit Cost	Events	Cost
Annual Ground Water Sampling (Years 6- 20)				
• Project Management	LS	$5000	1	$5,000
• Personnel	LS	$10,000	1	$10,000
• Equipment Costs	LS	$2,500	1	$2,500
• Sample Management	LS	$1500	1	$1,500
• Data Evaluation	LS	$4000	1	$4,000
• Total Annual Costs				$23,000*

Notes:
* Sample analyses is performed through the EPA CLP program are not included in the cost summary.
LS = Lump Sum

Expected Outcomes of Selected Remedy

The expected outcome of the selected remedy is the protection of the Sand-2 aquifer as well as returning the contaminated portion of the Sand-1 aquifer to its potential beneficial use as a drinking water supply. The remedial goal for the Sand-1 aquifer is based on the MCL of 1μg/L for PCP. Periodic assessments of the protection afforded by remedial actions will be made as the remedy is implemented. Approximately 20 years are estimated as the amount of time necessary to achieve the goals consistent with the use of the ground water as a drinking water supply.

The remedial goals identified in the ROD must be met at the completion of the remedial action throughout the ground water contaminant plume. The current plume boundary for PCP is illustrated in Figure 13. Compliance will be demonstrated by applying statistical evaluations to the contaminant concentrations in individual wells that have previously exceeded the remedial goals.

There are no anticipated socio-economic or community revitalization impacts following implementation of the ground water remedy. Since the ground water does not discharge into any nearby surface water bodies, there are no anticipated environmental or ecological benefits from the selected remedy. However, the removal action completed for the surface soils and sediments has provided for a potential redevelopment opportunity at the Conroe Creosoting facility. The soils cleanup levels are suitable for commercial/industrial redevelopment of the property consistent with the future site use restrictions and the excluded area containing the RCRA vault. In addition, the removal action also produced an ecological benefit through remediation of the Stewart's Creek sediments and the prevention of further migration of creosote constituents into the stream segment.

STATUTORY DETERMINATIONS

Under CERCLA section 121, 42 U.S.C. § 9621, 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 remedies for the source control and ground water operable units meet these statutory requirements.

Protection of Human Health and the Environment

The ground water remedy protects human health and the environment through implementation of a ground water monitoring program to confirm the natural attenuation of contaminants in the ground water and institutional controls to prevent accidental human exposure. Since the removal action has eliminated the principal source of contaminants leaching into the ground water, natural attenuation processes are expected to steadily decrease the existing PCP concentrations below the Remedial Goals based on the MCL. The current cancer risk to human health through the ground water exposure pathway is 1×10^{-6} (RME) for a future on-site worker. For non-carcinogenic threats, the hazard index is less than 1 (RME) for a future on-site worker (RME). There are no adverse impacts identified to any private or City of Conroe drinking water well. Implementation of institutional controls will provide notification to current and future landowners of the existing contamination at the Site.

Compliance with Applicable or Relevant and Appropriate Requirements

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

Chemical-Specific ARARs

- Federal Safe Drinking Water Act Maximum Contaminant Levels, Maximum Contaminant Level Goals, and Action Levels (40 CFR Part 141), which specify primary drinking water standards for public water supply systems.

To Be Considered Criteria

- *Methods for Evaluating the Attainment of Cleanup Standards, Volume 2: Ground Water* (EPA 230-R-92-014, July 1992): In implementing the selected ground water remedy, the reference document provides a variety of standard statistical methods that may be useful in evaluating the uncertainty of whether the ground water cleanup remedial goals for a Site have been met.
- *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites* (OSWER Directive 9283.1-12, October 1996): The objective of a presumptive remedy guidance is to use the Superfund program's past experience to streamline site investigations and speed up selection of cleanup actions. The guidance document provides a presumptive response strategy applicable to the ground water contamination as well as the applicable treatment technologies for the contaminants of concern at this Site.

Cost Effectiveness

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

The estimated present worth cost of the selected remedy is $442,000. EPA believes that the increased costs of $960,000 for the ground water pumping system under Alternative 3 does not provides a significant increase in protection of human health and the environment.

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

The selected ground water remedy meets the statutory requirement to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Natural attenuation rather than active treatment processes is the most practicable and cost efficient treatment method available. While natural attenuation is not a treatment technology, it is an alternative means of achieving the remedial objectives and goals within a reasonable time frame compared to the other alternative. EPA has determined that the selected ground water remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

Preference for Treatment as a Principal Element

The 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 contamination in the ground water is not necessarily appropriate at this Site to achieve the remedial action objectives and goals.

Five-Year Review Requirements

Since the selected remedy will not result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain remedial action objectives and cleanup levels, a policy review may be conducted within five years of the date of the Preliminary Close Out Report to ensure that the remedy is, or will be, protective of human health and the environment. The five year review will be a comprehensive review of both the ground water remedy and the RCRA vault containing contaminated soils and sediments constructed under the removal action. Pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), and as provided in the current guidance on Five Year Reviews [OSWER Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (June 2001)], EPA may conduct a policy five-year review by September 2008 (five years after the date of the Preliminary Close Out Report).

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Site was released for public comment on July 18, 2003. The Proposed Plan identified Alternative 2, Monitored Natural Attenuation, as the preferred alternative for the ground water remedy and no further action for the soils based on the cleanup performed under the EPA removal action. EPA did not receive comments from the community in support of, or in opposition to, the Preferred Alternative identified in the Proposed Plan. EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. During the public comment period, EPA continued to collect ground water samples for analyses to monitor the contamination. As a result of this monitoring, the extent of ground water contamination was refined to a smaller area than the determination presented in the Proposed Plan.

RESPONSIVENESS SUMMARY

STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

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

Overview of Public Comment Period.

The EPA issued its Proposed Plan of Action detailing remedial action recommendations for public review and comment on July 18, 2003. Documents and information EPA relied on in making its recommendations in the Proposed Plan were made available to the public on or before July 18, 2003, in three Administrative Record File locations, including the Montgomery County Memorial Library located in Conroe, Texas. The 30-day public comment period ended on August 18, 2003. The EPA held a public meeting to receive comments and answer questions on July 31, 2003, at the Runyan Elementary School Cafeteria in Conroe, Texas. All written comments as well as the transcript of oral comments received during the public comment period are included in the Administrative Record for the Site and are available at the three Administrative Record repositories.

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

Summary of Public Comments and EPA Responses

Public Meeting, July 31, 2003, at the Runyan Elementary School Cafeteria - Comments received.

The EPA opened the meeting with an introduction of the proposed plan, and the representatives present at the meeting from the EPA, TCEQ, Texas Department of Health (TDH), and the Agency for Toxic Substances and Disease Registry (ATSDR). The EPA also presented a summary of the activities regarding the off-site assessment of the sediments in Stewart's Creek, the on-site removal, the groundwater investigation and remedial alternatives, and the proposed plan. The following comments were received at the public meeting.

Comment: I stay approximately three-fourths of a mile from Conroe Creosoting Company, on the corner of 10th and E. We have had continual flooding in that area for about the last 15 or 20 years until they fixed the branch. I live about 200 feet from Stewart's Creek, and I live about 100 feet from the branch. So when it would flood it would just meet right in the middle kind of and just make a circle until it receded. My husband's first wife died with cancer in 1986. He had a cat that was diagnosed with leukemia not long after that. Could it not be that the damage was done way further back and after years of flooding and rains could it not have decontaminated that area?

EPA Response: The EPA investigation focused on the contamination that is still remaining today in the sediments within Stewart's Creek and addressed the contamination accordingly. Unfortunately, the EPA cannot retrace what happened to past releases into Stewart's Creek. Since the Conroe Site operated for 50 years, there's a possibility that some of those things could have occurred over those 50 years. The EPA based its decisions regarding the removal action on the information available at this time.

Comment: In our neighborhood I can count about 50 people that are deceased, and from 13th Street to 10th Street there are quite a few people now that's still very ill with cancer and breathing problems I would say, and we can't say directly that it did come from creosote contamination and we cannot say that it didn't. Well, it's just a mystery in our neighborhood that so many people died from cancer from Avenue E to Avenue M, roughly speaking there's been about 200 people in the last ten years and we just wonder why the cancer rate is so high. Sometimes we think that it might be from maybe corroded pipes that's been there a long time. We want to blame it on the water, but maybe only God knows. It's really a mystery.

TDH Response: The State of Texas has a cancer registry, and the incidence of lung cancer and cancer of the bronchus was elevated for men, and breast cancer mortality was elevated for women for the period of time in that ZIP code area. Those two types of cancers are also related or attributable to other factors such as diet and smoking, so it's difficult to absolutely determine the cause since the other factors are overwhelmingly greater on the effect of smoking and breast cancer.

Comment: The well that was on site that was used by the plant -- I don't know what depth it was and I don't know if it was tested, I would assume so -- and I don't know if it was found to have any contamination, but I was wondering about for years the employees, visitors, customers and several people used that for drinking water, ice, among other things.

EPA Response: The on-site private water well was tested. The site well is screened from about 150 to 165 feet below ground surface, which is the location of the second aquifer. Most people have their private wells screened in this aquifer. The only contaminant found in the well was lead. The EPA believes the lead contamination was present as a result of corrosion from the pump left in the well. There were no other detections of creosote or other site-related contaminants in the well. The on-site water supply well is screened in the same deep zone, also described as the Sand-2 aquifer in the RI Report, that is separated from the shallow or Sand-1 aquifer by a clay zone. There has been no contamination detected in the deep or Sand-2 aquifer.

Comment: Another question that I had is the great expense that is being spent by the -- I used to call it the TNRCC, by the Texas Commission on Environmental Quality and by the EPA. How is that going to be recovered for the taxpayer or what is the procedure or what happens in that? And that's approximately going to be about 14 million all told. Is that the correct figure?

EPA Response: The cost recovery issue is still pending and there has been no settlement with current landowner. The EPA is continuing to evaluate the financial resources of the current owners and determine the ability to pay for reimbursement of costs incurred for this project. The At this time, we do not have the total cost for the cleanup activities.

Comment: Are back taxes the reason the creosote factory closed?

EPA Response: The EPA believes the facility was closed for a number of reasons. The county tax assessors did foreclose on the property for back taxes.

Comment: I was raised on 13th street. The creek was in my backyard. I still live on 13th Street. You said something about cleaning. Will the water be -- that water was so pretty. It looked like a beach. Will it get back like that?

EPA Response: The EPA believes that by removing contamination from the Conroe Site there will be no future releases from contamination into Stewart's Creek. Also, the existing contaminated sediments have been removed within Stewart's Creek from the Conroe Site south to Avenue F. The EPA also removed several hundred tires from the creek during the sediment excavation. Further improvements to Stewart's Creek will be performed by the City of Conroe.

Comment: I live right near Stewart's Creek Park. I live with my parents. Actually, we've been there for 28 years. We've been flooded out '79, '94, '97. Anyway, the water actually got into our house about two to three feet deep. My brother and I used to play in Stewart's Creek in the '70s and the '80s. We used to actually wade in the water, and the park, there's a park right down the road from our house where we used to play in the water. It's a concern with me that there could be a risk.

ATSDR Response: The difficult thing about past events and releases is that we don't know what the concentrations were then. The creosote type constituents will typically stick to soil particle or organic matter, so they probably will be stuck on the bottom in the soils and sediments. Your exposure frequency was such that you probably weren't out there every day for 350 days a year. It was probably somewhat of an intermittent type exposure. In the human studies you have to be exposed on a daily basis at very, very high levels. You were likely exposed to a low level or you would have seen oily sludge or you would have smelled something. If you did, you probably wouldn't have gone in the water. So based upon that I doubt that you would have an increased risk of getting cancer from wading in the water. For a lot of the substances it's difficult for them to get through the skin as well, especially if they're already stuck in soil particles or organic matter.

Comment: I've actually had seizures. I don't know if that has something to do with it or not. I've had seizures, my niece has had seizures, my brother has had seizures. I don't know if that's anything that has to do with it or not. It was just a concern.

ATSDR Response: Based on the chemicals that were used at the Conroe facility, you typically wouldn't experience seizures unless exposed to high concentrations.

Comment: I understood that the employees that worked at the creosote plant have skin that is very shiny, and it looks like it's just oozing out of their pores.

ATSDR Response: Historically before there were a lot of occupational standards and laws, the creosote workers were exposed to very, very high levels. They used to carry a lot of the product on their backs, and they would have blisters and boils on their back from the creosote. It's very irritating to the skin, especially if it stays on the skin.

Comment: Sometime back the residents on 13th Street did not know about the dangers of the contaminated water and they would fish in Stewart's Creek, and people did eat the fish, but now they know better. Sometimes maybe already the damage has been done.

ATSDR Response: The creosote constituents, the polycyclic aromatic hydrocarbons or the tarry, sticky things, ingested by the fish are eventually expelled and do not accumulate in the fish tissue. Some metals may actually increase in the fish, or dioxin, but the levels that would be in those fish for dioxin would not have been a serious enough problem.

Comment: I just wanted to clarify, it's my understanding that this task force is not charged with or is not going to address the contaminants and the different contaminations of materials that were hauled from Conroe creosote, for instance, to, like, the post plant in San Jacinto County and dumped up there that obviously have contaminants in that area.

EPA Response: The EPA has reviewed the available information located in our own files and the TCEQ files, and it appears that some contamination has already been cleaned up at the other area. The EPA does not have any current plans to do any further Superfund site assessment work at the other area.

Comment: Are you all just doing this to stop the contamination or are you going to rebuild the creosote plant? Are you going to leave the contaminated soil on those ten acres?

EPA Response: The EPA doesn't have any plans to rebuild the creosote plant at the Conroe Site. The contaminated soil was placed in an on-site RCRA cell that has multiple liners and different systems to insure that there's no releases of the contaminants. The groundwater contamination will also be monitored to insure that there's no further spread of contamination. The EPA will also conduct technical reviews of the Site every 5 years to verify the conditions are protective of human health and the environment since the contaminated soils are being managed at the Site.

Comment: One more question. I work at Woodland Manor Nursing Home, and we have two employees there, Warren Scott and Brother Rodriguez, and they both have liver conditions. So does that contribute to it? They worked there over a 20-year period. One is in the hospital. They carried him last week. Mr. Rodriguez has cancer and Mr. Scott has cirrhosis of the liver -- I mean a liver condition.

ATSDR Response: The studies that show any type of effects on the kidney or the liver occurred at very, very high concentrations. Their exposures may have been high enough in the past, and typically those studies that showed that were either occupational studies or they were studies in rats or mice that were fed or breathed very, very high levels of creosote containing mixtures.

Comment: Will that property ever be used for anything else or will it just sit there idle? They won't build a school there?

EPA Response: The property can be developed for industrial purposes except for the property containing the RCRA vault which will be prohibited from any kind of future development. The site cleanup standards are based on industrial use and not future residential use or for schools. These restrictions will be noted in a property deed restrictions on future use of the property.

TECHNICAL AND LEGAL ISSUES

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