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October 20, 2021

Barry N. Breen
Acting Assistant Administrator
U.S. Environmental Protection Agency
Office of Land and Emergency Management, Mail Code 5101T
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Re: Houston Wood Preserving Works Site

Dear Mr. Breen:

On behalf of Union Pacific Railroad, please receive the enclosed response to your correspondence of September 9, 2021 regarding the Houston Wood Preserving Works site.

Encl.

USB Drive

Sincerely,

Kevin Peterburs
Senior Manager, Environmental Site Remediation

cc: Casey Katmis, U.S. EPA Deputy Associate Administrator for Intergovernmental Relations
Mayor Sylvester Turner, City of Houston
Christian D. Menefee, Harris County Attorneys' Office

UNION PACIFIC RAILROAD
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Kevin Peterburs
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INTRODUCTION

Union Pacific Railroad ("Union Pacific") is committed to continuing an open and transparent dialog with the Fifth Ward and Kashmere Gardens communities to ensure that residents and other stakeholders are properly informed about the historic and ongoing investigative and remedial activities at the former Houston Wood Preserving Works facility located at 1490 Liberty Road, Houston, Texas 77026 (the "Site"). Union Pacific welcomes the opportunity to respond to the EPA's questions regarding environmental justice aspects of regulatory issues identified in your September 9, 2021, letter.[1] In efforts to make the vast amount of scientific and technical information contained in its response to the EPA more accessible to the public, Union Pacific has prepared the following summary, and looks forward to meeting to discuss these issues as part of the regulatory process.

In 1997, Union Pacific acquired the former Houston Wood Preserving Site – long after its operations had been discontinued – as a result of its merger with Southern Pacific Transportation Company ("Southern Pacific"), the company that had owned and operated the facility. Union Pacific never operated the facility or treated wood there, but took on and conducted the extensive cleanup of the historical impacts pursuant to the Resource Conservation and Recovery Act ("RCRA"). Union Pacific learned that while wood treatment operations at the Site ended in 1984, Southern Pacific had been conducting various ongoing investigative activities at the Site during the thirteen years prior to the merger. Union Pacific never treated wood at the Site. Since Union Pacific became the owner of the closed Site, the company has continued and expanded the cleanup activities Southern Pacific started at the Site. Union Pacific has fully cooperated with and diligently pursued ongoing cleanup efforts under federal and state agency oversight by the United States Environmental Protection Agency ("EPA") and the Texas Commission on Environmental Quality ("TCEQ"). As part of its continuing efforts to implement Site cleanup, Union Pacific has requested from EPA the renewal of its RCRA Permit/Compliance Plan No. 50343 ("Permit"), which also includes an opportunity for public comment, and will enable the company to continue to conduct cleanup at the Site.

Union Pacific is aware that the former wood treating operations historically conducted at the Site involved the use of certain chemicals containing creosote, impacting soil and groundwater at the Site. Creosote is a liquid derived from the distillation of tar from wood or coal and is used as a wood preservative. The purpose of using creosote for wood preservation was human safety. Railroads sought to keep passengers, staff, and the public safe from train derailment accidents which could occur if the wooden ties separated. The use of creosote was standard industry practice throughout the United States since the 1800s due to its high efficacy in preserving wooden cross-ties to support railroad tracks, and ultimately protect human safety. At all relevant times, creosote was not considered an inherently hazardous material. To this day, EPA guidance regarding residential use suggests that creosote-treated wood can be disposed of as municipal solid waste.

[1] Union Pacific understands that the EPA's information request is pursuant to its efforts to address environmental justice and not pursuant to Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42. U.S.C. Sec. 9604 or any other statute.

Union Pacific continues to value the importance of input from the Fifth Ward and Kashmere Gardens communities as it moves through the EPA and TCEQ regulatory process. Union Pacific has acknowledged the community's concerns and it responded by diligently commissioning significant data and analytical reports to fully understand the magnitude and extent of the potential impacts to soil and groundwater from the Site.

Investigative and cleanup work has been taking place at the Site for over 30 years. The data gathered by Union Pacific has focused on determining if there are potential exposure pathways to people near the Site. To date, test results do not show impacted soil or groundwater exposure to residents. To further enhance its efforts to keep the community apprised of all investigative and remedial activities at the Site, Union Pacific launched a public website where the public can access the various scientific studies conducted in relation to the Site. This website is periodically updated to include the latest information and is currently undergoing a redesign to make it even more user-friendly, particularly for access on mobile devices, and to include additional information and more links to original source documents.[2]

Significant work has been accomplished to address the historic groundwater and soil issues, including the 2016 TCEQ-approved soil remediation at the Site, which involved soil excavation and consolidation to prevent potential exposure. Additionally, Union Pacific and its predecessor have completed the following remedial activities at the Site to prevent potential exposure pathways:

- Soils were excavated within and around the largest solid waste management unit at the Site. This area was entirely backfilled with compacted clay material.
- Soils were capped and covered with geotextile fabric in the area around the inactive wastewater lagoon, and north of the above ground storage tank areas.
- Asphalt was used to cap in place the southern drainage ditch and other areas to prevent potential exposure pathways.
- Concrete and asphalt pavement were used to cover the Engelwood Intermodal Yard to serve as a physical barrier.
- Railroad ballast ties and rails were used to cover the area between the former wood treating works area and the Englewood Intermodal Yard (approximately 100 feet wide).
- The area between the Site boundary and the Liberty Road right-of-way was addressed through a combination of soil excavation, soil capping, and the construction of a concrete sidewalk to prevent exposure pathways.

It appears that these remedial measures have been effective, given that recent soil samples taken near the residential properties in the vicinity of the Site did not identify concerning results under State standards. Additionally, the groundwater does not implicate a risk to residents because all residential properties in the vicinity of the Site use drinking water from the City of Houston, rather than from groundwater wells. Extensive soil gas and groundwater off-site sampling efforts also

[2] Union Pacific's website regarding activities at the Site is available at: https://hwpwinfo.com/. The URL for the site may change as part of the redesign referenced above. To the extent that the URL changes or any links change as part of that redesign, Union Pacific will reissue these answers with updated references and hyperlinks to try to make the Fifth Ward and Kashmere Gardens communities' access to the information as easy as possible

show that there is not significant vapor intrusion risk from the Site. Union Pacific also implemented a continuous process of removal of impacted material when located, and containment, treatment, and monitoring Site conditions which occur after wet weather events, including events as routine as a few days of rain. Current analytical data show that rain events are not exacerbating the soil or groundwater conditions.

Notwithstanding the extensive work already conducted, Union Pacific has also listened to the community's comments and concerns and is adding additional components to the cleanup in response. For example, under the authority of its Permit (which is in process of renewal), the company is planning to install a vertical wall (slurry wall) below ground as an additional measure to contain groundwater contamination at the Site. In an abundance of caution, Union Pacific will also continue groundwater monitoring at the Site pursuant to TCEQ oversight, and the company will continue performing inspections of areas which have been remediated to ensure that adequate protective barriers are in place. Union Pacific will also continue to recover creosote from impacted groundwater as much as is technically feasible.

Union Pacific looks forward to engaging with the Fifth Ward and Kashmere Gardens communities in an open and transparent dialog to identify the remedial measures that will be the most effective in addressing the communities' concerns regarding the Site, including those that relate to Site cleanup activities.

Union Pacific also sympathizes with the health concerns raised by community residents and stakeholders. The company hopes that the community can find reassurance in actions that Union Pacific has taken to thoroughly assess the concerns raised about potential health impacts over the last three decades through risk assessments conducted under TCEQ's supervision and based upon scientific site-specific data. Community residents should also know that the Site was the subject of a lawsuit entitled *Abraham v. Union Pacific Railroad Company.* In that lawsuit, various employees working at the Site, including those who were in direct physical contact with the wood materials containing creosote, alleged that exposure to creosote at the Site was the cause of various health impacts including cancer. After significant discovery was conducted including testimony by various qualified medical experts, the Court of Appeals affirmed the Trial Court ruling, finding that there was no admissible medical evidence of a causal link between the alleged health impacts (cancer) and the Site. This decision was rendered in 2007 and is publicly available at https://caselaw.findlaw.com/tx-court-of-appeals/1107509.html

Union Pacific sincerely appreciates the input, comments, and concerns that residents and other stakeholders have raised regarding the Site. The company is committed to doing everything possible to consider those concerns in an open and transparent process. Therefore, Union Pacific is proposing a public meeting to review in greater detail the questions raised by residents and stakeholders. The goal is to provide the community a meaningful opportunity to ask questions and obtain relevant information regarding remedial activities planned for the Site, including having available the underlying data gathered in the investigations. Union Pacific wants residents and other stakeholders to better understand all aspects of the Site.

Union Pacific thanks the Fifth Ward and Kashmere Gardens communities for coming together on this important issue. Union Pacific will continue to engage with the community in connection

with current and future site remediation activities to ensure that the communities and their future generations can thrive.[3]

RESPONSES TO EPA'S SEPTEMBER 9, 2021, LETTER IN CONNECTION WITH THE FORMER HOUSTON WOOD PRESERVING FACILITY AT 4910 LIBERTY ROAD, HOUSTON, TEXAS

CORPORATE INFORMATION

1. *When did UPRR commence operations at the Houston Wood Preserving Works facility (formerly known as the Houston Tie Plant)?*

   Response: All Southern Pacific Transportation Company ("Southern Pacific")wood treatment operations in 1984–thirteen years before Union Pacific Railroad ("Union Pacific") acquired the Houston Wood Preserving Works (the "Site") through its merger with Southern Pacific Transportation Company ("Southern Pacific") in 1997. Union Pacific diligently continued the cleanup that Southern Pacific had already started at the Site, and these are the only activities Union Pacific conducted at the Site. The Site was previously owned and operated by its predecessor, Southern Pacific which conducted wood-treating operations at the Site from 1911 to 1984.

2. *Describe how UPRR acquired the Houston Wood Preserving Works site.*

   Response: Union Pacific acquired the Site through its merger with Southern Pacific in 1997.

3. *Identify all current and former owners and operators of the Houston Wood Preserving Works site, and describe their nature of business operations, including, but not limited to, years of ownership or operation, products developed, manufactured, or sold, and chemicals or hazardous materials used.*

   Response: Records indicate that Southern Pacific and its subsidiaries owned and operated the site from 1911 until 1984. Union Pacific acquired Southern Pacific, including the Site, in 1997. However, this acquisition took place approximately 13 years after operations at the Site had terminated in 1984.

   It is understood that Southern Pacific conducted wood treating operations at the Site from 1911 to 1984. The wood was treated with preservatives to maintain railroad ties and protect human safety in railroad operations. It is believed that the process involved the use of creosote and pentachlorophenol to preserve the wood. Additionally, the Englewood

[3] Nothing in this response constitutes an admission to liability, or to any fact or legal theory in pending or future lawsuits (in which Union Pacific specifically reserves all rights, claims, and defenses). This correspondence is not intended to serve any purpose other than to respond to the EPA's environmental justice inquiry.

Intermodal Yard to the south of the former Site facilities was used for the transfer of box containers from the rail cars from truck trailers and vice-versa.

Information regarding the operation, products developed, manufactured, or sold, and chemicals or hazardous materials that may have been used by the former owners and operators is publicly available and has been previously provided to the US EPA and to the Texas Commission on Environmental Quality's ("TCEQ") predecessor agency in documents such as the 1993 RCRA Facility Assessment Report prepared by the US EPA, attached as Appendix 1. These reports are conveniently included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/ as well as the TCEQ records storage repository.[4]

4. *Describe how decisions are made/approved with respect to environmental protection, management, and remediation at the Houston Wood Preserving Works site.*

   Response: Union Pacific and its predecessor have conducted diligent cleanup efforts at the Site for the last 30 years pursuant to the U.S. Environmental Protection Agency's ("EPA") Resource Conservation and Recovery Act ("RCRA") cleanup program, supervised by the Texas Commission on Environmental Quality ("TCEQ"). Union Pacific has continued to undertake the cleanup work that Southern Pacific began at the Site in 1991. Documents identifying how the cleanup and post-closure care programs were implemented and the authority/approvals for that work are included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/, as well as in the TCEQ records storage repository, see footnote 4.

5. *Describe whether UPRR has a reserve fund for expenditures at the Houston Wood Preserving Works site.*

   Response: The RCRA program contains requirements governing how companies provide financial assurance for regulatory cleanups and Union Pacific has provided the necessary financial assurances as required by the RCRA Permit for cleanup activities currently underway. Its financial assurances have been approved by the governmental oversight agencies. A copy of the current permit identifying the financial assurance in connection with the Site is included on the USB drive submitted with these responses and can also be found at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

6. *Provide a copy of all corporate minutes of UPRR which contain discussions on or regarding the Houston Wood Preserving Works site.*

[4] Union Pacific has been informed that the TCEQ stores these records in its Central Records repository in Austin, Texas. Accordingly, the Union Pacific website and USB drive are provided to make information more accessible to the EPA, the City of Houston, residents, and interested parties.

Response: Union Pacific is committed to an open and transparent dialog with the public to ensure that the EPA's RCRA Permit and the TCEQ's remediation program address the community's concerns regarding Site cleanup efforts and related work. We have focused our responses on those issues and will continue to proactively work with the community to address questions and concerns regarding the Site. Union Pacific has not undertaken a review of corporate minutes, given that operations at the Site occurred thirteen years before it was acquired by Union Pacific, and therefore is unlikely to yield nonconfidential information.

7. *Identify all corporate officers, directors, and managers of UPRR, including their names and titles, for the past ten (10) years.*

Response: Union Pacific understands the importance of informing the community about its cleanup efforts at the Site. As such, the various Site managers for the last ten (10) years are identified as signatories to the numerous cleanup-related submissions to the TCEQ. These documents are included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/.

The current Directors are:

Andrew H. Card, Jr.
Former Chief of Staff to President
G.W. Bush
Government

William J. DeLaney
Former Chief Executive Officer
Sysco Corporation
Business

David B. Dillon
Former Chairman
The Kroger Company
Business

Lance M. Fritz
Chairman, President and Chief
Executive Officer
Union Pacific Corporation and
Union Pacific Railroad Company

Deborah C. Hopkins
Former Chief Executive Officer
Citi Ventures
Venture Capital Investing

Jane H. Lute
President and CEO
SICPA, North America
Business

Michael R. McCarthy
Chairman
McCarthy Group, LLC
Investment Management

Thomas F. McLarty III
President
McLarty Associates
Strategic Advisory and Advocacy Services

Jose H. Villarreal
Advisor
Akin, Gump, Strauss, Hauer &
Feld, LLP
Law Firm

Christopher J. Williams
Chairman
Siebert Williams Shank & Co.
Investment Management

Sheri H. Edison
Former Executive Vice President
and General Counsel
Amcor plc
Business

The current Officers are:

Lance M. Fritz
Chairman, President and Chief
Executive Officer
Union Pacific Corporation and
Union Pacific Railroad Company

Prentiss (Printz) W. Bolin, Jr.
Vice President - External Relations
Union Pacific Corporation

Eric J. Gehringer
Executive Vice President -
Operations
Union Pacific Railroad Company

Gary W. Grosz
Vice President and Treasurer
Union Pacific Corporation

Jennifer L. Hamann
Executive Vice President and Chief
Financial Officer
Union Pacific Corporation

Rahul Jalali
Senior Vice President and
Chief Information Officer
Union Pacific Corporation

Scott D. Moore
Senior Vice President - Corporate
Relations and Chief Administrative
Officer
Union Pacific Corporation

Clark J. Ponthier
Senior Vice President - Supply
Chain and Continuous
Improvement
Union Pacific Corporation

Craig V. Richardson
Executive Vice President and Chief
Legal Officer
Union Pacific Corporation

Kenyatta (Kenny) G. Rocker
Executive Vice President -
Marketing and Sales
Union Pacific Railroad

Todd M. Rynaski
Vice President and Controller
Union Pacific Corporation

Elizabeth F. Whited
Executive Vice President and Chief
Human Resource Officer
Union Pacific Railroad

There have been some changes to the officers and directors of Union Pacific over the last ten years, but the above is a complete list of current officers and directors. The governance policies of the railroad can be found at https://www.up.com/investor/governance/index.htm.

There are thousands of individuals who are managers among Union Pacific's 31,000+ employees, leading the company's logistics services in the western two thirds of the United States, across 23

states. To the extent identification of specific managers would be helpful to the Fifth Ward and Kashmere Gardens communities' understanding of the Site, Union Pacific is willing to provide that information.

The current manager for the Site is Mr. Kevin Peterburs, Senior Manager, Environmental Site Remediation for Union Pacific (kjpeterb@up.com; 4823 N. 119 St. Milwaukee, WI 53225).

8. *Identify all individuals/positions who exercise or have exercised authority with respect to environmental remediation decisions and environmental remediation expenditures at the Houston Wood Preserving Works site for the past ten (10) years.*

   Response: Union Pacific has worked to responsibly continue Southern Pacific's initial cleanup efforts at the Site since its acquisition of the Site in 1997. As such, the Site managers for the last ten (10) years are identified as signatories on the numerous submissions to the TCEQ. These documents are included on the USB drive submitted with these responses and can also be found in the TCEQ's records storage repository, see footnote 4.

   The current manager for the Site is Mr. Kevin Peterburs, Senior Manager, Environmental Site Remediation for Union (kjpeterb@up.com; 4823 N. 119 St. Milwaukee, WI 53225). He has held this role since August 2017.

9. *Identify all individuals who currently have, or who previously had, responsibility for environmental matters at the Houston Wood Preserving Works site, including the management of hazardous materials, hazardous constituents, and hazardous waste.*

   Response: Union Pacific has worked to responsibly continue cleanup efforts at the Site since its acquisition of the Site resulting from its merger with Southern Pacific since 1997. Over 30 years, many different individuals, including those within the company have contributed to Union Pacific's efforts to provide containment, treatment and monitoring at the site. These individuals are listed as signatories to the various documents that are included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/, as well as in the TCEQ records storage repository, see footnote 4.

   The current manager for the Site is Mr. Kevin Peterburs, Senior Manager, Environmental Site Remediation for Union Pacific (kjpeterb@up.com; 4823 N. 119 St. Milwaukee, WI 53225).

FACILITY OPERATIONS

10. *Describe all manufacturing/production operations at the Houston Wood Preserving Works site during its years of operation, including the following information:*
    a. *Dates of production processes;*
    b. *Description of production processes;*
    c. *Products produced and their associated uses;*

d. *Chemicals/constituents/raw materials (including, but not limited to, creosote) used in each manufacturing process; and*
e. *Byproducts and wastes produced from each manufacturing process, including the chemical composition of such wastes and the form of such wastes (e.g., sludges, liquids, etc.).*

Response: Historic Southern Pacific records indicated that the company conducted wood treating operations at the Site from 1911 to 1984 and are the source of the information below. According to Southern Pacific, the process involved the use of creosote, pentachlorophenol to preserve the wood, sap water (naphtha) and extender products (generally consisting of bunker C, styrene tar, or diesel fuel). Untreated wood was brought into the Site by rail car. The wood was cut and trimmed before being loaded into closed, pressurized cylinders. Then, the wood was treated with creosote. The Englewood Intermodal Yard to the south of the former Site facilities was used for the transfer of box containers from the rail cars from truck trailers and vice-versa. The byproducts from Site operations apparently included acetic acid, sap water, creosote, and extender. Southern Pacific's operations at the Site ended in 1984. Further details are available in the 1993 RCRA Facility Assessment Report prepared by the US EPA, attached as Appendix 1. This report is also included on the USB drive submitted with these responses, as well as in the TCEQ records storage repository, see footnote 4.

11. *Describe in detail all product or raw material storage areas, including all tanks and containers, and the locations of all such areas.*

Response: It is understood that historic product and raw material storage areas included tanks and containers, as summarized in the 1993 RCRA Facility Assessment Report prepared by the US EPA, attached as Appendix 1. These areas are mapped in Figure C.3 (Locations of Former Waste Management Units) attached as Appendix 2. Records indicate that storage areas for product and raw materials generally included underground storage tanks, aboveground storage tanks, and cylinders supported by concrete foundations around the Site Process Areas and that the products housed in these material storage areas mainly included creosote, sap water, and extender products. These areas have been inactive since at least 1984 when they achieved regulatory closure pursuant to oversight by the EPA and TCEQ. The information responsive to this question is further detailed in the 1993 RCRA Facility Assessment Report prepared by the US EPA. Please see pages 24 to 53 of the report which are the most relevant to these issues. This report is also included on the USB drive submitted with these responses, as well as in the TCEQ records storage repository, see footnote 4.

12. *Describe in detail the location, depth, and construction of any underground piping used for transporting product or raw materials to and from production and storage areas.*

Response: The information responsive to this question is detailed in the 1993 RCRA Facility Assessment Report prepared by the US EPA, attached as Appendix 1.

13. *Describe in detail the management of all waste streams and byproducts generated at the Houston Wood Preserving Works site, including all sample analysis results and documentation addressing the management or disposal of such materials.*

Response: Historical records indicate the following information regarding these issues. Southern Pacific generated waste streams at the Site that may have contained acetic acid, sap water (naphtha), creosote, and extender. Until around 1975, wastewater from the process area was apparently discharged into a wood-lined drainage ditch that ran along the southern boundary of the Site. The sap water was apparently discharged into the sanitary sewer under an industrial permit and into an on-site sap water treatment facility for off-site disposal at an approved facility. Two 12,500-gallon railroad tank cars were apparently used to store the treated water and creosote tank bottoms, until those materials were disposed of at the approved off-site facility. Records indicate that in 1979, Southern Pacific built a clay-lined surface impoundment on the southwest end of the Site, for the disposal of creosote-containing soil, tank bottoms, and debris from the inactive wastewater lagoon. Records indicate that these waste streams had ceased by the time the Site ceased operation in 1984, pursuant to EPA and TCEQ oversight. The historical information responsive to this question is detailed in the 1993 RCRA Facility Assessment Report prepared by the US EPA specifically found on pages 24 through 53, summarized in Table 5 of the report and attached here as Appendix 1.

For waste streams associated with the environmental post-closure activities, Union Pacific submits annual reports detailing wastes generated at the Site to the TCEQ. Waste streams generated as part of the post-closure care during environmental site investigations and corrective actions are provided on the State of Texas Notice of Registration. The waste streams on the Notice of Registration include the following:

TCEQ Waste Code	EPA Hazardous Wase Code	Waste Class	Description of Waste
0001301H	F034 K001	H	Soil generated primarily by the boring of monitor wells around the clean-closed wood preserving operation surface impoundment.
0909101H	F034 K001	H	Aqueous Waste with low surfactants. Groundwater generated from drilling activities for investigative purposes.
0912489H	F034 K001	H	Creosote sludge, soil mixture generated as part of corrective action performed on-site.
0914101H	F034 K001	H	Groundwater generated from purging of various monitor wells for investigative purposes.

TCEQ Waste Code	EPA Hazardous Wase Code	Waste Class	Description of Waste
0915301H	F034 K001	H	Soil derived from the boring of monitor wells for investigative purposes.
0917406H	F034 K001	H	Plastic and used personal protective equipment generated as a result of monitor well and/or soil sampling.
0501203H	D001 D018 D039	H	Spent Solvent
0918219H	F034 K001 U051	H	Recovered creosote NAPL from groundwater monitoring wells
1481514H	D002	H	Drilling mud from boring monitor wells for investigative purposes. Date of generation: 1-8-04
1482110H	D002	H	Purge water generated as part of groundwater monitoring and investigation. Date of generation: 1-8-04
1487307H	F034	H	Metal pipe and scrap metal from the former facility generated during the corrective action/remediation activities.
04003011	NA	1	Petroleum contaminated soils generated as part of corrective action work performed on-site. Generated on an intermittent basis.
14781011	NA	1	Petroleum contaminated purge water generated as part of ground water monitoring and investigation: Date of generation: 9-23-03.
14884891	NA	1	Petroleum tarry sludge and soil mixture, generated as part of corrective action work performed at the Site. Generated on an intermittent basis.
14891191	NA	1	Aqueous waste with low solvents, metals, and low toxic organics generated as part of site investigation and corrective actions.

TCEQ Waste Code	EPA Hazardous Wase Code	Waste Class	Description of Waste
09024882	NA	2	Waste rail ties generated from operation & maintenance of the railroad & are generated intermittently. Nonindustrial generator 3/21/2016.
14773012	NA	2	Petroleum contaminated soils generated as part of site investigation and corrective action. Date of generation: 01-08-2004
14804062	NA	2	Plastic and used personal protective equipment generated as a result of monitor well and/or soil sampling. Date of generation: 12-03-03
14835142	NA	2	Drilling mud from boring monitor wells for investigative purposes. Date of generation 01-08-04
14841012	NA	2	Petroleum contaminated purge water generated as part of ground water monitoring and investigation. Date of generation: 07-18-2007
14851022	NA	2	Petroleum-affected storm water generated during corrective action activities (i.e., storm water that may have been in contact with contaminated soil)
14863902	NA	2	Nonhazardous concrete and construction debris

Note: H – hazardous; 1 – TCEQ Class 1 non-hazardous; 2 – TCEQ Class 2 non-hazardous

Annual Waste Summaries that were submitted to the TCEQ detailing the waste streams generated and authorized as part of the cleanup activities from 2007-2020 are included on the USB drive submitted with these responses.

14. *Describe all past and present solid waste management units at the Houston Wood Preserving Works site, including, but not limited to, tanks, sumps, pits, waste piles, landfills, surface impoundments, container storage areas, and satellite accumulation areas. For each such solid waste management unit, provide the following information:*
    a. *A map showing each unit's boundaries, drawn to scale and showing the location and size of all past and present units;*
    b. *The type and dimensions of each unit;*
    c. *The dates that each unit was in use;*
    d. *The purpose and past usage of each unit;*

e. *The construction (materials, composition), maximum design capacity, and condition of each unit;*
f. *The closure of each unit, including the method of closure and what actions were taken to prevent or address potential or actual releases from the unit.*

Response: The Site has an authorized container storage area located in the center of the Site, which is fenced and locked. This container storage area is used to store investigation-derived creosote removed in connection to ongoing cleanup efforts. The waste is stored at the Site for less-than-90-days and is ultimately disposed at authorized disposal locations. Further details regarding the authorized waste storage area is provided in the RCRA Permit Application (Rev No. 5) (August 2020).

Records indicate that Southern Pacific historically operated at least twelve (12) solid waste management units at the Site. These areas are discussed in the 1993 RCRA Facility Assessment Report prepared by the US EPA, specifically pages 24 to 53, summarized in Table 5 of the report and attached here as Appendix 1. These areas are mapped in Figure C.3 (Locations of Former Waste Management Units), attached here as Appendix 2. Records indicate that the former solid waste management units ranged in size, with the largest unit measuring 180 foot by 106 foot by 7 feet in size to the smallest having the storage capacity of approximately 200 gallons. Records indicate that these units generally housed materials that may have included creosote-containing soil, sawdust, creosote wastewater, lubricating oil, sap water, extenders, diesel fuel, styrene tar, used vehicle oil, and boiler /cooling tower blowdown. All these solid waste management units are inactive and have either been removed or achieved regulatory closure pursuant to EPA and TCEQ oversight. The most recent groundwater and soil vapor study test results do not show that the closed historic solid waste management units are currently a source of soil or groundwater exposure to residents based on State standards.

ENVIRONMENTAL CONDITIONS

15. *When did UPRR discover or otherwise become aware of contamination originating from the Houston Wood Preserving Works site?*

    Response: In 1997, Union Pacific acquired the property as part of its merger with Southern Pacific and took over the on-going cleanup work at the Site. Since that time, Union Pacific has continued the cleanup work and the company has fully cooperated with the oversight agencies to efficiently investigate and address ongoing cleanup efforts at the Site. It has maintained a public website with up-to-date information about the Site to keep the community informed and engaged in the process (https://hwpwinfo.com).

16. *When was the on-site surface soil (0-2 feet) contamination discovered at the Houston Wood Preserving Works site?*

    Response: Historical records indicate that as part of the continuing cleanup activities at the Site, in 1996, Southern Pacific found soil contamination 0-2 feet below ground. Further

details are included in the Phase 1 RFI/Extent of Contamination Investigation Report, May 1996, which is included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. In 1997 when Union Pacific acquired the Site, it diligently continued investigative and remedial measures to address surface soil issues under EPA and TCEQ oversight to better understand the nature and extent of the historic impacts. To this day, Union Pacific is continuing the cleanup of historical impacts from the closed Site it acquired from its predecessor under agency oversight and achieving final closure is a priority for the railroad.

17. When was the on-site surface DNAPL contamination discovered at the site?

Response: The term nonaqueous phase liquid (NAPL) is used to describe an organic liquid that has distinct differences compared to water both physically and chemically. As a result, the organic liquid and water are immiscible leading to a physical interface between a mixture of water and the organic liquid. Nonaqueous phase liquids are typically divided into two general categories, dense and light, referred to as DNAPL or LNAPL, respectively, based on the organic liquid's density relative to water.

During the July 2017 quarterly inspection of the capped areas, a material was observed surfacing through the joints and cracks in the concrete and asphalt surfaces in the Englewood Intermodal Yard concrete cap area. Since the initial observation of the material at the surface, weekly inspections of the affected area have been conducted. The amount of material surfacing each week varied depending on the ambient temperatures (i.e., greater amounts of the material surfaced during warm weather). When recoverable amounts of the material surfaces, an environmental consultant or remediation contractor manually removes the material from the concrete or asphalt surface, places the recovered material into a storage container, and then properly disposes of the material. The occurrence and amount of recovered material are documented in the monthly PRACR updates to the TCEQ. Copies of the monthly PRACR updates are provided on the USB drive submitted with these responses.

18. When was the off-site surface soil (0-2 feet) contamination discovered?

Response: Historical records indicate that initial site investigations were conducted by Southern Pacific (prior to Union Pacific's acquisition of the property) where soil and groundwater contamination were detected (see Phase 1 RFI/Extent of Contamination Investigation Report, May 1996 (Terranext)) for initial soil and groundwater evaluation. This included off-site soil samples collected in the North Drainage Ditch (SWMU 2) where surface soil contamination was detected. However, the contamination was below the current TCEQ residential cleanup levels. These reports are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4.

19. *Describe in detail all testing, monitoring, response actions, remedial actions, and other efforts to assess and address contamination originating from the Houston Wood Preserving Works site.*

Response: Since acquiring the closed Site in 1997, Union Pacific conducted a vast number of environmental studies, assessments, and cleanup work at the Site, with input, guidance, and oversight from state and federal regulatory authorities. Among other investigative and cleanup activities, Union Pacific and its predecessors completed soil excavation and removal of Site contaminated soils associated with surface impoundment unit 1 (SWMU 1), which they backfilled with compacted clay; they covered contaminated soils with geotextile fabric and soil at the former wood processing areas; and capped with concrete and asphalt the Englewood Intermodal Yard; they capped with asphalt the southern drainage ditch; they excavated soils and covered the area with a concrete sidewalk to address the Liberty Road right of way; and they implemented engineering controls to prevent exposure to contaminated soils along the railroad ballast area (between the former wood treating works area and the Englewood Intermodal Yard). The Site areas where soil contamination has been addressed are identified in Figure 2A-1a (Response Action-Soil Capped Areas and NAPL Collection System), attached here as Appendix 3.

In efforts to maintain the community fully informed about activities at the Site, Union Pacific has posted the reports referenced here at the following website, which is periodically updated with the latest information about the Site (https://hwpwinfo.com/about-the-site/). Further details of environmental testing, monitoring, response actions, and remedial efforts are provided in the reports and documentation that have been submitted to the TCEQ, and predecessor agencies, and can be accessed via the methods referenced in the cover letter to these responses. All work at the Site has been reviewed, approved, and conducted under TCEQ's oversight.

20. *Describe in detail any and all leaks, spills, releases, or discharges into the environment of any hazardous wastes, hazardous constituents, or hazardous materials, including, but not limited to, products, feedstock, and byproducts, that have occurred at the Houston Wood Preserving Works site, including the following information:*
    a. *When and where each such leak, spill, release, or discharge occurred;*
    b. *How each such leak, spill, release, or discharge occurred;*
    c. *The known or estimated duration of each such leak, spill, release, or discharge;*
    d. *The known or estimated quantity, amount, or volume of each such leak, spill, release, or discharge;*
    e. *Any and all actions undertaken in response to each such leak, spill, release, or discharge, including, but not limited to, notification to any governmental agencies or entities;*
    f. *Any and all investigations of the circumstances, nature, extent or location of each such leak, spill, release, or discharge, including, but not limited to, the results of any soil, surface water, groundwater, sediment, or air testing.*

Response: The facility had ceased operations by 1984. The 1993 RCRA Facility Assessment Report prepared by the US EPA provides information regarding historical releases and is attached as Appendix 1. Based on the investigative work conducted to date under EPA and TCEQ oversight, it appears that historical releases to soil may have occurred around the Original Process Area (SWMU 5); the Process Area SWMU 4) the South Drainage Ditch (SWMU 2) the Former Inactive Wastewater Lagoon (AOC 6); the Englewood Intermodal Yard; and the Liberty Right of Way. It appears that releases to groundwater may have occurred in the former Houston Wood Preserving Works site and Englewood Intermodal Yard. These areas are mapped in Figure C.3 (Locations of Former Waste Management Units), attached here as Appendix 2.

Since acquiring the property in 1997, Union Pacific has not operated the Site and, as such, no known releases have occurred since 1997. However, in August 2019, a water line leak occurred due to the opening of a valve to an abandoned water line by a contractor that was working in the adjacent Englewood Intermodal Yard. The water line leak occurred underneath the soil cap area at the Site. Soils under the soil cap are impacted with contaminants associated with the former wood preserving operations that occurred at Site. As detailed in the attached report, runoff water samples were collected adjacent to the soil cap and in the ditch adjacent to the railroad tracks, and from the frac tank and analyzed for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs). None of the TPH, BTEX, or PAH concentrations in the two runoff samples exceeded the TRRP PCLs or TCEQ ecological surface water (freshwater) acute values. A summary report of the accidental water line leak release response that was submitted to the TCEQ in the 2019 PRACR, which is included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/, as well as in the TCEQ Central Records.

Union Pacific is continuing to diligently pursue cleanup of the Site as outlined int eh RCRA permit application as it continues to investigate the full impacts of the historic operations at the Site. Union Pacific values input by the Fifth Ward and Kashmere Gardens communities, the EPA, TCEQ and the City of Houston and encourages an open dialog to address the public's questions and concerns in its ongoing cleanup efforts.

21. *Produce any and all reports of environmental investigations, environmental site assessments, or environmental due diligence regarding the Houston Wood Preserving Works site. Identify all UPRR personnel or consultants assigned, retained or consulted in performing any such investigation.*

Response: Since acquiring the closed Site in 1997, Union Pacific conducted a vast number of environmental studies, assessments, and cleanup work at the Site, with input, guidance, and oversight from state and federal regulatory authorities. Details of environmental testing, monitoring, response actions, and remedial efforts are provided in the reports and documentation that have been submitted to the TCEQ and predecessor agencies. All work at the Site has been reviewed, approved, and conducted under TCEQ's oversight. These reports are included on the USB drive provided with these responses, and can also be found

at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

Union Pacific understands that it is challenging for members of the public to review thousands of pages containing the details of the investigative and remedial efforts undertaken at the Site over the last 30 years. Therefore, Union Pacific welcomes the opportunity to engage in an open and transparent dialog to assist the community in locating important information regarding the various activities at the Site, including the ongoing cleanup activities.

22. *Produce any and all groundwater monitoring reports and associated data regarding the Houston Wood Preserving Works site.*

    Response: Union Pacific has conducted significant and widespread sampling of 100 groundwater monitoring wells, installed by Southern Pacific and Union Pacific within the Site and other groundwater monitoring wells outside the property beneath the Greater Fifth Ward and the Kashmere Gardens area. Union Pacific has prepared, and continues to prepare, a significant amount of groundwater monitoring reports for the Site and it has submitted these reports to the TCEQ, and uploaded them to a public website intended to maintain the community informed about the Site, which is periodically updated to include the latest information (https://hwpwinfo.com/about-the-site/). These reports are also included on the USB drive submitted with these responses, as well as in the TCEQ records storage repository, see footnote 4.

23. *Produce any and all documents regarding groundwater contamination at, under, or originating from the Houston Wood Preserving Works site, including, but not limited to, any and all documents delineating any plume of groundwater contamination at, under, or originating from the Houston Wood Preserving Works site.*

    Response: Union Pacific has conducted significant and widespread sampling of 100 groundwater monitoring wells, installed by Southern Pacific and Union Pacific within the Site and other groundwater monitoring wells outside the property beneath the Greater Fifth Ward and the Kashmere Gardens area. Union Pacific has submitted numerous Site groundwater monitoring data in the Groundwater Monitoring Reports, Affected Property Assessment Reports, and Remedial Action Plans to the TCEQ or predecessor agencies. Understanding the importance of keeping the community informed of the data gathered and the ongoing investigative and remedial work at the Site, Union Pacific has posted the reports referenced here at the following website, which is periodically updated with the latest information about the Site (https://hwpwinfo.com/about-the-site/). These reports are also included on the USB drive submitted with these responses, as well as in the TCEQ Central Records storage repository, see footnote 4.

    In sum, these groundwater studies reveal the shallow groundwater, which can be separated into four distinct zones, is impacted with chemicals related to the former creosoting operations in the upper three zones. The vast majority of the shallow groundwater plume (referred to as the A-Transmissive Zone that is typically found in the top 24 feet below

ground surface) is within the Site boundary except to the north (along Liberty Road) and east where it extends onto the City of Houston right-of-way, but not beyond that right-of-way. The medium depth groundwater (referred to as the B Transmissive or Cohesive Zones typically found between about 24 feet and 60 feet below ground surface) plume encompasses the former Houston Wood Preserving Works area, northeastern portion of the Englewood Intermodal Yard, the eastern portion of the Site, and extends off-site to the north of the Site. Groundwater with contaminants within the deeper zone (referred to as the C Transmissive Zone typically found between about 60 and 75 feet below ground surface) has been identified in the northeast portion of the Site, extending to the north and east onto the City of Houston ROW. Contamination in the deepest zone (referred to as the D Transmissive Zone typically found deeper than 85 feet below ground surface) was not regularly observed above TCEQ cleanup levels. The groundwater analytical data from the three upper groundwater zones indicate that the contaminant concentrations in a majority of wells do not exhibit increasing trends. The arsenic groundwater plume continues to be evaluated. The presence of arsenic in groundwater is believed to be associated with naturally-occurring arsenate species within the groundwater matrix that are converted to the more soluble arsenite species due to reducing conditions resulting from the degradation of petroleum hydrocarbons (i.e. creosote-related COCs) from the Site.

Studies have shown that the dissolved contaminant plumes from creosote sources tend to have concentrations three to 50 times lower about 150 feet downgradient of the source compared to source concentrations. This is supported at the Site by the limited migration distance of the dissolved-phase plume from the areas where DNAPL is observed, indicating that natural attenuation is occurring and controlling large-scale expansion of the groundwater plume.

The groundwater studies confirm no risk to residents because all residential properties in the vicinity of the Site use drinking water from the City of Houston. Therefore, there is no existing risk to the Fifth Ward or Kashmere Gardens communities due to groundwater, nor is there any evidence of offsite vapor intrusion (gas coming up from the groundwater).

24. *Produce any and all potentiometric surface maps and figures and documentation of the direction and rate of groundwater flow at the Houston Wood Preserving Works site.*

Response: Details of the groundwater including directional flow are included as Figure 1A-2 (Off-Site Affected Properties [North]) and Figure 1A-3 (Off-Site Affected Properties [West]), attached as Appendices 4 and 5, respectively. Union Pacific has submitted several groundwater potentiometric surface maps in the Groundwater Monitoring Reports, APARs, and RAPs to the TCEQ or predecessor agencies. These reports are included on the USB drive submitted with these responses and can also be found at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

Union Pacific understands that these figures and data contain a lot of technical information. Therefore, Union Pacific welcomes the opportunity to engage in an open dialog with the community to ensure it is fully informed about the groundwater issues identified in

connection to the Site, and to ensure that the community can meaningfully participate in the information-gathering investigative work and in the implementation of the cleanup.

25. *Produce any and all documents regarding soil contamination at the Houston Wood Preserving Works site.*

    Response: Union Pacific has undertaken comprehensive efforts to understand the historic soil contamination issues associated with the Site, and to prepare for the appropriate remedial response. Therefore, Union Pacific commissioned several analytical reports including, the RFI Reports (1998, and 1999), Affected Property Assessment Reports (2000, 2004, 2009, and 2010), and Remedial Action Plans (2014, 2015, 2020), Response Action Completion Reports (2016, 2017, and 2019) and Post Response Action Completion Reports Monthly Updates, including the Englewood Intermodal Yard – Test Pit Evaluation Report (June 2021). (Southern Pacific commissioned a similar report in 1996). To ensure that the community remains fully informed about activities at the Site, Union Pacific has posted the reports referenced here at the following website, which is periodically updated with the latest information about the Site (https://hwpwinfo.com/about-the-site/). These reports are also included on the USB drive submitted with these responses, as well as in the TCEQ records storage repository, see footnote 4.

26. *Produce any and all documents regarding the migration of contamination off-site of the Houston Wood Preserving Works site.*

    Response: Union Pacific understands the current Site conditions and will continue to evaluate, assess, and remediate existing contamination, at the Site, and it will diligently pursue the implementation of an appropriate cleanup plan for the Site. Pursuant to such efforts, it has conducted numerous soil and groundwater investigations evaluating off-site migration of contamination in the Groundwater Monitoring Reports, Affected Property Assessment Reports, and Response Action Plans. To ensure that the community remains fully informed about activities at the Site, Union Pacific has posted the reports referenced here at the following website, which is periodically updated with the latest information about the Site (https://hwpwinfo.com/about-the-site/). These reports are also included on the USB drive submitted with these responses, as well as in the TCEQ records storage repository, see footnote 4.

    Records show that the contamination off-site is in the form of an underground groundwater plume found in the upper three groundwater zones. The vast majority of the shallow groundwater plume (referred to as the A-Transmissive Zone that is typically found in the top 24 feet below ground surface) is within the Site boundary except to the north (along Liberty Road) and east where it extends onto the City of Houston right-of-way, but not beyond that right-of-way. The medium depth groundwater (referred to as the B Transmissive or Cohesive Zones typically found between about 24 feet and 60 feet below ground surface) plume extends off-site to the north of the Site. Groundwater with contaminants within the deeper zone (referred to as the C Transmissive Zone typically found between about 60 and 75 feet below ground surface) has been identified in the northeast portion of the Site, extending to the north and east onto the City of Houston ROW

and north of the Site. The extent of the underground creosote plume is delineated and consistently monitored through groundwater sampling events to evaluate changes to the groundwater conditions. The arsenic groundwater plume continues to be evaluated. As previously discussed, the presence of arsenic in groundwater is believed to be associated with naturally-occurring arsenate species within the groundwater matrix. An on-going evaluation of the geochemical parameters collected during the recent groundwater monitoring events is being conducted.

27. *Produce any and all documents regarding actual or potential vapor intrusion at the Houston Wood Preserving Works site and off-site of the Houston Wood Preserving Works site.*

    Response: As recently as 2020, Union Pacific evaluated whether an actual or potential vapor intrusion pathway exists on or off the Site as part of the RCRA Permit Renewal Application, Response Action Plan (Rev 7), Appendix 3B – Updated Soil Vapor Intrusion Assessment Report, December 21, 2020. The evaluation concluded that no vapors emanate from the Site that would pose a risk to surrounding neighborhoods. This report is available on Union Pacific's public website regarding the Site (https://hwpwinfo.com/about-the-site/) and it is also included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4.

28. *Produce any and all documents regarding the assessment of risks and health and environmental impacts associated with contamination originating from or otherwise attributable to the Houston Wood Preserving Works site.*

    Response: The environmental justice concerns raised by the Fifth Ward and Kashmere Gardens communities, the EPA, the City of Houston, and TCEQ are important to Union Pacific. The company is committed to maintaining an open dialog with the public to ensure that all concerns are appropriately considered and addressed. Since 2000, the TCEQ managed the Site pursuant to the Texas Risk Reduction Program, which establishes tiered processes for evaluating potential human health risks and environmental impacts, including comparison of soil and groundwater data to protective concentration levels for chemicals of concern. The comparison to protective concentration levels of the soil and groundwater data per the appropriate pathways for each media are presented in the numerous Groundwater Monitoring Reports, Affected Property Assessment Reports, and Response Action Plans submitted to the TCEQ. These reports are included on the USB drive submitted with these responses and can also be found at Union Pacific's public website regarding the Site (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

    Union Pacific understands that the various reports referenced are highly technical and it therefore welcomes the opportunity to discuss the reports and answer the community's questions to ensure the community is engaged and actively participating in the process.

29. *Produce any and all documents regarding on-site worker and off-site receptor exposures or potential exposures to contamination originating from or otherwise attributable to the Houston Wood Preserving Works site.*

Response: The environmental justice concerns raised by the Fifth Ward and Kashmere Gardens communities, the EPA, the City of Houston and TCEQ are important to Union Pacific. The company is committed to working to address those concerns. Union Pacific has thoroughly investigated the potential human health issues that could possibly be associated with the Site, which was the subject of the lawsuit entitled *Abraham v. Union Pacific Railroad Company,* in which various employees working at the Site including those who were in direct physical contact with the wood materials containing creosote alleged that the exposure to creosote at the Site was the cause of various health impacts including cancer. There, the Court of Appeal affirmed the Trial Court ruling, finding that there was no admissible medical evidence establishing any causal link between the alleged health impacts of the workers (cancer) and the Site. This decision was rendered in 2007 and is available at https://caselaw.findlaw.com/tx-court-of-appeals/1107509.html

30. *When was access to on-site surface soil contamination limited to receptors and how? How long was the on-site surface contamination accessible to workers at the Houston Wood Preserving Works site? How long was the contamination accessible to on-site visitors/trespassers?*

Response: The Site has been fenced to restrict access since Union Pacific's acquisition and continuation of cleanup activities. As detailed in the 2000 Affected Property Assessment Report, Union Pacific used the portion of the Site that it owns for ongoing cleanup and railroad storage. Union Pacific posted signs in the early 2000s to notify on-site workers of soil contamination at the Site. In 2011 storage of railroad materials in the area ceased and a new fence was constructed. Since then, only signal work and crew change outs along the rail lines has occurred at the Site in addition to remedial activities. Union Pacific completed the soil response action for the Site in 2016, which was followed by recent soil samples in the vicinity of the Site which did not reveal concerning results under State standards. These reports are included on the USB drive submitted with these responses and can also be found at Union Pacific's public website regarding the Site (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

31. *When was access to on-site surface DNAPL limited to receptors and how? How long was the on-site surface DNAPL contamination accessible to workers? To on-site visitors/trespassers?*

Response: The Englewood Intermodal Yard is a currently operating, secured, and a restricted facility. It has a security fence surrounding most of the property with limited access through security entrances and exits. As required in the Revised Remedial Action Plans, warning signs are posted in the area restricting excavation activities to keep from encountering impacted material. As a result, risk of contact during construction and excavation activities are safeguarded by controlled property access and implementing soil

management plans for proposed construction activities as required under the proposed institutional control. The Remedial Action Plan is included on the USB drive submitted with these responses, on Union Pacific's public website regarding the Site (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

32. *When was off-site surface soil contamination fully delineated?*

Response: Union Pacific identified off-site surface soil contamination in 2014 to Texas Risk Reduction Program protective concentration levels for the off-site areas to the north in the 2014 Remedial Action Plan, approved by the TCEQ when it issued the Final Draft Permit in May 2021. Details of impacted surface soil and remediation on the southwest portion of the Site are provided in the 2014 Affected Property Assessment Report and 2016 Remedial Action Closure Report, respectively. Additional off-site soil data were presented in the 2020 Remedial Action Plan, which has been made publicly available by means of the Union Pacific website (https://hwpwinfo.com/about-the-site/). These reports are also included on the USB drive submitted with these responses, and in the TCEQ records storage repository, see footnote 4.

33. *When was access to off-site surface soil contamination limited to receptors and how? How long was the off-site surface soil contamination accessible to receptors?*

Response: The impacted soils above Texas Risk Reduction Program Residential protective concentration levels in the area immediately north of the above ground storage tank, within the City of Houston right of way between the Site property boundary and Liberty Road were addressed through a combination of limited soil excavation (placed within the capped area) and construction of a concrete sidewalk to restrict exposure to the surface soil in 2016. In addition, Union Pacific excavated the impacted soils in the area known as "area of concern (AOC) 6" and placed them under the soil cap and the area was backfilled with clean fill in 2016. These activities are extensively detailed in the 2016 Remedial Action Completion Report, approved by the TCEQ with issuance of the Final Draft Permit in May 2021. These reports are included on the USB drive submitted with these responses and can also be found on Union Pacific's public website regarding the Site (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

34. *When and what types of emission controls were used in connection with the removal of off-site contaminated soils?*

Response: Union Pacific performed initial air monitoring during construction to evaluate the potential for occupational exposures to potential vapors encountered during the excavation activities. Union Pacific developed an Air Monitoring Sampling and Analysis Plan to establish real-time dust monitoring downwind of dust-producing operations both at the excavation site and at the perimeter of the rail yard. The purpose of this monitoring was to identify those operations, if any, with the potential to generate dust above the site-specific action and implement near-immediate corrective actions to minimize dust

generation and offsite dust migration. To supplement real-time air monitoring efforts, analytical air samples were collected for PM_{10} and polycyclic aromatic hydrocarbons at locations downwind of remediation operations. Throughout the real-time PM_{10} monitoring, no exceedances of the stop work action levels were detected. These reports are included on the USB drive submitted with these responses and can also be found on Union Pacific's public website regarding the Site (https://hwpwinfo.com/), and in the TCEQ records storage repository, see footnote 4.

35. *When was confirmation that off-site soil contamination had attained applicable cleanup standards? What cleanup standards were used in making that determination and what methods were used to demonstrate confirmation?*

    Response: As detailed in the 2016 Response Action Completion Report, Union Pacific achieved the response objectives under the Texas Risk Reduction Program by physical removal of affected soil or through consolidation and capping of the impacted soils using a physical barrier within the Soil Cap Area in accordance with the EPA Area of Contamination approach. This report is included on the USB drive submitted with the responses and can also be found in the TCEQ records storage repository, see footnote 4. Union Pacific is committed to answering the community's questions and addressing concerns regarding off-site soil contamination are fully addressed. Therefore, it would welcome the opportunity to engage in a discussion with the public and ensure that all the facts and data are conveyed and understood by the public which is invited to meaningfully engage in the process.

HEALTH IMPACTS

36. *Is UPRR aware of any current or former employees, contractors, or other workers at the Houston Wood Preserving Works facility with adverse health effects believed or alleged to have resulted from exposure at the facility? Please provide details of the claimed health effects and dates.*

    Response: Union Pacific is not aware of any adverse health effects to any current or former Site workers. Union Pacific thoroughly analyzed the potential for health issues in connection to the Site nearly 20 years ago, when former workers alleged exposure from historical impacts at the Site and filed a lawsuit entitled *Abraham v. Union Pacific Railroad Company*. In the lawsuit, the employees working at the Site including those who were in direct physical contact with the wood materials containing creosote alleged that the exposure to creosote at the Site was the cause of various health impacts including cancer. There, the Court of Appeal affirmed the Trial Court ruling, finding that there was no admissible medical evidence establishing any causal link between the alleged health impacts of the workers (cancer) and the Site. This decision was rendered in 2007 and is available at https://caselaw.findlaw.com/tx-court-of-appeals/1107509.html

37. *Is UPRR aware of any individual with adverse health effects believed or alleged to have resulted from exposure to contamination originating at the facility? Please provide details of the claimed health effects and dates.*

Response: Union Pacific is not aware of any adverse health effects to any individual in connection to the Site. Union Pacific is aware that various lawsuits have been filed against Union Pacific on behalf of plaintiffs alleging property damage and/or personal injury in connection with the Site. Union Pacific disputes the assertions contained in the lawsuits.

PUBLIC UTILITIES

38. *What steps has UPRR taken to evaluate the potential risk for its contamination plume(s) to enter and adversely impact the City of Houston underground drinking water infrastructure located within the plume area?*

    a. *Drinking Water*
        i. *Has UPRR evaluated whether the drinking water infrastructure is above or below the depth of contaminated groundwater from the site?*
        ii. *Has UPRR evaluated whether the drinking water infrastructure construction materials are compatible with the type of groundwater contaminated from the site?*
        iii. *Has UPRR sampled drinking water from the public subsurface drinking water infrastructure to evaluate whether it has been adversely impacted by the contamination from the site? If so, provide the sampling documents.*
        iv. *Has UPRR assessed the integrity of the drinking water infrastructure in the vicinity of the contaminated groundwater to evaluate potential impacts to drinking water?*

Response:
a. *Drinking Water*

i. and ii. – Union Pacific has evaluated whether the drinking water infrastructure is above or below the depth of contaminated groundwater from the Site. Further, Union Pacific evaluated whether it was likely that groundwater would impact water in the line. These studies and evaluations show no evidence that the groundwater is entering the 84-inch water line, therefore there is no evidence that the infrastructure is impacted by the groundwater contamination from the Site. This evaluation is contained in the 2009 Affected Property Assessment Report, which is included on the USB drive submitted with these responses and can also be found at https://hwpwinfo.com/, as well as in the TCEQ records storage repository, see footnote 4.

iii. The City of Houston sampled the drinking water in July 2019 and found no detected concentrations of chemicals of concern (Source: City of Houston Health Department website: Fifth Ward/Kashmere Gardens Union Pacific Railroad Site Contamination and Area Cancer Cluster (houstontx.gov)).

iv. The engineering drawings provided by the City of Houston regarding the integrity of the 84-in water line show that it is constructed out of welded steel. Therefore, Union Pacific has not found any impacts to the water infrastructure. The engineering drawings provided

in the *City of Houston Department of Public Works Surface Water Transmission Program – Proposed 84" Water Main Along Glenarm, Chew, Lee, and Lockwood From Kress to Lucille (Contract No. 2B-2), Lockwood, Andrews & Newman, Inc. (1998)* (P34535) are included on the USB drive submitted with these responses.

b. Wastewater

i. *Has UPRR evaluated whether the public wastewater infrastructure is above or below the depth of contaminated groundwater from the site?*
ii. *Has UPRR evaluated whether the public wastewater infrastructure construction materials are compatible with the type of groundwater contaminated from the site?*
iii. *Has UPRR sampled wastewater from the public subsurface wastewater infrastructure to evaluate whether it has been adversely impacted by the contamination from the site? If so, provide the sampling documents.*

Response:

b. Wastewater

i., ii., and iii. – Information regarding wastewater infrastructure issues are detailed in the Affected Property Assessment Reports Addendum 2009 and its Updated Addendum of October 2010, approved by the TCEQ on April 13, 2011. It is known that the City of Houston 60-inch sanitary sewer line cuts across the east end of the Site. Based on a review of the City of Houston drawing files for the sanitary sewer line, the sewer line potentially intersects the saturated transmission zone unit at its shallowest point (20 feet below ground surface). (See *Lockwood Area Trunk Sanitary Sewer (from Mulvey Street to N. Side of Liberty Rd.) Drawing No. 9765, October 1950*). In 2010, three water samples were collected of wastewater from the sanitary sewer line upgradient, within the Site, and downgradient of the Site to evaluate potential discharge of site-specific chemicals of concern in the shallowest transmissive zone that could potentially be released to the wastewater line. The results suggest that there was no loading of constituents of concern from groundwater into the sanitary sewer that would pose a risk. (Updated Affected Property Assessment Reports Addendum, 2010). Each of the reports referred to in this response is included on the USB drive submitted with these answers and can also be found in the TCEQ records storage repository, see footnote 4.

c. *Stormwater*

i. *Has UPRR evaluated whether the stormwater infrastructure is above or below the depth of contaminated groundwater from the site?*
ii. *Has UPRR evaluated whether the stormwater infrastructure construction materials are compatible with the type of groundwater contaminated from the site?*

iii. *Has UPRR sampled stormwater from the public subsurface storm water infrastructure to evaluate whether it has been adversely impacted by the contamination from the site? If so, provide the sampling documents.*

iv. *Houston has collected water samples from the public stormwater infrastructure located within the plume area and has confirmed the presence of creosote contaminants. UPRR has collected sediment samples from its private stormwater system at the site, which discharges to the City of Houston storm water system, and has confirmed the presence of contaminants.*

1) *Has UPRR evaluated the condition of the public storm water system to determine whether there is infiltration of groundwater and/or groundwater contaminants into the stormwater system?*
2) *What steps has UPRR taken to prevent the (ongoing) discharge of contaminants through its own stormwater system into the City of Houston stormwater system from the site? Has the condition of the private stormwater system been evaluated to determine whether infiltration is occurring?*
3) *Why is the stormwater pathway, which provides a conduit for UPRR's contaminants into surface water, not addressed as part of the Response/Remedial Action Plan proposed for the site?*

Response:

c. Stormwater

1) Union Pacific developed an initial scope of work dated July 12, 2021, to evaluate the storm water sewer line in Liberty Road. The TCEQ provided comments on the work plan in a letter dated August 31, 2021, and Union Pacific submitted a revised work plan in a letter dated September 22, 2021, to the TCEQ. The TCEQ approved the updated work plan in a letter dated September 29, 2021. Union Pacific will submit a findings report after conducting the investigation of the Liberty Road storm water sewer line. The documents referred to in this response are included on the USB drive submitted with these answers and can also be found in the TCEQ records storage repository, see footnote 4.

2) Union Pacific is currently evaluating the storm water system within the Englewood Intermodal Yard and storm water system within the Site. Union Pacific provided details of the initial evaluation to the TCEQ in a report titled "*Englewood Intermodal Yard – Test Pit Evaluation Report"* dated June 2, 2021. While camera survey footage of some of the storm water lines in the Englewood Intermodal Yard identified multiple breaks and separations at joints in the storm water lines, no releases of water or NAPL were observed entering the surveyed storm lines at the time of the inspections. The report referred to in this response is included on the USB drive submitted with these answers and can also be found at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

3) Stormwater from the Site does not constitute a pathway for exposure. Union Pacific is monitoring Site conditions particularly after wet weather events. Current analytical data

show that rain events are not exacerbating the soil or groundwater conditions. Union Pacific will continue to proactively monitor this pathway in accordance with TCEQ guidance. If impacts are identified where the stormwater pathway is affected, Union Pacific will diligently evaluate appropriate response actions.

SOURCE MATERIAL

39. *What is the current vertical and horizontal extent of all known contaminated/source material at the site?*

    Response: The historic operational sources from the Site have been closed and inactive since 1984. Those historic sources have been delineated and discussed in the Affected Property Assessment Reports (2000, 2004, 2009, and 2010) and more recently in the Remedial Action Plan Rev 5 (TPH & NAPL Assessment Interim Report dated May 29, 2020), which have been approved by TCEQ. Creosote DNAPL has been detected in soil borings and monitoring wells on and off-site. However, the DNAPL sources were removed over 25 years ago. For nearly 30 years, Union Pacific (and Southern Pacific) conducted numerous DNAPL investigations, including a supplemental NAPL assessment in 2019, which indicated that there was no evidence of off-site NAPL present within the shallowest groundwater zone (20 feet below ground surface). (See Figure 1A-4 – Conceptual Site Model, S-N Cross Section (from Response Action Plan (Aug 2020)), attached here as Appendix 6. To the extent NAPL has been identified off-site, it generally occurs in areas located approximately 500 feet north of the Site, at depths of 24 feet or more below the ground surface, inaccessible to the general public. The conceptual site model indicated that NAPL mass predominantly resides within certain parts of the Site and the Englewood Intermodal Yard area, with some NAPL residing off-site within even deeper areas, 24 feet below ground surface north of the Site and approximately 60-68 feet below ground surface off-site northeast of the Site, which are similarly inaccessible to the public. Each of the reports referred to in this response is included on the USB drive submitted with these answers and can also be found at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

40. *Has the known contaminated/source material been collected in one location on-site, or is it located at various locations around the site?*

    Response: Union Pacific excavated impacted source material within the Inactive Wastewater Lagoon along the northern fence line and consolidated it under the soil cap and other caps established at the Site. Regarding source material in the form of NAPL at the Site, where creosote DNAPL is encountered in monitoring or recovery wells, it is recovered from the monitoring and recovery wells and temporarily stored in the Container Storage Area pending disposal at a permitted landfill that can receive the waste. The TCEQ approved these removal action methods in the Remedial Action Plan (Rev. 0, Dec 2014) which is included on the USB drive submitted with these responses, at https://hwpwinfo.com/, as well as at TCEQ records storage repository, see footnote 4.

41. *Is the area(s) of contaminated/source material fully delineated at the site?*

Response: Yes, as detailed in the response to Comment No. 39 above, Union Pacific fully delineated the source material through the investigations conducted at the Site which were each reviewed and approved by the TCEQ.

42. *Have all contaminated/source material locations for the site have been identified?*

Response: Yes. Union Pacific identified all impacted source material locations at the Site through the numerous investigations conducted at the Site which were each reviewed and approved by the TCEQ.

43. *For each existing or potential source of groundwater or stormwater contamination remaining on-site that has been identified, why has that source of contamination not been excavated or removed?*

Response: Since 1984, the historic operational sources have been closed or removed from the Site. As part of its ongoing cleanup efforts, Union Pacific conducted technical studies which ultimately concluded that full DNAPL recovery is not feasible based on the following considerations:

1. Most monitoring wells where DNAPL was found on and off-site do not have measurable, or recoverable, DNAPL present in the groundwater wells, indicating that the creosote resides in the groundwater-bearing unit as residual NAPL (trapped in the pore spaces of the geologic matrix) and is no longer mobile under natural conditions.

2. Creosote DNAPL occurs at depths of 24-68 feet below ground surface at and near the Site and it is known that the mobility of fluids (both NAPL and water) is extremely limited at such depths.

Case studies suggest that removing up to 80%–90% of the DNAPL source material will only lead to limited reductions of dissolved-phase contaminants downgradient of the NAPL. Therefore, it does not appear that complete removal of DNAPL is technically feasible or necessary to meet groundwater remediation goals at the Site.

For storm water, Union Pacific continues to evaluate if the stormwater system at the Site is impacted by contaminated soil and/or groundwater. Following the additional investigation activities, (the TCEQ recently approved the workplan) and if needed, response actions will be evaluated to address the surface water pathway.

Each of the reports and studies referenced in this response are included on the USB drive that accompanies these responses, as well as in the TCEQ records storage repository, see footnote 4. However, Union Pacific understands the highly technical nature of the content provided in this section including the various analytical reports referenced. Therefore, it

would welcome the opportunity to answer questions the community, EPA, the City of Houston or TCEQ may have regarding the status of remediation efforts at the Site and the rationale for the activities undertaken thus far. Ultimately, Union Pacific would like to partner with the local community in an open and transparent exchange of information regarding activities at the Site so that the community can meaningfully engage in the process of identifying and ultimately implementing the most suitable remedial actions.

NON-AQUEOUS PHASE LIQUID CONTAMINATION PLUME(S)

44. *What is the current vertical and horizontal extent of all known NAPL (DNAPL and LNAPL) plumes?*

    Response: The historic operational sources from the Site have been closed and inactive since 1984. Those historic sources have been delineated and discussed in the Affected Property Assessment Reports (2000, 2004, 2009, and 2010) and more recently in the Remedial Action Plan Rev 5 (TPH & NAPL Assessment Interim Report dated May 29, 2020), which have been approved by TCEQ. Creosote DNAPL has been detected in soil borings and monitoring wells on and off-site. However, the DNAPL sources were removed over 25 years ago. For nearly 30 years, Union Pacific (and Southern Pacific) conducted numerous DNAPL investigations, including a supplemental NAPL assessment in 2019, which indicated that there was no evidence of off-site NAPL present within the shallowest groundwater zone (20 feet below ground surface). (See Figure 1A-4 – Conceptual Site Model, S-N Cross Section (from Response Action Plan (Aug 2020)), attached here as Appendix 6. To the extent NAPL has been identified off-site, it generally occurs in areas located approximately 500 feet north of the Site, at depths of 24 feet or more below the ground surface, inaccessible to the general public. The conceptual site model indicated that NAPL mass predominantly resides within certain parts of the Site and the Englewood Intermodal Yard area, with some NAPL residing off-site within even deeper areas, 24 feet below ground surface north of the Site and approximately 60-68 feet below ground surface off-site northeast of the Site, which are similarly inaccessible to the public. Each of the reports referred to in this response is included on the USB drive submitted with these answers and can also be found at Union Pacific's public website (https://hwpwinfo.com/), as well as in the TCEQ records storage repository, see footnote 4.

45. *Are each of the known NAPL plumes fully delineated?*

    Response: Yes, each of the NAPL plumes are fully delineated as reflected in the Remedial Action Plan (Attachment 1A) (Dec 2014) and Remedial Action Plan Revision No. 5, Appendix 3 - TPH & NAPL Investigation Report (Aug 2020). These reports are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

46. *Are each of the known NAPL plumes documented to be stable and not migrating?*

Response: Years of testing and data demonstrate that NAPL is stable and not migrating. However, Union Pacific continues to conduct bi-weekly DNAPL recovery events to evaluate the NAPL thickness in the monitoring and recovery wells. See Remedial Action Plan Revision No. 5, Appendix 3 - TPH & NAPL Investigation Report (Aug 2020), and Quarterly DNAPL Reports on the discussion of DNAPL thickness trends and observations in the DNAPL recovery wells. These reports are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

47. *Have all NAPL plumes been identified?*

Response: Yes, all NAPL plumes have been identified. See Remedial Action Plan Revision No. 5, Appendix 3 - TPH & NAPL Investigation Report (Aug 2020) which is included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

48. *If the NAPL plume(s) were stable and not migrating, would there be any need for a slurry wall containment system?*

Response: Science and testing demonstrate that NAPL is not currently migrating to pose any present risk. However, as an additional proactive measure to address the potential for any future migration, Union Pacific proposed the slurry wall containment system as part of the NAPL Response Objectives detailed in the Response Action Plan Revision No. 5. The proposed on-site slurry wall will impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. The proposed slurry wall will minimize the potential for future groundwater migration from the source areas on-site to the off-site properties. These documents are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

DISSOLVED GROUNDWATER CONTAMINATION PLUME(S)

49. *What is the current vertical and horizontal extent of all known groundwater contamination plumes from the site?*

Response: The vast majority of the shallow groundwater plume (20 feet or more below ground surface) is within the Site boundary except to the north (along Liberty Road) and east where it extends onto the City of Houston ROW, but not beyond that ROW. Medium-to-deep groundwater (over 24 feet below ground surface) encompasses the northeastern portion of the Englewood Intermodal Yard, the eastern portion of the Site, and extends off-site to the north of the Site. Impacted groundwater (at or greater than 68 feet below ground

surface) has been identified in the northeast portion of the Site, extending to the north and east onto the City of Houston ROW. No contaminants were observed at the deepest groundwater depths of more than sixty-eight (68) feet below ground surface. The groundwater does not appear to pose a risk to residents since all residential properties in the vicinity of the Site use drinking water from the City of Houston, rather than from groundwater wells. This information is detailed in Section 5.0 (Conclusions) of the TCEQ-approved Groundwater Monitoring Report (July 2020), and is represented in the following: Figure 1A-2 (Off-Site Affected Properties [North]) and Figure 1A-3 (Off-Site Affected Properties [West]), attached here as Appendices 4-5.

50. *Are each of the known groundwater contamination plumes fully delineated?*

Response: Arsenic in groundwater is being delineated since concentrations have been detected in the four groundwater-bearing units above the protective concentration levels set by TCEQ. As discussed in a response letter dated August 5, 2020, to TCEQ's Comment Letter dated July 16, 2020, the presence of arsenic concentrations in groundwater is believed to be associated with naturally occurring arsenate species within the groundwater-bearing unit matrix that are converted to the more soluble arsenite species due to reducing conditions resulting from the degradation of petroleum hydrocarbons from historic wood operations at the Site. Union Pacific is evaluating redox conditions and potential arsenic dissolution/attenuation processes in the groundwater bearing units as part of its 2021 Annual Groundwater Monitoring Report. However, all residential properties in the vicinity of the Site use drinking water from the City of Houston, rather than from groundwater wells, so arsenic in groundwater is not considered a present risk to residents. These documents are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4.

51. *Are each of the known groundwater contamination plumes documented to be stable and not migrating?*

Response: The groundwater data that Union Pacific has collected and provided to the TCEQ in the 2020 Groundwater Monitoring Report (July 2020) indicates that the plumes are stable. Given the importance of this issue, Union Pacific continues to diligently evaluate the groundwater data for trends in the groundwater concentrations to assess plume stability. The 2020 Groundwater Monitoring Report (July 2020) is included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

52. *Have all groundwater contamination plumes been identified?*

Response: Yes, all groundwater contamination plumes have been identified as reflected in the various Affected Property Assessment Reports and most recent Groundwater Monitoring Report (July 2020). These reports are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. Union Pacific understands the importance of maintaining an open dialog with

the local community to ensure that all data is made available and understood. That is why this data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

PROPOSED RESPONSE/REMEDIAL ACTION PLAN(S)

53. *Would a slurry wall be more effective at minimizing the migration the contamination plumes if all of the source material and NAPL were located behind the slurry wall?*

    Response: The slurry wall barrier is intended to impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. This will reduce the risk of potential future migration of contaminated groundwater from the Site, and similarly reduce the potential for migration of mobile NAPL from the Site. It is understood that the NAPL mass predominantly resides within certain parts of the Site and Englewood Intermodal Yard area of the Site, with some NAPL residing within the secondary porosity of the carbonate seams and clay fractures in the mid-deeper groundwater-bearing zones of the Site (24-60 feet below ground surface). With the majority of the NAPL mass within the Site and within the proposed slurry wall alignment, the proposed slurry wall alignment will impede any potential migration from the Site to the off-site areas.

54. *How can an adequate remedial method be designed and implemented if not all source material has been identified?*

    Response: Union Pacific has identified all source material as discussed in the numerous NAPL assessments conducted. These assessments are included on the USB drive submitted along with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

    Union Pacific desires to engage in a transparent dialog with the Fifth Ward and Kashmere Gardens communities, and would be happy to answer any questions or requests for clarification regarding the technical information contained in this response.

55. *How can an adequate remedial method be designed and implemented if a significant portion of the NAPL plume has already migrated outside of the slurry wall?*

    Response: The majority of the NAPL plume is not offsite but resides within the property owned by Union Pacific and will be contained within the slurry wall as detailed in the Remedial Action Plan (Rev No. 5, Appendix 3 - Interim NAPL and TPH Assessment (Golder, 2020d), Figures 2, 3 and 4). This report is included on the USB drive submitted along with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

56. *During hot summer days creosote is known to ooze up through the parking lot on the UPRR property that is supposed to act as a cap over the contamination. If creosote can migrate up through this "cap," is it not also possible for stormwater to migrate down through the cap, thereby further mobilizing the contaminants under the cap?*

    Response: Union Pacific monitors the groundwater conditions within the concrete cap area in the Englewood Intermodal Yard on a regular basis. As detailed in the Groundwater Monitoring Report (July 2020), the groundwater concentration trend analyses did not indicate any increasing trends in the shallow groundwater wells (A-Transmissive Zone) in this area. In the event stormwater was migrating downward and mobilizing contaminants, the groundwater data from these shallow wells would likely indicate increasing concentration trends as a result of the infiltration. In addition, groundwater elevations in these shallow wells do not appear to respond following large rainfall events. As an example, groundwater elevations in the shallow wells in the Englewood Intermodal Yard did not show a significant increase following Hurricane Harvey in August 2017. These reports are included on the USB drive submitted with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

57. *Are you planning on using monitored natural attenuation to reduce the contaminants in the groundwater? What is the monitoring plan?*

    Response: After the active multi-phase extraction conducted by Union Pacific achieves the TCEQ-approved objectives, Union Pacific proposes to evaluate monitored natural attenuation to address the residual off-site groundwater zones.

    The overall groundwater monitoring plan is detailed in the GWSAP provided in the RCRA Permit Section XI (Compliance Plan) Attachment C. The Corrective Action Monitoring requirements are listed in the Final Draft Permit under Compliance Plan Table VII (Reporting Requirements) issued by the TCEQ on May 7, 2021. These documents are included on the USB drive submitted along with these responses and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

58. *Provide copies of any description or assessment of remedial options other than the remedy proposed in the final draft permit for the UPRR site that has been developed by UPRR or its consultants including any information regarding the cost of such remedial options.*

    Response: Since acquiring the Site in 1997, Union Pacific has conducted a vast number of environmental studies, assessments, and cleanup work at the Site, with input, guidance, and oversight from state and federal regulatory authorities. Details of the environmental testing, monitoring, response actions, and remedial efforts are provided in the reports and documentation that have been submitted to the TCEQ, and predecessor agencies, and can be accessed via the methods referenced in the cover letter to these responses. All work at

the Site has been reviewed, approved and conducted under TCEQ's oversight. These reports include extensive cost information regarding remedial options. These documents are included on the USB drive submitted along with these responses, and can also be found in the TCEQ records storage repository, see footnote 4. This data has additionally been made available to the public at Union Pacific's website (https://hwpwinfo.com/about-the-site/a).

59. *Disclose and describe any other experience UPRR has had with assessing and/or remediating creosote or similar contamination at other facilities owned, operated or under the control of UPRR or any other person, entity, or organization affiliated now or in the past with UPRR including a discussion of remediation options selected at such facilities.*

    Response: EPA's letter requests that UPRR provide information regarding the Houston Wood Preserving Site, so Union Pacific has focused its response on the Houston Wood Preserving Site consistent with that request. As indicated in the introduction above, creosote treatment was commonplace throughout the United States for a century of railroad operations to protect human safety by improving wooden railroad components to prevent track damage and resultant potential derailment.

COMMUNITY ENGAGEMENT/OUTREACH TO LOCAL AND ENVIRONMENTAL JUSTICE COMMUNITIES

60. *Describe any community engagement or outreach that UPRR has conducted with respect to contamination originating from the Houston Wood Preserving Works site.*

    Response: Union Pacific is seeking input from its neighbors in the Fifth Ward and Kashmere Gardens neighborhoods and will continue its proactive efforts to inform and engage the public by means of various outreach activities, both in conjunction with the TCEQ and on its own, to ensure that the public has adequate information regarding the Site conditions, the work being performed and to answer questions Union Pacific has actively conducted public outreach and has held numerous public meetings with the community, local politicians, and stakeholders to make sure they were kept informed regarding Site status and the work being accomplished. Union Pacific is committed to continuing its community engagement as part of the regulatory process at the Site and Union Pacific recognizes that further steps are necessary to improve the public dialog and to address environmental justice concerns raised. Union Pacific has distributed flyers in the community, conducted community awareness meetings, published notices in the local newspapers regarding the cleanup activities and permit renewals, and has sent numerous letters to property owners within the historical plume boundary for many years and will continue its outreach and information exchange with the community. Union Pacific will continue to host outreach meetings with Harris County, the local citizens group IMPACT and the City of Houston. These meetings are of critical importance to Union Pacific, the company continues to be committed to provide all relevant information and to answer questions raised as well as to address any ongoing concerns regarding Site conditions and work planned in connection to the Site.

Examples of UPRR's outreach activities include:

(1) November 2002 – Notification Letters - Possibility for a Constituent of Potential Concern to be Present in Soil or Ground Water
(2) November 13, 2003 – Community Awareness Meeting (True Vine Missionary Baptist Church)
(3) September 9, 2004 – Community Awareness Meeting (True Vine Missionary Baptist Church)
(4) September/October 2004 – Notice of Information Availability Certified Mailing
(5) December 2004 – Public Notice RCRA Permit Renewal – newspaper/radio broadcast
(6) February 2010 – Notice of Information Availability Certified Mailing
(7) December 2010 – Notice of Information Availability Certified Mailing
(8) September 2014 – Community Awareness Meeting, discuss restrictive covenants (True Vine Missionary Baptist Church) – Outreach to community on RCs for next two years
(9) April 2015 – Public Notice RCRA Permit Renewal – newspaper
(10) June 2015 – Notice of Information Availability Certified Mailing
(11) February 2016 – Meeting at Fifth Ward Super Neighborhood
(12) November 2018 – Notice of Information Availability Certified Mailing
(13) July 2019 – Notice of Information Availability (GW data submittals to TCEQ)
(14) January 2020 – Meeting with Impact Fifth Ward
(15) 2020-2021 – Various communication and engagement with Harris County and City of Houston
(16) April 2020 – Notice of Information Availability (GW data submittals to TCEQ)
(17) August 2020 – Notice of Information Availability (GW data submittals to TCEQ)
(18) March 2021 – Notice of Information Availability (GW data submittals to TCEQ)

61. *Produce any and all comments or feedback received from the community. Describe any and all action items UPRR has taken in response to community feedback.*

Response: Union Pacific has received feedback from the community in a number of ways, including through the outreach activities identified above and public meetings that are held during the cleanup process. UPRR also obtains feedback through input from TCEQ in response to community and stakeholder concerns expressed to the agency, which can be found in the TCEQ Central Records repository. Union Pacific has addressed such feedback and comments in the various reports, responses and submittals made to TCEQ over the years. Most recently, Union Pacific has proposed to add the additional components of a slurry wall and additional groundwater monitoring in response to the community's concerns and comments about the site cleanup.

62. *Describe any efforts that UPRR has made to educate the public regarding contamination originating from the Houston Wood Preserving Works site.*

Response: *See* responses to Question 60 and 61. Union Pacific is committed to continue engaging with and educating the public to address the public's concerns raised in connection to the Site.

63. *Describe any efforts that UPRR has made to monitor or otherwise assess the health of the residents and communities in proximity to the Houston Wood Preserving Works site*.

Response: Union Pacific continues to investigate the potential human health issues that could possibly be associated with the Site and has been conducting those human health investigations for over three decades. As noted in prior responses, Union Pacific has commissioned and completed hundreds of analyses and reports under federal and state agency oversight. This has occurred both in litigation (*Abraham v. Union Pacific Railroad*) and in the ordinary environmental regulatory course with EPA and TCEQ. In none of these investigations and reports has Union Pacific encountered any evidence establishing the existence of human health issues associated with the Site or any scientific analysis identifying a causal link to the Site. Union Pacific commits to continuing these investigations pursuant to its ongoing work at the Site consistent with the regulatory process governing the Site and to address any environmental justice concerns arising from the historic operations at the Site.

APPENDICES

1. 1993 RCRA Facility Assessment Report prepared by the US EPA
2. Figure C.3 (Locations of Former Waste Management Units)
3. Figure 2A-1a (Response Action-Soil Capped Areas and NAPL Collection System)
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7. USB Drive Document List

Appendix 1: 1993 RCRA Facility Assessment Report prepared by the US EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

December 3, 1993

Southern Pacific Transportion Co.
Attn: Ms. Michelle Belco
913 Franklin Ave.
Houston, Texas 77002

Dear Ms. Belco:

Enclosed is a copy of the following RCRA Facility Assessment (RFA) report completed by an EPA contractor.

Facility Name: Southern Pacific Transportion Co.

EPA ID Number: TXD000820266

The document is for your information and no response is required at this time. You will be notified in the future if further action is required. In the meantime, you may direct questions to me or your staff may direct questions to Jon Rinehart (214) 655-6789.

Sincerely yours,

Laurie King
Chief
TX/OK Section

Enclosure

cc: Minor Hibbs, TNRCC

Printed on Recycled Paper

RCRA FACILITY ASSESSMENT REPORT

PRC Environmental Management, Inc.
October 1993

RCRA FACILITY ASSESSMENT REPORT
SOUTHERN PACIFIC
TRANSPORTATION COMPANY
HOUSTON, TEXAS
TXD000820266

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 6
1445 Ross Avenue
Dallas, TX 75202

Prepared by
PRC Environmental Management, Inc.
350 North St. Paul
Suite 2600
Dallas, TX 75201

EPA Contract No. 68-W9-0041

Work Assignment No. R2685
Project No. 01

October 1993

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DISCLAIMER

This report was prepared for the U.S. Environmental Protection Agency (EPA), Region 6, by PRC Environmental Management, Inc., in fulfillment of Contract No. 68-W9-0041, Work Assignment No. R268501. The opinions, findings, and conclusions expressed herein are those of the contractor and not necessarily those of EPA or other cooperating agencies. Mention of company or product names is not to be considered as an endorsement by EPA.

This document is intended to assist EPA and state personnel in developing requirements for a Resource Conservation and Recovery Act (RCRA)-regulated facility owner or operator to conduct a RCRA facility investigation (RFI) pursuant to Title 40, Code of Federal Regulations (CFR) 264. EPA will not necessarily limit the RFI or other requirements to those that correspond with the recommendations set forth herein. EPA and state personnel must exercise their technical judgment in using the RCRA Facility Assessment report, as well as other relevant information, in determining what RFI or other requirements to include in a permit or order.

EXECUTIVE SUMMARY

PRC Environmental Management, Inc. (PRC), evaluated the Southern Pacific Transportation Company (SPTCo) site through a preliminary document review (PR) at the Texas Water Commission (TWC), now the Texas Natural Resource Conservation Commission (TNRCC), and U.S. Environmental Protection Agency (EPA) Region 6 offices. The PR was followed by a visual site inspection (VSI) to (1) determine the current operating status, (2) identify solid waste management units (SWMU) and areas of concern (AOC), (3) assess the regulatory compliance of those units, and (4) assess actual and potential releases to the environment from those units.

The site is an inactive wood-treating facility that has been owned and operated by SPTCo since 1957. The facility is located about 1 mile north of Interstate Highway 10, off Lockwood Drive, Houston, Harris County, Texas. It occupies about 25 acres. The site area is predominantly surfaced with road-base gravel, asphalt, and concrete. Several sets of railroad tracks terminate within and pass through the yard. The wood-treating operation closed in 1984. The site is now used as a railroad material storage yard.

During the facility's active status, untreated wood was brought in by rail car. The wood was cut and trimmed before being loaded into closed, pressurized retort cylinders. The wood was treated with creosote, resulting in a waste stream containing acetic acid, sap water, and creosote. On August 15, 1980, SPTCo filed a Notification of Hazardous Waste Activity, identifying materials that would cause the facility to be classified as a generator of hazardous waste. The facility filed its Part A permit application on November 18, 1980. SPTCo executed an affidavit of exclusion from hazardous waste permitting on May 5, 1984, which the Texas Department of Water Resources (TDWR) approved on August 31, 1984.

In 1979 and 1980, SPTCo built an on-site surface impoundment, to dispose of creosote-contaminated soil and material. In response to TDWR requests, the facility submitted a RCRA closure plan for the surface impoundment, in addition to revisions of its Part A and B permit applications, in November 1983. Certifications of off-site removal and closure of this unit were submitted to TDWR in 1984. Following closure of the surface impoundment, SPTCo implemented a ground-water monitoring plan. Analysis of ground-water samples collected around the surface

impoundment indicated the presence of significant levels of several creosote constituents, apparently emanating from the unit. As a result of these data, TWC requested submittal of a Part B post-closure care application and ground-water compliance plan, which SPTCo submitted on May 13, 1991. TWC and SPTCo are currently revising the Part A and B permit applications, and the compliance plan.

PRC identified 17 potential SWMUs and 4 potential AOCs during the PR. Based on the VSI, the number of potential SWMUs was decreased to 12, and the list of AOCs was revised to seven. The SWMU and AOC list was revised by (1) combining similar SWMUs, (2) deleting nonexistent SWMUs, and (3) adding new SWMUs. Of the 12 SWMUs and 7 AOCs, only three are active, and 17 are recommended for a RCRA facility investigation (RFI). The SWMUs and AOCs cover almost all of the site area.

Previous facility inspections, notices of violation, and the VSI have provided evidence of possible contaminant releases to the air, soils, and surface waters from many SWMUs. In addition, ground-water monitoring data indicate the presence of contamination to that media. Although the facility has been owned and operated by SPTCo since 1957, the site has a history of wood-treating operations that date back to 1911.

PRC recommends a facility-wide RFI to determine the nature and extent of soil, surface water, and ground-water contamination.

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Work Assignment No. R2685, Project No. 01, from the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0041. Under this work assignment, PRC is contracted to provide technical support on a Resource Conservation and Recovery Act (RCRA) facility assessment (RFA) of the Southern Pacific Transportation Company (SPTCo) site in Houston, Texas.

This report describes the findings of a preliminary review (PR) and a visual site inspection (VSI). It includes (1) a description of the facility and its solid waste management units (SWMU), (2) an identification of the waste release potential through various contaminant migration pathways, and (3) a summary of conclusions and recommendations regarding further investigation, such as the need for a RCRA facility investigation (RFI).

1.1 PURPOSE OF THE RCRA FACILITY ASSESSMENT

The purpose of an RFA is to identify environmental releases or potential releases from SWMUs that may require corrective action. The RFA is the first step in implementing the corrective action provisions of the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA. Specifically, HSWA Sections 3004(u), 3004(v), and 3008(h) grant EPA the authority to initiate corrective action for releases of hazardous wastes and constituents from SWMUs at RCRA-regulated facilities. An RFA generally consists of (1) a PR, (2) a VSI, and, if necessary, (3) a sampling visit (SV). An SV is conducted only when available information is insufficient to support a recommendation of an RFI. The RFA at SPTCo did not include sampling.

According to EPA's RFA guidance document (U.S. EPA, 1986), the four purposes of an RFA are as follows:

- Identify and gather information on releases at RCRA-regulated facilities.
- Evaluate SWMUs and other areas of concern (AOC) for releases to all media, and regulated units for releases to media other than ground water.

- Make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.

- Screen from further investigation those SWMUs and AOCs that do not pose a threat to human health or the environment.

An RFA is conducted when RCRA permits are requested or modified, or when the facility ceases its management of RCRA-regulated solid wastes.

1.2 PROCEDURES

The RFA was conducted in accordance with procedures in EPA's RFA guidance document (U.S. EPA, 1986). PRC conducted the PR at the EPA Region 6 office in Dallas, Texas, during the week of July 2, 1993, and at the Texas Water Commission (TWC), now the Texas Natural Resource Conservation Commission (TNRCC), in Austin, Texas, during the week of July 9, 1993.

PRC reviewed all documents relevant to the SPTCo RFA. The main sources of information were (1) the RCRA Part B permit application, (2) TWC memoranda and solid waste inspection reports concerning the facility, and (3) various facility schematic diagrams. PRC used the information collected during the PR to prepare a list of potential SWMUs. PRC then submitted this list of potential SWMUs, in addition to a request for general facility information, through EPA Region 6 to the SPTCo representative, Ms. Michelle Belco, for review and input. SPTCo representatives provided the requested information to PRC following the VSI, on a date agreed upon by PRC (SPTCo, 1993b).

PRC conducted the VSI on August 23 and 24, 1993, at the SPTCo facility. Upon PRC's arrival at the facility, PRC and SPTCo representatives held a preliminary meeting to discuss the facility's history, organization, and operations, and to resolve questions concerning its hazardous waste management practices. PRC representatives explained the purpose of the visit and discussed the RFA process. Meeting participants included the following:

- Douglas Czechowski PRC
- Kevin Matherne PRC

- Michelle Belco — SPTCo
- William Bowles — Industrial Compliance (IC)
- John Norman — IC
- Laurie Cahill — Holme, Roberts & Owen (HRO)

To gain an understanding of SPTCo's waste management practices, PRC personnel visited the entire facility, including all SWMU locations identified during the PR. The VSI and follow-up telephone calls provided the information needed to make the recommendations presented in this report.

Photographs taken during the VSI are included in Appendix A.

1.3 REPORT

This report (1) summarizes the information obtained during the PR and VSI, and (2) evaluates the information in terms of the RFA objectives. The facility is described in Section 2.0; the environmental setting is discussed in Section 3.0; SWMU operations are identified in Section 4.0; AOCs are identified in Section 5.0; potential human and environmental targets are described in Section 6.0; and conclusions and recommendations are presented in Section 7.0.

2.0 FACILITY DESCRIPTION

This section describes the location of the facility and its operations, lists the identified SWMUs and AOCs, and describes the sources and types of wastes managed at the facility.

2.1 SITE LOCATION

SPTCo operated a wood-treatment and storage yard at this location from 1957 until 1984. The wood-treatment process area, which was located at the eastern end of the site, occupied about 3 of the 25 acres. The site is located about 1 mile north of Interstate Highway 10, off Lockwood Drive, in Houston, Harris County, Texas (Figure 1). The geographic coordinates are 29°47'08"

north latitude and 95°19'04" west longitude. The facility grounds are surfaced predominantly with road-base gravel, asphalt and concrete. Several sets of railroad tracks end within, and pass through, the yard. The wood-treatment operation closed in 1984. Currently, the only operation on-site is a scrap metals salvaging operation and railroad storage (laydown) yard. The site is fenced; it is accessed only by a gate near the office. According to facility representatives, SPTCo no longer provides private security to patrol the area after working hours. Attachment A includes a series of aerial photographs from 1955, 1965, 1969, 1976, 1980, 1985 and 1991. Pertinent facility information is as follows:

- Facility Location - 1 Mile North of Interstate Highway 10, off Lockwood Drive
Houston, Harris County, Texas
- Facility Address - 4910 Liberty Road
Houston, TX 77020
- Facility Contact - Ms. Michelle Belco
Southern Pacific Transportation Company
913 Franklin Ave.
Houston, TX 77002
- Telephone - (713) 223-7539
- EPA I.D. Number - TXD000820266
- TWC Registration Number - TX13595

Operations at the site began in about 1911. Wood-treatment operations were discontinued in the mid-1980's (SPTCo, 1993b). The Texas and New Orleans (TNO) railroad is believed to have operated a wood-treatment facility at this location as early as 1929. Ownership information before 1929 was unavailable. Wood-treatment operations were located in two different areas of the site. From about 1911 to a date between 1955 and 1962, the processing facility was located in and around the location of the former underground storage tank (UST) 44-023-05. Between 1955 and 1962, the processing facility was relocated to the eastern corner of the site. Facility site plats drawn in 1927 and the late 1950's are included as Attachments B and C. In addition to the process area, the site consists of (1) a series of wood-sizing buildings (including an incinerator), (2) a water treatment area, (3) a series of aboveground waste and product storage tanks, (4) an inactive surface

impoundment, (5) one wood-tie storage building, (6) miscellaneous sheds, and (7) an office building. Most of the site area was used to store both treated and untreated railroad ties; most of the area is now used as a storage yard for miscellaneous railroad items.

2.2 FACILITY OPERATIONS AND HAZARDOUS WASTE MANAGEMENT

SPTCo operated a wood-treating facility at this site from 1957 until 1984. Wood-treatment operations for the original process area (pre-1960's) could not be determined. Previous operations in the original process area (SWMU No. 5) probably used processes and waste streams similar to those used by recent operations in the recent process area (SWMU No. 4). Wood-treatment operations using the recent process area are described in the following paragraphs.

Raw untreated wood was transported to the site and stored in the northwest portion of the area. Following storage, the raw wood was cropped and sized in the timber sizing, resaw house, framing mill, and adzing plant. The adzing plant trimmed and squared the ends of each railroad tie. After sizing, the railroad ties were transported, via rail, to the on-site processing facility for treatment.

Untreated ties were placed into one of five retort cylinders and treated with naphtha and heat to extract the sap and moisture from the wood. These cylinders were supported by concrete foundations; however, the operating area was mainly gravel. After the sap water was removed from them, the cylinders were flooded with a combination of creosote and extender; they were then allowed to soak for about 24 hours. The creosote and extender were subsequently pumped back into the working tanks in the aboveground storage tank (AST) area (SWMU No. 8) for recycling. After the ties were removed from the cylinders on carts, they were left to dry and cool in an area just west of the retort cylinders. After the treated ties were dried and cooled, they were stored in the northwest corner and central sections of the site (SWMU No. 12)

ASTs (SWMU No. 8) were located next to the east side of the process facility. ASTs were naphtha storage tanks, creosote storage tanks, and working tanks that held either extender or a mixture of extender and creosote. Extender, which was used to dilute the creosote, usually consisted

of bunker C, styrene tar, or diesel fuel. A 12-foot-deep concrete holding pit was used to hold newly arrived product prior to storage in the ASTs.

As a result of the process area treatments, described previously, the process area (SWMU No. 4) generated a waste stream containing acetic acid, sap water (naphtha), creosote, and extender. Until about 1975, this wastewater was discharged from the retort cylinders into a wood-lined drainage ditch (SWMU No. 2) that ran along the southern boundary of the facility and next to the railroad tracks. According to facility representatives, some of the naphtha was pumped back into the naphtha tanks (SWMU No. 8) for recycling. After 1975, the sap water was routinely discharged (1) into the sanitary sewer under a wet industry permit, and (2) later into an on-site sap water treatment facility (SWMU No. 10) and disposed of off-site. Two 12,500-gallon railroad tank cars (SWMU No. 7) were used to store the treated water, in addition to creosote tank bottoms, while the water and tank bottoms awaited off-site disposal. The liquid was removed by vacuum trucks and disposed of at EMPAK in Houston, Texas. About 20,000 gallons per day of creosote-contaminated dilute acetic acid were generated as a by-product of the treatment process. Hazardous wastes managed at the facility consist of K001, U051, and U188 sludge from the waste treatment process.

In 1979 and 1980, a surface impoundment (SI)(SWMU No. 1) was built, on the southwest end of the site, for the disposal of creosote-contaminated soil and debris from the inactive wastewater lagoon (AOC No. 6). The clay-lined impoundment was also used to hold creosote-contaminated tank bottoms. An estimated 5,065 cubic yards of material were removed from the SI in 1984 (SPTCo, 1991). Closure was completed in April 1984. Ground-water monitoring has been conducted quarterly since 1985. Rollins Environmental Services performed the closure and monitoring.

Releases of chemicals in the treatment process were limited to (1) spills in the operating area from the treatment cylinders, and (2) an occasional accident. On about three occasions in the past 20 years, a chemical tank has fallen. In one of those instances, high-flash naphtha was spilled onto Liberty Road. A letter from SPTCo to the Texas Department of Water Resources (TDWR), dated November 28, 1979, stated that a spill had released creosote off-site.

The site is now used to redistribute railroad-related materials and assembly track. The facility generates three waste streams, all nonhazardous: (1) scrap metal, (2) used motor oil, and (3) plant production refuse. The scrap metal and used motor oil are recycled off-site (SPTCo, 1993b). Table 1 lists all disposal facilities used by SPTCo.

As a result of this RFA, 12 SWMU have been identified at the SPTCo site in Houston, Texas. The definition of a SWMU adopted in this RFA reflects current EPA policy, as stated in the RFA guidance document (U.S. EPA, 1986). Table 2 summarizes the regulatory and operating status of all SWMUs identified at the SPTCo facility. Only one RCRA-permitted unit - the inactive surface impoundment (SWMU No. 1) - has been identified at this facility. In addition to the 12 SWMUs, 7 AOCs were identified, based on the VSI and information subsequently received from SPTCo. Table 3 lists the AOCs. Photographs of the SWMUs and AOCs are in the Appendix. SWMU and AOC locations are in Figures 2 and 2a.

2.3 REGULATORY STATUS

This section summarizes the facility's past and present regulatory status under state and federal agencies.

2.3.1 Permits

During May 1980, TDWR requested that SPTCo submit a Part A permit application (PRC, 1993b). On August 15, 1980, SPTCo filed a Notification of Hazardous Waste Activity with EPA, because it anticipated that its railroad operations could involve materials, such as creosote and pentachlorophenol, that would cause the facility to be classified as a generator of hazardous waste. SPTCo did not describe the hazardous wastes, but stated that it would provide a description as facility operations developed (U.S. EPA, 1980a).

On November 18, 1980, SPTCo filed a hazardous waste permit application (Part A) with EPA (U.S. EPA, 1980b). Information on whether the facility also submitted a Part B permit application at that time is unavailable. Because the SI (SWMU No. 1) was reactivated in September 1982, TDWR requested that SPTCo submit revised Part A and Part B permit applications. On May 2, 1983,

TABLE 1 OFF-SITE TREATMENT, RECYCLING, RECLAMATION, AND DISPOSAL FACILITIES USED BY SPTCO
EMPAK, Inc. 2000 West Loop South Suite 1800 Houston, TX 77027 (used for sap water disposal) Dixie Oil Processors, Inc. P.O. Box 856 Friendswood, TX 77546 (used for sap water disposal) Gulf Coast Waste Disposal Authority 910 Bay Area Blvd. Houston, TX 77058 (used for sap water disposal) Malone Service Co. P.O. Box 208 Texas City, TX (contaminated liquid from inactive surface impoundment) Rollins Class I Landfill Deer Park, TX (contaminated soil and debris from inactive surface impoundment) Proler International 7501 Wallisville Road Houston, TX (scrap metal) Browning-Ferris Industries 11013 Old Beaumont Highway Houston, TX 77078 (plant refuse)

Note:

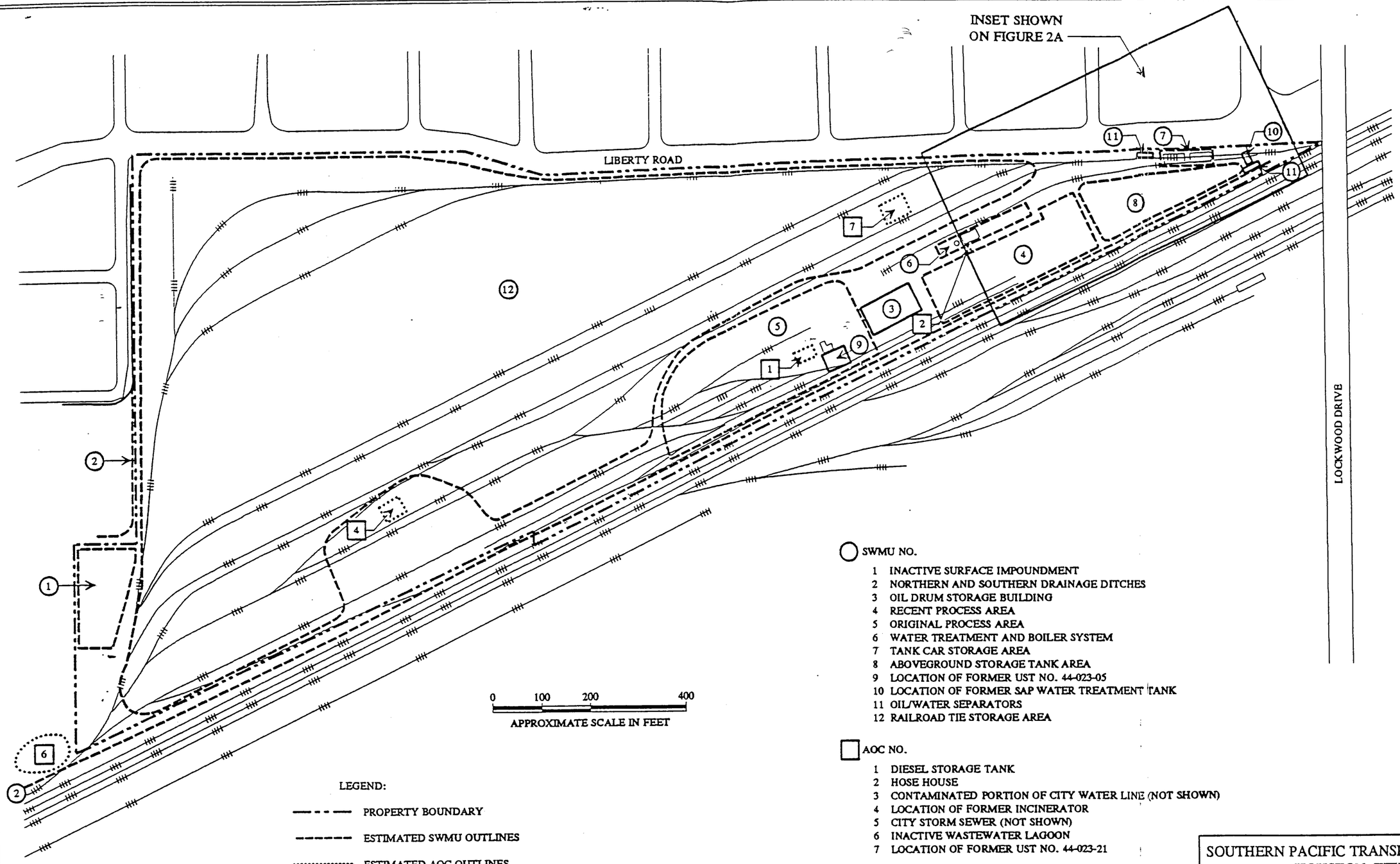
Source - SPTCo, 1993b

TABLE 2

SOLID WASTE MANAGEMENT UNITS (SWMU)

SWMU Number	Description	Regulatory Status	Operating Status
1	Inactive Surface Impoundment	Closure Application (Permit no. 50343)	Inactive
2	Northern and Southern Drainage Ditches	Not Permitted	Northern - Active Southern - Inactive
3	Oil Drum Storage Building	Not Permitted	Inactive
4	Recent Process Area	Not Permitted	Inactive
5	Original Process Area	Not Permitted	Inactive
6	Water Treatment and Boiler System	Not Permitted	Inactive
7	Tank Car Storage Area	Not Permitted	Inactive
8	Aboveground Storage Tank Area	Not Permitted	Inactive
9	Location of Former UST No. 44-023-05	Not Permitted	Inactive
10	Location of Former Sap Water Treatment Tank	Not Permitted	Inactive
11	Oil/Water Separators	Not Permitted	Inactive
12	Railroad Tie Storage Area	Not Permitted	Inactive

TABLE 3 AREAS OF CONCERN (AOC)	
AOC Number	**Description**
1	Diesel Storage Tank
2	Hose House
3	Contaminated Portion of City Water Line
4	Location of Former Incinerator
5	City Storm Sewer
6	Inactive Wastewater Lagoon
7	Location of Former UST No. 44-023-21



SWMU NO.

1 INACTIVE SURFACE IMPOUNDMENT
2 NORTHERN AND SOUTHERN DRAINAGE DITCHES
3 OIL DRUM STORAGE BUILDING
4 RECENT PROCESS AREA
5 ORIGINAL PROCESS AREA
6 WATER TREATMENT AND BOILER SYSTEM
7 TANK CAR STORAGE AREA
8 ABOVEGROUND STORAGE TANK AREA
9 LOCATION OF FORMER UST NO. 44-023-05
10 LOCATION OF FORMER SAP WATER TREATMENT TANK
11 OIL/WATER SEPARATORS
12 RAILROAD TIE STORAGE AREA

AOC NO.

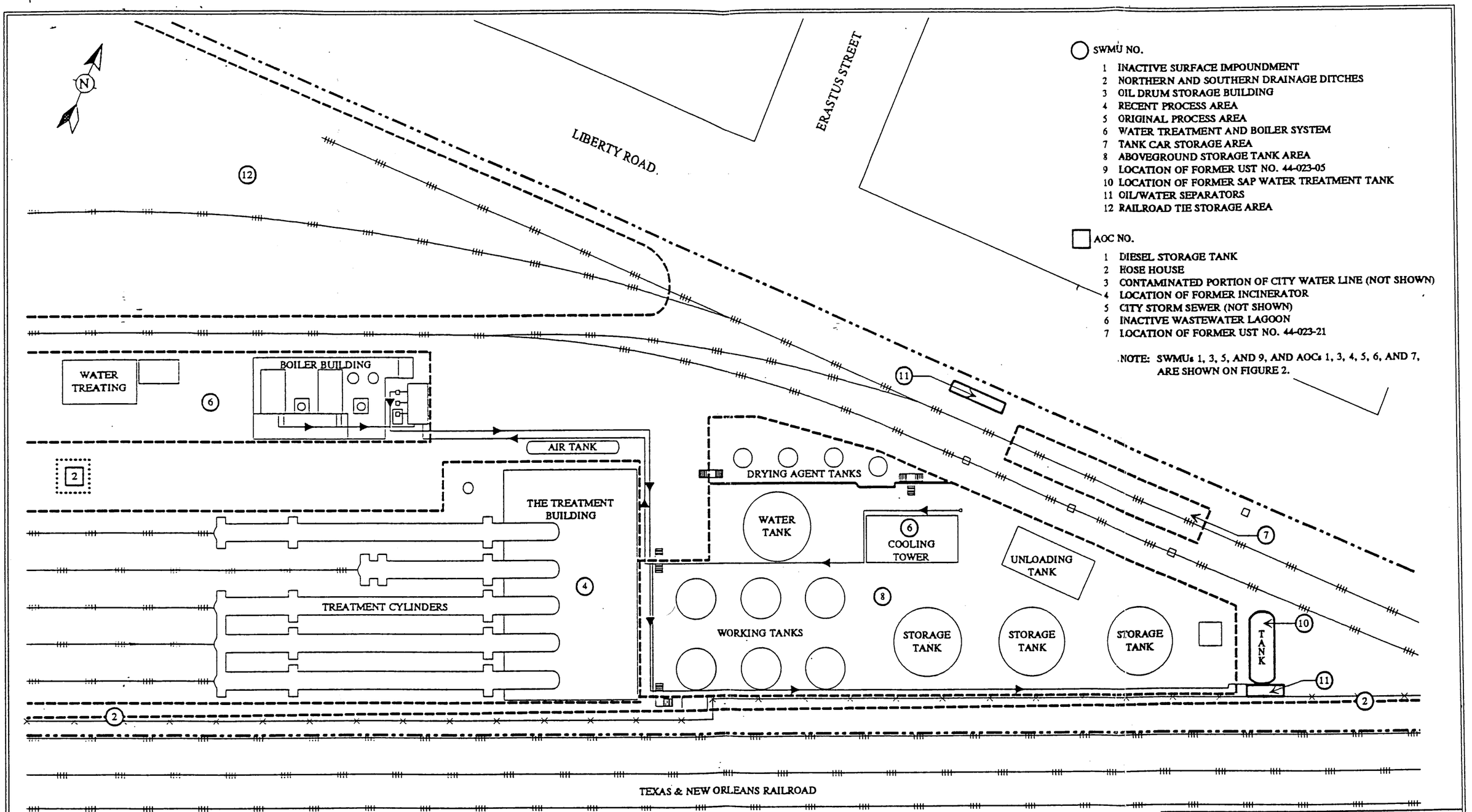
1 DIESEL STORAGE TANK
2 HOSE HOUSE
3 CONTAMINATED PORTION OF CITY WATER LINE (NOT SHOWN)
4 LOCATION OF FORMER INCINERATOR
5 CITY STORM SEWER (NOT SHOWN)
6 INACTIVE WASTEWATER LAGOON
7 LOCATION OF FORMER UST NO. 44-023-21

SOUTHERN PACIFIC TRANSPORTATION CO.
HOUSTON, TEXAS

FIGURE 2
SWMU AND AOC LOCATION MAP

PRC Environmental Management, Inc.

SOURCE: MODIFIED FROM SPTCo COMPLIANCE PLAN APPLICATION, MAY 13, 1991



SWMU NO.

1 INACTIVE SURFACE IMPOUNDMENT
2 NORTHERN AND SOUTHERN DRAINAGE DITCHES
3 OIL DRUM STORAGE BUILDING
4 RECENT PROCESS AREA
5 ORIGINAL PROCESS AREA
6 WATER TREATMENT AND BOILER SYSTEM
7 TANK CAR STORAGE AREA
8 ABOVEGROUND STORAGE TANK AREA
9 LOCATION OF FORMER UST NO. 44-023-05
10 LOCATION OF FORMER SAP WATER TREATMENT TANK
11 OIL/WATER SEPARATORS
12 RAILROAD TIE STORAGE AREA

AOC NO.

1 DIESEL STORAGE TANK
2 HOSE HOUSE
3 CONTAMINATED PORTION OF CITY WATER LINE (NOT SHOWN)
4 LOCATION OF FORMER INCINERATOR
5 CITY STORM SEWER (NOT SHOWN)
6 INACTIVE WASTEWATER LAGOON
7 LOCATION OF FORMER UST NO. 44-023-21

NOTE: SWMUs 1, 3, 5, AND 9, AND AOCs 1, 3, 4, 5, 6, AND 7, ARE SHOWN ON FIGURE 2.

LEGEND:

PROPERTY BOUNDARY
ESTIMATED SWMU OUTLINES
ESTIMATED AOC OUTLINES
RAILROAD

0 20 40 80
APPROXIMATE SCALE IN FEET

SOURCE: MODIFIED FROM SPTCo COMPLIANCE PLAN APPLICATION, MAY 13, 1991

SOUTHERN PACIFIC TRANSPORTATION CO.
HOUSTON, TEXAS

FIGURE 2A
DETAILED SWMU AND AOC LOCATION MAP

PRC Environmental Management, Inc.

SPTCo received notification, from TDWR, of a review of its Part A and B permit applications, in addition to instructions to close the SI (PRC, 1993b). In November 1983, SPTCo submitted a RCRA closure plan for the SI (SPTCo, 1993b). In 1984, SPTCo submitted to TDWR certification of off-site removal and closure of the SI (TWC, 1984). About 5,065 cubic yards of material were estimated to have been removed from the SI (SPTCo, 1991). Following closure of this unit, SPTCo implemented a ground-water monitoring system.

On May 5, 1984, SPTCo executed an affidavit of exclusion from hazardous waste permitting requirements for the purpose of notifying the TDWR executive director that SPTCo was not required to apply for a hazardous waste permit, because it qualified for the accumulation time storage exclusion of Texas Administrative Code (TAC) Section 335.69 (SPTCo, 1984). On August 31, 1984, after reviewing SPTCo's Part A permit and affidavit of exclusion, TDWR approved and withdrew the hazardous waste permit application (TDWR, 1984).

During October and December 1984, ground-water sampling data from the surface impoundment indicated (1) a significant increase in concentrations of several creosote constituents, and (2) that the source of contamination was between the upgradient well (no. 4) and the downgradient wells (no. 1, 2, and 3) (TWC, 1986). On July 11, 1990, based on the ground-water analytical data, TWC requested submittal of a Part B post-closure care application and ground-water compliance plan. SPTCo submitted its Part B application and compliance plan on May 13, 1991 (Permit No. 50343). TWC and SPTCo are currently revising the Part A and B permit applications and the compliance plan (SPTCo, 1993b).

In June 1990, SPTCo removed UST 44-023-05 from the site and encountered levels of total petroleum hydrocarbons (TPH) that exceeded TWC action levels. On February 7, 1992, SPTCo submitted a work plan to TWC. The plan proposed overexcavating the location from which the UST had been removed. In preparation for the overexcavation, SPTCo removed some tracks overlaying the location. During this removal, SPTCo encountered discolored soils that did not appear to be related to a release or potential release from this UST. Because of both UST-related and non-UST-related contamination, the area is undergoing a voluntary site assessment under Post-Closure Permit No. HW-50343-000 (SPTCo, 1993b). On June 4, 1993, SPTCo submitted the Phase One deliverable of its voluntary site assessment (SPTCo, 1993a).

SPTCo held a wet industry permit from the City of Houston for industrial discharges into the sanitary sewer (Permit No. 8287). The permit, which was in force at least as early as 1975, expired on August 21, 1979. In 1978, the facility received several Notices of Violation (NOV) concerning this permit. The violations involved excessive discharges. On January 17, 1979, SPTCo was informed by the City of Houston that this permit would not be renewed, because permitted levels of pH, phenol, temperature, and oil and grease had been exceeded. On February 2, 1979, the City of Houston issued SPTCo an interim Wet Industry permit (Permit No. 10409). In 1980, SPTCo disconnected its industrial operations from the sanitary sewer and began discharging only domestic waste. On July 22, 1981, SPTCo received a citation for failure to acquire an industrial waste permit. SPTCo notified the City of Houston that, since the facility had stopped discharging industrial waste to the sanitary sewer, no permit was required (SPTCo, 1993b).

According to the Air Programs branch of the Texas Natural Resource Conservation Commission (TNRCC), the SPTCo site was assigned an account number but was never issued a Texas Air Control Board (TACB) permit (PRC, 1993a).

2.3.2 Other Compliance Issues

In 1979, a supplier or SPTCo employee reported observing an overfill of a naphtha tank located in the northeast corner. The extent of the overfill, exact location, and remedial activities performed are unknown. A TWC site inspection report, compiled by PRC, informed SPTCo that there had been off-site releases of naphtha and creosote (SPTCo, 1993b).

On April 28, 1979, the Houston Fire Department responded to a fire at the southwest border of the facility. The cause of the fire is unknown. The Houston Fire Department and SPTCo determined that creosote-contaminated soil and debris surrounded the area of the fire. The contamination originated from (1) the surface runoff from the site, and (2) discharges from a wood-lined ditch along the southern border (SPTCo, 1993b).

Based on an agreement with the City of Houston, SPTCo implemented a response action to address the contaminated soil and debris. In 1979, after the facility investigated off-site disposal options, SPTCo built a clay-lined SI to contain the creosote-contaminated material (TWC, 1986). It

was located in the southwest corner of the site. SPTCo also installed a barrier in the wood-lined ditch to remove any potential discharge onto the off-site location (SPTCo, 1993b).

On July 3, 1979, TDWR and the Health Department received a complaint alleging that waste condensate effluent was running onto the property next to, and west of, the facility. SPTCo determined that the runoff consisted of distilled water and treating solution from the boilers, after having been run through the process heating coils. SPTCo remediated the runoff problem by installing a steam condensate system. In 1979, SPTCo built a SI to dispose of the runoff material (SWMU No. 1) and installed a barrier in the wood-lined ditch (AOC No. 6) to prevent discharges onto the adjacent property (SPTCo, 1993b).

In a letter dated November 28, 1979, SPTCo notified TDWR that (1) a spill had released creosote off-site, and (2) high-flash naphtha had been spilled onto Liberty Road (TWC, 1986).

In 1980, wastewater from SPTCo reportedly flooded yards and homes on Kirk Street. The flood was attributed to the installation of a French drain. However, the extent, nature, and specific details of the flooding are unknown (SPTCo, 1993b).

Also in 1980, SPTCo reported a release of creosote to its potable water system. SPTCo sampled the water system at nine locations throughout the facility. The results indicated that the release of contaminants was caused by a leak around a pump seal. PRC was unable to determine the location of the pump seal. SPTCo remediated the contamination by (1) flushing the pipelines, (2) repairing the leak around the pump seal, and (3) installing a new piping system for potable water. The potable water system was back in service by December 1980 (SPTCo, 1993b). According to facility representatives, the original contaminated water line was left in place.

On October 15, 1980, SPTCo observed a flow of hot water with an oily odor in a storm drain manhole near Lockwood Overpass. The discharge was determined to be blowdown water from the process boilers. SPTCo installed a water treatment facility for the boiler blowdown water to correct its practice of storm water discharge. Upon correcting the leak condition, SPTCo sampled the discharge from the Lockwood manhole. The results indicated that SPTCo was in compliance with the City of Houston's sanitation and sewer discharge requirements (SPTCo, 1993b).

From 1978 to 1981, the City of Houston Pollution Control Division (CHPCD), TACB, and Texas Air Pollution Control (TAPC) issued SPTCo about 20 NOVs for alleged odor emissions from its processing facility or various ASTs. Table 4 lists the cited violations chronologically (SPTCo, 1993b).

On February 2, 1982, the City of Houston issued to SPTCo an NOV for discharging from the cooling tower directly into the storm sewer system and floor drains (SPTCo, 1993b).

On July 13, 1982, TDWR conducted a site inspection at SPTCo. The results indicated that creosote-contaminated soil was present in the facility's waste storage tank and tank truck loading area. In its report, TDWR indicated a concern about potential storm water runoff (SPTCo, 1993b). Facility representatives were unable to provide any details concerning the location or waste management of the waste storage tank and truck loading area (PRC, 1993b; 1993c).

On December 18, 1984, Engineering Science conducted a RCRA 3012 preliminary assessment (PA). Based on its PA, Engineering Science recommended (1) sampling and analysis of surface soils and, possibly, impoundment monitoring wells for creosote constituents and chlorinated phenols, and (2) determining whether pentachlorophenol was used and how associated wastes are and were handled (TWC, 1984).

On June 3, 1986, TWC conducted a site inspection, which focused on the recent process area (SWMU No. 4) and the inactive SI (SWMU No. 1). An oily sheen was observed on the water in a pit located within the process area; the water was dark brown. Sediment and gravel in the more shallow areas appeared to be covered with a black viscous liquid. Visible contamination from the wood-treatment operation appeared to be limited to the pit area. In the area in which the ditch leaves the property, brownish standing water and dead vegetation were observed (TWC, 1986).

3.0 ENVIRONMENTAL SETTING

This section describes the environmental setting and water resources of the SPTCo facility in Houston, Harris County, Texas. The information provides a basis for evaluating the potential impact, on human health and the environment, of potential releases of hazardous constituents from the

TABLE 4

ALLEGED AIR EMISSION AND NUISANCE ODOR VIOLATIONS AT SPTCO

Sheet 1 of 2

Date	Regulatory Agency	Violation	Source	Cause
--/--/78	CHPCD	NOV	Sap removal process	Leak in emission collection and exhaust system
3/--/78	CHPCD	NOV	Sap pits no. 1 and 2	--
3/--/78	CHPCD	NOV	Retort cylinder door	Facility door gasket
3/10/78	CHPCD	NOV	Retort cylinder door	Creosote odor from facility door gasket
3/27/78	CHPCD	NOV	--	Shipment of oil from supplier
3/28/78	CHPCD	NOV	Sap pits no. 1 and 2	Uncovered pits
3/29/78	CHPCD	NOV	--	Shipment of oil from supplier
7/14/78	TACB	Apparent Violation of Regulation	Unauthorized change in process feed	--
7/25/78	CHPCD	NOV	Retort cylinder doors	Release of unspecified process chemicals from cylinder doors when opened to remove treated railroad ties
7/26/78	CHPCD	NOV	Retort cylinder doors	Release of sap and creosote odors upon opening of cylinder doors
8/8/78	CHPCD	NOV	Different phases of the operation	Release of creosote in ambient air

TABLE 4

ALLEGED AIR EMISSION AND NUISANCE ODOR VIOLATIONS AT SPTCO

Sheet 2 of 2

Date	Regulatory Agency	Violation	Source	Cause
8/9/78	CHPCD	NOV	Different phases of the operation	Release of creosote in ambient air
9/20/78	CHPCD	NOV	Sap pit	Damaged sap pit cover
11/21/78	CHPCD	NOV	Sap pit	Leak in emission collection and exhaust system
1/26/79	CHPCD	NOV	Retort cylinder no. 3	Installation of new gasket
6/29/79	CHPCD	NOV	Retort cylinder no. 5	Installation of new gasket
7/23/79	CHPCD	NOV	Retort cylinder no. 5	Installation of new gasket
1/23/80	CHPCD	NOV	Retort cylinder no. 2	Opening of pressure cylinders; railroad ties; and faulty cylinder gasket
3/6/81	TAPC	–	Tank no. 11	Tank boil-over
3/6/81	TAPC	NOV	Processing plant	Emission of creosote and naphtha-like odors

Note:

Source - SPTCo, 1993b

CHPCD = City of Houston Pollution Control Division
NOV = Notice of Violation
TACB = Texas Air Control Board
TAPC = Texas Air Pollution Control

SWMUs and AOCs identified at the facility. The following subsections describe the land use, climate, topography and surface water, soils, geology, and ground water at and around the facility.

3.1 LAND USE

SPTCo is located in a mixed residential, commercial, and industrial section of Houston. The 25-acre facility property in Houston, Harris County, Texas, is about 1 mile north of Interstate Highway 10. The estimated population (1) within a 1-mile radius of SPTCo is about 19,000, and (2) within a 3-mile radius is about 118,000 (SPTCo, 1993b).

The surrounding land use to the north and west, next to the facility property, is mainly residential and light commercial. Property to the southeast is mixed residential and industrial, with heavy industrial usage further southeast, associated with the Houston Ship Channel and Port of Houston (SPTCo, 1991). According to facility representatives, SPTCo also owns the property directly south and southeast of the Liberty Road SPTCo site (across the railroad right of way). This property is presently used as an internodal yard, but it has historically contained several ASTs. These oil storage tanks are visible (1) in the 1955 aerial photograph included in Attachment A, and (2) on the 1927 site plat (Attachment B).

Two National Priority Lists (NPL) sites are both located about 1-1/2 miles northwest of the SPTCo facility. The North Cavalcade Street and South Cavalcade Street NPL sites (EPA ID No. TXD980873343 and TXD980810386), of which were both used for wood-preserving operations, contain areas of contaminated soil and ground water (EPA, 1990).

3.2 CLIMATE

The climate of Harris County is predominantly marine. The terrain includes numerous small streams and bayous that, together with Houston's proximity to Galveston Bay, are conducive to fog. Heavy fog occurs on an average of 16 days per year, and light fog occurs on about 62 days per year. Prevailing winds are from the south and southwest, except in January, when frequent high-pressure areas bring invasions of polar air and prevailing northerly winds [U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS), 1976].

Temperatures are moderated by the influence of winds from the Gulf of Mexico, resulting in mild winters and relatively cool summer nights. The mean annual temperature is about 69°F. In downtown Houston a low temperature of 32°F is recorded on an average of only about 7 days per year. Most freezing temperatures occur late at night and last only a few hours, because they are usually accompanied by clear skies and morning sunshine, which rapidly brings the temperature above freezing. The growing season averages 271 days, during which 75 percent of the normal precipitation occurs (USDA SCS, 1976).

Because of the proximity of the Gulf of Mexico, Houston experiences abundant rainfall, with an average annual precipitation of 45.95 inches. December has the most precipitation, with an average of 4.36 inches. March receives the least precipitation, averaging about 2.67 inches. Total yearly rainfall has varied from 17.66 inches in 1917 to 72.86 inches in 1900. About 3 of every 4 years have a total precipitation of between 30 and 60 inches. Snow is rare. Destructive windstorms are infrequent, but both thundersqualls and tropical storms, including hurricanes, occasionally pass through the area, bringing torrential rains and strong winds (USDA SCS, 1976).

3.3 TOPOGRAPHY AND SURFACE WATER

The site and surrounding area are relatively flat. The SPTCo facility is about 45 feet above mean sea level (MSL). The site is located near several intermittent and permanent bayous, which flow to the east-southeast. The facility property drains to several city storm sewers, then north to Hunting Bayou, and eventually south into Buffalo Bayou. Buffalo Bayou is an urban waterway - with industrial and, possibly recreational uses - that drains into the Houston Ship Channel. The drinking water supply for the Houston area is obtained mainly from surface water in the northern part of Harris County. The bodies of surface water downgradient of the SPTCo facility are not used to supply drinking water. According to Federal Emergency Management Agency (FEMA) Map 48201C0240G, the facility is not located within a 100-year flood plain (SPTCo, 1993b).

3.4 SOILS

The soils underlying the facility are composed entirely of Urban land, which is located mainly in the Houston metropolitan area. These soils have been built up extensively, and 75 to 100 percent

of the mapped areas are either covered with structure, or disturbed by cutting, filling, or grading. The soils are so obscured or altered that classification of the soils is impractical (USDA SCS, 1976).

3.5 GEOLOGY

Harris County, Texas, is in the western Gulf section of the Texas Coastal Plain. The uppermost formations, from which the soils of the county are derived, are of Pliocene, Pleistocene, and Holocene age. The underlying Tertiary sediments of the Gulf Coastal Plain, which are tens of thousands of feet thick at the coastline, represent mainly marine and shallow marine environments of deposition. These formations originally consisted of fluvial, deltaic, coastal marsh, lagoonal materials, and shallow marine deposits. Some of the more prominent geologic features in the county are sedimentary deposits broken by normal faults, salt domes and mounds, undrained depressions, and scarps [U.S. Geological Survey (USGS), 1976].

The Beaumont Formation is the youngest Pleistocene-age deposit that outcrops in Harris County. It underlies recent Holocene soils. The sediments of the Beaumont Formation were derived from several different fluvial sources. In the Houston, Crosby, and Baytown areas, the source of sediment was the Pleistocene ancestor of the Brazos River. The Beaumont Formation has a relict (beach ridge) depositional pattern with slightly elevated distributaries or meander ridges commonly associated with deltaic depositional environments. The low areas that separate the ridges are the old surfaces of backswamps or flood basins. A pattern of meandering streams is faintly discernible on the surface ridges in Harris County (USDA SCS, 1976).

Underlying the Beaumont Formation, in descending order, are the Lissie Formation and the Willis Sand of the Pleistocene series, the Goliad Sand of the Pliocene series, and the Lagarto Clay of the Miocene Series. All of these formations are composed of lenticular beds of sands, gravel, silt, and clay. Their combined thickness is about 4,300 feet. The massive clay section of the Anahuac Formation, which underlies the Largarto Clay, is about 700 feet thick near the site. The bed is wedge-shaped and pinches out north of the SPTCo facility. The Frio Group that underlies the Anahuac Formation consists of massive sands interbedded with thick to thin beds of clay. It is about 1,500 feet thick in the site vicinity.

3.6 GROUND WATER

3.6.1 Regional Ground Water

The Gulf Coast Aquifer, which includes sediments of the Catahoula, Jasper, Evangeline, and Chicot units, underlies about 35,000 square miles of the Coastal Plain and extends 90 to 120 miles inland from the coastline. The Jasper, Evangeline, and Chicot Aquifers all occur above the Catahoula confining system. This basal confining unit occurs at depths of greater than 7,600 feet in Harris County. The Evangeline and Chicot Aquifers are hydraulically connected and form the water table aquifer in Harris County. The freshwater lens within these aquifers extends to depths of 3,000 feet [Bureau of Economic Geology (BEG), 1977]. Large quantities of water are pumped from these aquifers, mainly from depths of from 500 to 1,000 feet (lower Chicot and upper Evangeline), for municipal supply, industrial use, and irrigation (USGS, 1976).

The Chicot Aquifer, in southeast Texas, is distinguished from the Evangeline Aquifer by a higher sand-clay ratio in the sediments. Differences in hydraulic conductivity or water levels in some areas are also used to differentiate these aquifers. From west to east across Harris County, the Chicot Aquifer thickens from 400 to 800 feet. Recharge to this aquifer is from the updip section, which outcrops at the surface in parts of northern Harris County. Ground-water movement within the aquifer is southeasterly, toward the coast (TDWR, 1979).

The combined structural framework of the Chicot and Evangeline Aquifers controls the regional hydrology between Harris and Galveston Counties. A major fault zone between these counties acts as a partial hydrological barrier that separates two partly independent flow systems. An abrupt change in elevation of the base of the freshwater lens coincides with the fault. Below 1,000 feet, meteoric ground water is not flowing across the fault boundary into Galveston County but is discharging into shallower aquifers in southern Harris County (BEG, 1977).

The Evangeline Aquifer has a lower sand-clay ratio than the overlying Chicot. Individual sand beds are characteristically tens of feet thick. Near the outcrop area, north and west of Harris County, the Evangeline Aquifer ranges from 400 to 1,000 feet thick. In Harris County, it ranges

from 600 to 1,400 feet thick. Recharge to this aquifer is from the overlying Chicot Aquifer and from infiltration of precipitation in the outcrop areas (TDWR, 1979).

The Evangeline Aquifer is separated from the underlying Jasper Aquifer by the Burkeville confining system, which retards the interchange of ground water between the two aquifers. The Burkeville system consists of stratigraphic units of silt and clay interbedded with individual sand layers. The configuration of this system is highly irregular and transgresses formational boundaries. The Burkeville confining system is about 300 feet thick in Harris County (TDWR, 1979).

3.6.2 Site Hydrogeology

Previous subsurface investigations have indicated shallow ground water at about 16 feet below ground surface (bgs). The water-bearing unit is a fine-grained sand that ranges from about 2 to 8 feet thick in the vicinity of the facility. The next encountered shallow water-bearing unit consists of a dense sand, about 9 feet thick, encountered at about 30 feet bgs. This unit is underlain by a thick red clay (SPTCo, 1993b).

4.0 SOLID WASTE MANAGEMENT UNITS

This section discusses the solid waste management units (SWMU) at SPTCo and evaluates actual or potential contaminant releases from those units. PRC identified 12 SWMUs during the PR and the VSI. Photographs of the SWMUs are provided in the Appendix. Unless otherwise referenced, data presented in this section were obtained during the VSI.

4.1 SWMU NO. 1 - INACTIVE SURFACE IMPOUNDMENT (PHOTOS 1 AND 2)

Description

The inactive surface impoundment (SI) is a grass-covered section of land located at the southwest corner of the facility property. The SI is bordered on the southern side by an earthen berm, which is about 2 by 3 by about 80 to 100 feet long. The berm extends about 100 feet south of the southwest corner of the SI. A chain-link security fence is located along the northern and western

margins of the SI. The original SI dimensions were about 180 by 106 feet at the surface, extending to a depth of about 7 feet bgs (SPTCo, 1991). Based on these dimensions, the SI would have a capacity of 133,560 cubic feet (about 4,950 cubic yards). Since the SI was filled and revegetated during closure operations, the original dimensions could not be verified during the VSI. According to SPTCo facility representatives, a clay liner was installed during the construction of the SI. No information was available concerning the thickness and engineering properties of the liner. According to SPTCo representatives, the SI was built in 1979 for the disposal of contaminated surface soils remediated from an adjacent low-lying ponding area (AOC No. 6). Surface soils of the ponding area were remediated in response to a fire in 1979 and the discovery of contaminated soils. Installation of the SI was based on an agreement with TDWR for disposal of the soils.

Status

After disposal of the ponding area soils, TDWR and the facility classified the SI as inactive. In 1982, an unknown quantity of creosote-contaminated sawdust was disposed of in the SI, and the SI was reactivated under RCRA. In 1984, SPTCo closed the SI by excavating the soils and materials contained within, and initiated ground-water monitoring. In 1984, SPTCo submitted its Part A permit application. In 1991, SPTCo submitted its Part B permit application for the post-closure care of the SI, which is still under review by EPA and TWC.

Waste Type

The SI was used for the disposal of (1) the creosote-contaminated soils from the ponding area in 1979, and (2) contaminated sawdust from the retort area. File information also indicates that creosote-contaminated tank bottoms were disposed of in the SI (TWC, 1986). These wastes have been classified as K001 wastes.

Waste Management

According to facility representatives, the SI was installed mainly for the one-time disposal of ponding area soils. Surface water runoff accumulated in the SI was pumped out by Malone Service Co. on an as-needed basis and disposed of off-site. In 1984, the facility excavated the waste material

from the SI and disposed of the materials off-site. About 5,065 cubic yards of material were removed from the SI (SPTCo, 1991).

Environmental Releases

In 1984, the facility began investigating and monitoring the shallow ground water in the vicinity of the SI. According to facility representatives, TDWR required monitoring of ground-water quality for a period of 1 year. TDWR was to review the monitoring program at the end of the monitoring period but, according to SPTCo, neither TDWR nor any other agency has required an additional response or action. Quarterly ground-water monitoring has continued to the present. Subsurface investigations performed at the facility indicate two shallow ground-water zones beneath the SI. These zones are located at about 35 feet (upper zone) and 15 feet (lower zone) above MSL. Between 1984 and 1991, nine ground-water monitoring wells were installed in the upper zone, and three piezometers were installed in the lower permeable zone. Hydrogeological data collected from these wells and piezometers indicate hydraulic conductivity between the zones. Analytical data compiled from 1984 until 1991 indicate that benzene, toluene, naphthalene, 2,4-dimethylphenol, and phenol are the most frequently detected parameters. These data also indicate that naphthalene is the parameter with the highest concentrations observed. Attachment D contains a summary of all ground-water analytical data from August 1984 through June 1993. No analytical data have been collected for ground water in the lower permeable zone.

Remedial Action Taken

Contaminated soils were excavated and removed for off-site disposal during 1984 closure operations. No remedial actions have been taken in regard to the contaminated ground water.

Suggested Action

PRC recommends an RFI of this unit.

Reasons

Although the soils of the SI were excavated to contaminant levels below background levels, ground-water monitoring has detected contamination in the upper permeable zone. In addition, no information obtained indicates that (1) the horizontal extent of the affected ground water has been determined, or (2) contaminants are absent from the lower permeable layer.

4.2 SWMU NO. 2 - NORTHERN AND SOUTHERN DRAINAGE DITCHES (PHOTO 3)

Description

The northern drainage ditch (NDD) is located at the northwest corner of the SI and runs northward toward Ranch and Kashmere Streets. During the VSI, visibility of the NDD was limited by the growth of native vegetation. The southern drainage ditch (SDD) was a wood-lined trench which was formerly located along the south side of the process area. The SDD paralleled railroad tracks from the eastern to western side of the facility and began near the AST area (SWMU No. 8). Near the southwest corner of the facility, the ditch was routed below railroad tracks via PVC piping. The piping led to a natural drainage ditch and low-lying area near the southwest corner of the SI, known as the inactive wastewater lagoon (AOC No. 6). The natural drainage ditch flows off site to the west into Buffalo Bayou. For the purpose of worker safety, the facility has filled in the wood-lined portion of the ditch along the southern facility boundary. The PVC piping has been plugged below the tracks at the southwestern end of the facility.

Status

The facility representatives present during the VSI did not know the date on which the wood-lined SDD was plugged and filled in. The ditch was reportedly present in 1986 (TWC, 1986). The NDD is active.

Waste Type

The NDD receives potentially creosote-contaminated surface water runoff from the site via a storm sewer (TWC, 1986). According to facility representatives, the wood-lined SDD was used for the disposal of wastewater generated by the process that removed sap and moisture from untreated ties. The process was performed under steam pressure in the retorts, and the wastewater contained residual naphtha and creosote.

Waste Management

The NDD receives surface runoff from the facility and may flow into Hunters Bayou. The facility had no information about the specific use of the NDD as a waste management unit. Naphtha- and creosote-contaminated wastewater was pumped from the retorts into the wood-lined SDD for disposal via the sanitary sewer. The SDD also received surface water runoff from the facility. Wastewater not received in the sewer from the ditch was allowed to evaporate or flow west into a natural drainage area at the southwest corner of the facility. In the late 1970's, the City of Houston revoked SPTCo's wet industry permit because of elevated levels of phenols. Sap wastewater was then pumped into a sap water collection AST for disposal off site, and use of the SDD ceased.

Environmental Releases

In 1986, TWC representatives observed dark standing water and stressed vegetation in the NDD. Sap wastewater contaminated with naphtha and creosote had been discharged directly into the SDD. According to facility representatives, TDWR had installed a weir downstream of the site, during the 1970's, to prevent contaminated runoff from the SDD from entering Buffalo Bayou. The weir prevented drainage of the natural ditch, which increased the level of ponding in the low inactive wastewater lagoon.

Remedial Action Taken

No remedial actions have been taken at the NDD or the unlined ditch at the southwest corner of the facility. The wood-lined portion of the SDD has been filled in to prevent accidents from unloading activities at the railroad tracks.

Suggested Action

PRC recommends an RFI of the drainage ditches.

Reasons

Potentially contaminated surface water has been released to the NDD. Creosote-contaminated wastewater from the retort area has been released into the SDD. Remedial actions at the ponding area indicated creosote-contaminated soils.

4.3 SWMU NO. 3 - OIL DRUM STORAGE (ODS) BUILDING

Description

SPTCo representatives were uncertain of the exact location of the oil drum storage (ODS) building. It may have been at the location of the former power house building or at the current repair and sign shop. The ODS building was used to store unused oil and lubricant products for the process machinery (SPTCo, 1993b). No maintenance work was conducted in the ODS building.

No evidence of the former power house was observed during the VSI, and the area has been regraded with gravel. The repair and sign shop consists of a metal and wood building, about 125 by 50 feet, with concrete flooring. It now houses spare parts, field equipment, and reflective signs used by the SPTCo railroad. No subgrade structures were observed inside or surrounding the building.

Status

SPTCo is uncertain of the year in which the former power house was built. It was dismantled between 1955 and 1962 (SPTCo, 1993b). The repair and sign shop building was built between 1955 and 1965.

Waste Type

The ODS building was used for oil and lubricant product. No hazardous materials or wastes were observed in the repair and sign shop during the VSI.

Waste Management

No hazardous or solid wastes were managed in the ODS building.

Environmental Releases

No releases have been reported for the ODS building.

Remedial Action

In 1990 or 1991, SPTCo removed, from the location of the former power house, 427 drums containing product. The power house has been identified as a possible location of the ODS building. A small number of the drums also contained waste oil. Minor soil staining was observed in the area of the drums (SPTCo, 1993b). No other remedial actions have been reported for the ODS building.

Suggested Action

PRC recommends no further action at the ODS building.

Reasons

No hazardous or solid wastes are associated with the former ODS building, and the ODS building was used only to store product. Also, no wastes are currently being disposed of or managed in the current repair and sign shop.

4.4 SWMU NO. 4 - RECENT PROCESS AREA (PHOTO 4)

Description

The recent process area was used by the facility from the early 1960's until the early to mid-1980's. The area occupied about 3 acres in the southeast section of the facility. It consisted of (1) a process building that measured 150 by 50 feet, (2) four retort cylinders that measured about 125 by 12 feet, (3) one retort cylinder that measured about 60 by 12 feet, located next to the process building that is on the west side, and (4) a drip area next to the western side of the retorts. According to facility representatives, the retort cylinders were housed in a slightly depressed area that was covered with gravel. The retort cylinders were braced and kept above ground by concrete brackets. Crossties were brought in and out of the process area via railroad tracks. No structures currently exist in the process area. The area, which has been regraded with limestone or caliche gravel, is used as a laydown yard for steel and PVC piping, and treated crossties. During the VSI, portions of a concrete foundation were observed in the vicinity of the former process building. The west side of the foundation appeared to have contained a subsurface sump or work area. The remains of a concrete retaining wall, about 3 feet tall by 1 foot wide, were observed around the southern and eastern ends of the process area.

Status

Aerial photographs of the facility property indicate that the recent process area was built between 1955 and 1964 (Attachment A). Facility representatives indicated that the area was used for wood treatment until the early to mid-1980's. Some process area structures were observed on site until 1986 (TWC, 1986). The recent process area is now inactive, and no structures are on site.

Waste Type

Wastes associated with the process area include sap wastewater containing residual naphtha, creosote, and extenders. According to facility representatives, pentachlorophenol and other polynuclear aromatic hydrocarbons (PNAs) may have been used at the treatment facility. Extenders used by the facility included bunker C oil, styrene tar, and diesel fuel. The facility also stated that used vehicle maintenance oil may have been used as an extender. In 1979, the facility received vinyl chloride (VC)-contaminated extender from its contractor, Dominquez and Sapp Enterprises, Inc. The extender sold by Dominquez and Sapp was obtained from the old Texas City Wye site, which was under remediation when the extender was purchased. TACB detected VC emissions from the facility; the facility canceled its contract with Dominquez and Sapp when the VC was discovered.

Waste Management

Until about 1975, sap wastewater was discharged from the retort area into the SDD (SWMU No. 2). From 1975 until 1979, the facility discharged the sap wastewater into the City of Houston sanitary sewer under a wet industry permit. Because of elevated levels of phenols, pH, temperature, and oil and grease, the City revoked SPTCo's permit in 1979. Because of the costs of reducing phenols in the wastewater, SPTCo did not reapply for its discharge permit. Instead, it began storing wastewater in the sap water treatment tank (SWMU No. 10) prior to transfer to the tank cars (SWMU No. 7) for off-site disposal.

Environmental Releases

From 1978 until 1980, SPTCo received several NOVs concerning nuisance odors from the wood-treatment area. According to SPTCo, the NOVs resulted from opening of the retort cylinders after treatment. In addition, SPTCo directly released sap wastewater - which contained residual naphtha, creosote, and extenders - into a drainage ditch along the southern side of the process area. SPTCo then discharged the wastewater into the City of Houston's sanitary sewer until its wet industry permit was revoked in 1979 because of elevated levels of phenols, pH, temperature, and oil and grease. In 1986, TWC conducted an investigation and sampled the surface water and soils at the retort area. During the inspection, an oily sheen and dark brown discoloration were observed on

rainwater collected in the depressed area of the retort cylinders. In addition, a black viscous material was observed on the surface soils of the pit. TWC sampling results are unknown.

Remedial Actions

No remedial actions have been associated with the recent process area.

Suggested Actions

PRC recommends an RFI of the recent process area.

Reasons

The recent process area operated for over 20 years, contained evidence of releases to soil and surface water, and appeared to lack secondary containment. Although the results of the TWC sampling are unknown, the locations of these samples cover only a portion of this SWMU.

4.5 SWMU NO. 5 - ORIGINAL PROCESS AREA (PHOTO 5)

Description

The original process area was located in the south-central portion of the facility, west of the recent process area. According to a facility map provided by SPTCo (Attachment B), the original process area consisted of (1) one retort cylinder, about 150 by 12 feet, located in a covered shed at the north side of the area, and (2) three retort cylinders, each about 125 by 12 feet, located in a covered shed at the south side of the area. Located between the two retort sheds were, from east to west, (1) the former power house building, (2) a 5-by-41-foot cylinder, three underground brick tanks (42, 43, and 46 feet in diameter), and two 20-foot diameter steel ASTs used for product storage and mixing operations. A 15-foot-diameter AST and a 10-by-20-foot sump were located north of the large retort shed. A 9-by-150-foot concrete catch basin was located on the east side of the large retort shed. No evidence of the previous structures was observed by PRC during the VSI.

Status

According to SPTCo representatives, the original process area was in operation from about 1911 until 1955 or 1962. A review of 1955 and 1965 aerial photographs indicates that the original process area was dismantled between these years (Attachment A). The original process area is now a gravel-covered area containing a train track, several buildings, the diesel storage tank (AOC No. 1), and the former location of UST No. 44-023-05 (SWMU No. 9).

Waste Types

SPTCo was unable to provide information concerning the original process area. SPTCo personnel believe that wastes generated at the original process area were similar to those generated at the recent process area, probably including sap wastewater, creosote, and tank bottoms generated by the storage tanks.

Waste Management

SPTCo was unable to provide information concerning waste management at the original process area.

Environmental Releases

No information concerning environmental releases was available for the original process area. In 1990, during closure procedures for the UST, surface soil contamination was encountered in the vicinity of UST No. 44-023-05. SPTCo representatives assumed that the contamination did not originate from UST releases, but from previous activity in the original process area, where the UST was located. The diesel storage tank (AOC No. 1), is also located within the SWMU, showed evidence of stained gravel and soil during the VSI.

Remedial Action

No information concerning remedial activities for the original process area was available from the facility. SPTCo is requesting a voluntary site assessment in conjunction with the closure of UST No. 44-023-05.

Suggested Action

PRC recommends an RFI of the original process area.

Reasons

Contaminated soils encountered during the closure of UST No. 44-023-05, which was located in the original process area, indicate possible releases from the original process area or UST 44-023-05. Stained gravel and soil below the diesel storage tank indicated a possible release. In addition, no information is available concerning the treatment process or waste management activities at the original process area.

4.6 SWMU NO. 6 - WATER TREATMENT AND BOILER SYSTEM (PHOTOS 6 THROUGH 8)

Description

SPTCo used the water treatment and boiler system to (1) treat and distill municipal water, and (2) generate steam used in heating the wood-treatment retort cylinders. Steam and heated water from the retort cylinders were cooled in a cooling tower prior to discharge. SPTCo representatives did not have specific information concerning the design or processes of the system, and the system is now inactive. According to SPTCo representatives, some of the buildings and equipment associated with the system have been removed, and the area has been regarded with gravel. During the VSI, PRC observed the treatment building, the former location of a water storage AST, and the former location of the boiler equipment. No other structures pertaining to the system were observed during the VSI. The treatment building is located north of the retort area. It consisted of a metal building, about 40

by 20 feet, with concrete flooring. The building was open along the south side, and wooden pallet debris was observed covering the floor. According to SPTCo representatives, the building may have been used to house pump equipment.

Next and east of the treatment building was a concrete tank enclosed in a metal building. The tank was rectangular, measuring about 30 by 15 feet. The tank was above ground. It had cinder block walls, about 3 feet tall by 1 foot wide. The tank opening was covered with wooden planking; rolls of chain-link fencing were stored on top. The view inside the tank was obscured, but standing water and wood debris were observed inside the tank. PRC could not determine whether the tank extended below grade. A 2- to 4-inch-diameter pipe was observed extending from the south wall of the tank. A hard, white, granular accumulation of an unknown substance was observed around the open end of the pipe. SPTCo representatives did not know the nature or cause of the accumulation and did not have any information concerning the function of the tank in the water treatment system.

A circular concrete foundation, about 25 feet in diameter, was observed next to, and west of, the treatment building. SPTCo representatives assumed that this was the location of a former water storage AST used in the treatment system. A rectangular concrete foundation, partially covered with gravel, was observed about 20 feet east of the treatment building. According to SPTCo representatives, this was the former location of the boiler equipment and building. The cooling tower was formerly located in the AST area east of the wood-treatment facility. SPTCo representatives had no specific information concerning the construction or operation of the cooling tower. The cooling tower has been removed, and the area has been regraded with gravel.

Status

The water treatment and boiler system is inactive and partially dismantled. Aerial photographs indicate that the system was built between 1955 and 1965 (Attachment A). According to SPTCo representatives, the system became inactive in the mid-1980's, when wood-treatment operations were ceased at the facility.

Waste Types

Wastes associated with the system included boiler and cooling tower blowdown from the accumulation of scale and sediment deposits in the system. No information was available concerning potential additives to the water treatment and boiler system.

Waste Management

SPTCo indicated that boiler and cooling tower blow down were originally discharged into the storm sewer. Boiler blowdown had also likely been discharged directly onto the ground surface. Because of problems associated with releases from the retort cylinders into the treatment system, SPTCo later installed a treatment system for the blowdown and began discharging into the sanitary sewer (SPTCo, 1993b). Specific dates were unavailable.

Environmental Releases

On July 3, 1979, a formal complaint was received by the Texas Department of Water Resources (TDWR) and the Texas Department of Health concerning waste runoff from the facility to the adjacent property on the west side. SPTCo assumed that the runoff was associated with distilled water condensate from the boilers, which came into contact with wood-treatment fluids via a faulty steam coil in the retort cylinders (SPTCo, 1993b).

On October 15, 1980, a discharge with an oily odor was observed in a storm drain near the Lockwood Overpass. According to SPTCo, the odor was caused by leaking steam coils in the retorts, which released treatment fluids into the blowdown discharge (SPTCo, 1993b).

On July 22, 1981, SPTCo was cited for a violation for failing to acquire a wet industry permit for the discharge of blowdown into the storm sewer.

On February 2, 1982, SPTCo received an NOV from the City of Houston for discharging cooling tower blowdown directly into the storm sewer (SPTCo, 1993b).

Remedial Action Taken

As a result of the formal complaint received in 1979, SPTCo installed a steam condensate collection and treatment system to remediate the runoff problem. SPTCo also replaced the leaking coils to prevent further releases into the boiler system. SPTCo did not have specific information concerning the design or operation of the condensate system. As a result of the observed release into the Lockwood Overpass manhole, leaking retort coils were repaired, and a treatment system for the boiler blowdown may have been installed for the correction of pH and temperature prior to blowdown discharge (SPTCo, 1993b).

Suggested Action

PRC recommends an RFI of the water treatment and boiler system, including the former cooling tower.

Reasons

Potentially contaminated blowdown discharge may have been released directly to the ground surface or into facility storm sewers. In addition, specific information concerning the design, operation, and potential chemical agents used in the system, was unavailable from the facility.

4.7 SWMU NO. 7 - TANK CAR STORAGE AREA

Description

The tank car storage area was located in the northeast corner of the facility in the vicinity of the AST (SWMU No. 8). Two tank cars, each having a capacity of 12,500 gallons, were located on the tracks near Liberty Road. The cars have been removed from the facility, and no evidence of the cars was observed during the VSI.

Status

The tank car storage area is inactive. According to SPTCo representatives, the facility began using the tank cars between 1955 and 1965. The tank cars were used until wood processing activities ceased in the 1984. In 1984, the tank cars were cleaned and removed from the facility (SPTCo, 1993b).

Waste Types

The tank cars were used to store sap wastewater and tank bottoms prior to off-site disposal.

Waste Management

SAP wastewater and tank bottoms were transferred to the two rail cars. According to SPTCo representatives, wastes stored in the tank cars were disposed of off-site on an approximately weekly basis. The tank cars were vacuumed out by Gulf Coast Waste Authority of Houston, Texas.

Environmental Releases

SPTCo representatives stated that they were unaware of any major spills from the tank cars. A RCRA 3012 preliminary assessment conducted by Engineering Science, Inc., in 1984, indicated that spillage from the routine transfer of waste to the rail cars and from the rail cars was apparent in the vicinity of the two tank cars (U.S. EPA, 1985). No evidence of releases was observed during the VSI.

Remedial Action Taken

Both tank cars were cleaned and removed from the site in 1984. No other actions have been taken in the vicinity of the tank cars.

Suggested Action

PRC recommends an RFI of the tank car storage area.

Reasons

Routine spills were associated with these units. In addition, there was no spill or surface runoff containment.

4.8 SWMU NO. 8 - ABOVEGROUND STORAGE TANK (AST) AREA (PHOTOS 9 AND 10)

Description

The AST area was formerly located east of the recent process area (SWMU No. 4), in the northeast corner of the facility. The area housed 14 ASTs and a below-grade product drop tank used to store creosote and extenders. In addition, a series of aboveground pipes and manifolds was used to transfer product and wastes between tanks and the process area retort cylinders. A 1981 site diagram of the wood-preserving works indicated that six of the tanks were classified as working tanks, containing creosote and extenders pumped to and from the retort cylinders. The tanks, which were about 20 feet in diameter, were located next to the wood-treatment building.

Three tanks classified as storage tanks were located along the south side of the recent process area. These tanks, which were about 30 feet in diameter, were used to store creosote pumped into the working tanks.

An AST, about 30 feet in diameter, and four naphtha storage tanks, about 10 feet in diameter, were located north of the working tanks. The naphtha tanks were used in the process of removing sap and moisture from untreated ties.

The product drop tank was a concrete tank, about 35 by 20 feet, located at the northeast corner of the AST area. SPTCo representatives stated that the tank was constructed of concrete and

was about 12 feet deep. SPTCo representatives stated that the product drop tank was used for the off-loading of creosote and extenders from the railway prior to storage in the ASTs. The cooling tower was also located in the AST area.

Secondary containment consisted of a concrete retaining wall, about 4 feet high by 1 foot wide. The facility installed the wall to prevent surface water runoff into the storm sewers. During the VSI, three circular concrete foundations were observed in the vicinity of the three creosote storage tanks. Remnants of the concrete retaining wall were also observed at the southeast and southwest corners of the AST area. The ASTs have been removed from the area, and the area has been regraded with gravel. Piping and commercially treated wood ties were observed being stored in the area. No evidence of releases was observed during the VSI.

Status

SPTCo is now using the AST area as a railroad laydown and switch yard for commercially treated wood ties, piping, and miscellaneous equipment. Aerial photography indicates that the tanks were installed between 1955 and 1965 (Attachment A) for use with the recent process area. The tanks were dismantled and removed when wood-preserving activities ceased in 1984.

Waste Types

Wastes associated with the AST area include creosote and naphtha tank bottoms classified as K001 wastes. About 394 tons per year of sludge were generated by the AST area (U.S. EPA, 1985). Contaminated soils removed following spills may also be associated with the AST area.

Waste Management

SPTCo representatives stated that tank bottoms were periodically removed from the ASTs and placed into the storage tank cars for off-site disposal. The ASTs were used to store creosote, naphtha, and extender. SPTCo representatives had no information concerning disposal practices either before or during the use of the tank cars.

Environmental Releases

SPTCo representatives were aware of a 1979 naphtha spill that resulted from the overfill of a naphtha AST. However, SPTCo had no knowledge concerning the extent or exact location of the spill, or cleanup procedures (SPTCo, 1993b). In 1981, an explosion of a working tank at the AST area resulted from unauthorized welding operations in the area. The extent of the release or cleanup operations is unknown. According to SPTCo representatives, the tank was rebuilt and put back into service.

Remedial Action Taken

Secondary containment walls were constructed around the AST to prevent surface runoff. SPTCo representatives were unaware of any specific remedial activities conducted in the AST area. Details of the extent and cleanup of the 1979 naphtha spill and the 1981 working tank explosion were unavailable.

Suggested Action

PRC recommends an RFI of the former AST area.

Reasons

Undetected or unreported releases may have occurred from the subsurface product drop tank or from the transfer of materials from the drop tank to the ASTs through the aboveground piping and manifold system. The AST area lacked a continuous concrete foundation to prevent releases to the adjacent soils. In addition, SPTCo has no information about the extent of the cleanup of a 1979 naphtha spill and a 1981 tank explosion.

4.9 SWMU NO. 9 - LOCATION OF FORMER UNDERGROUND STORAGE TANK NO. 44-023-05 (PHOTO 5)

Description

UST 44-023-05 was a 2000-gallon capacity steel tank located at the south side of the facility, in the vicinity of the original process area (SWMU No. 5). The tank was 5.5 feet in diameter and 12 feet long. The UST has been removed, and the area has been regraded with gravel. The tank was reported to be empty and contain no holes when it was removed (SPTCo, 1993b). No evidence of the UST was observed during the VSI.

Status

UST 44-023-05 was installed in 1966 and removed on June 5, 1990 (SPTCo, 1993b). The UST was removed by D & H Pump Services of El Paso, Texas.

Waste Types

According to SPTCo representatives, UST 44-023-05 was used to store gasoline used in facility equipment. No hazardous wastes were associated with the UST.

Waste Management

The tank was used to store gasoline. Information concerning runoff controls or secondary containment was unavailable.

Environmental Releases

Visible contamination was reported in the tank pit during the removal of the UST. Samples collected from the tank pit indicated TPH concentrations above the TWC action level of 100 ppm (SPTCo, 1993b). No evidence of damage or leaks from the tank was observed, and SPTCo assumed that elevated TPH levels were caused by spills and overfill associated with the tank. During

overexcavation activities in the tank area, discolored soils were discovered. SPTCo determined that the contamination was not UST-related and ceased overexcavation activities. The basis of this determination was not available.

Remedial Action Taken

On June 5, 1990, SPTCo removed UST 44-023-05 and overexcavated about 100 cubic yards of soil in the area of the tank. Because possible non-UST-related soil contamination was discovered, SPTCo ceased closure activities at the UST. On December 2, 1992, SPTCo requested TWC approval of a four-phase voluntary site assessment to determine the extent and nature of the contaminated soils. SPTCo has finished compiling data (Phase I) and has begun developing an assessment plan for the investigation (Phase II).

Suggested Action

PRC recommends an RFI of the location of the former UST 44-023-05.

Reasons

The UST is located within the original process area, and visible contamination has been observed in the vicinity of the tank pit. In addition, analytical data associated with the soils of the tank pit indicate releases from the UST. Some of the contamination encountered in the area may have been released from the original process area.

4.10 SWMU NO. 10 - LOCATION OF FORMER SAP WATER TREATMENT TANK (PHOTO 11)

Description

The sap water treatment tank was formerly located next to the AST area (SWMU No. 8), in the northeast corner of the facility property. SPTCo representatives had no information regarding the construction or capacity of the tank. A 1981 site diagram of the wood-treatment facility indicates that

the tank was about 25 by 10 feet. During the VSI, several concrete corner pads were observed in the vicinity of the tank location. The pads were identified as the tank foundation. No other evidence of the sap water treatment tank was observed during the VSI.

Status

SPTCo representatives estimate that the tank was installed in 1979, and removed in 1984, when the recent process area (SWMU No. 4) became inactive.

Waste Types

The tank was used to store wastewater generated during the removal of sap and moisture from untreated lumber. Wastewater contained naphtha, which was used as the drying agent, in addition to creosote residue and extender from the retort cylinders, in which the process was performed.

Waste Management

Sap wastewater was pumped from the retort cylinders into the tank before transport to the tank cars (SWMU No. 7). Wastewater was retained in the tank until a sufficient quantity was generated for transport to the tank cars and disposal by Gulf Coast Waste Disposal Authority. Tank bottoms were also periodically removed from the tank and disposed of by the tank cars.

Environmental Releases

The facility is unaware of any releases associated with the sap water treatment tank.

Remedial Action Taken

The facility is unaware of any remedial actions associated with the sap water treatment tank, other than removal of the tank in 1984 and regrading of the area with gravel.

Suggested Action

PRC recommends an RFI of the location of the former sap water treatment tank.

Reasons

Wastewater may have been spilled or released from the tank. In addition, no secondary containment or spill prevention devices were documented for the tank.

4.11 SWMU NO. 11 - OIL/WATER SEPARATORS (PHOTOS 12 AND 13)

Description

During the VSI, two oil/water separators were observed in the northeast portion of the facility site. The southern separator was located next to the location of the former sap wastewater treatment tank (SWMU No. 10). The northern separator was located north of the AST area (SWMU No. 8) in the vicinity of the northern fence boundary. Both separators were subsurface structures, measuring about 6 by 4 by 3 to 4 feet deep. Both were constructed of concrete, with a three-compartment design.

During the VSI, standing water was observed in the separator adjacent to the former sap wastewater tank location. The water was clear, and a heavy algal growth was observed inside the separator. A slight algal sheen was observed on the surface of the water. The northern separator was filled with soil and gravel, and no water was observed inside the separator.

Status

Both separators are inactive. The southern separator was installed in 1979 as part of the sap water treatment system (SWMU No. 10), which was removed in 1984. According to SPTCo representatives, the northern separator was built after the sap water separator. It was never active.

Waste Type

The southern separator accepted sap water discharge from the retort cylinders, which contained naphtha, creosote residue, and extender. According to the facility, the northern separator was never used by the facility.

Waste Management

Sap wastewater was pumped into the southern separator before discharge into the tank or the sanitary sewer. The oil was skimmed from the separator and pumped back into the working tanks (SPTCo, 1993b). According to SPTCo representatives, the northern separator was never active and accepted no wastes.

Environmental Releases

In 1979, the City of Houston revoked SPTCo's wet industry permit for discharge into the sanitary sewer for exceeding pH, phenols, temperature, and oil and grease (SPTCo, 1993b). The southern oil/water separator was used for the discharge of sap wastewater directly into the sanitary sewer or into the adjacent sap water treatment tank (SWMU No. 10).

Remedial Actions Taken

The facility is unaware of any remedial actions taken for either separator.

Suggested Action

PRC recommends an RFI of both oil/water separators.

Reasons

Contaminated sap wastewater may have been released to soils and ground water in the vicinity of the separator. Although the facility claims that the northern separator was never used, the separator could have accumulated contaminated runoff from the facility.

4.12 SWMU NO. 12 - RAILROAD TIE STORAGE AREA (PHOTOS 14 AND 15)

Description

Throughout the history of the site, most of the property not used for specific process areas was used to store treated railroad ties (Attachment A). Many areas of the facility are now used as off-load storage yards for commercially treated ties, prefabricated rail lines, and other material. Much of the previous storage area has been regraded with gravel.

Status

Commercially treated ties are still stored on portions of the site. The facility began storing treated ties in 1911, when the facility began wood-processing operations. Large scale storage of treated ties ceased when wood processing operations were stopped in 1984.

Waste Types

Wastes associated with the treated tie storage area include creosote and extenders, which may have been released after the formal cooling and drying process of the ties in the retort area.

Waste Management

SPTCo representatives are unaware of specific waste management practices in the treated tie storage areas.

Environmental Releases

The facility is unaware of any releases from the railroad tie storage area.

Remedial Action Taken

The facility has regraded the most of the property with clean gravel.

Suggested Action

PRC recommends an RFI of the railroad tie storage area.

Reasons

Since 1911, the facility has stored treated ties on most of the facility . The facility has no information indicating whether other areas of the site were used as drip areas before movement of the ties to this area. There appears to have been no runoff controls or secondary containment. Releases may have occurred from recently treated ties because of insufficient drying time and exposure to the elements.

5.0 AREAS OF CONCERN

This section discusses the AOCs identified after the PR and the VSI. An AOC is not necessarily a SWMU; however, such an area is potentially contaminated or provides a contaminant release pathway.

5.1 AOC NO. 1 - DIESEL STORAGE TANK (DST) (PHOTOS 16 AND 17)

The diesel storage tank (DST) is an AST located in the south-central portion of the facility, in the vicinity of the original process area (SWMU No. 5). The DST is used by the facility to store diesel fuel for equipment use. It is of steel construction and is supported above ground by steel bracing. SPTCo representatives did not know the age or capacity of the DST. The DST is

surrounded by a concrete retaining wall, about 3 feet high and 1 foot thick. The bottom of the retaining area is covered with gravel. Discoloration and dried algal mats were observed on the gravel cover during the VSI. According to SPTCo representatives, native soils are located below the gravel cover.

PRC recommends an RFI of the DST, because (1) there was no secondary containment below the gravel, (2) signs of staining and gravel discoloration were observed, and (3) it is located in the original process area.

5.2 AOC NO. 2 - HOSE HOUSE (PHOTOS 18 AND 19)

The hose house is a metal building, measuring about 15 by 12 feet, with concrete flooring located southwest of the water treatment building. A 6-by 2-foot concrete slab was observed in the middle of the floor. An unidentified metal structure was observed on top of the concrete slab, and fresh oil staining was observed around the metal structure. The remains of a shower stall were observed at the eastern end of the building. An open sewer pipe, about 6 inches in diameter, was observed next to the building on the east side. A concrete ramp was located next to the sewer pipe, apparently to direct drainage from exposed piping observed extending from the eastern wall of the building. During the VSI PRC observed minor stains around the vicinity of the sewer drain. SPTCo identified the building as the hose house and stated that the concrete slab was the location of a booster for fire water. No hazardous wastes were treated or stored at the hose house (SPTCo, 1993b).

PRC recommends no additional investigation of the hose house. PRC believes that no routine waste management was associated with the building. The staining noted during the VSI probably resulted from the disposal of a small amount of used oil.

5.3 AOC NO. 3 - CONTAMINATED PORTION OF CITY WATER LINE

In 1980, SPTCo discovered contamination in its drinking water system. Analytical results from samples collected from the drinking water system indicated elevated levels of phenols. SPTCo stated that "it was determined that the presence of contaminants was caused by a leak around a pump seal" (SPTCo, 1993b). SPTCo repaired the leak and flushed the system. According to SPTCo

representatives, a new pipeline may have been installed next to the contaminated portion, which was probably left in place. SPTCo representatives did not know location of the leak or the new line.

PRC recommends an RFI of the contaminated portion of the city water line. The release of contamination into the leaking line indicates subsurface contamination at the facility. The pipeline may be acting as a conduit for the continued migration of contaminants.

5.4 AOC NO. 4 - LOCATION OF FORMER INCINERATOR (PHOTO 20)

An incinerator was formerly located on the facility about 75 feet west of the adzing plant. According to SPTCo representatives, the incinerator was used to dispose of untreated lumber remnants generated by the framing mill and adzing plant. The facility had no information concerning the construction or operation of the incinerator. Aerial photography indicates that the incinerator was (1) installed between 1955 and 1965, and (2) removed in 1976 or before (Attachment A). The area of the incinerator is currently regraded with gravel and houses several concrete slabs.

PRC recommends an RFI of the location of the former incinerator, because information is lacking regarding (1) material incinerated, (2) operation of the unit, and (3) analyses and ultimate disposition of the waste ash generated by the incinerator.

5.5 AOC NO. 5 - CITY STORM SEWER

The city storm sewer used to receive surface water runoff from the facility, including boiler and cooling tower blowdown and sap wastewater. A concrete retaining wall was built around the AST area (SWMU No. 8) to prevent potentially contaminated runoff from entering the sewer. Runoff features observed during the VSI included several subsurface concrete boxes with steel grate tops located throughout the facility. Discharges to the storm sewer were reported in 1980 and 1982 resulting in the issuance of NOVs to the facility (SPTCo, 1993b). Details of the locations of the sewer lines were unavailable.

PRC recommends an RFI of the city storm sewer because of (1) reported releases into the runoff pathways, (2) the age of the facility, and (3) the potential for a release of contaminated runoff from areas throughout the facility.

5.6 AOC NO. 6 - INACTIVE WASTEWATER LAGOON (PHOTO 21)

The inactive wastewater lagoon is a low-lying area off site, next to the inactive SI (SWMU No. 1). This area was periodically flooded and received discharges of sap wastewater and surface water runoff via the SDD (SWMU No. 2). In 1979, a fire in the area may have resulted from soil contamination within the area. The uppermost layer of soils in the lagoon area were scraped off and disposed of in the SI. The SDD was plugged to prevent further discharge into the area. The inactive wastewater lagoon was considered to be inactive following these actions. The area is located outside of the facility boundary. During the VSI, stressed vegetation was observed in the lagoon area.

PRC recommends an RFI of the lagoon area because of (1) known releases of sap wastewater into the area, (2) insufficient information about the extent of soil removal in the area, and (3) the potential impact, on soils and ground water, of the percolation of contaminants.

5.7 AOC NO. 7 - LOCATION OF FORMER UNDERGROUND STORAGE TANK NO. 44-023-21

UST 44-023-21 was formerly located next to the access road northeast of the existing diesel storage tank (DST) (AOC No. 1). The capacity of the tank was 200 gallons. It was used to store gasoline used by the facility. Details concerning the construction activities and installation date are unknown. According to SPTCo, TWC certified clean closure in 1990. Information on waste management practices was unavailable. However, analytical results of samples taken during the UST closure indicate that a release may have occurred from this UST. Total benzene, toluene, ethylbenzene, and xylene (BTEX) levels below the TWC action limit of 30 ppm were detected in soil samples (SPTCo, 1993b). PRC has not received the closure report requested from SPTCo.

PRC recommends an RFI of the location of the former UST unless adequate closure documentation can be obtained. In addition, the closure report should be reviewed to determine its adequacy in verifying the extent of contamination.

6.0 HUMAN AND ENVIRONMENTAL TARGETS

This section discusses the potential human and environmental targets of a release of hazardous material into the environment from SWMUs and AOCs at SPTCo. Potential pathways include air, soil, subsurface gas, surface water, and ground water.

SPTCo is located in the Houston metropolitan area. About 19,000 people live within a 1-mile radius, and about 118,000 people live within a 3-mile radius (SPTCo, 1993b). Land use north and west of the facility is mainly residential and light commercial. Property to the south and east is mixed residential and industrial. The facility is surrounded by a chain-link fence. During the VSI, PRC observed that the section of fence along the southwestern edge of the facility appeared to have been installed recently. Access is controlled mainly through the front gate, but PRC observed gaps in the fence that were large enough for persons to enter. According to facility representatives, the site is not monitored after working hours.

6.1 AIR

Although the facility no longer operates a wood-treatment facility at this site, historical operations have resulted in releases to the air and subsequent violations. The facility was neither regulated by any air permits nor registered with TACB (PRC, 1993a). During 1978, 1979, and 1981, the facility received a series of NOVs citing odor complaints from nearby residents. The facility determined that the odors originated from the retort cylinders in the recent process area (SWMU No. 4) and the ASTs (SWMU No. 8). Specific odor complaints included creosote, oil, extender, and the emission of VC into the atmosphere, resulting from the use of contaminated extender. Also, in March 1981, TACB cited the facility for the nuisance created by the boil-over of an AST (SPTCo, 1993b).

Areas with a potential to release contaminants to the air include (1) the recent process area and ASTs, (2) the SDD, used for wastewater management through the late 1970's (SWMU No. 2), (3) the oil/water separators (SWMU No. 11), (4) the inactive SI (SWMU No. 1), (5) the incinerator used in the wood-sizing operations (AOC No. 4), and (6) storage areas for freshly-treated railroad ties, which occupied most of the site (SWMU No. 12). The incinerator was reported to have burned untreated lumber, but waste management documentation was unavailable.

Since wood-preserving operations ceased in 1984, the current overall potential of a release to the air is low. SPTCo currently employs 20 employees at the site. Historical employee numbers were unavailable.

6.2 SOIL

Soil samples collected during a June 1986 TWC site inspection detected creosote constituents in the recent process area (SWMU No. 4) and the SDD (SWMU No. 2). Creosote-contaminated soil within the inactive SI (SWMU No. 1) was removed in 1984. Surface spillage was observed around the tank cars (SWMU No. 7) during a RCRA 3012 preliminary assessment in December 1984. Soil sampling results from the bottom of a UST excavation pit (SWMU No. 9) indicated that TPH levels exceeded TWC action levels (SPTCo, 1993b). Overexcavation of this pit encountered additional contamination believed to be related to wood-treatment operations within the original process area (SWMU No. 5). During the VSI, discolored soil and gravel were observed within this area and below the aboveground DST (AOC No. 1).

Releases of boiler blowdown water from SWMU No. 6 onto the surrounding soil reportedly occurred during 1979 and 1981 (SPTCo, 1993b). Sources of potential releases to soils include (1) daily operations, leaks, and the documented tank boil-over and tank explosion within the AST area (SWMU No. 8), and (2) drippage from freshly-treated railroad ties (SWMU No. 12). Spilled or leaked materials have historically included creosote, naphtha, diesel, styrene tar, bunker C, phenols, VC, and waste oil.

Most aboveground sources of contamination have been removed from the site since the mid-1980's. However, a moderate potential exists for continued releases from subsurface sources.

6.3 SUBSURFACE GAS

There is no evidence of waste buried on site that would cause a subsurface gas release. However, several below-grade brick or concrete-lined tanks and pipelines associated with these tanks are known to have been used in process operations and could still be in place. In addition, city storm sewers are located below the site. According to the facility, there are no landfills at the site (SPTCo, 1993b).

6.4 SURFACE WATER

The site topography is flat, with a slight gradient toward the northwest (SPTCo, 1993b). The regional land surface slopes gradually to the east. Surface water drainage features around the site include (1) a drainage ditch next to the western site boundary, and (2) the regraded SDD, which follows the northeast-southwest-trending railroad tracks. The nearest surface water bodies include Hunting Bayou, about 1 mile north, and Buffalo Bayou, about 2 miles south.

Surface water and soil samples collected during a TWC site inspection detected significant concentrations of contaminants in the soils and surface water of the drainage path. These data indicated that creosote waste was being carried off site by storm water (TWC, 1986). The destination of this storm water is Buffalo Bayou, which is an urban waterway. The samples were collected in the recent process area (SWMU No. 4) and the SDD (SWMU No. 2). Both of these areas have been dismantled and/or regraded since the TWC site inspection was conducted. This inspection also described brownish standing water and dead vegetation in the NDD (SWMU No. 2), located along the north side of the inactive SI (SWMU No. 1). Contaminated surface water that accumulated in the surface impoundment was removed periodically by Malone Service Company (SPTCo, 1993b).

Other SWMUs or AOCs that may have released contamination via surface runoff include (1) the water treatment and boiler system (SWMU No. 6) (2) the inactive wastewater lagoon (AOC No. 6), and (3) the city storm sewer (AOC No. 5). City storm sewers within the site receive potentially contaminated surface runoff, which is conveyed to adjacent drainage ditches (SWMU No. 2). Creosote-and oil-contaminated boiler blowdown water was reported to have been discharged to the storm drain in October 1980 (SPTCo, 1993b). On February 2, 1982, the facility

was cited for discharging from the cooling tower directly into the storm sewer system. In addition, wastewater was reported to have flooded into neighboring yards and homes on Kirk Street in 1980. The flooding was attributed to the installation of a French drain, but the extent of the flooding and the exact location are unknown (SPTCo, 1993b).

The inactive wastewater lagoon is an off-site low-lying area that formerly received creosote-contaminated wastewater from the SDD. This lagoon was filled in with sediments over time, and the area caught fire in 1979. Creosote-contaminated soils from this lagoon were placed in the adjacent SI.

The potential for a release of hazardous constituents to surface water is moderate. Since the site is no longer used for wood treatment, the potential source of contaminated surface runoff would be the existing SWMUs and AOCs.

6.5 GROUND WATER

Following the closure of the SI in 1984, SPTCo installed a series of four ground-water monitoring wells. Wells 1, 2, and 3 are located downgradient of the SI, and well four is upgradient and at the edge of the impoundment. Four additional monitoring wells were installed in 1990. Wells 1, 2, 4, 5, 7, and 8 were proposed to be included in the ground-water detection program (SPTCo, 1991).

Ground-water samples are collected quarterly and analyzed for the presence of volatile and semivolatile constituents. Analytical results for the second quarter of 1993 confirmed the presence of nine chemicals on the closure list with concentrations in ground water exceeding analytical method detection limits. The chemicals are (1) acenaphthene, (2) anthracene, (3) dibenzofuran, (4) ethylbenzene, (5) fluoranthene, (6) 2-methylnaphthalene, (7) naphthalene, (8) phenanthrene, and (9) pyrene (SPTCo, 1993b).

The present monitoring wells are all screened in a shallow sand zone identified as the + 35-foot Sand, which refers to its approximate elevation above MSL. Depths to the top of the screened intervals in these wells range from 8.5 to 14.8 feet bgs. The screened interval ranges from

5 to 15 feet thick. Three piezometers screen a deeper sand zone, referred to as the + 15-foot Sand, at a depth of from 36 to 38 feet bgs. According to facility representatives, the + 35-foot and + 15-foot Sand zones appear to be in hydraulic communication with each other (PRC, 1993c). No other wells are known to be located on the SPTCo site. The facility has proposed installing five ground-water recovery wells and three additional ground-water monitoring wells within the + 35-foot Sand, and three ground-water monitoring wells within the + 15-foot Sand (SPTCo, 1993b).

Thirty-nine wells are known to be located within a 3-mile radius of the site (SPTCo, 1993b). Ten of these wells appear to be active, based on 1992 pumpage data. The nearest active drinking water wells (wells 1085 and 1086) are operated by the City of Houston and located almost 2 miles northwest of the site (SPTCo, 1993b). Well screen depths in these wells begin at about 999 and 735 feet bgs, respectively. Other nearby active wells include two industrial wells located about 1-3/4 miles southwest (National Vinegar Co. wells 1951 and 4117), and one industrial well located about 2 miles southeast (Rice Laundry, Inc., well 1990). Well screen depths from these three wells begin at 486, 300, and 810 feet bgs, respectively. The other five wells are located from 2 to 3 miles from the SPTCo site. Four of these wells are industrial wells, and one - located about 2-3/4 miles northwest - is a City of Houston public supply well.

Although there are active public drinking water wells within the general area of the SPTCo site, the drinking water for the Houston area is supplied mainly by surface water.

Existing contaminated ground water at the site is believed to have resulted from the placement of creosote-contaminated soil and material into the SI (SWMU No. 1). Since the depth to ground water below the site has been demonstrated to be as shallow as 10 feet, additional ground-water contamination could result from many of the SWMUs and AOCs. Therefore, the potential for ground-water contamination is considered high. However, since the distance and depth to actively used drinking water supply wells are about 2 miles and over 700 feet, respectively, the potential threat to these drinking water supplies is considered low.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Twelve SWMUs and 7 AOCs were identified at the Southern Pacific Transportation Company in Houston, Texas. These SWMUs and AOCs are summarized in Table 5.

Based on the PR and the VSI, PRC identified the following active SWMUs and AOCs:

- SWMU No. 2 - Northern Drainage Ditch
- AOC No. 1 - Diesel Storage Tank
- AOC No. 5 - City Storm Sewer

The other 11 SWMUs and 5 AOCs were inactive, because wood-treatment operations ceased in 1984.

PRC recommended further investigation of the following 11 SWMUs and 6 AOCs:

- SWMU No. 1 - Inactive Surface Impoundment
- SWMU No. 2 - Northern and Southern Drainage Ditches
- SWMU No. 4 - Recent Process Area
- SWMU No. 5 - Original Process Area
- SWMU No. 6 - Water Treatment and Boiler System
- SWMU No. 7 - Tank Car Storage Area
- SWMU No. 8 - Aboveground Storage Tank Area
- SWMU No. 9 - Location of Former UST No. 44-023-05
- SWMU No. 10 - Location of Former Sap Water Treatment Tank
- SWMU No. 11 - Oil/water separators
- SWMU No. 12 - Railroad Tie Storage Area

TABLE 5

SWMU AND AOC SUMMARY

Sheet 1 of 7

	SWMU No. 1	SWMU No. 2	SWMU No. 3
Unit Name	Inactive Surface Impoundment (SI)	Northern and Southern Drainage Ditches	Oil Drum Storage (ODS) Building
Description	• Presently a grass-covered field • Measures 180 by 106 by 7 feet deep • Clay-lined	The northern drainage ditch (NDD) is unlined and runs along the western site boundary, north of the SI. The southern drainage ditch (SDD) was wood-lined and ran the entire length of the southern site boundary.	Exact location could not be determined but is believed to be location of (1) former power house, or (2) current repair and sign shop. Power house no longer exists. Repair and sign shop is a metal and wood building, about 125 by 50 feet, with a concrete floor.
Operating Status	Inactive; the unit was built in 1979 and underwent closure in 1984. Post-closure care permit is currently under review by TWC and EPA.	The NDD is active; the SDD was filled in and regraded in the late 1980's, and is no longer used.	Inactive; the former power house was dismantled between 1955 and 1962. The repair and sign shop was built between 1955 and 1965 and is still in use.
Regulatory Status	RCRA-permitted	Not RCRA-permitted	Not RCRA-permiited
Waste Type	Creosote-contaminated soil, sawdust, and tank bottoms	Creosote-contaminated wastewater and residual naphtha	Lubricating oil
Waste Management	The unit received wastes from the wastewater lagoon (AOC No. 6) and the recent process area (SWMU No. 4). Contaminated material was removed and disposed of off-site by Rollins. Contaminated surface water within the unit was removed by Malone.	The NDD receives surface runoff (including storm sewer runoff) from the facility. The SDD received (1) creosote-contaminated wastewater from the process area (SWMU No. 4), and (2) surface runoff. The NDD may flow into Hunters Bayou. The SDD flowed into the lagoon area (AOC No. 6) and, ultimately, into Buffalo Bayou.	No hazardous wastes were reported to have been managed in the ODS building.
Release History	The SI released benzene, toluene, naphthalene, and phenols to the groundwater.	The ditches released creosote contaminants to the soils, and the inactive wastewater lagoon.	No known release
Release Pathway	Ground water	Soil and surface water	N/A
Remedial Action Taken	About 5,065 cubic yards of contaminated soils and material were removed from the SI in 1984. Groundwater monitoring wells were installed, which detected contamination in the shallowest aquifer.	The NDD has received no remedial action. The SDD was filled in and regraded; it is no longer used.	SPTCo removed 427 drums from the ODS in 1990 or 1991. The drums were reported to have contained product and waste oil.
Release Potential	High	High	Low
Potential Pathway	Soil, surface water, and groundwater	Soil, surface water, and groundwater	N/A
Reason	Documented release to shallow ground water	Releases to soil	No evidence or documentation of releases
Need for RFI	Yes	Yes	No

TABLE 5

SWMU AND AOC SUMMARY

Sheet 2 of 7

	SWMU No. 4	SWMU No. 5	SWMU No. 6
Unit Name	Recent Process Area	Original Process Area	Water Treatment and Boiler System
Description	Area consisted of a process building (150 by 50 feet), four retort cylinders (125 by 12 feet), one retort cylinder (60 by 12 feet) and a drip area. The area has been dismantled and is presently covered by limestone or white caliche gravel.	Area consisted of one large retort cylinder (150 by 12 feet) and three retort cylinders (125 by 12 feet) inside two covered sheds, a power house building, a cylinder (5 by 41 feet), three brick-lined underground storage tanks (UST) and 2 ASTs (20 feet in diameter). The area has been dismantled and is presently covered by white caliche gravel.	Area consisted of a water storage tank, a treatment building (40 by 20 feet), a boiler, and a cooling tower. The water treatment building and boiler pad were the only remnants of this system observed during the VSI.
Operating Status	Inactive; built between 1955 and 1964, and active until 1984	Inactive; in operation from about 1911 until 1955 or 1962.	Inactive; built between 1955 and 1965, and was active until the mid-1980's
Regulatory Status	Not RCRA-permitted	Not RCRA-permitted	Not RCRA-permitted
Waste Type	Naphtha, creosote, and extenders (Bunker C, diesel fuel, styrene tar, and used vehicle oil)	Specific waste listing was not available, but wastes would likely have been similar to wastes generated at the recent process area (SWMU No. 4).	Boiler and cooling tower blowdown
Waste Management	Naphtha, creosote, and extender were piped from aboveground storage tank (AST) area (SWMU No. 8). Following treatment, these materials were either returned to the AST area or deposited in the SDD (SWMU No. 2), tank cars (SWMU No. 7), or sap tank (SWMU No. 11).	Information regarding waste management for this unit was unavailable.	Boiler and cooling tower blow-down were originally discharged onto the ground or into the storm sewer.
Release History	Visible staining of area soils and surface water were documented by TWC. Elevated levels of phenols, pH, and oil and grease were released to the sanitary sewer. Air quality violations related to the retort cylinders were cited from 1978 to 1980.	Subsurface soil contamination, discovered during excavation of UST No. 44-023-05 (SWMU No. 9) was determined to have originated from this area. Staining observed below diesel storage tank (AOC No. 1) indicated releases within this area.	The following releases were documented from this unit: (1)boiler condensate (ran off-site via surface runoff), (2) oily storm sewer discharge, and (3) discharges of boiler and cooling tower blowdown into the storm sewer.
Release Pathway	Soils, surface water, and air	Soil	Soil and surface water
Remedial Action Taken	No known remedial action	No known remedial action	A steam condensate and treatment system was installed to remediate a runoff problem.
Release Potential	High	Moderate	Moderate
Potential Pathway	Soils, surface water, air, and groundwater	Soils, surface water, air, and groundwater	Soils, surface water, air, and groundwater
Reason	Past history of documented releases and minimal containment	Indicated release to soil, probable lack of containment	Past history of documented releases to soil and surface water and minimal containment
Need for RFI	Yes	Yes	Yes

TABLE 5

SWMU AND AOC SUMMARY

Sheet 3 of 7

	SWMU No. 7	SWMU No. 8	SWMU No. 9
Unit Name	Tank Car Storage Area	Aboveground Storage Tank (AST) Area	Location of Former UST No. 44-023-05
Description	• Two railroad tank cars • A 12,500 gallon capacity per car	Area contained 14 ASTs, a below-grade product drop tank, a cooling tower, and associated piping and manifolds to allow for transport between tanks and the recent process area (SWMU No. 4). The area is presently dismantled and covered with white caliche gravel.	• A 2000-gallon steel underground storage tank (UST) • Was 5.5 feet in diameter and 12 feet long
Operating Status	Inactive; the railroad tank cars were used from the late 1950's through 1984, when they were removed.	Inactive; the tanks were installed between 1955 and 1965, and were used until 1984.	Inactive; installed in 1966 and removed on June 5, 1990
Regulatory Status	Not RCRA-permitted	Not RCRA-permitted	Not RCRA-permitted
Waste Type	Sap wastewater and tank bottoms	Tank bottoms (K001), creosote and extender mix, and naphtha	This tank was used to store gasoline.
Waste Management	Wastes from the process area were stored in these tank cars and removed by vacuum truck as needed.	Product was stored in the product drop tank before being transferred to the appropriate storage tank. Work tanks would store the extender mixture. Creosote extender, sap water, and tank bottoms were periodically sent to the storage tank cars (SWMU No. 7).	Information on watse management was unavailable
Release History	Surface spillage has been documented.	A naphtha spill and a working tank explosion were documented.	Visible contamination was observed in the tank pit during removal. Samples collected below the tank indicated TPH levels above TWC action levels.
Release Pathway	Soil	Soil	Soil
Remedial Action Taken	Both tanks were cleaned and removed in 1984. Specific details were unavailable.	Secondary containment walls were constructed around the AST area to prevent surface runoff. No dates were available.	100 cubic yards of soil were overexcavated during tank removal. Additional soil contamination was determined to be unrelated to this UST and is presently being evaluated by a voluntary site assessment.
Release Potential	Moderate	Moderate	High
Potential Pathway	Soil, surface water, and ground water	Soil, surface water, and ground water	Soil and ground water
Reason	Reported signs of surface spillage and lack of secondary containment	Reported spillage and tank explosion, and lack of secondary containment for adjacent soil	Documented soil contamination and location of UST 44-023-05 within the original process area (SWMU No. 5)
Need for RFI	Yes	Yes	Yes

TABLE 5

SWMU AND AOC SUMMARY

Sheet 4 of 7

	SWMU No. 10	SWMU No. 11	SWMU No. 12
Unit Name	Location of Former Sap Water Treatment Tank	Oil/Water Separators	Railroad Tie Storage Area
Description	• Measured 25 by 10 feet • Tank material or capacity is unknown.	• Two below-grade concrete separators • Measured 6 by 4 feet by about 3 feet deep	Most the site not used for specific process areas was used to store railroad ties.
Operating Status	Inactive; tank was installed in 1979 and removed in 1984.	Both separators are inactive. One of the separators was associated with the sap water tank (SWMU No. 10) which was installed in 1979 and removed in 1989. The other separator was never used.	Inactive; facility operations began in 1911 and continued through 1984. Railroad ties and other materials were observed being stored during the VSI.
Regulatory Status	Not RCRA-permitted	Not RCRA-permitted	Not RCRA-permitted
Waste Type	Wastewater containing naphtha, creosote residue, and extender	Wastewater containing naphtha, creosote residue, and extender	Creosote and extender
Waste Management	Wastewater was pumped from the retort cylinders (process area) into the tank prior to transfer to tank cars (SWMU No. 7).	The southern separator received wastewater from the process area. It skimmed off the oil before discharge into the sanitary sewer or adjacent sap water tank. Skimmed oil was returned to the working tanks. The northern separator reportedly received no wastes.	Freshly treated railroad ties from the process areas (SWMUs No. 4 and 5) were stacked and stored throughout this area.
Release History	No known release	Discharge of wastewater into the sanitary sewer was reported to exceed allowable levels of phenols, pH, temperature, and oil and grease. Permit was not renewed.	No known release
Release Pathway	N/A	Surface water	Soil
Remedial Action Taken	Tank was removed in 1984. The area has since been regraded with gravel	No known remedial action	The facility has regraded the majority of the site with clean gravel.
Release Potential	Unknown	Moderate	Moderate
Potential Pathway	Soil	Soil, surface water, and groundwater	Soil, surface water, and groundwater
Reason	Possible releases; lackof secondary containment	Documented excessive discharges to the sanitary sewer, lack of waste management documentation	Releases may have occurred from treated ties because of insufficient drying time and exposure to the elements. The area appeared to lack any runoff controls.
Need for RFI	Yes	Yes	Yes

TABLE 5

SWMU AND AOC SUMMARY

Sheet 5 of 7

	AOC No. 1	AOC No. 2	AOC No. 3
Unit Name	Diesel Storage Tank (DST)	Hose House	Contaminated Portion of City Water Line
Description	Aboveground storage tank supported by steel bracing; capacity is unknown.	• Metal building with concrete floor • Measures 15 by 12 feet	Abandoned portion of city water line; dimensions and location are unknown.
Operating Status	Active; age unknown	Inactive; dates of operation unknown	Inactive; contamination was discovered, and line was replaced in 1980.
Regulatory Status	Not RCRA-permitted	Not RCRA-permitted	Not RCRA-permitted
Waste Type	Tank contains diesel fuel	According to SPTCo, no hazardous wastes were treated or stored in the hose house.	Phenols
Waste Management	DST is surrounded by a concrete retaining wall, about 3 feet high and 1 foot thick	Shower drain and additional hose house drains appeared to drain into an adjacent sewer pipe.	A leaking pump seal was determined to have released contaminants from affected soils.
Release History	Stains and discoloration on underlying gravel observed during VSI	Signs of recent oil staining were visible inside hose house, and minor staining was observed on the ground in the vicinity of sewer drain.	Contamination to facility drinking water was detected in 1980.
Release Pathway	Soil	Soil and surface water	Soil
Remedial Action Taken	No known remedial action	No known remedial action	SPTCo repaired the leak, flushed the system, and installed a new pipeline next to the contaminated line. According to facility representatives, the contaminated line was not removed.
Release Potential	Moderate	Low	High
Potential Pathway	Soil, surface water, and groundwater	Soil, surface water, and ground water	Soil and ground water
Reason	Observed staining and discoloration on underlying gravel, lack of secondary containment below the gravel, and location of DST in original process area (SWMU No. 5)	Building did not treat or store hazardous wastes.	Documented contamination into water line indicates subsurface contamination from affected soils. In addition, adequate cleanup documentation and specific location information are lacking.
Need for RFI	Yes	No	Yes

TABLE 5

SWMU AND AOC SUMMARY

Sheet 6 of 7

	AOC No. 4	AOC No. 5	AOC No. 6
Unit Name	Location of Former Incinerator	City Storm Sewer	Inactive Wastewater Lagoon
Description	Formerly located about 75 feet west of the adzing plant	Underground storm sewer lines; locations unknown	Low-lying area located outside of the southwest corner of the site
Operating Status	Inactive and dismantled; appeared to have been installed between 1955 and 1965, and removed before 1976.	Active	Inactive since 1980
Regulatory Status	Not RCRA-permitted	Not RCRA-permitted	Not RCRA-permitted
Waste Type	Untreated lumber remnants	Boiler and cooling tower blowdown, potential runoff of creosote-contaminated surface water from facility SWMUs	Sap wastewater and surface water runoff, containing creosote residue
Waste Management	From framing mill and adzing plant; disposition of waste ash is unknown.	Received runoff or discharge from facility SWMUs, such as the AST, process area, and boiler and water treatment area (SWMUs No. 8, 4, and 6). Storm sewers were reported to have discharged into adjacent drainage ditches, such as SWMU No. 2.	Low-lying area periodically received discharges of wastewater and surface runoff from the site. After settling out, runoff continued west toward Buffalo Bayou.
Release History	No known release	Discharges were documented in 1980 and 1982.	In 1979, a fire exposed the presence of creosote-contaminated soils. The contamination was determined to have resulted from pooling of facility wastewater in this area.
Release Pathway	N/A	Surface water and soil	Soil and surface water
Remedial Action Taken	No known remedial action	No known remedial action	Following the fire, the uppermost layer of soils was scraped off and disposed of in the new (now inactive) surface impoundment (SWMU No. 1).
Release Potential	Moderate	Moderate	High
Potential Pathway	Air, soil, and surface water	Surface water, soil, and ground water	Soil, surface water, and ground water
Reason	Lack of waste management information concerning material incinerated, operation of unit, and analyses and disposition of waste ash	Documented releases to storm sewers and potential releases of contaminated runoff from facility SWMUs	Known releases of sap wastewater and surface runoff into this area, documented contamination of area soils, and lack of information concerning the extent of soil removal
Need for RFI	Yes	Yes	Yes

TABLE 5

SWMU AND AOC SUMMARY

Sheet 7 of 7

	AOC No. 7		
Unit Name	Location of Former UST No. 44-023-21		
Description	• A 200-gallon-capacity UST		
Operating Status	Inactive; the installation date is unknown; the tank was removed in 1990.		
Regulatory Status	Not RCRA-permitted		
Waste Type	This tank was used to store gasoline.		
Waste Management	Information on waste management activities was unavailable.		
Release History	Total benzene, toluene, ethyl benzene, and xylene (BTEX) levels below the TWC action limit of 30 ppm were detected in soils sampled during tank removal.		
Release Pathway	Soil		
Remedial Action Taken	UST 44-023-21 was clean closed according to SPTCo. PRC did not receive documentation of this closure.		
Release Potential	Moderate		
Potential Pathway	Soil		
Reason	Possible soil contamination and poor documentation of closure operations		
Need for RFI	Yes, unless adequate closure documenation can be provided		

- AOC No. 1 - Diesel Storage Tank
- AOC No. 3 - Contaminated Portion of City Water Line
- AOC No. 4 - Location of Former Incinerator
- AOC No. 5 - City Storm Sewer
- AOC No. 6 - Inactive Wastewater Lagoon
- AOC No. 7 - Location of Former UST No. 44-023-21

PRC recommends an RFI of SWMUs No. 1, 2, 4, 5, and 9, and AOCs No. 3 and 6, because of documented contamination in the soil, surface water, or ground water. PRC recommends an RFI of SWMU No. 6 and AOC No. 5 because of documented releases of boiler and cooling tower blowdown to the soil and facility storm sewers. PRC recommends an RFI of SWMU No. 7 because of documented signs of spillage and the lack of secondary containment. PRC recommends an RFI of SWMU No. 8 because of a documented spill and storage tank explosion, and potential releases from above and below-grade tanks. SWMUs No. 10 and 11 were recommended for RFI for potential spills and lack of secondary containment. SWMU No. 12 covers the majority of the site grounds and was recommended for RFI because of potential releases from railroad ties due to insufficient drying time and exposure to the elements. AOC No. 1 was recommended for RFI because of observed soil staining during the VSI, and lack of secondary containment below the AST. AOC No. 4 was recommended for RFI because of a lack of documentation concerning the material incinerated, waste management practices, and analysis and disposition of the waste ash. AOC No. 7 was removed and closed, but was recommended for an RFI because of possible soil contamination and a lack of closure documentation.

Based on previous facility inspections, NOVs, and the VSI, there is evidence that contaminants have been released to the air, soils, and surface waters from many SWMUs. In addition, ground-water monitoring data indicate contamination to that media. Because (1) of the documented contamination, (2) the majority of the site being recommended for RFI through inclusion in various SWMUs and AOCs, and (3) a history of wood treating operations going back to 1911, PRC recommends a facility-wide RFI to determine the nature and extent of soil, surface water, and ground-water contamination.

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APPENDIX

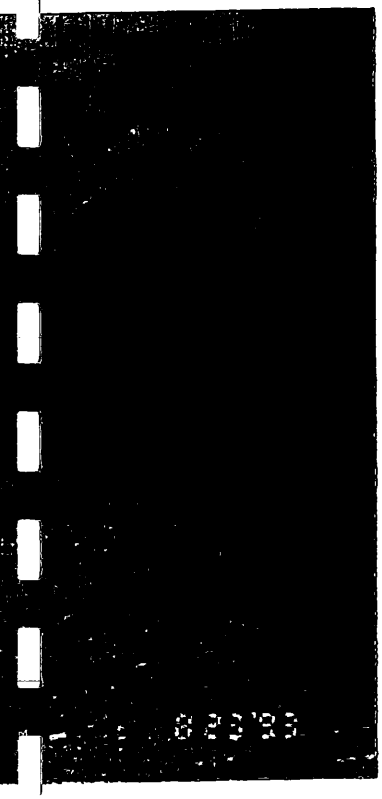
VSI PHOTOGRAPHS

PHOTOGRAPH NO. 1

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: North

Picture Description: Inactive surface impoundment (SWMU No. 1); black drums in background were reported to contain drill cuttings and development water from a recently completed monitoring well.

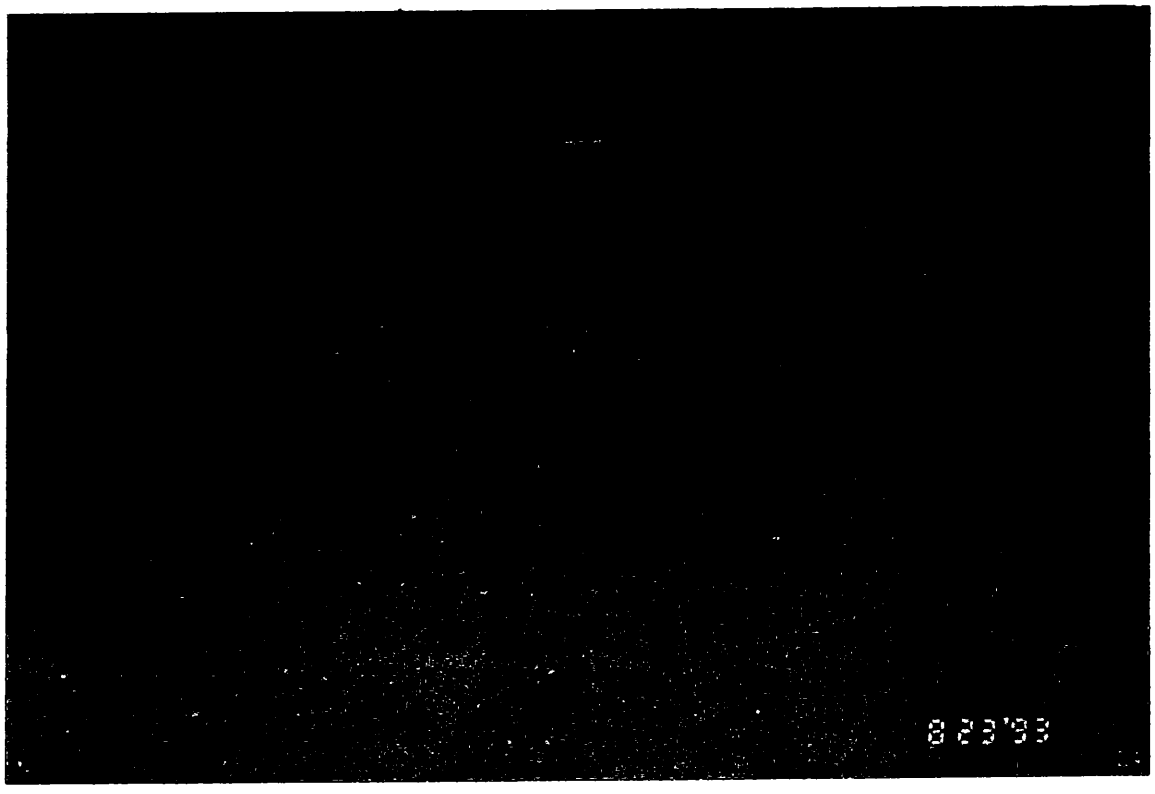
PHOTOGRAPH NO. 3



g: Northwest
ey hd the railroad tracks.

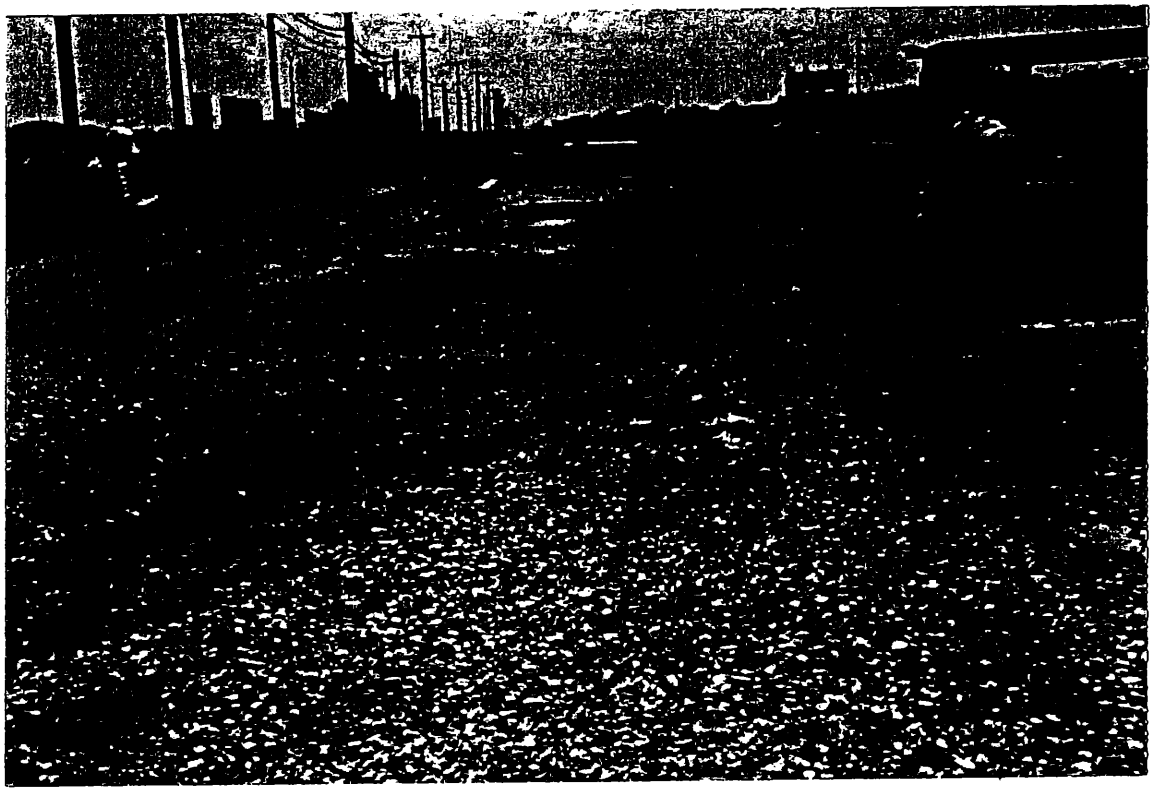
en by: K. Matherne Direction Facing: North
ainage ditch (SWMU No. 2), west of the facility boundary.

PHOTOGRAPH NO. 4



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East
Picture Description: Recent Process Area (SWMU No. 4), which has been regraded and is now used for material storage

PHOTOGRAPH NO. 5



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Southwest
Picture Description: Location of Former UST no. 44-023-05 (SWMU No. 9), which is within the original process area (SWMU No. 5)

PHOTOGRAPH NO. 6

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East

Picture Description: Concrete pad, believed to have been the location of the boiler (SWMU No. 6); the area is now used for material storage.

PHOTOGRAPH NO. 7

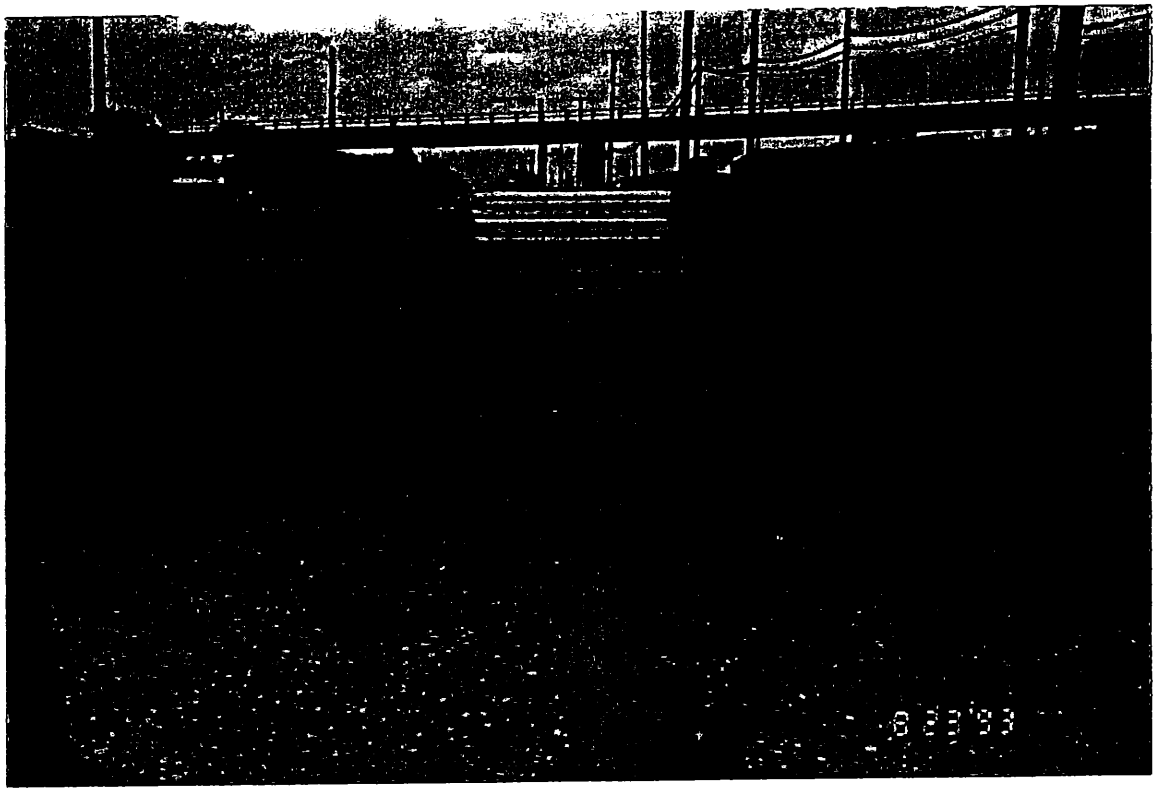
Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Northwest
Picture Description: Above-grade concrete tank in the former water treatment area (SWMU No. 6); note the white crystalline powder in the pipe protruding from the side of the wall (center of photograph).

PHOTOGRAPH NO. 8

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: North

Picture Description: Close-up of white crystalline powder within the concrete wall, facing south, in the former water treatment area (SWMU No. 6).

PHOTOGRAPH NO. 9



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East

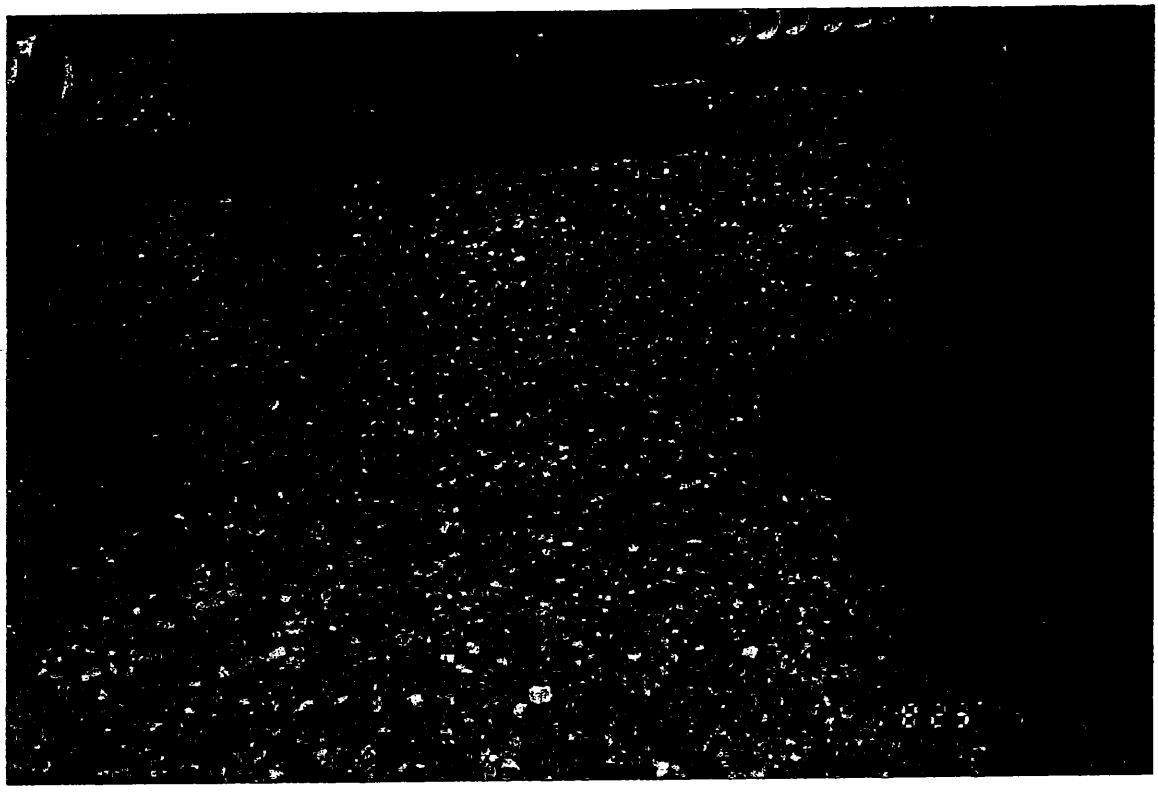
Picture Description: Former aboveground storage tank (AST) area (SWMU No. 8); the base of a former AST is visible in the bottom center of the photograph.

PHOTOGRAPH NO. 10

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Southeast

Picture Description: A portion of the retaining wall that originally surrounded the entire AST (SWMU No. 8); wall is now limited to the southeast side of the SWMU.

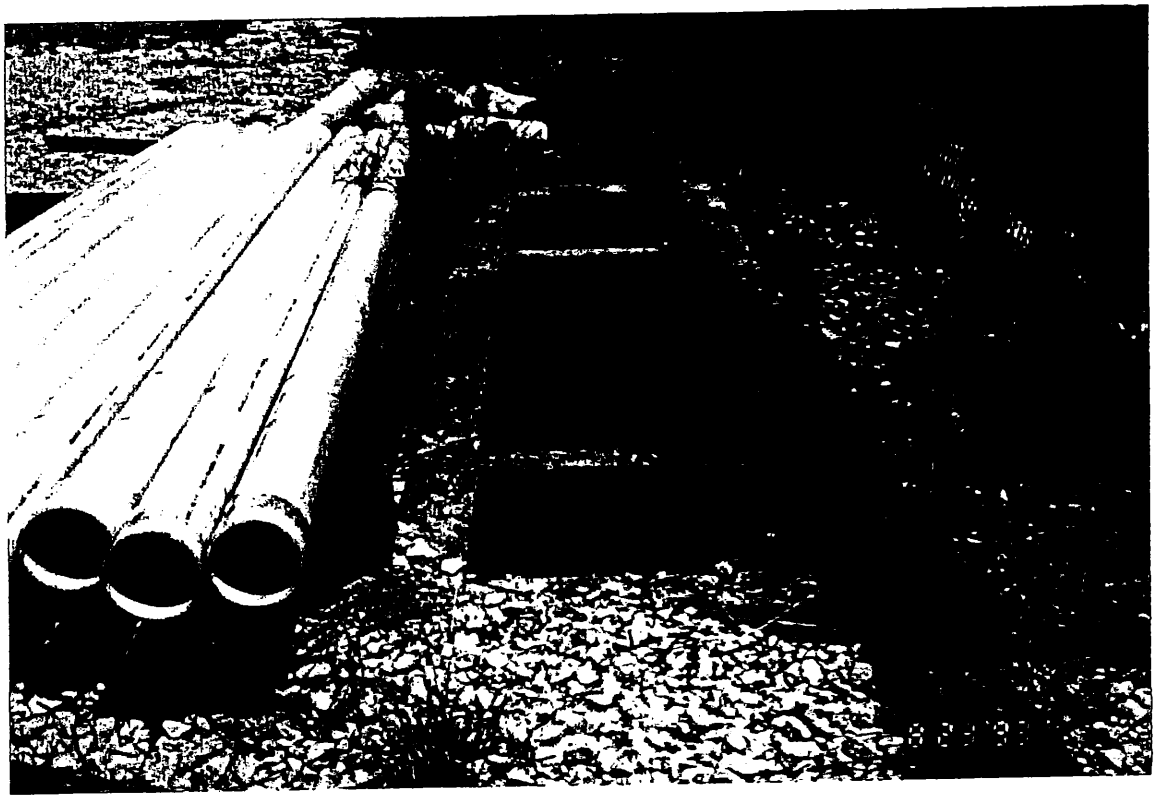
PHOTOGRAPH NO. 11



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East

Picture Description: Location of the former sap water treatment tank area (SWMU No. 10); note concrete tank supports (flush with ground level) that were believed to have defined the tank edges.

PHOTOGRAPH NO. 12



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East

Picture Description: An oil/water separator (SWMU No. 11) used in sap water treatment; this separator was located next to the location of the former sap water treatment tank area (SWMU No. 10), which is partially covered by the white PVC pipe visible on the left edge of the photograph.

PHOTOGRAPH NO. 13

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: West
Picture Description: An inactive oil/water separator (SWMU No. 11) located along the northern edge of the facility (Liberty Road); this separator is now filled with sand, gravel, and debris and is surrounded by a rusty metal railing.

PHOTOGRAPH NO. 14

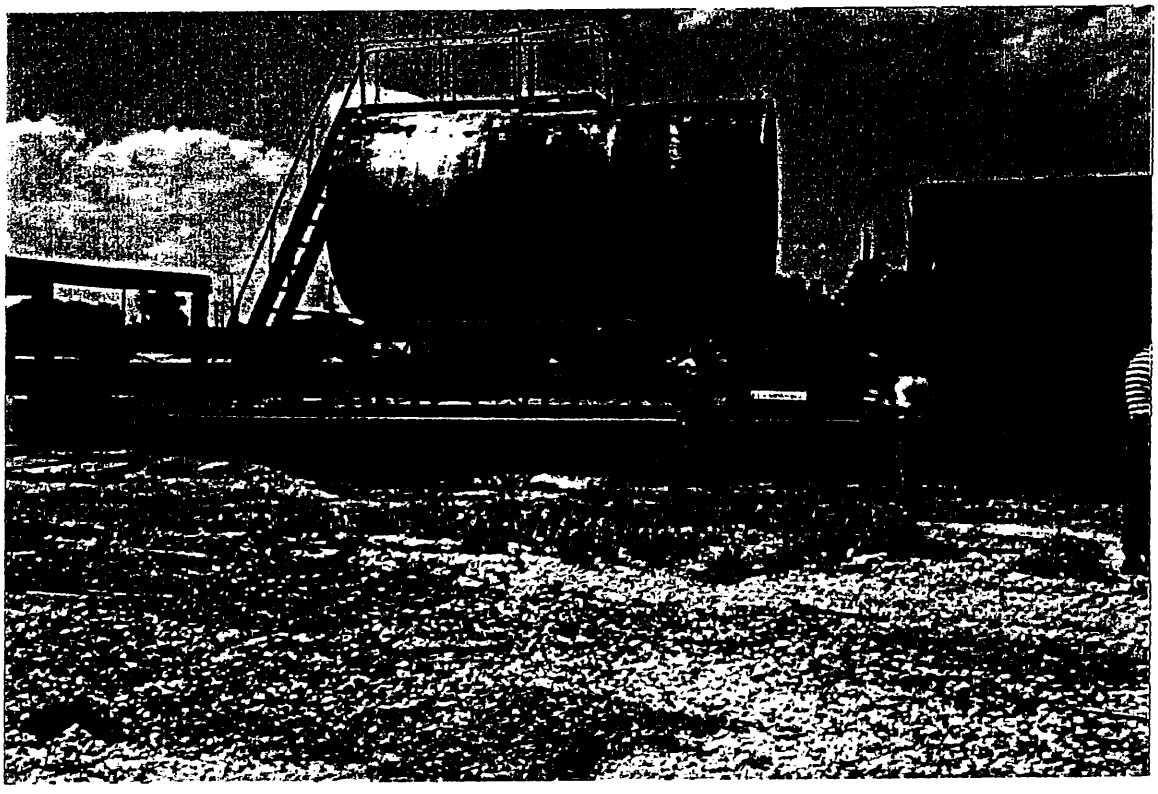
Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: North
Picture Description: Northwest portion of the site, formerly used for storage of railroad ties (SWMU No. 12); note the pile of rusted scrap metal at the left.

PHOTOGRAPH NO. 15

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Northeast

Picture Description: Close-up of the switch panel plant in the railroad tie storage area (SWMU No. 12); the switch panel plant now assembles sections of track and treated ties, and stores them in this area.

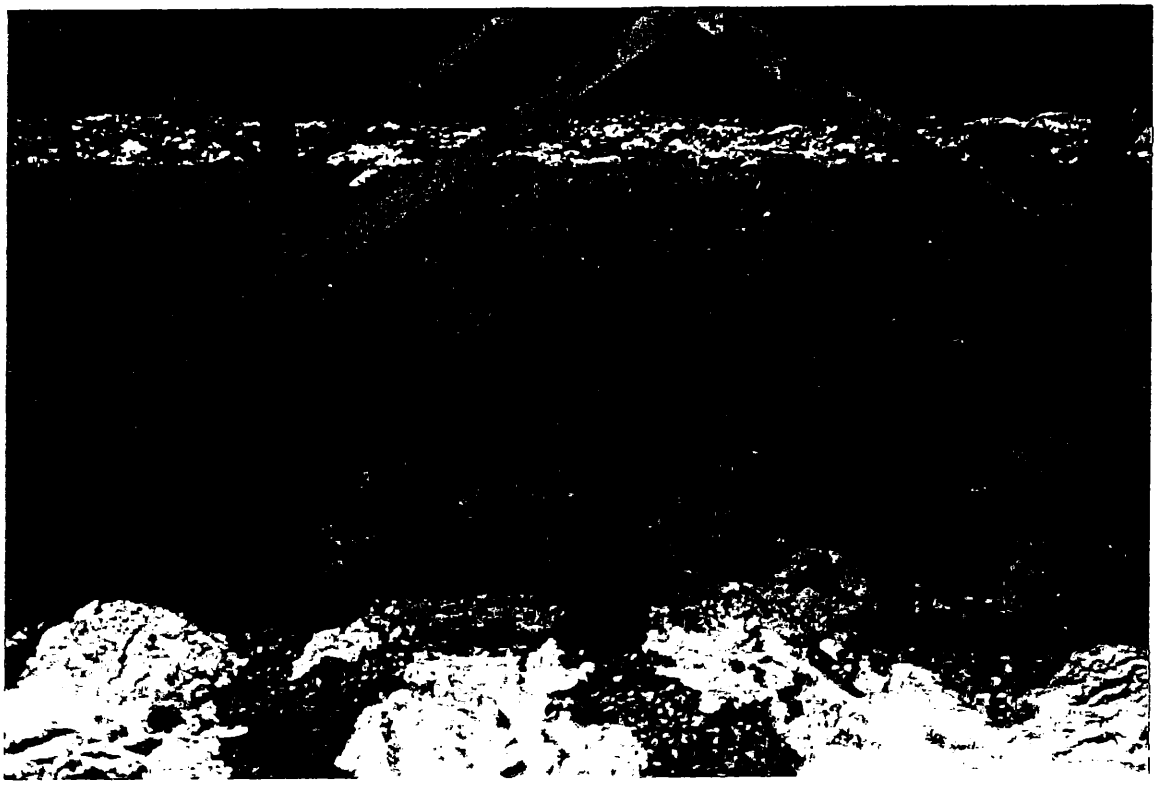
PHOTOGRAPH NO. 16



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: North

Picture Description: Diesel storage tank (AOC No. 1); note the concrete containment wall around the tank area.

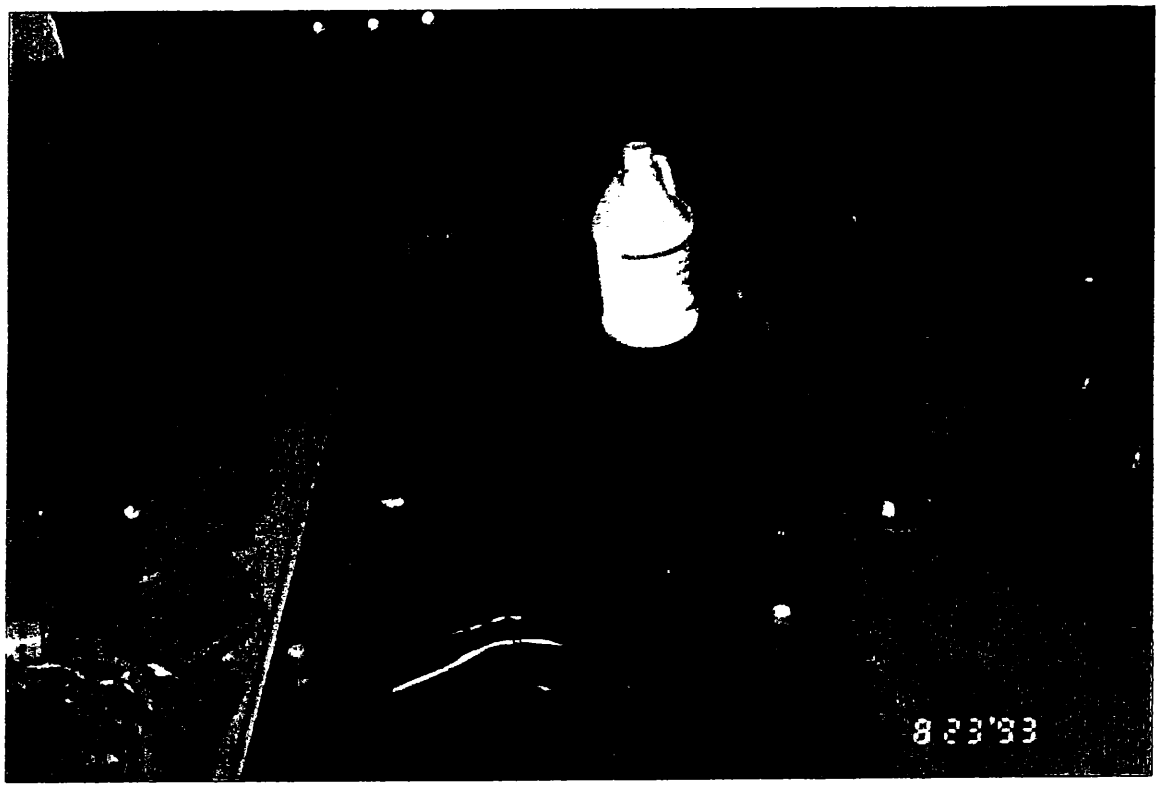
PHOTOGRAPH NO. 17



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: North

Picture Description: Gravel area below the diesel storage tank (AOC No. 1); note the dried algal mats and stained gravel.

PHOTOGRAPH NO. 18



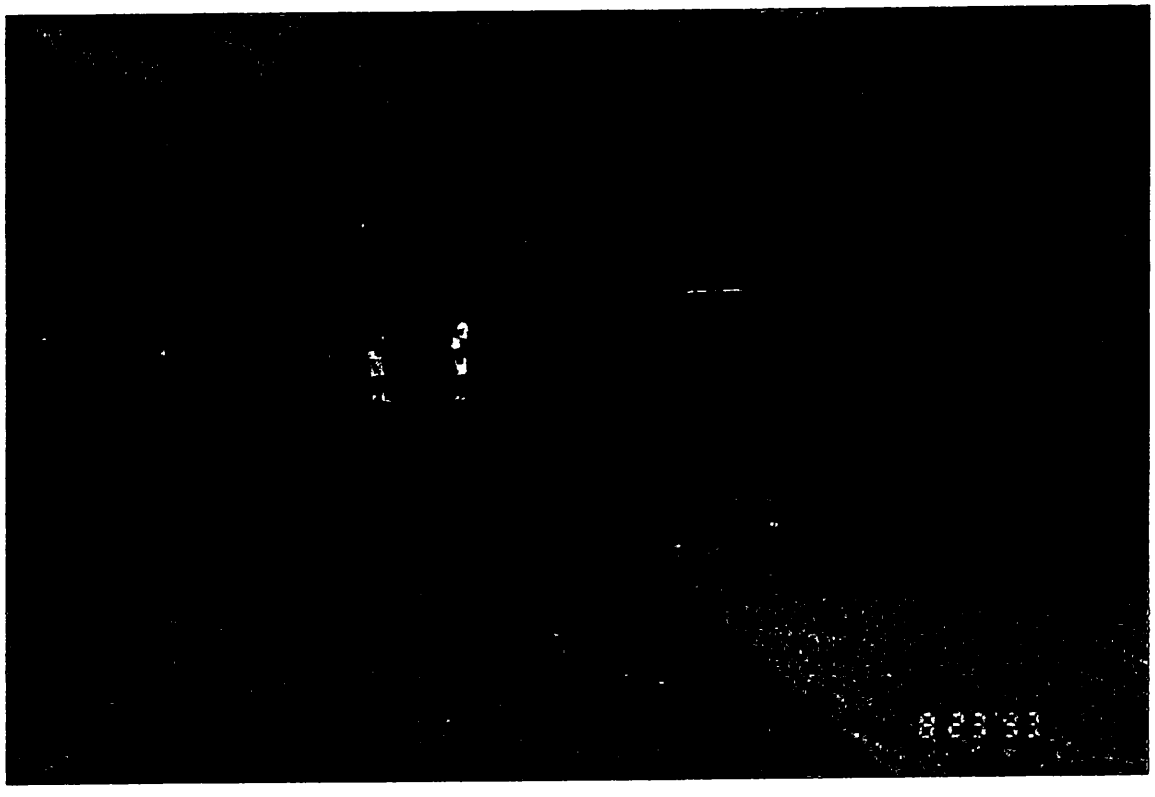
Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Southeast
Picture Description: Inside the hose house (AOC No. 2); note recent oil staining (center) and floor drain cap (upper right).

PHOTOGRAPH NO. 19

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: West

Picture Description: East side of the hose house (AOC No. 2); a sewer opening is visible to the right of center.

PHOTOGRAPH NO. 20



Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: East

Picture Description: Concrete pad, believed to have been the location of the former incinerator (AOC No. 4), in the center of the photograph; the adzing plant building is visible in the background (top-center).

PHOTOGRAPH NO. 21

Date: 08/23/93 Picture Taken by: K. Matherne Direction Facing: Northwest
Picture Description: Inactive wastewater lagoon (AOC No. 6), visible beyond the facility security fence; note houses in the background.

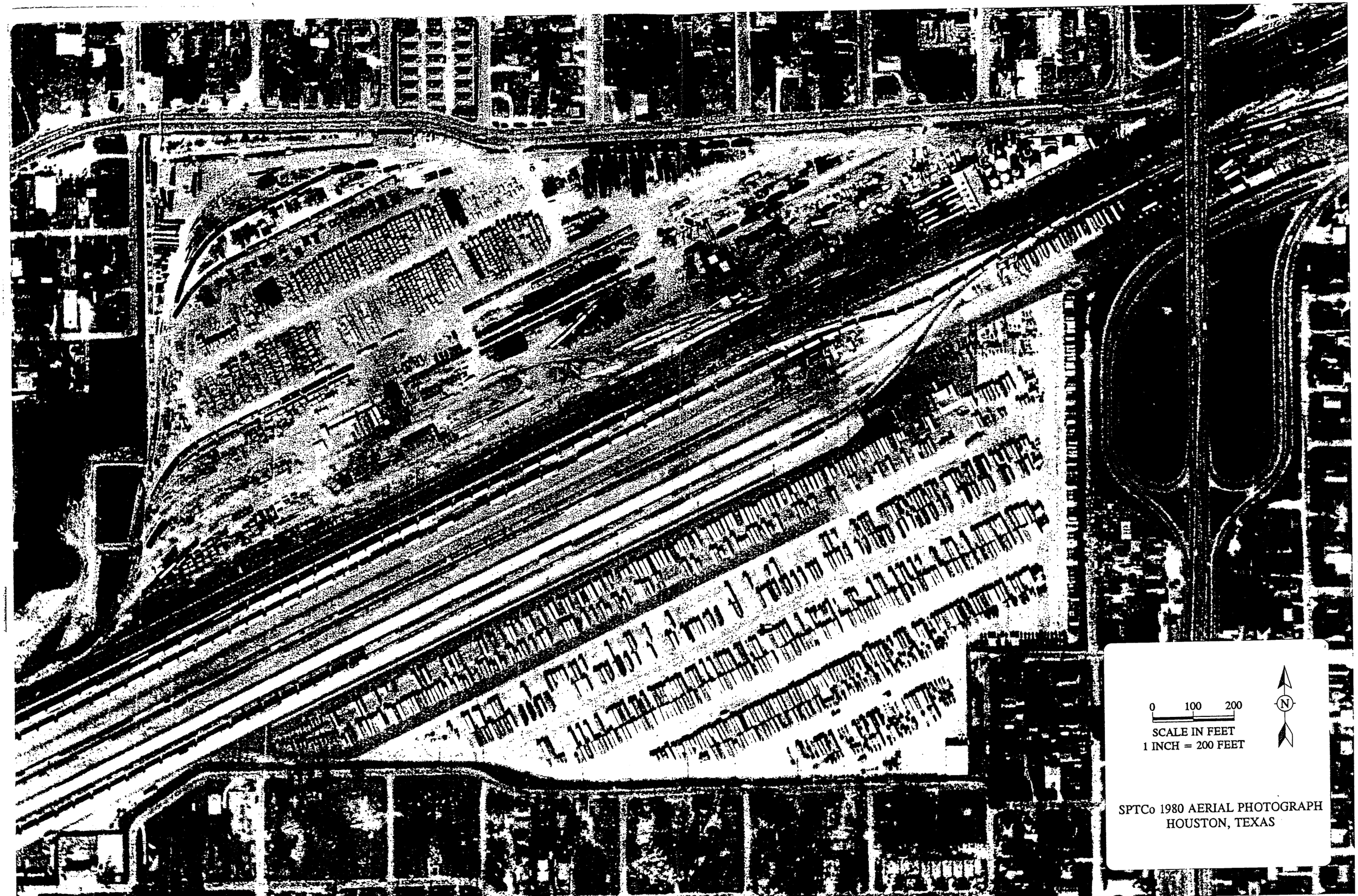
ATTACHMENT A

HISTORICAL AERIAL PHOTOGRAPHS

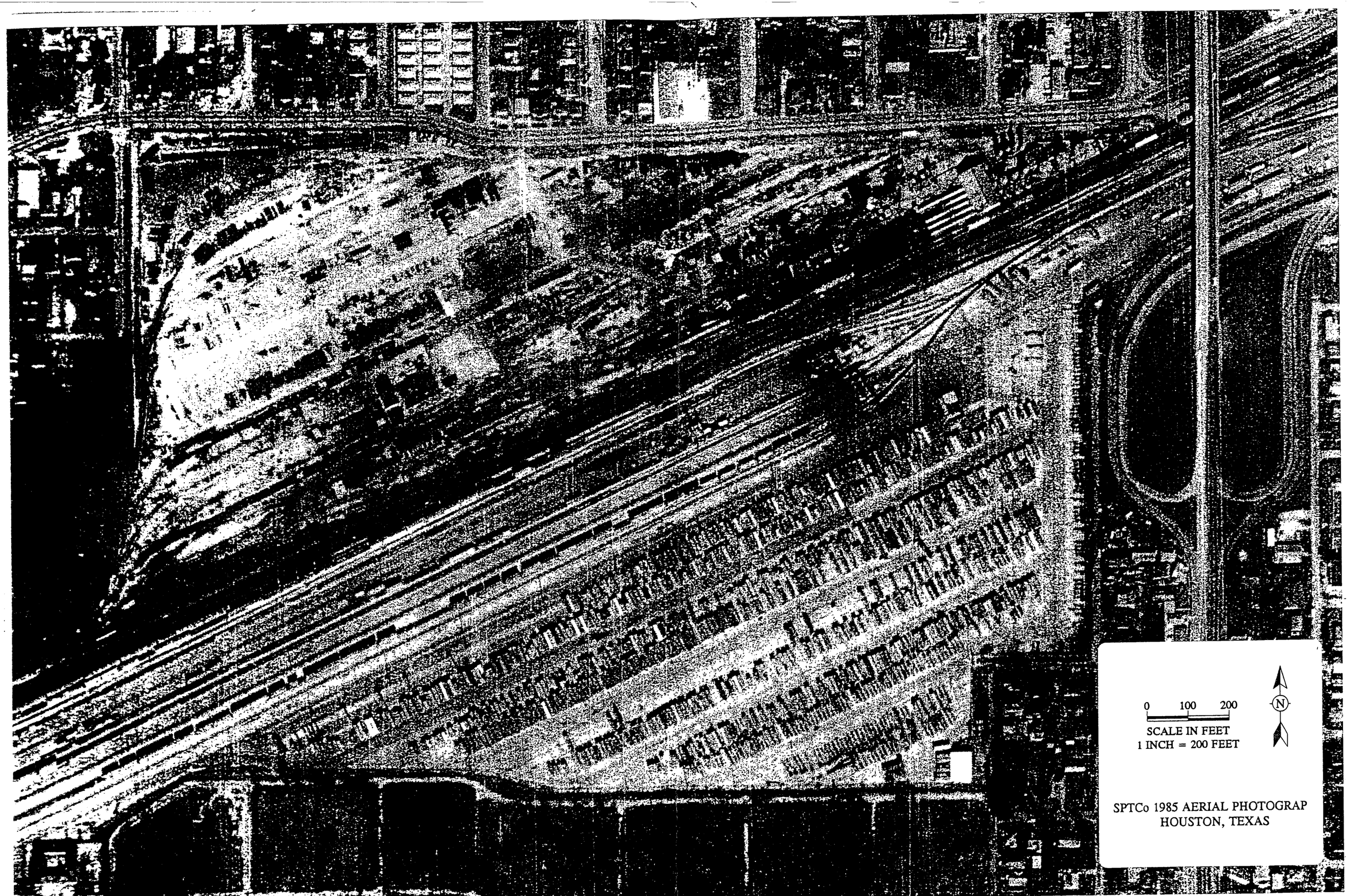
SPTCo 1955 AERIAL PHOTOGRAPH
HOUSTON, TEXAS

SPTCo 1969 AERIAL PHOTOGRAP
HOUSTON, TEXAS

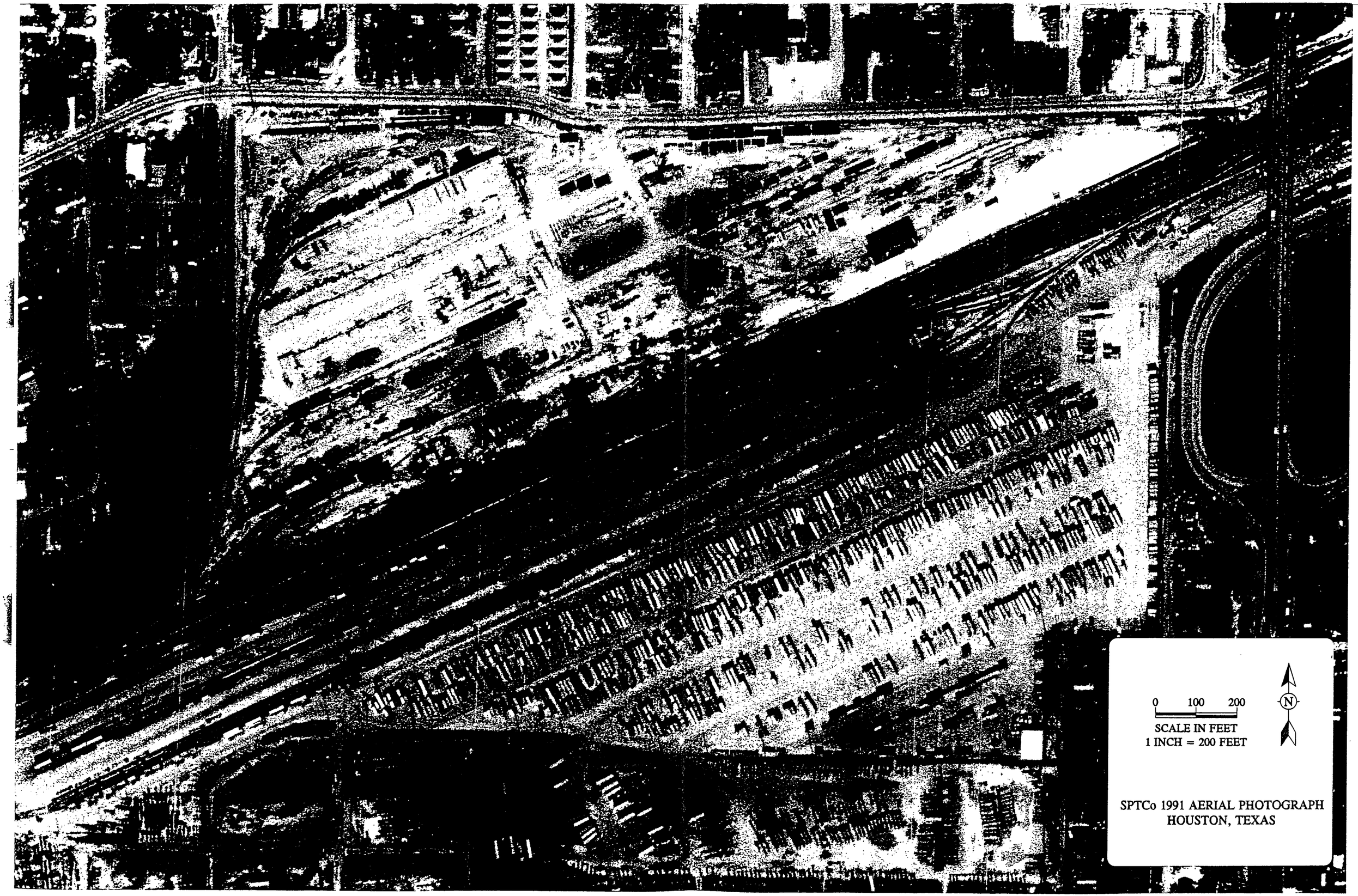
SPTCo 1976 AERIAL PHOTOGRAPH
HOUSTON, TEXAS



SPTCo 1980 AERIAL PHOTOGRAPH
HOUSTON, TEXAS



SPTCo 1985 AERIAL PHOTOGRAP
HOUSTON, TEXAS



SPTCo 1991 AERIAL PHOTOGRAPH
HOUSTON, TEXAS

ATTACHMENT B

1927 FACILITY PLAT

NOT AVAILABLE

ATTACHMENT C

FACILITY PLAT FROM LATE 1950'S

NOT AVAILABLE

ATTACHMENT D

GROUND-WATER ANALYTICAL DATA

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-1

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Aug 84	16	NA	NA	NA	ND<10	NA	NA	NA	NA	NA
Dec 84	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	NA
Mar 85	37	ND<10	ND<10	ND<10	ND<10	NA	229	ND<10	147	ND<10
Jun 85	1	ND<10	181	12	ND<10	NA	187	10	ND<10	19
Sep 85	5	ND<10	ND<10	ND<10	ND<10	NA	168	ND<10	88	ND<10
Nov 85	201	ND<10	37	349	61	NA	160	ND<10	210	ND<10
Feb 86	8	ND<10	ND<10	200	32	NA	ND<10	ND<10	200	ND<10
May 86	9	ND<10	ND<10	31	ND<10	NA	610	ND<10	ND<10	ND<10
Sep 86	ND<1	ND<10	ND<10	41	11	NA	470	10.01	110	46
Nov 86	ND<1	ND<10	ND<10	34	ND<10	ND<30	76	ND<10	ND<10	ND<10
Mar 87	7	24	ND<10	ND<10	ND<10	NA	ND<10	ND<10	ND<10	ND<10
May 87	ND<1	ND<10	NA	28	25	NA	104	ND<10	ND<10	ND<10
Aug 87	5	NA	NA	NA	ND<10	NA	NA	NA	NA	30
Nov 87	8	ND<10	ND<10	43	7	ND<10	71	ND<10	822	41
Feb 88	7	NA	NA	NA	17	NA	NA	NA	NA	ND<10
Jun 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Aug 88	10	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Dec 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	23
Mar 89	14	NA	NA	NA	12	NA	NA	NA	NA	ND<10
Jun 89	20	NA	NA	NA	10	NA	NA	NA	NA	ND<10
Aug 89	4	NA	NA	NA	9	NA	NA	NA	NA	ND<10
Dec 89	2	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-1

(ug/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Mar 90	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Jun 90	ND<1	NA	NA	NA	ND<10	ND<10	NA	NA	NA	ND<10
Mar 91	ND<10	ND<10	NA	ND<10	ND<10	ND<10	230	ND<10	27	ND<10
Apr 91	4	ND<10	ND<10	15	2	17	260	ND<10	ND<10	ND<20
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	269	ND<100	147	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	110	ND<10	84	ND<10
Jul 92	5.5	ND<5	ND<10	19.1	ND<5	19.9	299	ND<5	128	ND<5
Oct 92	10	ND<5	ND<10	27	ND<5	29	201	ND<10	15	ND<10
Jan 93	7	ND<5	ND<10	22	ND<5	27	220	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	14	ND<5	15	170	ND<10	13	ND<10
Jun 93	6	ND<5	ND<10	11	ND<5	15	220	ND<10	13	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-1

(µg/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Aug 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	20
Dec 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	11	ND<10
Mar 85	ND<10	14	NA	ND<10	229	NA	37	ND<10	ND<10	ND<10	46	ND<10	ND<10
Jun 85	ND<10	33	NA	ND<10	237	NA	12	ND<10	11	ND<10	29	10	ND<10
Sep 85	ND<10	ND<10	NA	ND<10	423	NA	589	ND<10	137	ND<10	ND<10	ND<10	ND<10
Nov 85	ND<10	ND<10	NA	ND<10	240	NA	42	ND<10	320	ND<10	ND<10	ND<10	ND<10
Feb 86	120	ND<10	NA	53	53	NA	250	ND<10	ND<10	ND<10	ND<10	48	900
May 86	ND<10	ND<10	NA	ND<10	400	NA	5800	ND<10	580	ND<10	ND<10	15	ND<10
Sep 86	180	42	NA	320	380	NA	4900	ND<10	730	ND<10	510	95	ND<10
Nov 86	ND<10	ND<10	NA	11	59	NA	ND<10	ND<10	71	ND<10	ND<10	ND<10	ND<10
Mar 87	ND<10	ND<10	NA	13	ND<10	NA	10	ND<10	76	ND<10	ND<10	ND<10	ND<10
May 87	ND<10	ND<10	NA	ND<10	68	NA	D-BRL	37	17	ND<10	NA	ND<10	ND<10
Aug 87	NA	30	NA	NA	NA	NA	1697	NA	NA	ND<10	NA	ND<10	31
Nov 87	13	39	NA	344	450	NA	2602	22	124	ND<10	121	ND<10	ND<1
Feb 88	NA	ND<10	NA	NA	NA	NA	174	NA	NA	ND<10	NA	ND<10	5
Jun 88	NA	ND<10	NA	NA	NA	NA	2140	NA	NA	ND<10	NA	ND<10	ND<10
Aug 88	NA	45	NA	NA	NA	NA	3000	NA	NA	ND<10	NA	ND<10	380
Dec 88	NA	26	NA	NA	NA	NA	240	NA	NA	ND<10	NA	ND<10	330
Mar 89	NA	10	NA	NA	NA	NA	3400	NA	NA	ND<10	NA	ND<10	ND<10
Jun 89	NA	ND<10	NA	NA	NA	NA	120	NA	NA	ND<10	NA	ND<10	ND<10
Aug 89	NA	ND<10	NA	NA	NA	NA	ND<10	NA	NA	ND<10	NA	ND<10	ND<10
Dec 89	NA	ND<10	NA	NA	NA	NA	810	NA	NA	ND<10	NA	ND<10	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-1

(ug/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Mar 90	NA	ND<10	NA	NA	NA	NA	1170	NA	NA	ND<10	NA	ND<10	ND<10
Jun 90	NA	ND<10	NA	NA	NA	NA	650	NA	NA	ND<10	NA	ND<10	ND<10
Mar 91	ND<10	ND<10	NA	ND<10	170	NA	450	ND<10	170	ND<10	13	ND<10	ND<10
Apr 91	36	ND<20	160	ND<10	150	NA	640	ND<10	150	ND<20	ND<10	ND<20	ND<100
Nov 91	ND<100	ND<100	108	ND<100	143	ND<100	1060	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	84	ND<10	97	59	155	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	36	ND<5	128	8	146	ND<5	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<25
Oct 92	ND<10	ND<10	136	ND<10	140	325	950	ND<10	99	ND<10	ND<10	37	ND<50
Jan 93	ND<10	ND<10	150	12	160	295	ND<10	ND<10	140	ND<10	ND<10	19	ND<50
Mar 93	ND<10	ND<10	130	11	130	170	370	ND<10	100	ND<10	ND<10	ND<10	ND<50
Jun 93	ND<10	ND<10	160	10	140	300	470	ND<10	100	ND<10	ND<10	ND<10	ND<50

NA = Not available ND< = Not detectable at detection limit D-DNL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-2

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Aug 84	16	NA	NA	NA	ND<10	NA	NA	NA	NA	NA
Dec 84	0.5	NA	NA	NA	ND<10	NA	NA	NA	NA	NA
Mar 85	ND<1	ND<10	ND<10	ND<10	ND<10	NA	233	ND<10	137	ND<10
Jun 85	2	ND<10	18	ND<10	ND<10	NA	133	ND<10	116	11
Sep 85	27	ND<10	ND<10	33	33	NA	35	35	67	ND<10
Nov 85	692	ND<10	141	ND<10	ND<10	NA	170	ND<10	34	44
Feb 86	51	ND<10	ND<10	103	44	NA	2300	150	69	12
May 86	80	ND<10	ND<10	ND<10	ND<10	NA	731	ND<10	ND<10	ND<10
Sep 86	ND<1	ND<10	ND<10	ND<10	890	NA	99	ND<10	23	ND<10
Nov 86	223	ND<10	ND<10	76	62	65	ND<10	ND<10	ND<10	ND<10
Mar 87	55	ND<10	183	86	80	NA	97	ND<10	10	D-BRL
May 87	47	ND<10	NA	174	65	NA	93	ND<10	ND<10	ND<10
Aug 87	16	NA	NA	NA	27	NA	NA	NA	NA	ND<10
Nov 87	29	ND<10	ND<10	189	56	ND<10	ND<10	303	336	10
Feb 88	62	NA	NA	NA	100	NA	NA	NA	NA	D-BRL
Jun 88	111	NA	NA	NA	59	NA	NA	NA	NA	ND<10
Aug 88	25	NA	NA	NA	45	NA	NA	NA	NA	ND<10
Dec 88	50	NA	NA	NA	80	NA	NA	NA	NA	19
Mar 89	56	NA	NA	NA	68	NA	NA	NA	NA	D-BRL
Jun 89	80	NA	NA	NA	70	NA	NA	NA	NA	ND<10
Aug 89	45	NA	NA	NA	78	NA	NA	NA	NA	D-BRL
Dec 89	21	NA	NA	NA	44	NA	NA	NA	NA	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-2

(ug/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene *
Mar 90	18	NA	NA	NA	47	NA	NA	NA	NA	ND<10
Jun 90	27	NA	NA	NA	43	NA	NA	NA	NA	ND<10
Mar 91	33	ND<10	NA	110	63	130	230	10	22	ND<10
Apr 91	19	ND<10	ND<10	150	28	130	290	ND<10	ND<10	ND<100
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	126	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	170	ND<10	120	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	19.4	153	ND<5	ND<5	ND<5
Oct 92	6	ND<5	ND<10	20	ND<5	14	69	ND<10	ND<10	ND<10
Jan 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	34	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	33	ND<10	ND<10	ND<10
Jun 93	ND<5	ND<5	ND<10	9	ND<5	7	85	ND<10	32	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-2

(µg/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Aug 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<20
Dec 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<10
Mar 85	ND<10	ND<10	NA	ND<10	245	NA	146	ND<10	ND<10	ND<10	65	ND<10	ND<10
Jun 85	ND<10	19	NA	36	166	NA	39	ND<10	ND<10	ND<10	111	2721	ND<10
Sep 85	ND<10	150	NA	ND<10	128	NA	235	ND<10	107	ND<10	ND<10	ND<10	ND<10
Nov 85	ND<10	76	NA	84	240	NA	350	ND<10	52	250	ND<10	250	ND<10
Feb 86	ND<10	ND<10	NA	44	ND<10	NA	2700	ND<10	ND<10	19	22	110	410
May 86	ND<10	ND<10	NA	ND<10	502	NA	364	ND<10	467	80	ND<10	110	ND<10
Sep 86	ND<10	ND<10	NA	66	91	NA	590	ND<10	160	28	38	270	ND<10
Nov 86	ND<10	ND<10	NA	ND<10	ND<10	NA	10	ND<10	ND<10	3500	ND<10	13	ND<10
Mar 87	ND<10	D-BRL	NA	15	82	NA	ND<10	43	63	718	ND<10	99	ND<10
May 87	ND<10	ND<10	NA	ND<10	60	NA	ND<10	53	12	ND<10	18	5	ND<10
Aug 87	NA	ND<10	NA	NA	NA	NA	123	NA	NA	ND<10	NA	11	ND<10
Nov 87	13	ND<10	NA	98	229	NA	46	ND<10	43	ND<10	33	29	ND<10
Feb 88	NA	ND<10	NA	NA	NA	NA	ND<10	NA	NA	745	NA	256	ND<10
Jun 88	NA	ND<10	NA	NA	NA	NA	ND<10	NA	NA	17	NA	30	ND<10
Aug 88	NA	48	NA	NA	NA	NA	ND<10	NA	NA	35	NA	106	360
Dec 88	NA	18	NA	NA	NA	NA	210	NA	NA	180	NA	250	ND<10
Mar 89	NA	10	NA	NA	NA	NA	ND<10	NA	NA	100	NA	30	ND<10
Jun 89	NA	ND<10	NA	NA	NA	NA	170	NA	NA	ND<10	NA	60	ND<10
Aug 89	NA	D-BRL	NA	NA	NA	NA	ND<10	NA	NA	ND<10	NA	5	ND<10
Dec 89	NA	ND<10	NA	NA	NA	NA	1300	NA	NA	ND<10	NA	37	ND<10

NA = Not available

ND< = Not detectable at detection limit

D-BRL = Detected but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-2

(ug/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Mar 90	NA	ND<10	NA	NA	NA	NA	2170	NA	NA	ND<10	NA	5	ND<10
Jun 90	NA	ND<10	NA	NA	NA	NA	1340	NA	NA	ND<10	NA	320	ND<10
Mar 91	ND<10	ND<10	NA	30	160	NA	320	ND<10	130	ND<10	16	46	ND<10
Apr 91	ND<10	ND<100	180	ND<10	180	NA	4300	ND<10	170	ND<100	ND<10	ND<100	ND<500
Nov 91	ND<100	ND<100	62	ND<100	38	ND<100	124	ND<100	24	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	100	ND<10	130	42	800	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	110	ND<5	93	ND<5	106	ND<5	17	ND<5	ND<5	ND<10	ND<5	ND<5	ND<25
Oct 92	190	ND<10	49	ND<10	52	12	253	ND<10	38	ND<10	ND<10	11	ND<50
Jan 93	ND<10	ND<10	25	ND<10	ND<10	ND<10	43	ND<10	29	ND<10	ND<10	ND<10	ND<50
Mar 93	ND<10	ND<10	26	ND<10	28	ND<10	47	ND<10	23	ND<10	ND<10	ND<10	ND<50
Jun 93	ND<10	ND<10	53	ND<10	52	21	270	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-3

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Aug 84	17	NA	NA	NA	5	NA	NA	NA	NA	NA
Dec 84	0.5	NA	NA	NA	5	NA	NA	NA	NA	NA
Mar 85	ND<1	ND<10	ND<10	ND<10	ND<10	NA	221	ND<10	45	ND<10
Jun 85	ND<1	ND<10	28	ND<10	ND<10	NA	ND<10	ND<10	106	ND<10
Sep 85	ND<1	ND<10	ND<10	ND<10	11	NA	ND<10	218	158	ND<10
Nov 85	44	ND<10	ND<10	66	78	NA	110	ND<10	98	ND<10
Feb 86	8	ND<10	ND<10	38	ND<10	NA	14	120	46	ND<10
May 86	12	ND<10	ND<10	ND<10	ND<10	NA	560	ND<10	ND<10	ND<10
Sep 86	ND<1	ND<10	ND<10	15	ND<10	NA	ND<10	ND<10	36	ND<10
Nov 86	150	ND<10	ND<10	44	18	56	71	ND<10	ND<10	ND<10
Mar 87	ND<1	ND<10	ND<10	ND<10	ND<10	NA	118	ND<10	12	D-BRL
May 87	ND<1	34	NA	41	39	NA	89	ND<10	ND<10	ND<10
Aug 87	5	NA	NA	NA	10	NA	NA	NA	NA	ND<10
Nov 87	ND<1	ND<10	ND<10	62	52	ND<10	248	ND<10	158	ND<10
Feb 88	14	NA	NA	NA	16	NA	NA	NA	NA	23
Jun 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	36
Aug 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Dec 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	17
Mar 89	30	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Jun 89	20	NA	NA	NA	10	NA	NA	NA	NA	D-BRL
Aug 89	15	NA	NA	NA	21	NA	NA	NA	NA	D-BRL
Dec 89	12	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10

NA = Not available

ND< = Non detectable at detection limit

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HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-3

(ug/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Mar 90	9	NA	NA	NA	8	NA	NA	NA	NA	ND<10
Jun 90	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Mar 91	26	ND<10	NA	20	14	31	200	ND<10	23	ND<10
Apr 91	10	ND<10	ND<10	28	3	33	230	ND<10	ND<10	ND<10
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	146	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	139	ND<10	ND<10	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	122	ND<5	46	ND<5
Oct 92	6	ND<5	ND<10	13	5	15	117	ND<10	11	ND<10
Jan 93	ND<5	ND<5	ND<10	10	ND<5	9	180	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	11	ND<5	12	170	ND<10	17	ND<10
Jun 93	ND<5	ND<5	ND<10	7	ND<5	7	190	ND<10	19	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-3

(µg/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Aug 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<20
Dec 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<10
Mar 85	ND<10	ND<10	NA	ND<10	174	NA	1068	ND<10	ND<10	ND<10	34	ND<10	ND<10
Jun 85	ND<10	ND<10	NA	23	161	NA	56	ND<10	ND<10	ND<10	72	94	ND<10
Sep 85	ND<10	ND<10	NA	ND<10	282	NA	ND<10	ND<10	277	ND<10	ND<10	ND<10	ND<10
Nov 85	ND<10	ND<10	NA	ND<10	140	NA	17	ND<10	150	ND<10	ND<10	82	ND<10
Feb 86	16	ND<10	NA	43	2200	NA	1090	ND<10	ND<10	ND<10	10	550	ND<10
May 86	ND<10	ND<10	NA	ND<10	280	NA	7400	ND<10	280	ND<10	ND<10	ND<10	ND<10
Sep 86	57	ND<10	NA	129	120	NA	3200	ND<10	230	ND<10	54	ND<10	ND<10
Nov 86	ND<10	ND<10	NA	18	46	NA	110	ND<10	49	ND<10	11	ND<10	ND<10
Mar 87	ND<10	D-BRL	NA	15	89	NA	ND<10	27	71	ND<10	ND<10	D-BRL	217.
May 87	ND<10	ND<10	NA	24	55	NA	ND<10	ND<10	15	ND<10	20	ND<10	ND<10
Aug 87	NA	ND<10	NA	NA	NA	NA	50	NA	NA	ND<10	NA	ND<10	ND<10
Nov 87	ND<10	ND<10	NA	33	147	NA	106	271	24	ND<10	14	ND<10	ND<10
Feb 88	NA	ND<10	NA	NA	NA	NA	1855	NA	NA	ND<10	NA	10	ND<10
Jun 88	NA	22	NA	NA	NA	NA	2010	NA	NA	ND<10	NA	ND<10	12
Aug 88	NA	110	NA	NA	NA	NA	7600	NA	NA	ND<10	NA	43	870
Dec 88	NA	20	NA	NA	NA	NA	300	NA	NA	ND<10	NA	170	ND<10
Mar 89	NA	ND<10	NA	NA	NA	NA	5000	NA	NA	ND<10	NA	100	ND<10
Jun 89	NA	ND<10	NA	NA	NA	NA	300	NA	NA	ND<10	NA	30	ND<10
Aug 89	NA	ND<10	NA	NA	NA	NA	1270	NA	NA	ND<10	NA	10	ND<10
Dec 89	NA	ND<10	NA	NA	NA	NA	850	NA	NA	ND<10	NA	ND<10	ND<10

NA = Not available

ND< = Not detected at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-3

(µg/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Mar 90	NA	ND<10	NA	NA	NA	NA	1000	NA	NA	ND<10	NA	ND<10	ND<10
Jun 90	NA	ND<10	NA	NA	NA	NA	1340	NA	NA	ND<10	NA	12	ND<10
Mar 91	ND<10	ND<10	NA	19	130	NA	1550	ND<10	130	ND<10	10	ND<10	ND<10
Apr 91	ND<10	ND<100	170	ND<10	150	NA	2700	ND<10	200	ND<100	ND<10	ND<100	ND<500
Nov 91	ND<100	ND<100	67	ND<100	81	ND<100	1067	ND<100	74	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	70	ND<10	80	ND<10	366	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	208	ND<5	92	18	110	ND<5	ND<5	ND<5	ND<5	ND<10	9	ND<5	ND<25
Oct 92	ND<10	ND<10	ND<10	13	87	11	408	ND<10	64	ND<10	ND<10	ND<10	ND<50
Jan 93	20	ND<10	140	32	130	22	ND<10	ND<10	120	ND<10	16	ND<10	ND<50
Mar 93	ND<10	ND<10	140	21	130	40	ND<10	ND<10	100	ND<10	12	ND<10	ND<50
Jun 93	ND<10	ND<10	160	28	140	29	360	ND<10	140	ND<10	16	ND<10	ND<50

NA = Not available ND< = Non detectable at detection limit D-DRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-4

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Aug 84	13	NA	NA	NA	5	NA	NA	NA	NA	NA
Dec 84	0.5	NA	NA	NA	5	NA	NA	NA	NA	NA
Mar 85	41	ND<10	ND<10	ND<10	ND<10	NA	99	ND<10	20	ND<10
Jun 85	ND<1	ND<10	ND<10	ND<10	3	NA	194	ND<10	46	ND<10
Sep 85	ND<1	ND<10	ND<10	ND<10	ND<10	NA	ND<10	20	13	ND<10
Nov 85	14	ND<10	40	17	10	NA	60	ND<10	18	ND<10
Feb 86	ND<1	ND<10	ND<10	ND<10	ND<10	NA	47	ND<10	10	ND<10
May 86	70	ND<10	ND<10	18	ND<10	NA	270	ND<10	ND<10	ND<10
Sep 86	ND<1	ND<10	ND<10	16	ND<10	NA	76	ND<10	17	ND<10
Nov 86	ND<1	ND<10	ND<10	ND<10	ND<10	ND<30	37	ND<10	ND<10	ND<10
Mar 87	10	ND<10	ND<10	ND<10	D-BRL	NA	55	ND<10	ND<10	ND<10
May 87	219	74	NA	ND<10	138	NA	55	ND<10	ND<10	ND<10
Aug 87	4	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Nov 87	24	ND<10	62	20	10	ND<10	136	ND<10	35	D-BRL
Feb 88	7	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Jun 88	31	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Aug 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Dec 88	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Mar 89	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Jun 89	2	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Aug 89	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Dec 89	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-4

(ppb)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Mar 90	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Jun 90	ND<1	NA	NA	NA	ND<10	NA	NA	NA	NA	ND<10
Mar 91	ND<10	ND<10	NA	ND<10	ND<10	ND<10	10	ND<10	ND<10	ND<10
Apr 91	4	ND<10	ND<10	2	ND<1	6	52	ND<10	ND<10	ND<20
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	126	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	82	ND<5	ND<5	ND<5
Oct 92	ND<5	ND<5	ND<10	ND<5	ND<5	10	79	ND<10	ND<10	ND<10
Jan 93	ND<5	ND<5	ND<10	ND<5	ND<5	10	79	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	16	ND<10	ND<10	ND<10
Jun 93	ND<5	ND<5	ND<10	ND<5	ND<5	6	89	ND<10	ND<10	ND<10

NA = Not available ND< = Non detectable at detection limit D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SFTC: ENGLEWOOD YARD, HOUSTON, TEXAS

MW-4

(ug/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Aug 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<20
Dec 84	NA	ND<10	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	ND<10
Mar 85	ND<10	ND<10	NA	ND<10	69	NA	718	ND<10	ND<10	ND<10	10	ND<10	ND<10
Jun 85	ND<10	ND<10	NA	24	145	NA	906	ND<10	ND<10	ND<10	74	ND<10	ND<10
Sep 85	ND<10	ND<10	NA	ND<10	21	NA	11	ND<10	19	ND<10	ND<10	ND<10	ND<10
Nov 85	ND<10	ND<10	NA	ND<10	56	NA	100	ND<10	28	ND<10	ND<10	ND<10	ND<10
Feb 86	ND<10	ND<10	NA	ND<10	26	NA	200	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
May 86	ND<10	ND<10	NA	ND<10	98	NA	1590	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
Sep 86	ND<10	ND<10	NA	ND<10	37	NA	540	ND<10	16	ND<10	ND<10	ND<10	ND<10
Nov 86	ND<10	ND<10	NA	ND<10	17	NA	117	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
Mar 87	ND<10	ND<10	NA	ND<10	33	NA	289	ND<10	18	ND<10	ND<10	ND<10	ND<10
May 87	ND<10	ND<10	NA	ND<10	23	NA	1100	10	ND<10	ND<10	ND<10	ND<10	ND<10
Aug 87	NA	ND<10	NA	NA	NA	NA	808	NA	NA	ND<10	NA	ND<10	ND<10
Nov 87	19	D-BRL	NA	18	69	NA	1272	157	ND<10	ND<10	11	ND<10	ND<10
Feb 88	NA	ND<10	NA	NA	NA	NA	556	NA	NA	10	NA	ND<10	ND<10
Jun 88	NA	ND<10	NA	NA	NA	NA	375	NA	NA	ND<10	NA	ND<10	ND<10
Aug 88	NA	49	NA	NA	NA	NA	950	NA	NA	ND<10	NA	ND<10	160
Dec 88	NA	ND<10	NA	NA	NA	NA	450	NA	NA	ND<10	NA	ND<10	ND<10
Mar 89	NA	ND<10	NA	NA	NA	NA	5	NA	NA	ND<10	NA	ND<10	ND<10
Jun 89	NA	ND<10	NA	NA	NA	NA	120	NA	NA	ND<10	NA	ND<10	ND<10
Aug 89	NA	ND<10	NA	NA	NA	NA	5	NA	NA	ND<10	NA	ND<10	ND<10
Dec 89	NA	ND<10	NA	NA	NA	NA	5	NA	NA	ND<10	NA	ND<10	ND<10

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-4

(ug/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Mar 90	NA	ND<10	NA	ND<10	NA	NA	5	NA	NA	ND<10	NA	ND<10	ND<10
Jun 90	NA	ND<10	NA	ND<10	NA	NA	181	NA	NA	ND<10	NA	ND<10	ND<10
Mar 91	ND<10	ND<10	NA	ND<10	ND<10	NA	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
Apr 91	48	ND<20	21	ND<10	21	28	380	ND<10	ND<10	ND<20	ND<10	ND<20	ND<100
Nov 91	ND<100	ND<100	62	ND<100	38	ND<100	124	ND<100	24	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	35	ND<5	42	ND<5	35	ND<5	822	ND<5	ND<5	ND<10	ND<5	ND<5	ND<25
Oct 92	ND<10	ND<10	44	ND<10	47	89	367	ND<10	21	ND<10	ND<10	ND<10	ND<50
Jan 93	ND<12	ND<10	29	ND<10	34	63	ND<10	ND<10	12	ND<10	ND<10	ND<10	ND<50
Mar 93	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	35	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jun 93	ND<10	ND<10	46	ND<10	44	110	ND<10	ND<10	14	ND<10	ND<10	ND<10	ND<50

NA = Not available ND< = Non detectable at detection limit D-PL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-5

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Dec 90	ND<5	ND<5	NA	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10
Feb 91	ND<5	ND<5	NA	ND<5	ND<5	ND<5	48	ND<20	ND<20	ND<20
Apr 91	ND<1	NA	NA	2	ND<1	3	29	ND<20	ND<20	ND<20
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	226	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	47	ND<10	ND<10	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	76	ND<5	ND<5	ND<5
Oct 92	ND<5	ND<5	ND<10	9	ND<5	19	82	ND<10	ND<10	ND<10
Jan 93	ND<5	ND<5	ND<10	7	ND<5	15	76	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	6	ND<5	15	47	ND<10	ND<10	ND<10
Jun 93	ND<5	ND<5	ND<10	ND<5	ND<5	7	79	ND<10	ND<10	ND<10

NA = Not available ND< = Not detectable at detection limit D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-5

(ug/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Dec 90	ND<10	ND<10	25	11	31	ND<10	440	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Feb 91	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20	74	ND<20	ND<20	ND<20	ND<20	ND<20	ND<100
Apr 91	37	ND<20	ND<20	ND<20	ND<20	ND<20	190	ND<20	ND<20	ND<20	ND<20	ND<20	ND<100
Nov 91	ND<100	ND<100	ND<100	ND<100	110	ND<100	1283	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	813	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	82	ND<5	28	9	44	ND<5	ND<5	ND<5	ND<5	ND<10	53	ND<5	ND<25
Oct 92	35	ND<10	32	10	51	36	659	ND<10	13	ND<10	ND<10	ND<10	ND<50
Jan 93	ND<10	ND<10	29	ND<10	42	45	659	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Mar 93	ND<10	ND<10	20	ND<10	26	42	440	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jun 93	ND<10	ND<10	32	ND<10	38	17	ND<10	ND<10	11	ND<10	ND<10	ND<10	ND<50

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-7

(µg/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Apr 91	3	NA	NA	5	1	13	130	ND<20	ND<20	ND<20
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
Oct 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	20	ND<10	ND<10	ND<10
Jan 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	39	ND<10	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	20	ND<10	ND<10	ND<10
Jun 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	12	ND<10	ND<10	ND<10

NA = Not available

ND< = Non detectable at detection limit

D BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

MW-7

(µg/L)

Date	Bis(2-Ethylhexyl) phthalate	Chrysene	Dibenzo-furan	Fluoranthene	Fluorene	2-Methyl-naphthalene	Naphthalene	Nitro-benzene	Phenanthrene	Phenol	Pyrene	2,4-Dimethyl-phenol	4-Nitro-phenol
Apr 91	ND<20	ND<20	41	ND<20	69	48	660	ND<20	42	ND<20	ND<20	ND<20	ND<100
Nov 91	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100	ND<100
Mar 92	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<25
Oct 92	23	ND<10	ND<10	ND<10	14	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jan 93	ND<10	ND<10	ND<10	ND<10	16	25	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Mar 93	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50
Jun 93	ND<10	ND<10	ND<10	ND<10	12	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<50

NA = Not available

ND< = Non detectable at detection limit

D-BRL = Detected, but below reporting limit

HISTORICAL RESULTS OF LABORATORY TESTING - GROUNDWATER COMPLIANCE PLAN
SPTCo ENGLEWOOD YARD, HOUSTON, TEXAS

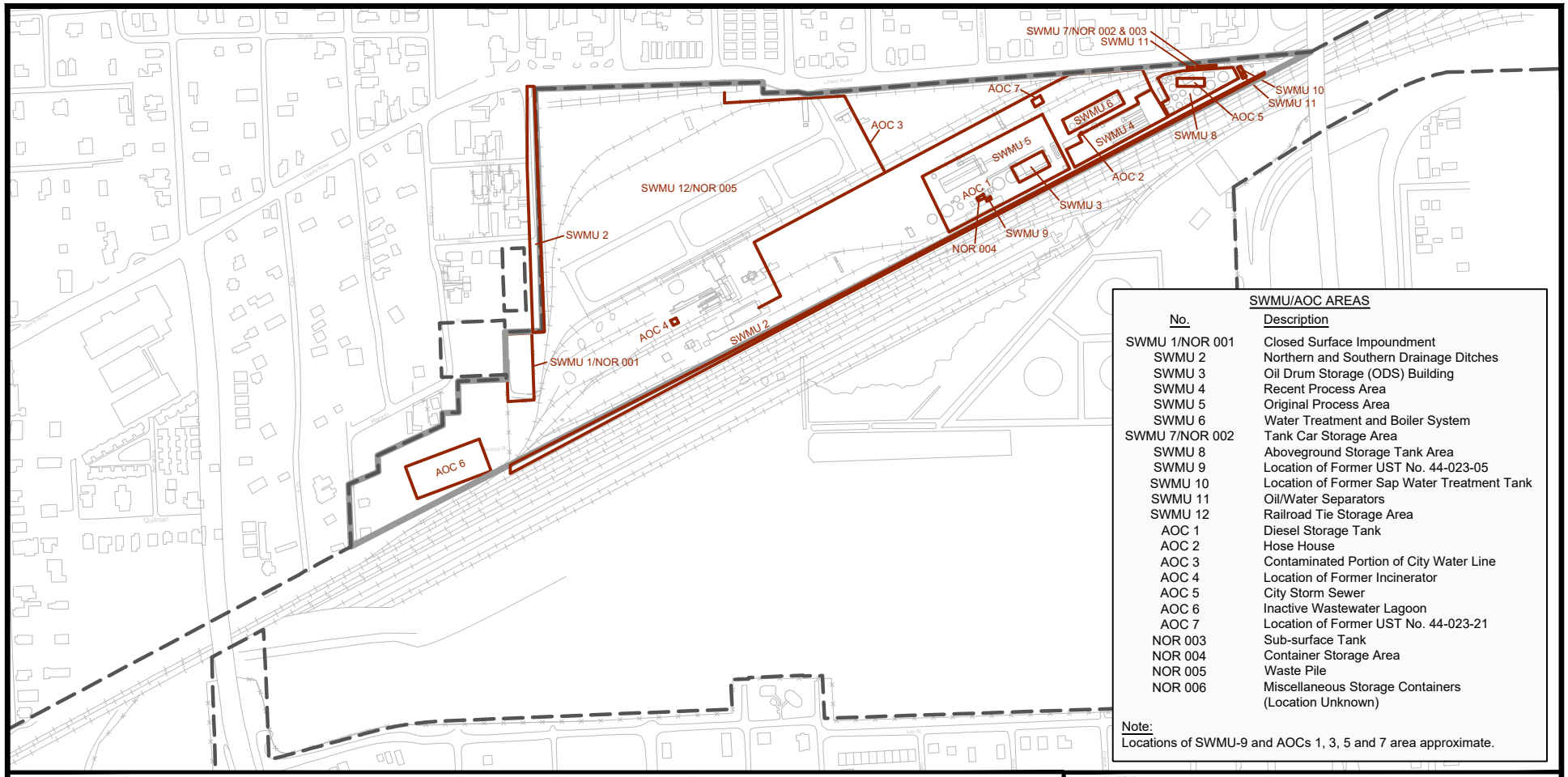
MW-8

(ug/L)

Date	Benzene	Chlorobenzene	Dichloromethane	Ethylbenzene	Toluene	Xylenes	Acenaphthene	Acenaphthylene	Anthracene	Benzo(A)Anthracene
Apr 91	2	NA	NA	ND<1	ND<1	ND<1	25	ND<20	ND<20	ND<20
Nov 91	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	95	ND<100	ND<100	ND<100
Mar 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10
Jul 92	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
Oct 92	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10
Jan 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<23	ND<10	ND<10
Mar 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	12	ND<10	ND<10	ND<10
Jun 93	ND<5	ND<5	ND<10	ND<5	ND<5	ND<5	ND<10	ND<10	ND<10	ND<10

NA = Not available
ND< = Non detectable at detection limit

Appendix 2: Figure C.3 (Locations of Former Waste Management Units)



SWMU/AOC AREAS

No.	Description
SWMU 1/NOR 001	Closed Surface Impoundment
SWMU 2	Northern and Southern Drainage Ditches
SWMU 3	Oil Drum Storage (ODS) Building
SWMU 4	Recent Process Area
SWMU 5	Original Process Area
SWMU 6	Water Treatment and Boiler System
SWMU 7/NOR 002	Tank Car Storage Area
SWMU 8	Aboveground Storage Tank Area
SWMU 9	Location of Former UST No. 44-023-05
SWMU 10	Location of Former Sap Water Treatment Tank
SWMU 11	Oil/Water Separators
SWMU 12	Railroad Tie Storage Area
AOC 1	Diesel Storage Tank
AOC 2	Hose House
AOC 3	Contaminated Portion of City Water Line
AOC 4	Location of Former Incinerator
AOC 5	City Storm Sewer
AOC 6	Inactive Wastewater Lagoon
AOC 7	Location of Former UST No. 44-023-21
NOR 003	Sub-surface Tank
NOR 004	Container Storage Area
NOR 005	Waste Pile
NOR 006	Miscellaneous Storage Containers (Location Unknown)

Note:
Locations of SWMU-9 and AOCs 1, 3, 5 and 7 area approximate.

EXPLANATION

- UPRR Property Boundary
- UPRR Facility Boundary
- Historic Structure and Feature
- Road, Parking Lot, Sidewalk
- Fence
- Railroad

N

Approx. Scale in Feet

0 250 500

SOURCE:
Base map from ERM-Southwest, Inc APAR Addendum, Fig 3-1, dated June 2004.

UNION PACIFIC RAILROAD CO.

HOUSTON WOOD PRESERVING WORKS

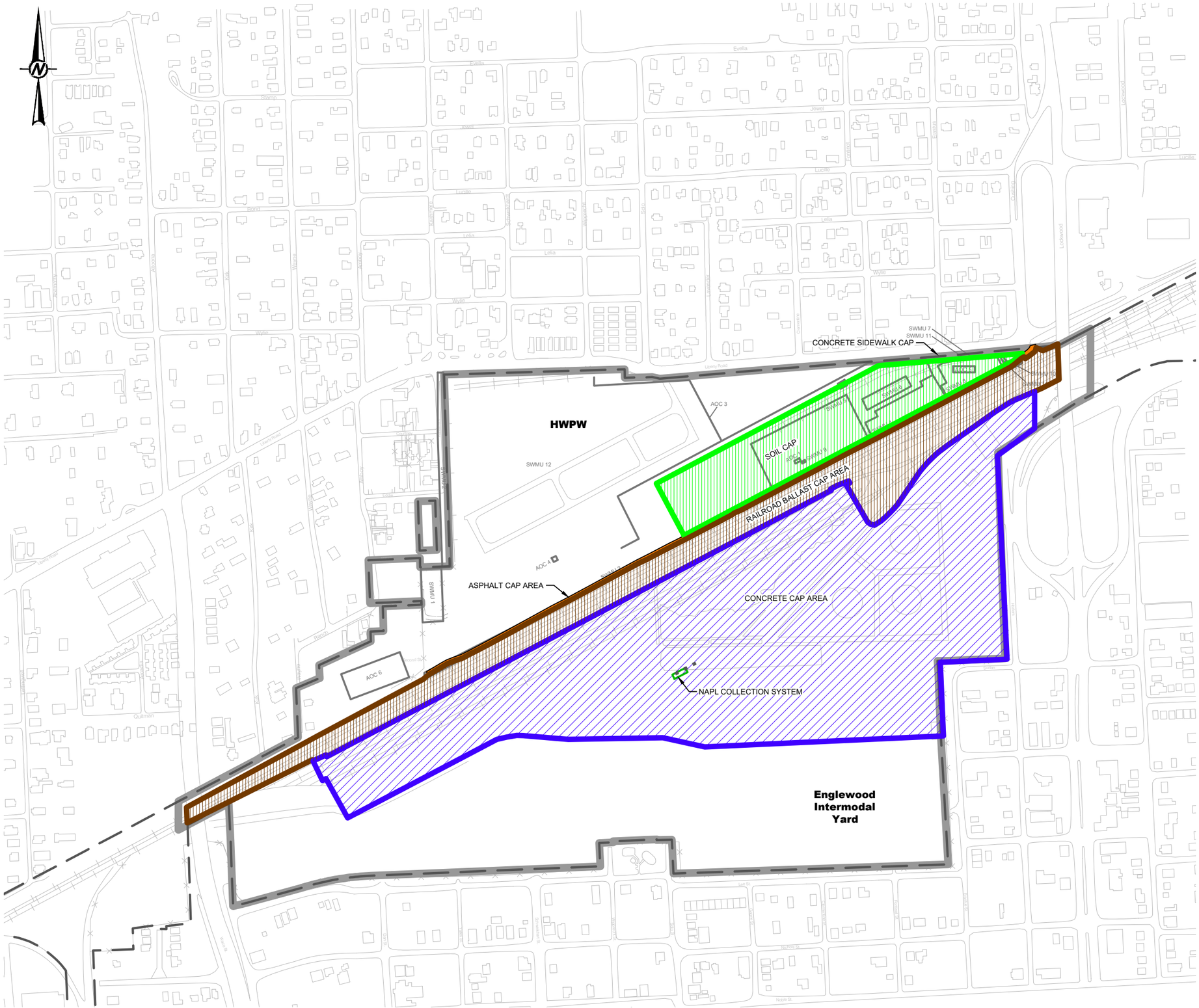
Figure C.3

LOCATIONS OF FORMER WASTE MANAGEMENT UNITS

PROJECT: 1358	BY: AJD	REVISIONS
DATE: NOV., 2014	CHECKED: ECM	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Appendix 3: Figure 2A-1a (Response Action-Soil Capped Areas and NAPL Collection System)



LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- HISTORIC STRUCTURE AND FEATURE
- RAILROAD BALLAST CAP AREA
- ASPHALT CAP AREA
- SOIL CAP
- CONCRETE CAP AREA
- NAPL COLLECTION SYSTEM SUMP
- EXISTING NAPL COLLECTION SYSTEM (CONSTRUCTED FEB. 2019)

REFERENCE(S)

BASE MAP FROM ERM-SOUTHEAST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

0 200 400
1" = 400' FEET

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
RESPONSE ACTION - SOIL
CAPPED AREAS AND NAPL COLLECTION SYSTEM

CONSULTANT

GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-17
DESIGNED	AJD
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

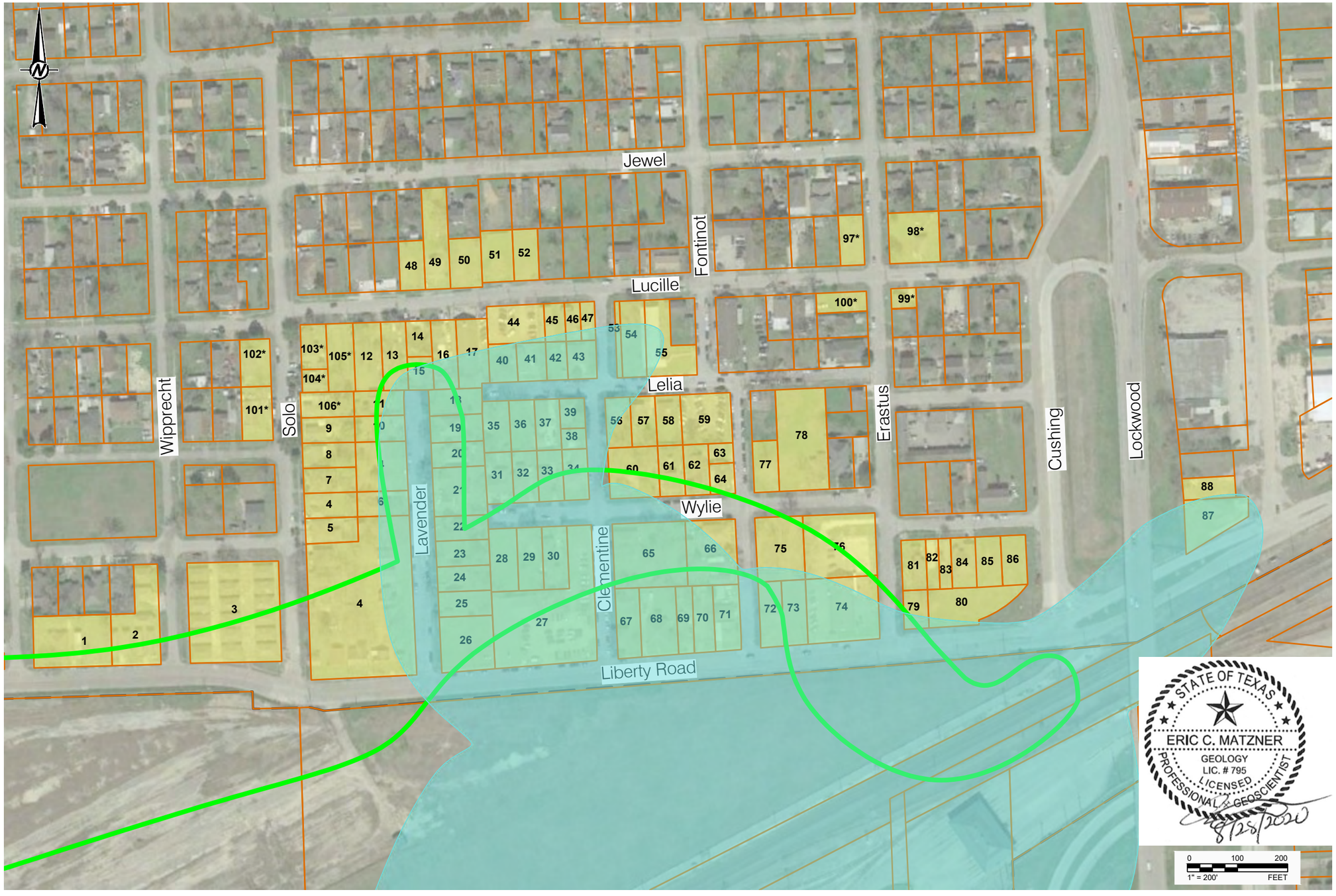
PROJECT NO.	REV.	FIGURE
19119232	0	2A-1a

Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG 2A-1a - Response Action Design-Soil (Capped Areas and NAPLE Collection System).dwg | Last Edited By: rsalazar Date: 2020-08-12 Time:2:20:04 PM | Printed By: adiamond Date: 2020-08-17 Time:5:38:07 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Appendix 4: Figure 1A-2
(Off-Site Affected Properties [North])

MAP ID	PARCEL ADDRESS
1	4705 Liberty Rd
2	4713 Liberty Rd
3	2902 Wipprecht St # 18
4	2909 Lavender St
5	2922 Solo St
6	2925 Lavender St
7	2930 Solo St
8	2934 Solo St
9	2938 Solo St
10	2937 Lavender St
11	2941 Lavender St
12	4910 Lucille St
13	5002 Lucille St
14	5004 Lucille St
15	2943 Lavender St
16	5006 Lucille St
17	5008 Lucille St
18	2942 Lavender St
19	2938 Lavender St
20	2934 Lavender St
21	2926 Lavender St
22	2924 Lavender St
23	2922 Lavender St
24	2910 Lavender St
25	2906 Lavender St
26	2904 Lavender St
27	5005 Liberty
28	0 Wylie St
29	5006 Wylie St
30	5010 Wylie St
31	5005 Wylie St
32	5007 Wylie St
33	5011 Wylie St
34	2901 Clementine St
35	5002 Lelia St
36	0 Lelia St
37	5014 Lelia St
38	2921 1/2 Clementine
39	2921 Clementine St
40	0 Lelia St
41	5009 Lelia St
42	0 Lelia
43	5015 Lelia St
44	5012 Lucille
45	5014 Lucille St
46	5016 Lucille St
47	0 Lucille
48	5005 Lucille St
49	5005 Lucille St
50	5007 Lucille St
51	5009 Lucille St
52	0 Lucille St
53	0 Lelia
54	705 Lucille
55	0 Leila St
56	2918 Clementine St
57	5116 Lelia St
58	5112 Lelia St
59	5118 Lelia St
60	5107 Wylie St
61	5107 Wylie St
62	5111 Wylie St
63	2913 Fontinot St
64	5119 Wylie St
65	2820 Clementine St
66	2813 Fontinot St
67	5101 Liberty Rd
68	5105 Liberty Rd
69	5109 Liberty Rd
70	5113 Liberty Rd
71	5117 Liberty Rd
72	5201 Liberty Rd
73	5201 Liberty Rd
74	2809 Erastus St # 1
75	5201 Wylie St
76	2809 Erastus St
77	5201 Wylie St
78	5202 Lelia St
79	5301 Liberty Rd
80	5311 Liberty Rd
81	2806 Erastus St
82	5304 Wylie St
83	5304 1/2 Wylie St
84	5308 Wylie St
85	0 Liberty Rd
86	5311 Liberty Rd
87	3300 E Lockwood Dr
88	3300 E Lockwood
97	3101 Erastus St
98	5303 Lucille St
99	5302 Lucille St
100	3009 Erastus St
101	4807 Lucille St
102	4810 Lucille St
103	4900 Lucille St
104	2946 Solo St
105	4902 Lucille St
106	2940 Solo St



LEGEND

GROUNDWATER PCLE ZONES (JAN-MAR 2020) (A-TZ, B-CZ/B-TZ AND C-TZ)

GROUNDWATER PCLE ZONE - ARSENIC (JAN-MAR 2020) (A-TZ AND B-TZ)

REFERENCE(S)

AERIAL PHOTO FROM GOOGLE EARTH, IMAGERY DATED 2/23/19, AND PROPERTY INFORMATION FROM HARRIS COUNTY APPRAISAL DISTRICT (HCAD), 2018.

NOTE(S)

1. ALL PROPERTIES ARE IN HOUSTON, HARRIS COUNTY, COUNTY CODE 101, 77026
2. * - INCLUDED DUE TO ARSENIC DETECTED AT CONCENTRATIONS ABOVE THE PROTECTIVE CONCENTRATION LEVELS (PCL) IN GROUNDWATER SAMPLES COLLECTED IN MAY/JUNE 2020 FROM MONITORING WELLS INSTALLED IN 2020. OTHER SITE-SPECIFIC COCs HAVE NOT BEEN DETECTED ABOVE PCLs IN THE NEW WELLS IN THESE AREAS.

CLIENT
UNION PACIFIC RAILROAD CO.

CONSULTANT
GOLDER

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

PROJECT
HOUSTON WOOD PRESERVING WORKS

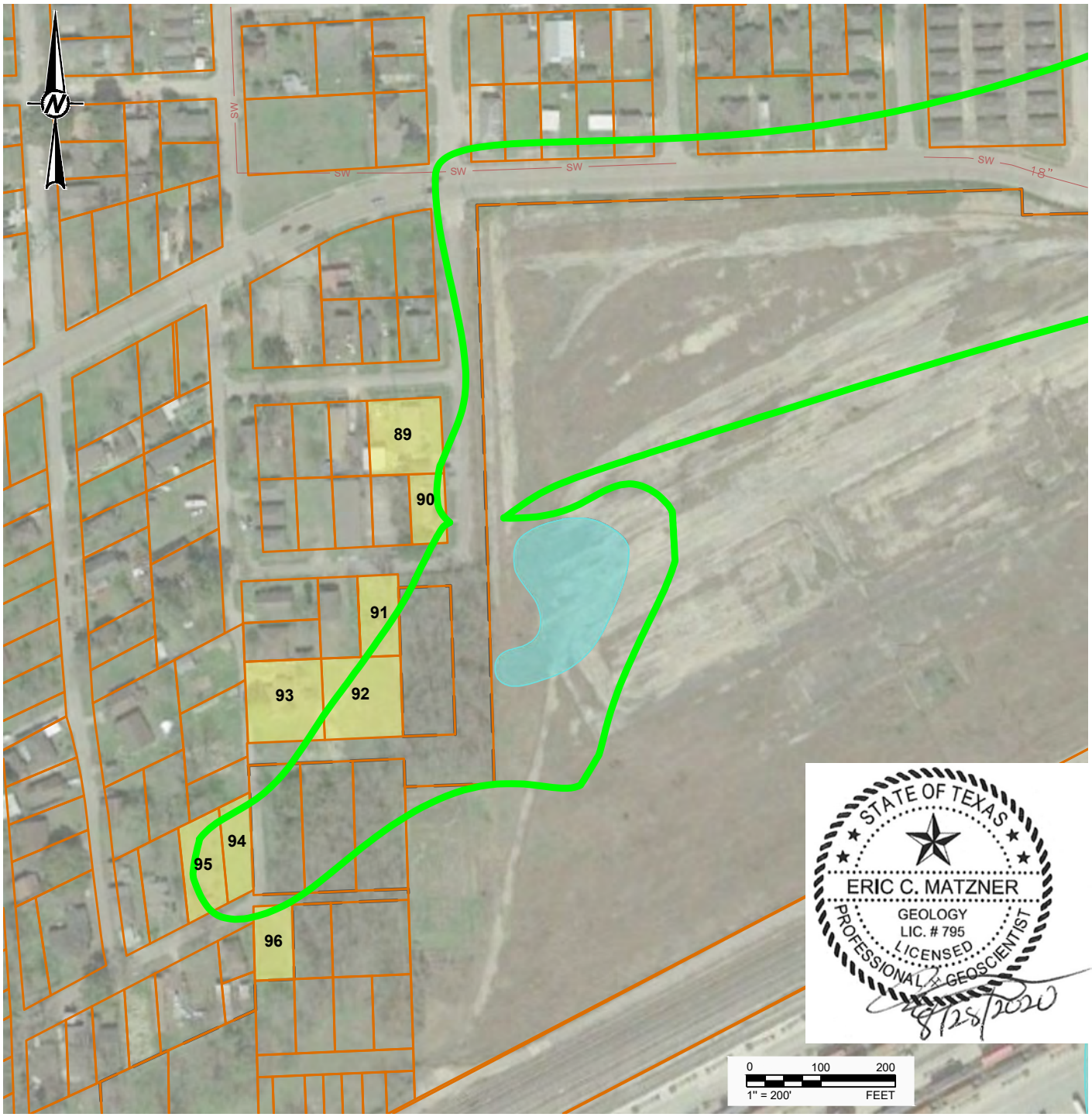
TITLE
OFF-SITE AFFECTED PROPERTIES (NORTH)

PROJECT NO. 19119232 | REV. 0 | FIGURE 1A-2

Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG 1A-2 - Off-Site Affected Properties (North).dwg | Last Edited By: rsalazar Date: 2020-08-28 Time:11:31:31 AM | Printed By: RSalazar Date: 2020-08-28 Time:1:14:54 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Appendix 5: Figure 1A-3
(Off-Site Affected Properties [West])



STATE OF TEXAS
ERIC C. MATZNER
GEOLOGY
LIC. # 795
LICENSED
PROFESSIONAL GEOSCIENTIST
8/28/2020

MAP ID	PARCEL ADDRESS
89	4518 Courtney St
90	2803 Kashmere St
91	4508 Eddie St
92	0 Ranch St
93	2604 Amboy St
94	0 Quitman St
95	4425 Quitman St
96	0 1St St

LEGEND

GROUNDWATER PCLE ZONES (JAN-MAR 2020)
(A-TZ, B-CZ/B-TZ AND C-TZ)

GROUNDWATER PCLE ZONE - ARSENIC (JAN-MAR 2020)
(A-TZ AND B-TZ)

NOTE(S)

1. ALL PROPERTIES ARE IN HOUSTON, HARRIS COUNTY, COUNTY CODE 101, 77026

REFERENCE(S)

AERIAL PHOTO FROM GOOGLE EARTH, IMAGERY DATED 2/23/19, AND PROPERTY INFORMATION FROM HARRIS COUNTY APPRAISAL DISTRICT (HCAD), 2018.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
OFF-SITE AFFECTED PROPERTIES (WEST)

CONSULTANT
GOLDER

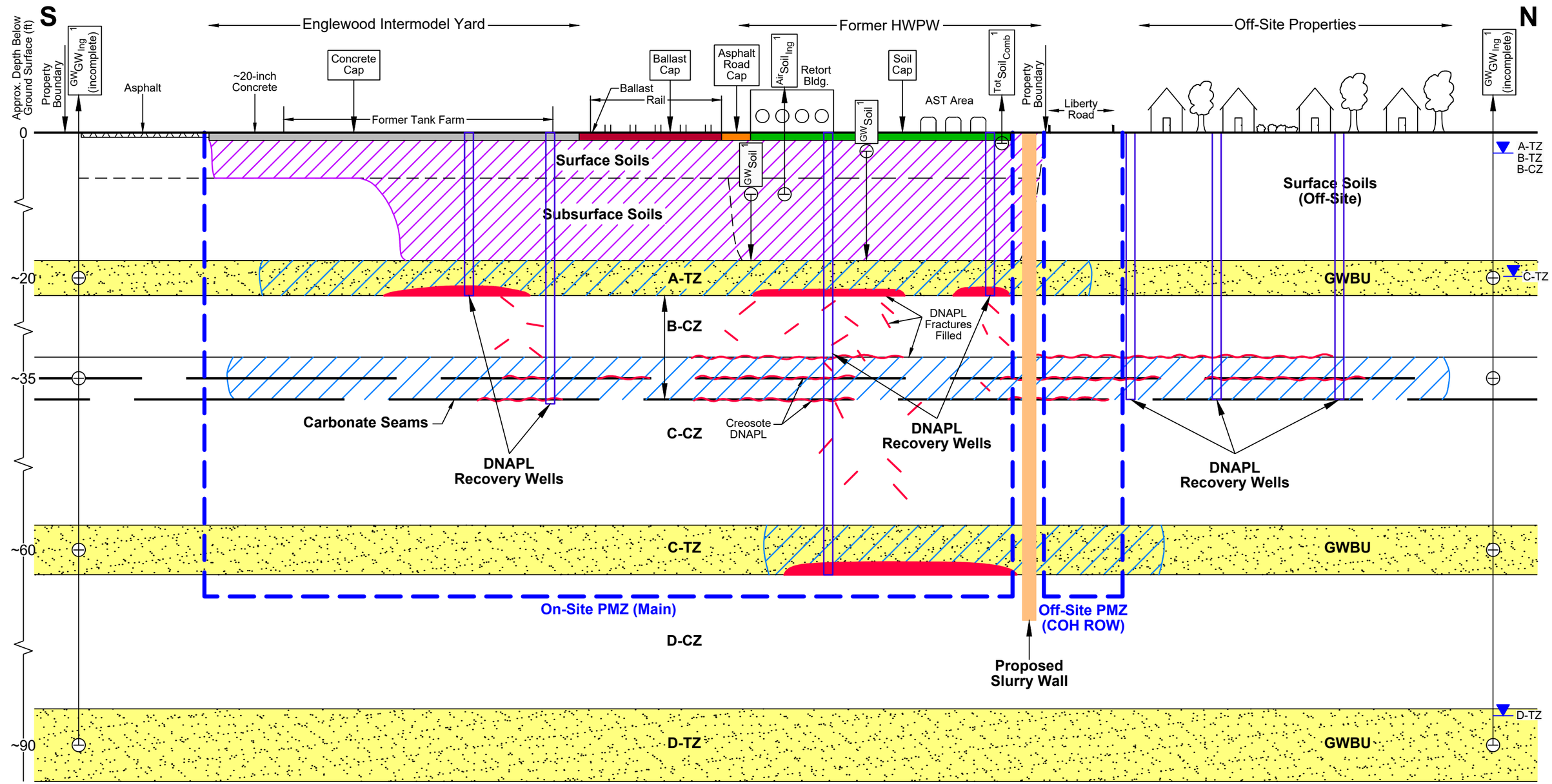
YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | FIGURE 1A-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

Last Edited By: rsalazar Date: 2020-08-28 Time:11:32:03 AM | Printed By: RSalazar Date: 2020-08-28 Time:1:16:16 PM
Path: \\texarkanadata\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG 1A-3 - Off-Site Affected Properties (West).dwg

Appendix 6: Figure 1A-4 Cross-Section of Below-Ground Areas at and Near the Site



LEGEND

- SOIL AFFECTED PROPERTY
- GROUNDWATER AFFECTED PROPERTY
- PMZ
- PROPOSED SLURRY WALL

STATE OF TEXAS
ERIC C. MATZNER
GEOLOGY
LIC. # 795
LICENSED
PROFESSIONAL GEOSCIENTIST
8/28/2020

NOTE(S)

1. PROTECTIVE CONCENTRATION LEVEL (PCL) NOMENCLATURE FOR DEFAULT EXPOSURE PATHWAYS.
2. ALL LOCATIONS, BOUNDARIES AND DEPTHS SHOWN HAVE BEEN GENERALIZED FOR CSM PURPOSES AND ARE APPROXIMATE.

CLIENT
UNION PACIFIC RAILROAD CO.

CONSULTANT
GOLDER

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD
REVIEWED	ECM
APPROVED	ECM

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
CONCEPTUAL SITE MODEL (SOUTH-NORTH)

PROJECT NO.	REV.	FIGURE
19119232	0	1A-4

Path: \\texarkanaldata\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG 1A-4 - Conceptual Site Model S-N.dwg | Last Edited By: adiamond Date: 2020-08-29 Time:3:20:05 PM | Printed By: adiamond Date: 2020-08-29 Time:3:20:46 PM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Appendix 7: List of USB Drive Documents

Main Folder	Sub-folder1	Sub-folder2	Sub-folder3	File Name
Documentation	APAR	---		1-Houston, tx - Wood Preserving Works - APAR July 2000.pdf
Documentation	APAR			2-Houston, tx - Wood Preserving Works - Revised APAR June 2004.pdf
Documentation	APAR			3-Houston, tx - Wood Preserving Works - APAR Addendum 20090713.pdf
Documentation	APAR			3-Houston, tx - Wood Preserving Works - APAR Addendum Appendices 20090713.pdf
Documentation	APAR			4-Houston, TX - Wood Preserving Works - Updated APAR Addendum_Vol I & II 20101015.pdf
Documentation	APAR			5-Houston, tx - Wood Preserving Works - APAR Addendum Update 03012011.pdf
Documentation	APAR			6-Houston, tx - Wood Preserving Works - RAP Attachement 1A 20141121.pdf
Documentation	City of Houston	COH Utilities		P34535_84in_WL.pdf
Documentation	City of Houston	HHD		july-29-2019-drinking-water-sample-analysis-and-location.pdf
Documentation	DNAPL Recovery			1-Houston, tx - Wood Preserving Works - TCEQ Proposed DNAPL Recovery Test Work plan 20130205.pdf
Documentation	DNAPL Recovery			2-Houston, tx - Wood Preserving Works - DNAPL Recovery Test Results 1st 8 months 20131016.pdf
Documentation	DNAPL Recovery			3-Houston, tx - Wood Preserving Works - DNAPL Recovery Test Results 1st 12-months_20140317.pdf
Documentation	DNAPL Recovery			4-Houston, tx - Wood Preserving Works - DNAPL Recovery Test Results 1st 18-months_20140925.pdf
Documentation	DNAPL Recovery			5-Houston, tx - Wood Preserving Works - DNAPL Recovery Test 24 Month Report 20150410.pdf
Documentation	DNAPL Recovery			6-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20170317.pdf
Documentation	DNAPL Recovery			6a-Houston, tx - Wood Preserving Works - TCEQ Review DNAPL Recovery Report 20170627.pdf
Documentation	DNAPL Recovery			7-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20180417.pdf
Documentation	DNAPL Recovery			8-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20180830.pdf
Documentation	DNAPL Recovery			9-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20181218.pdf
Documentation	DNAPL Recovery			10-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20190312.pdf
Documentation	DNAPL Recovery			11-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_2019 1st Quarter.pdf
Documentation	DNAPL Recovery			12-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20190830.pdf
Documentation	DNAPL Recovery			13-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20191105.pdf
Documentation	DNAPL Recovery			14-Houston, tx - Wood Preserving Works - DNAPL Recovery Activities Report_20200316.pdf
Documentation	DNAPL Recovery			15-Houston, tx - Wood Preserving Works - DNAPL Recov Report 1Q20_20200606.pdf
Documentation	DNAPL Recovery			16-Houston, tx - Wood Preserving Works - DNAPL Recov Report 2Q20_20200828.pdf
Documentation	DNAPL Recovery			17-Houston, tx - Wood Preserving Works - DNAPL Recov Report 3Q20_20201106.pdf
Documentation	DNAPL Recovery			18-Houston, tx - Wood Preserving Works - DNAPL Recov Report 4Q20_20210212.pdf
Documentation	DNAPL Recovery			19-Houston, tx - Wood Preserving Works - DNAPL Recov Report 1Q21_20210514.pdf
Documentation	DNAPL Recovery			20-Houston, tx - Wood Preserving Works - DNAPL Recov Report 2Q21_20210728.pdf
Documentation	EPA-ITRC Docs			EPA, 2003 – The DNAPL Remediation Challenge_EPA-600-R03143, December 2003.pdf
Documentation	EPA-ITRC Docs			ITRC, 2011 - Integrated DNAPL Site Strategy-1.pdf
Documentation	GW and Assessment Reports	Liberty Rd SW Sewer		Houston tx - Wood Preserving Works - COH SW Line Assessment WP 20210712.pdf
Documentation	GW and Assessment Reports	Liberty Rd SW Sewer		Houston tx - Wood Preserving Works - COH SW Line Assessment WP Response Letter_20210922.pdf
Documentation	GW and Assessment Reports	Liberty Rd SW Sewer		IHWCA_31547_OUT_20210831_Comments- Storm Water Sewer Ass WP.pdf
Documentation	GW and Assessment Reports	Liberty Rd SW Sewer		IHWCA_31547_OUT_20210929_Approval- COH SW Assessment WP_26617013.pdf
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - SG Probe Water Evaluation 20201023.pdf
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - Interim NAPL & TPH Report.pdf
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - PCP Surface Soil Assessment Report Final 20200330
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - Updated PCP Soil Assessment Report Final 20200714
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - Updated VI Assessment 202000804.pdf
Documentation	GW and Assessment Reports	Other Assessments		Houston, tx - Wood Preserving Works - Updated VI Assessment 202001221.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		1-Terranext Annual Report Jan1 through Dec 31,1995.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		2-Terranext CP Semi-Annual Report Jan1 through June 30, 1996.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		3-Terranext GW First Semiannual Period 1996.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		4-Terranext Semi-Annual Report July1 through Dec 31, 1996.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		5a-Permit No. HW-50343-000 Annual Report Jan1 - Dec31,1996.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		5-Terranext CP Annual Report Jan1 through Dec 31,1996.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		6-Compliance Plan Semi-Annual Report January 1 Through June 30,1997.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		7-Terranext CP Semi-Annual Report Jan 1 through June 30, 1997.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		8-ERM Second Semiannual Event 1997.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		9-ERM Monitoring Report First Semiannual Event 1998.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		10-ERM Annual Report Permit No. HW-05343,Jan1-Dec31, 1998.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		11-ERM Monitoring Report First Semiannual Event 1999.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		12-ERM Monitoring Report Second Semiannual Event 1999.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		13-ERM Monitoring Report First Semiannual Event 2000.pdf

Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		14-ERM Monitoring Report First Semiannual Event 2001.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		15-ERM Monitoring Report Second Semiannual Event 2001.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		16-ERM Annual Report, Permit No. HW-50343-000, Jan1 - Dec31, 2001.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		16-ERM Monitoring Report First Semiannual Event 2002.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		17-ERM Monitoring Report Second Semiannual Event 2002.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		18-ERM Monitoring Report First Semiannual Event 2003.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		19-ERM Monitoring Report Second Semiannual Event 2003.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		20-ERM Annual Report, Permit No. HW-05343-000, Jan1 - Dec31, 2003.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		21-ERM Monitoring Report First Semiannual Event 2004.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		22-ERM Monitoring Report Second Semiannual Event 2004.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		23-ERM Annual Report, Permit No. HW-50343-000, Jan1 - Dec31, 2004.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		24-ERM Monitoring Report First Semiannual Event 2005.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		25-ERM Monitoring Report Second Semiannual Event 2005.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		26-ERM Monitoring Report First Semiannual Event 2006.pdf
Documentation	GW and Assessment Reports	Pre-2007 SWMU 1 GW Reports		27-ERM Monitoring Report Second Semiannual Event 2006.pdf
Documentation	GW and Assessment Reports	Site-Wide GW Reports		Houston, tx - Wood Preserving Works - Response to TCEQ Letter Nov 29, 2017 20180813.pdf
Documentation	GW and Assessment Reports	Site-Wide GW Reports		Houston tx - Wood Preserving Works - Jan 2019 Groundwater Monitoring Report.pdf
Documentation	GW and Assessment Reports	Site-Wide GW Reports		Houston tx - Wood Preserving Works - Groundwater Monitoring Report 20210430.pdf
Documentation	GW and Assessment Reports	Site-Wide GW Reports		Houston, tx - Wood Preserving Works - IGMR Response Letter 20200805.pdf
Documentation	GW and Assessment Reports	Site-Wide GW Reports		Houston, tx - Wood Preserving Works - Interim GW Mon Report_20200430.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2021 1st SA Report.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2007 1st Semi Annual Report.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2007 2nd Semi-Annual Report_Final.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2008 1st semi-annual report final.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2008 2nd semi-annual report.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2009 1st semi-annual report 07_20_2009.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2009 2nd Semi-Annual Report_no data.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2010 1st Semi-Annual Report_July19.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2010 2nd Semiannual Event_FINAL.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2011 1st Semi-Annual Report 20110714.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2011 2nd Semi-Annual Report 20120102.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2012 1st Semi-Annual Report 20120702.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2012 2nd Semi-Annual Report 20130104.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2013 1st Semi-Annual report _20130627.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2013 2nd Semi-Annual Report 20140114.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2014 1st Semi-Annual Report 20140714.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2015 1st SemiAnnual Report 20150629.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2015 2nd Semi Annual Report 20160111.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2016 1st Semi Annual Report 20160712.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2016 2nd Semi-Annual Report 20160103.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2017 1st Semi-Annual Report 20170707.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2017 2nd Semi-Annual Report 20180118.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2018 1st Semi-Annual Report 20180720.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2018 2nd Semi-annual Report 20181221.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2019 1st Semi-Annual Report 20190711.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2019 2nd Semi-Annual Report.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2020 1st Semi-Annual Report 20200706.pdf
Documentation	GW and Assessment Reports	SWMU 1 GW Reports		Houston, tx - Wood Preserving Works - SWMU 1 2020 2nd SA Report 20210114.pdf
Documentation	PRACR			1-Houston, tx - Wood Preserving Works - Post-Harvey PRACR 20170929.pdf
Documentation	PRACR			2-Houston, tx - Wood Preserving Works - Post-Harvey PRACR Updated - 20180117.pdf
Documentation	PRACR			3-Houston, tx - Wood Preserving Works - SWR 31547 - 2018 PRACR 20190328.pdf
Documentation	PRACR			4-Houston tx - Wood Preserving Works Water Line Release 20190918.pdf
Documentation	PRACR			5-Houston, tx - Wood Preserving Works - 2019 PRACR 20200331.pdf
Documentation	PRACR			6-Houston, tx - Wood Preserving Works - 2020 PRACR 20210329.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works- SWR 31547 - Monthly Status Update - Cap Repairs 20181031.pdf
Documentation	PRACR	Monthly Updates	2018	Houston tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20181130.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180420.pdf

Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180521.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180621.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180720 Stamped Letter.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180720.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180831.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20180928.pdf
Documentation	PRACR	Monthly Updates	2018	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20181231.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190204.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190228.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190329.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190430.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190531.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190628.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190731.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20190903.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx - Wood Preserving Works - SWR 31547 - Monthly Status Update - Cap Repairs 20191001.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx-WPW - Monthly Status Update - Cap Repairs 20191104.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 201212.pdf
Documentation	PRACR	Monthly Updates	2019	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 201911.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202001.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202002.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202003.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202004.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202005.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202006.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202007.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202008.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202009.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202010.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202011.pdf
Documentation	PRACR	Monthly Updates	2020	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202012.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202101.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202102.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202103.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202104.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202105.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202106.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202107.pdf
Documentation	PRACR	Monthly Updates	2021	Houston, tx-WPW-SWR 31547 - Monthly Status Update - Cap Repairs 202108_20210915.pdf
Documentation	PRACR	Test Pits		Houston, tx - Wood Preserving Works - SWR 31547 - Test Pit Evaluation 202106.pdf
Documentation	RACR			Houston, tx - Wood Preserving Works RACR 20160718.pdf
Documentation	RACR			Houston, tx - Wood Preserving Works RACR 20170624 Rev 1.pdf
Documentation	RACR			Houston, tx - Wood Preserving Works RACR Rev 2 Aug 2020 replacement pages.pdf
Documentation	RAP			1-Houston, tx - Wood Preserving Works - RCRA Part B Compliance Plan - Response Action Plan 20141121.pdf
Documentation	RAP			2-Houston, tx - Wood Preserving Works - Revised Response Action Plan with attachments and appendices 20160108.pdf
Documentation	RAP			3-Houston, tx - Wood Preserving Works - RAP Attachement 1A 20141121.pdf
Documentation	RAP			4-Houston, tx - Wood Preserving Works - Revised Response Action Plan Rev 2 20160715.pdf
Documentation	RAP			5-Houston, tx - Wood Preserving Works - Revised Response Action Plan Rev 3 20170624.pdf
Documentation	RAP			6-Houston, tx - Wood Preserving Works - Conceptual RAP Rev 4 20190710.pdf
Documentation	RAP			7-Houston tx - Wood Preserving Works - CP Att XI.D RAP Rev 5_20200831.pdf
Documentation	RAP			8-Houston, tx - Wood Preserving Works - RAP Rev 7 - Additional Information for IDP 20210115.pdf
Documentation	RCRA Permit			2021 May - Final Draft Permit, Technical Summary, and Executive Director's Preliminary Decision.pdf
Documentation	RCRA Permit			2021 May - Notice of Application and Preliminary Decision.pdf
Documentation	RCRA Permit			Houston tx - Wood Preserving Works - RAP through Rev 7.pdf
Documentation	RCRA Permit			Houston, tx - Wood Preserving Works - 50343 - TNOD 2 Response 20160703.pdf
Documentation	RCRA Permit			Houston, tx - Wood Preserving Works - 50343 - TNOD 3 Response 20170623.pdf
Documentation	RCRA Permit			Houston, tx - Wood Preserving Works - 50343 - TNOD 4 Response 20190710.pdf

Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - 50343 - TNOD1 Response 20151222.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - Part B Att XI.D-RAP Rev0 20141121.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - Part B RAP Vol II Att 1A 20141121.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - Permit Renewal Rev0 - Part A 20141212.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - Permit Renewal Rev0 - Part B 20141212.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - Permit Renewal Rev0 - Parts A&B 20141212.pdf
Documentation	RCRA Permit		Houston, tx - Wood Preserving Works - RCRA Permit Renewal through Jan 2021.pdf
Documentation	RFA		RCRA Facility Assessment Report-PRC1993.pdf
Documentation	RFI (pre-TRRP)		HWPW Phase I RFI Terranext May 1996.pdf
Documentation	RFI (pre-TRRP)		HWPW Phase 2 Feruary 1998.pdf
Documentation	RFI (pre-TRRP)		HWPW Phase 2B September 1999.pdf
Documentation	Waste		2020 08 NOR.PDF
Documentation	Waste	2007	STEERS 2007 Waste Summary-HWPW-confirmation.pdf
Documentation	Waste	2007	332144 REV.pdf
Documentation	Waste	2008	STEERS 2008 Waste Summary-HWPW-confirmation.pdf
Documentation	Waste	2009	UPRR HWPW STEERS 2009 Annual Report_confirmed.pdf
Documentation	Waste	2009	902086 Houston Wood Preserving Works Final.pdf
Documentation	Waste	2010	1007401 Waste Characterization Final2.pdf
Documentation	Waste	2010	2010 STEERS Annual Waste Summary Report.pdf
Documentation	Waste	2010	1007064 Waste Characterization Final Revised.pdf
Documentation	Waste	2011	2011 STEERS Annual Waste Summary Report.pdf
Documentation	Waste	2012	2012 P2 Annual Report Attachment.pdf
Documentation	Waste	2013	2013 P2 Annual Report Attachment.pdf
Documentation	Waste	2014	2014 waste report STEERS.pdf
Documentation	Waste	2014	2014 P2 Annual Report Attachment.pdf
Documentation	Waste	2015	2015 P2 Annual Report Attachment.pdf
Documentation	Waste	2015	2015 annual waste report STEERS.pdf
Documentation	Waste	2016	TCEQ STEERS AWS Information 2016.pdf
Documentation	Waste	2016	2016 P2 Annual Report Attachment.pdf
Documentation	Waste	2017	2017 P2 Annual Report Attachment.pdf
Documentation	Waste	2017	2017 Annual Waste Report - STEERS - HWPW.pdf
Documentation	Waste	2018	HWPW STEERS 2018 AWS.pdf
Documentation	Waste	2018	HS18020223 Houston TXWood Preserving Works Final.pdf
Documentation	Waste	2018	HS18020543 Houston TXWood Preserving Works IDW Final.pdf
Documentation	Waste	2018	HS18030106 Houston TXWood Preserving Works Final.pdf
Documentation	Waste	2019	STEERS REPORT_2019.pdf.pdf
Documentation	Waste	2019	HS19051772 Houston TXWood Preserving Works REV01 Final.pdf
Documentation	Waste	2019	HS19080668 Water Line Leak.pdf
Documentation	Waste	2019	HS19120483 Houston TXWood Preserving Works Final.pdf
Documentation	Waste	2019	PR APR 2019 Attachment.pdf
Documentation	Waste	2020	HS21010962 Houston TXWood Preserving Works SPLP Final.pdf
Documentation	Waste	2020	2020 STEERS AWS.pdf
Documentation	Waste	2020	HS20020756 Houston TXWood Preserving Works Final.pdf
Documentation	Waste	2020	HS20060314 Houston TXWood Preserving Works SO InvIDW Final.pdf
Documentation	Waste	2020	HS20060631 Houston TXWood Preserving Works Totewater IDW Final.pdf
Documentation	Waste	2020	HS20060998 Houston TXWood Preserving Works SG Soil Water IDW Final.pdf
Documentation	Waste	2020	HS20061366 Houston TXWood Preserving Works PurgewaterIDW Final.pdf
Documentation	Waste	2020	HS20121076 Houston TXWood Preserving Works Final.pdf
Documentation	Waste	2020	HS21010226 Houston TXWood Preserving Works IDW Final.pdf