STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

June 30, 2015

Ms. Jamie Bernard-Drakey
U.S. EPA, Region VII
Superfund Division
11201 Renner Blvd
Lenexa, KS 66219

Dear Ms. Bernard-Drakey:

The Missouri Department of Natural Resources (Department), Hazardous Waste Program's (HWP) Site Assessment Unit (SAU) has completed the following reports under the Superfund (SPF) Combined Cooperative Agreement. As per the grant requirements, enclosed are two electronic copies of each report.

Site Name	Report Type	Recommendation
Laclede Coal Gas	Site Reassessment (SR)	Removal Assessment
Bourbon Lagoon	Abbreviated Preliminary Assessment (APA)	Further CERCLA Assessment Site Inspection

A brief summary of the findings for each site is provided below:

Laclede Coal Gas
Please find a summary of the site and findings in the paragraphs below. The Department would like to suggest the following updates be made to the Superfund Enterprise Management System (SEMS) for the Laclede Coal Gas site (EPA ID: MOD981715980):

1.) Change incorrect address
- The address currently listed on CERCLIS for the Laclede Coal Gas site is "Mound St & Broadway", this is incorrect and it needs to be updated to "Mullanphy and North 1st Streets".

2.) Update Preliminary Assessment and Site Inspection dates
- Under the "Actions" for the site, the Preliminary Assessment actual completion date needs to be changed from 03/27/1990 to 06/23/1988 and the Site Inspection actual completion date needs to be changed from 09/28/1992 to 10/29/1991. When updated, the dates would reflect the date the associated report was completed.

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3.) Laclede Coal Gas to be named Parent site

- The Laclede Coal Gas site should be named a Parent Site for the Mound Street PCB's site (EPA ID: MO0000093682). The Mound Street PCB's site is currently being addressed as a separate site, but is also being addressed under USEPA's Removal Assessment that is being conducted for the Laclede Coal Gas site.

The Department is in the process of sending the primary responsible party, Laclede Gas Company, a letter and a copy of the report.

The Laclede Coal Gas site is the location of a former manufactured gas plant (FMGP) currently occupied by a liquid asphalt petroleum tank farm. The site is located in the City of St. Louis on the northeast corner of the intersection of Mullanphy and North 1st Streets. Historically, an electrical power plant was located on the northeast corner of the FMGP property. Over the years, several investigations were conducted regarding oil slicks on the nearby Mississippi River suspected to originate from the nearby former electric power plant. Numerous oil spills prompted investigations of the FMGP location and an underground storage tank (UST) located just north of the site on another property.

Polychlorinated biphenyls (PCBs) were the main suspected contaminant of concern in the initial investigations; however FMGP constituents were also addressed during subsequent investigations. The various contaminant concerns addressed in multiple investigations of different media (the FMGP, oil leaks, a UST), result in a confusing history with many site name aliases for what would become two USEPA CERCLA sites, Laclede Coal Gas and Mound Street PCB's.

Approximately 930 million gallons of coal tar waste were produced at this facility. It is estimated that roughly 76 percent of the waste was sold, with the remaining 24 percent being buried on site, which is estimated to be 224 million gallons of coal tar waste potentially buried at the site. Contaminants of concern include FMGP constituents, but also the petroleum related constituents in association to the current operations of the asphalt tank farm. The presence of petroleum related compounds could increase the potential for migration of FMGP related contamination, thus increasing the chance for vapor intrusion in the adjacent St. Louis Community Release Center. PCBs should also be included as a potential contaminant of concern because the Mound Street PCB's site is located on the Laclede Coal Gas site and the past sampling did not definitively document that PCBs were released in the environmental media.

Based on the operational history of the Laclede Coal Gas site and the documented release of FMGP-related contaminants to environmental media and the presence of PCBs in a UST near the site, the Department is referring the site to USEPA for removal assessment and/or removal action. The Department sent a Request for Federal Action form to USEPA on April 24, 2014 requesting a response action.

<u>Bourbon Lagoon</u>
The Bourbon Lagoon site is the City of Bourbon's former wastewater treatment lagoon where chemical wastes are suspected to have been dumped and buried. The site is located at 440

Highway J in Bourbon, Missouri, Crawford County. The old lagoon was built in the 1960s and was backfilled starting in 1974 when the new wastewater treatment plant was built. On March 17, 2014, the Department's Rolla Satellite Office received an anonymous citizen report of chemicals purchased by the city being dumped into the lagoon after the city determined the chemicals could not be used. Of particular concern is the City of Bourbon's public drinking water well #2, located approximately 0.36 mile southeast of the former lagoon, having had low level detections of trichloroethylene (TCE) for the past 10 years.

A CERCLA Pre-Screening Investigation was completed on December 30, 2014 with conclusions that SEMS entry was warranted and recommendation for additional CERCLA investigation. The APA form was completed documenting the potential for a release based on the allegations of buried chemicals, the results of a geophysical study, and the potential for the lagoon to be a source of contamination linked to the consistent TCE detections in a nearby city public drinking water well. A Site Inspection was recommended.

If you have any questions or concerns, please do not hesitate to contact me by mail at the Department of Natural Resources, Hazardous Waste Program, P.O. Box 176, Jefferson City, MO 65102-0176, by phone at (573) 751-7880 or 1-800-361-4827, or by e-mail at valerie.wilder@dnr.mo.gov.

Sincerely,

HAZARDOUS WASTE PROGRAM

Valerie Wilder

Valerie Wilder, Chief
Site Assessment Unit
Superfund Section

VW:js

c: Dorothy Franklin, St. Louis Regional Office
Amy Baker, Southeast Regional Office

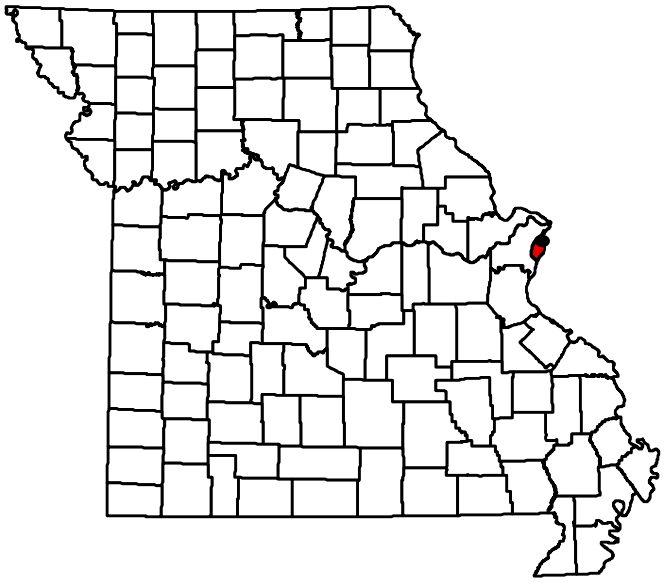
Enclosures

SITE REASSESSMENT REPORT

Laclede Coal Gas Site
St. Louis City, Missouri

MOD981715980

June 12, 2015



Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

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REFERENCES

I. SITE REASSESSMENT NARRATIVE REPORT

DATE: **June 12, 2015**

PREPARED BY: **Hillary Wakefield**
Missouri Department of Natural Resources

SITE: **Laclede Coal Gas**
St. Louis City

C.A. NUMBER: **V99738107**

USEPA ID. NO: **MOD981715980**

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources (MDNR), through a cooperative agreement with the U.S. Environmental Protection Agency (USEPA), conducted a Site Reassessment (SR) at the Laclede Coal Gas site in the City of St. Louis, Missouri.

The Laclede Coal Gas site is the location of a former manufactured gas plant (FMGP), currently occupied by a liquid asphalt petroleum tank farm. In the late 1870's, Laclede Gas Light Company Station "B" (also named Laclede Gas Co.) was constructed on two city blocks northeast of the intersection of North 1st and Mullanphy Streets. The facility operated as an FMGP until the late 1940s. Also shown on historic maps (Figures 2 – 6 in Appendix A), is an electric plant, Laclede Gas Light Company Station "E", located on the second city block next to the FMGP gasometers on the southwest corner of the intersection of Mound Street and Levee. The electric power plant operated under several different owners until 1973 (E&E, 1988). No FMGP structures have been identified on historic maps on the Station "E" property, which is now referred to as the Mound Street PCB's site.

Starting in 1976, investigations were conducted regarding several oil slicks on the Mississippi River suspected to originate from the former electric power plant. In the early 1980s, numerous oil spills, possibly leading to flooding in the electric plant

facility's basement, prompted USEPA investigations of the Station "B" FMGP location and an underground storage tank (UST) located just north of Mound Street on another property. Polychlorinated biphenyls (PCBs) were the main suspected contaminant of concern in the initial investigations; however FMGP constituents were also addressed during subsequent investigations. The various contaminant concerns addressed in multiple investigations of different media (the FMGP, oil leaks, a UST), result in a complex history with many site names and aliases for what would become two USEPA CERCLA sites. These two sites, Laclede Coal Gas (Laclede Gas Light Company Station "B") (EPA ID: MOD981715980 and address of 1700 North 1st Street) and Mound Street PCB's (Laclede Gas Light Company Station "E") (EPA ID: MO0000093682 and address of 1725 North Wharf Street), are located adjacent to each other, originally constructed on two city blocks that eventually became one city block.

The Laclede Coal Gas site was discovered in CERCLIS on August 6, 1987. The site has an alias of Mound Street Power Station SS#07CY. A Preliminary Assessment, addressed under the site name "Mound Street Power Plant", was completed in 1988 and a Screening Site Inspection (SSI) was completed in 1991, with no further action recommended at that time. In 2009, as part of a review of the inventory of FMGP sites in Missouri, MDNR and USEPA determined that the Laclede Coal Gas and Mound Street PCB's sites needed Site Reassessment investigations in order to adequately assess potential releases and the risk to human health and the environment. A review of file information documented a complex history of site names, aliases, addresses, contaminant sources and conclusions and recommendations based on numerous investigations.

The purpose of the Laclede Coal Gas SR investigation was to collect sufficient information through file review and a site reconnaissance to assess if there is any current threat to human health and the environment and to determine the need for additional action under CERCLA/SARA or other authority. The scope of this investigation included reviewing available file information for the Laclede Coal Gas site (USEPA ID: MOD981715980) and the Mound Street PCB's site (USEPA ID: MO0000093682) and collecting additional non-sampling information regarding these two sites. The SR was

initiated on October 6, 2011. The Mound Street PCB's site is also being investigated as a SR and a report will be completed shortly after the completion date for the Laclede Coal Gas SR. The investigation included two site reconnaissance events on September 26, 2013 and October 14, 2014.

2.0 SITE DESCRIPTION

2.1 Location

The Laclede Coal Gas site is located in the City of St. Louis on the northeast corner of the intersection of Mullanphy and North 1st Streets in a mostly industrial area on the Mississippi River floodplain. Figure 1a in Appendix A is a Site Location Map. The Laclede Coal Gas site lies approximately 300 feet west of the Mississippi River and is located in Township 45 North, Range 7 East (Falls, 1993). The geographic coordinates of the site as determined with ArcMap are located in the middle of the boundary of the site 4280861.75 m Northing 745198.18 m Easting (MDNR, 2014b).

Directions to the site are as follows: while traveling on Interstate-70E/US Highway-40 E towards the City of St. Louis, exit at 249C (Convention Center/Busch Stadium exit) and turn left (east) onto Biddle Street. From Biddle Street, turn left (north) onto North 3rd Street, which immediately changes to North Broadway and travel on to Mullanphy Street. Turn right (east) onto Mullanphy Street and turn left on North 1st Street. The Laclede Coal Gas site is located on the right on property currently occupied by Center Point Terminal Company, a storage facility for liquid asphalt.

St. Louis City has a temperate climate with hot summers and cold winters. In winter, the average temperature is 33° Fahrenheit (F), with an average daily minimum temperature of 25° F. In summer, the average temperature is 78° F, with an average daily maximum temperature of 88° F (MWCW, 2013b). The prevailing wind direction is from the northwest, with a mean wind speed of 9 miles per hour (NCDC, 2013). The total annual precipitation in the area is approximately 38.84 inches (MWCW, 2013a). The 2-year, 24-hour rainfall for the area is estimated to be 3.35 inches (Huff and Angel, 1992).

2.2 Site Description and Current Site Conditions

The Laclede Coal Gas site currently encompasses two parcels of property bound on the south by Mullanphy Street, on the west by North 1st Street, on the north by the historic Mound Street (currently a gravel road), and on the east by Commercial Street (formerly Levee Street and also known as North Wharf Street). The larger parcel is occupied by Center Point Terminal Company's Apex Oil Petroleum Fuel and Terminal (Apex Oil PFT) facility (Photographs 1 & 2 in Appendix B). Apex Oil Company operates a liquid asphalt and residual fuel storage facility at this location (WPT, 2013). Figures 1b in Appendix A is a Historic Operations Map containing an overlay of a 1909 Sanborn Fire Insurance map that includes the FMGP. A majority of the FMGP was located where the Apex Oil PFT facility stands today, as shown in Figure 1c: Current Operations Map. In the northeast corner of the site, on a separate parcel, is a vacant grassy area which is the location of the Mound Street PCB's site. The buildings on the Mound Street PCB's site were demolished in 1991, and the property currently has no structures upon it (E&E, 1991). The total area of the Laclede Coal Gas site is approximately five acres.

A chain-link fence surrounds the petroleum tanks on the Apex Oil PFT property. No fencing or other barrier exists around the property for the Mound Street PCB's site. Grass looks well maintained in the vacant area and there is no sign of oil staining on the soil in the Mound Street PCB's site (Photographs 3, 4, and 5). Located to the east of the site are several railroad tracks, a concrete flood wall, the Great Rivers Greenway Riverfront Trail (Photograph 6) and then the Mississippi River.

According to St. Louis's geospatial webpage, Geo St. Louis, the grass-covered parcel of property on which the electric power plant (and Mound Street PCB's site) was once located is currently owned by Center Point Terminal Mound Street LLC and has an address of 1725 North Wharf Street (City St. L, 2014a). The remaining portion of the Laclede Coal Gas site where the majority of the FMGP was located is currently owned by the Duraine U.S. Corporation (Duraine) and occupied by Apex Oil PFT. Duraine

changed its corporate name to Center Point Terminal Company on May 15, 1996 (City St. L, 2014b and MSS, 1996).

2.3 Operational History

In the late 1800s, the Laclede Gas and Light Company constructed a large coal gasification plant (FMGP), Station "B", on the property, which operated until the mid-to-late 1940s. The specific dates of operation vary in published resources. Earliest property records available indicate that the northeast section of the site was used by the Mound Street Warehouse Corporation, which sold the land and buildings to the Laclede Gas and Light Company on February 8, 1888 (E&E, 1988). However, according to the Laclede Gas and St. Louis: 150 Years of Working Together, 1857-2007 book, Laclede first opened and produced gas at Station B in 1873 and produced gas for more than 75 years (Beck, 2007). Station B was also maintained as a backup facility following the introductions of straight natural gas in 1949 (Beck, 2007). Another source states that Laclede Gas and Light Company built and operated Station B from the late 1880s until 1945 (E&E, 1988).

According to the Brown's Directory of North American Gas Companies, on March 23, 1940, the name of the facility was changed to the Laclede Power and Light Corporation (aka Laclede Electric or Station "E" Electric Plant), and the Laclede Gas Light Company (aka Laclede Gas or Station "B" Gas Manufacture), suggesting that the operations were separated, at least financially (E&E, 1988). Both Station "B" and Station "E" can be found in Figure 2, a 1925 Poor's Publishing Company Map Showing Manufacturing and Distributing Stations, General Office and Property of The Laclede Gas Light Company in St. Louis, MO.

Laclede Gas used a retort process for coal carbonization in the generation of gas. Beck (2007) reports the following specific operations for Station B, described as "the older and smaller" [of Laclede's stations]. Station B produced a combination of natural gas and coal gas, manufactured to help in winter peak demand periods. The station consisted of

five standard Lowe water gas sets producing about 4 million cubic feet of water gas a day. Station B also featured one retort facility that included 16 benches, each with eight-16 foot long retorts. The coal gas retort house had a daily capacity of 0.5 million cubic feet of coal gas. Chemical laboratories for the daily testing of gas were also maintained at Station B.

In 1917, government officials requested Laclede Gas Light build stripping plants at two of their stations, including Station B for the production of toluol. Toluol is a byproduct of coal or water gas and is used to manufacture toluene, a feedstock used to create the manufacturing commercial explosives needed during World War I. "Toluene production jumped from 623,000 gallons in 1915 to 8.8 million gallons in 1918 (Beck, 2007)".

FMGP features on the site during the operation of Station "B" are documented on a number of historic fire insurance maps, particularly those created by the Sanborn Fire Insurance Map Company and the Oliver & Whipple's Fire Insurance Agency, as well as a Dry's Birdseye (Figures 3-8 in Appendix A). The FMGP features included three gasometers, a coal shed, coal bins, a generator house, a condenser room, ammonia wells, a purifying room/house, gas purifying tanks, and an engine house.

Approximately 930 million gallons of coal tar waste were produced at this facility. It is estimated that approximately 76 percent of the waste was sold, with the remaining 24 percent being buried on site (E&E, 1988). This equates to approximately 1.1 million cubic yards or 224 million gallons of coal tar waste potentially buried at the site (E&E, 1991). On site burial was typically conducted in unlined pits. An estimated production schedule as listed in a previous report on the Mound Street Power Plant for this manufactured gas plant can be found in Table 1 (E&E, 1988).

Table 1
Estimated Production Record for the Laclede Coal Gas Plant
St. Louis, Missouri
(E&E, 1988)

Year	Gas Type	Gas Production Rate ($feet^3$/year)				By-Products (10^3 gallons)			
		Coal	Water	Coke	Total	Coke	Tar	Ammonia	Other
1890	Coal	1,000			1,000				
1900	Coal	1,200			1,200				
1910	Coal, Water	1,200	2,800		4,000				
1920									
1930	Coal, Water, Coke	1,692	2,323	2,022	6,037	337	4,355	2,789	821,17* lbs sulfate
1940	Coke			1,969	1,969				
1950	Coke			1,338	1,338				
AVERAGES:		**1,273**	**2,562**	**1,776**	**2,591**	**337**	**4,355**	**2,789**	

*Sold to the U.S. Army for munition manufacture.
(821,17* is number as published in text).

In 1911, Laclede Gas Light completed and began operating an electric generating station at Mound Street and the Levee called Station E (Beck, 2007). In March of 1945, the entire facility was sold to the Union Electric Company (UE) and they continued to use the power facility until 1973. UE did not manufacture coal gas at this site. In 1969, the Apex Oil Company purchased the former coal gas works (Laclede Gas Light Company) from UE. However, UE continued to operate its electrical facility from the former Laclede Electric works (E&E, 1988). The Apex Oil Company utilized the site as a tank farm for the storage of petroleum fuels until the mid-1980s, when it became an asphalt product terminal (E&E, 1991 and E&E, 1988). The Apex Oil PFT facility is currently still operating at this location.

The Apex Oil PFT facility is an active Resource Conservation and Recovery Act (RCRA) site and can be found in the USEPA's RCRAInfo database in Envirofacts under the name

Center Point Terminals Co (USEPA Registry Id: 110015853138). According to USEPA's ECHO (Enforcement and Compliance History Online) database, Center Point Terminals Company was involved in a Civil Enforcement Case regarding a Notice of Violation issued by the USEPA pre-2010; the case is considered closed according to RCRA. No other information was provided with the report retrieved online (USEPA 2014a-d). In 1986, Apex Oil PFT experienced a spill of oil which covered most of the site, as documented in the 1991 SSI. There were no further details about the spill or cleanup documented in the SSI report (E&E, 1991). In 1993, Apex reported a leak in a 6 inch pipe line on-site. They repaired the pipeline and then took the line out of service. Apex reported excavating, recovering and disposing of 2.5 barrels of oil/soil (PFT, 1993).

In 1973, the UE property (Laclede Electric) was transferred to the Tenlis Company. Tenlis dismantled the power generation and transmission equipment on the Mound Street PCB's site location. Transformer oil was reportedly disposed by Midwest Oil Company. The dismantled equipment was sold as scrap metal (E&E, 1988). In 1981, Tenlis transferred the property to AZCON (E&E, 1991). The operations of AZCON are unknown; however, it was reported in the MDNR PA report that AZCON could have been a metal recycling company (MDNR, 1994a).

In 1985, Mound Street Corporation became the property owner of the Mound Street PCB's site and leased the building to an individual for an electric motor stripping operation (E&E, 1991). An oil fire occurred in the basement of the building in 1989, and the building was demolished in the spring of 1991 (MDNR, 1994a). McKinley Iron became the owner of the property in 1993 (MDNR, 1994a). The property does not have any buildings or older structures, and is currently vacant (Sverdrup, 1996 and MDNR, 2013).

2.4 Previous Investigations

2.4.1 Past Mound Street PCB's Site Investigations

The Mound Street PCB's site was investigated numerous times from 1976 to 1996, focusing on several oil releases and PCB contamination associated with the releases. PCBs were documented in oil from a UST located across the street to the north of the Laclede Coal Gas site. These samples documented significant amounts of PCBs in the oil found within the UST. It is possible that the PCB contaminated oil from the UST migrated into the manholes near the Mound Street PCB's site.

The Mound Street PCB's portion of the Laclede Coal Gas site, however, did contain gas purifying tanks from the former manufactured gas plant. PCBs are not a contaminant of concern associated with FMGPs. The Mound Street PCB's Site Reassessment report will cover these investigations in more detail for the Mound Street PCB's site. It should also be noted that the past oil releases could have, and possibly still are, affecting the transport of the FMGP wastes in the subsurface.

2.4.2 Ecology & Environment Investigation/Field Investigation Team Preliminary Assessment, Mound Street Power Plant (Alias used at the time for Laclede Coal Gas) (EPA ID#MOD981715980), 1988 (E&E, 1988)

The Ecology and Environment/Field Investigation Team (E&E/FIT) was tasked by Region VII USEPA to conduct a Preliminary Assessment (PA) of the Mound Street Power Plant site. E&E/FIT completed and submitted a PA report on June 23, 1988. This PA request was prompted by reports of oil accumulation in the facility and occasional oil releases to the Mississippi River. The PA report focused on potential chemical hazards associated with the current facility and past operations on site including the former coal gasification plant.

The field activities were conducted on September 17, 1987. Six oil, water and oil/water mixture samples were collected from the Mound Street Power Plant building basement and two from manholes on Mound Street during the PA site reconnaissance. The samples were analyzed for PCBs. No PCB contamination was detected at a 1 ppm (parts

per million or milligram/kilogram (mg/kg)) detection limit in any of the samples. The source of oil in the basement of the Mound Street Power Plant building was potentially identified as the adjacent Apex Oil PFT. It was stated in the report that Apex Oil PFT had numerous spills, some of which had entered the Mound Street building basement. Transformers and hydraulic oil tanks, located in the basement of the Mound Street building, were allegedly drained and removed in the 1970s; however, no records confirming the proper disposal of oil were available.

Based on the St. Louis Division of Health and the E&E/FIT sampling there was no PCB contamination in the oils present in the basement of the former electric power plant, (Mound Street Power Plant). This statement is qualified in that the PCB detection limits were 1 ppm for the E&E/FIT data and unknown for the St. Louis Division of Health data. No evidence was uncovered suggesting that the oil in the basement should contain PCBs. Initial concerns were raised based on the existence of large electric transformers located on site. The evidence suggests that the oil in these transformers was moved off site. The most likely point of origin of the oil is the Apex Oil PFT, located several yards uphill from the former electric power plant, where the material was contained in a concrete basement.

The power plant was the main focus of E&E's PA. Coal gas wastes were discussed and no volatile organics were sampled. Historical documents provided identification that this site is the location of Laclede Coal Gas. Section 4 of the Potential Hazardous Waste Site worksheet in the PA report stated: "Currently the site [Mound Street Power Plant] is considered to involve only the oil in the former power plant. The former coal gas site should be included in consideration of this site".

The groundwater/drinking water pathway was assessed as part of this investigation and it was determined that coal gasification wastes were potentially being released into the groundwater. The PA investigation for the Mound Street Power Plant revealed no groundwater use, therefore determining that there were no potential targets at the time. Release of groundwater contaminants to the Mississippi River via groundwater to surface

water discharge was not assessed with sampling. At the time of the investigation, all City of St. Louis Mississippi River drinking water intakes were located approximately nine miles upstream of the site. Other potential targets included recreational uses, commercial fishing, and industrial intakes.

None of the suspected wastes associated with this site were determined to have a potential for air release, unless involved in a structural fire. According to the Mound Street Power Plant PA, if the coal gasification wastes were present at the site, there was a potential risk of exposure to local workers coming into direct contact (dermal, inhalation, and ingestion) with wastes

2.4.3 Ecology & Environment Field Investigation Team Screening Site Inspection, Laclede Coal Gas (USEPA ID#MOD981715980), 1991 (E&E, 1991)

As tasked by the USEPA, the E&E/FIT conducted and submitted the Screening Site Inspection (SSI) report on the Laclede Coal Gas site, on October 29, 1991 (E&E, 1991). The objectives of this SSI were to determine the approximate areal and vertical extent of subsurface contamination; to determine whether contamination is present in the 0 to 2 foot interval; to determine whether contaminants have migrated via surface water runoff, or via the ground water/surface water interface; and to determine whether any coal tar wastes present have leached into the shallow ground water.

The E&E/FIT conducted a site reconnaissance of the FMGP and the power plant properties on November 20, 1990 in preparation of the Laclede Coal Gas SSI work plan. "Seepage" material was observed coming from the foundation and piping system of an abandoned pump house, formerly part of the Mound Street Power Plant building. This pump house, known as the Mullanphy Pump house, was built circa 1900, located east of the Riverfront Greenway Trail and contained pumps which provided water from the Mississippi River to the industrial facilities along its banks (Photograph 8, 9 and 10 in Appendix B). At the time of the 1990 investigation, the pipes were reportedly plugged with concrete; however, seepage was leaching through the concrete. The pump house was located on the eastern side of the flood wall; therefore, the seepage was going

directly into the Mississippi River. No samples were collected and no description of the seepage material was made during the site reconnaissance.

SSI field activities occurred March 3-9, 1991. Thirteen subsurface soil, twelve surface soil, six groundwater, six surface water, four sediment, and one oil sample were collected on and around the Apex Oil PFT property. Selected analytical results for groundwater, surface water, surface soil, subsurface soil, and sediment for the SSI sampling event can be found in Appendix C in Tables 3-7. No samples were collected from the basement of the Mound Street Power Plant Building, as originally planned, since the building was being demolished at the time of the SSI field activities. Samples were submitted to the contract laboratory program (CLP) for analysis of volatile organic compounds (VOCs), semi-volatiles (SVOCs), metals, and cyanides. None of the samples collected during the Laclede Coal Gas SSI were analyzed for PCBs. In addition, the Field Analytical Screening Program (FASP) screened 92 samples on site to help select CLP sample locations. Seventeen drums of Investigation Derived Waste were generated and a subcontractor was used for soil sampling.

2.4.3.1 Waste Source Sampling and Results

Cyanide and Polycyclic Aromatic Hydrocarbons (PAHs) were detected above background levels in surface soils samples that were submitted for CLP analysis. A majority of the site is contaminated with cyanide at concentrations significantly above the detection limit of the background sample 6.7 mg/kg. In sample number 104, cyanide was detected at 220 mg/kg and 190 mg/kg for sample number 105. PAH contamination in surface soils was less extensive than the cyanide contamination. Benzo(a)pyrene was detected at 22 mg/kg in sample number 105 and 16 mg/kg in sample number 104, both results exceed the lowest Superfund Chemical Data Matrix (SCDM) benchmark value and the USEPA Screening Level (SL) for Industrial Use, and both samples were significantly above the background concentration of 0.70 mg/kg for benzo(a)pyrene.

Subsurface samples also contained cyanide, PAHs, and benzene significantly above background levels. Many of these highly contaminated samples were collected in the

central portion of the bermed Apex Oil PFT area. Cyanide contamination was found to be significant at a depth of 11+ feet. Cyanide was detected in sample 008 at a depth of 8-12 feet at 860 mg/kg, and 250 mg/kg at 11-17 feet in sample 011, both exceeding the USEPA SL for Industrial Use value of 140 mg/kg. CLP data revealed significant PAH contamination at least five times greater than background concentration at four of the sampling locations. Benzene was detected at 150 mg/kg in sample number 008, exceeding lowest SCDM benchmark value and USEPA SL for Industrial Use. A majority of the PAHs were above background concentrations and exceeded the SCDM and EPA SLs. Benzo(a)pyrene was detected at 95 mg/kg in sample number 008, and 120 mg/kg in sample number 011. The lowest SCDM benchmark value for benzo(a)pyrene is 0.088 mg/kg and 0.21 mg/kg for the USEPA SL for Industrial Use.

2.4.3.2 Groundwater, Surface Water, and Sediment Sampling and Results

A total of 9 samples, including a duplicate, field blank, rinsate, and extra volume samples were collected during the 1991 Screening SI. Due to sub-surface debris, only two mini-wells were installed with the Geoprobe. The other samples were collected from the Corps of Engineers piezometer wells along the west side of the Mississippi River levee wall (Figure 10 in Appendix A). Samples were analyzed for VOCs, SVOCs, cyanide, total metals, and dissolved metals. Groundwater sampling indicated no significant dissolved metals contamination when compared to background levels (Table 3 in Appendix C).

Cyanide was detected in all groundwater samples at concentrations above the 17 microgram/liter (ug/L) detection limit, except for the background sample where it was not detected. Cyanide (590 ug/L and 1,600 ug/L) and benzene (93 ug/L) concentrations significantly exceeded background (which was non-detect) in two samples. Several PAHs (acenapthalene, fluorine, and phenanthene) and benzene were detected in a piezometer well located downgradient from the site (Sample 204). Concentrations of total and dissolved arsenic, total lead, cyanide and benzene exceeded SCDM and USEPA benchmarks for drinking/tap water. Groundwater sampling data does not indicate a release of dissolved metals when compared to background concentrations.

A total of 6 surface water samples were collected, including 2 duplicates (Figure 10 in Appendix C). Samples were analyzed for total petroleum hydrocarbons, VOCs, SVOCs, cyanide, total metals, and dissolved metals. In addition, 4 sediment samples were collected, including a duplicate and were analyzed for total petroleum hydrocarbons, VOCs, SVOCs, cyanide, and total metals. Surface water and sediment samples were screened on site in the mobile lab for the presence of PAHs and VOCs.

Surface water and sediment samples were collected at three locations downgradient of the site. In addition, the East St. Louis raw water intake, located across the Mississippi River was sampled and background samples were not collected for surface water or sediment samples. The most upgradient of these samples exhibited the most contamination. The sample collected from the surface water intake, detected total chromium, lead, and zinc. These metals were not detected in the dissolved fraction of these samples. Low levels of PAHs and cyanide were found in the sediment samples.

2.4.3.3 E&E FIT Site Inspection Investigation Conclusions

Because of the abundance of potable surface water within the area of the site, groundwater has never been utilized as a source of drinking water. The surface water intake which serves the City of St. Louis and surrounding communities is located approximately nine miles upstream from the site. A municipal intake for the Illinois Metro East community is located almost directly across the Mississippi River from the site and approximately 300,000 residents are served by this water supply. The report stated that it was not likely that any sensitive environment or critical habitats existed within 15 miles downstream of the site with the possible exception of the Sicklefin Chub (*Hybopsis meek*) which occurred in the Mississippi River in 1944 and may still occur in the area.

The sampling data identified cyanides, BTEX (benzene, toluene, ethylbenzene, and xylenes) compounds, and PAHs as the major on-site contaminants. The cyanide contamination was found throughout the site in the 0 to 2 foot soil sample depth. Deeper

soil samples revealed cyanide contamination at depths as great as 11 feet. PAH contamination, both in shallow and deep soil samples, was restricted to small areas within the site as evidenced by FASP data and was found at depths as great as 38 feet. The greatest area of PAH contamination was found within the bermed tank farm. Only one ground water sample (#204) showed PAH and benzene contamination, but all contained cyanide.

Attribution was difficult to assess because Apex Oil PFT at the time of the SSI stored #6 oil on-site in large quantities. The total PAH content of this oil is very high. The Apex Oil PFT experienced a spill of this oil over the entire site in 1986. BTEX compounds were found at relatively high concentrations in several subsurface soil samples. It is known that FMGPs frequently buried coal tar waste on site. PAHs are a major constituent of coal tars. Thus, both the FMGP and the Apex Oil PFT could be responsible for the PAH contamination found abundantly in on-site soils, and to a much lesser extent in the ground water. The cyanide contamination, however, is assumed to largely be a result of the FMGP as cyanide is not considered a significant constituent of most oils. Cyanide is an oxide waste produced during the gas purification process when manufacturing coal gas.

3.0 WASTE CHARACTERISTICS/QUANTITY AND SAMPLING

The primary contaminants of concern at the Laclede Coal Gas site (including the Mound Street PCB's site) originate from at least two separate sources/operations: coal gas operation and the electrical power generation and transmission operations. Coal tar wastes from coal gas operations include PAHs, BTEX compounds, and various spent iron oxides containing sulfur, cyanide, etc. PCBs are found in transformer and hydraulic oil. It is estimated that 1,107,469 cubic yards of coal tar wastes may be buried on the former Laclede Coal Gas site, which includes the Mound Street PCB's site. This number is generated from the estimate of gallons of coal tar waste (1 cubic yard = 202 gallons) not sold during production, as documented during the SSI Report of 1991. The quantity of PCB contaminated oil in the subsurface is unknown (E&E, 1991). The primary

contaminants of concern for the Laclede Coal Gas SR are PAHs, cyanide, and benzene. The exact quantity of these contaminants disposed of on the property is unknown. FMGP contaminants include but are not limited to PAHs, BTEX, arsenic, lead, and cyanide.

The following was in the Waste Quantity section in E&E's SSI report (E&E, 1991):
"The Laclede Coal Gas facility operated for almost 60 years, producing approximately 932,640 million cubic feet of gas (Brown's Directory of American Gas Companies, 1890 to 1940 editions). According to the Handbook on Manufactured Gas Plants, approximately 1 gallon of tar waste is accumulated for every 1000 cubic feet of gas produced. Using this conversion factor, approximately 932 million gallons of tar waste were produced at the Laclede Coal Gas facility. According to the Handbook on Manufactured Gas Plants, approximately 76% of the tar waste from gas plant operations produced was sold. The other 24% was probably buried on site. Therefore, approximately 223,680,000 gallons of coal tar could be buried on site. It was common practice for FMGPs to bury their waste on site in pits or unlined trenches."

3.1 Waste/Source Sampling

A total of 24 locations were drilled with solid stem augers, with depths ranging from 2 to 38 feet during the E&E 1991 SSI (Figures 9 & 10 in Appendix A). Samples were collected off the auger flights and screened on-site for PAHs and VOCs in the mobile laboratory. Samples from the four screened out locations were resampled and analyzed for VOCs, SVOCs cyanides, and total metals. A total of eight samples from the four locations were collected at depths ranging from 3 to 17 feet, and were located in the middle of the five large asphalt tanks on the Apex Oil PFT property. A background sample was collected in the farthest northwest corner of the Apex Oil PFT property and five additional samples were collected at this location.

During the E&E 1991 SSI, the screening results from the subsurface soil samples indicated that the highest PAH contamination zone was located in the central portion of the tank farm. Results from the four sample locations within the central portion of the tank farm, revealed significant PAH contamination at least five times greater than

background contamination at all four sampling locations. Cyanide contamination was found to be significant to a depth of 11+ feet. Significant benzene levels were also detected in a sample near one of the southern-most asphalt tanks (sample 013).

In addition, 12 surface soil samples were collected during the E&E 1991 SSI to determine whether contamination was present in the 0-2 foot interval and were submitted for SVOCs, cyanide, and total metals analyses (Figure 10 in Appendix A). Results from the surface soil indicated that a majority of the site is significantly contaminated with cyanide at greater than the three times detection limit of the background sample. Four out of the twelve samples collected contained a total PAH content greater than five times the concentration of the background sample.

The 1991 SSI collected a sample of #6 oil from an 80,000-gallon tank on the Apex Oil PFT site. The sample was screened on-site and then submitted for total petroleum hydrocarbons, VOCs, and SVOCs analyses. The oil sample collected contained significant concentrations of many PAHs.

3.2 Polychlorinated biphenyls (PCBs) (ATSDR, 2000)

PCBs are a group of synthetic organic chemicals that can cause a number of different harmful effects. PCBs are a class of chemical compounds in which 2–10 chlorine atoms are attached to the biphenyl molecule. A large number of chlorinated compounds are possible. The 209 possible compounds are called congeners. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow. Some PCBs are volatile and may exist as a vapor in air. They have no known smell or taste.

Monsanto Corporation, the major U.S. producer of PCBs from 1930 to 1977, marketed mixtures of PCBs under the trade name Aroclor. The Aroclors are identified by a four-digit numbering code in which the first two digits indicate the type of mixture and the last two digits indicate the approximate chlorine content by weight percent. Thus, Aroclor

1242 is a chlorinated biphenyl mixture of varying amounts of mono- through heptachlorinated homologs with an average chlorine content of 42%. The exception to this code is Aroclor 1016, which contains mono- through hexachlorinated homologs with an average chlorine content of 41%.

Because they don't burn easily and are good insulating materials, PCBs were used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of PCBs stopped in the United States in August 1977 because there was evidence that PCBs build up in the environment and may cause harmful effects. Once in the environment, PCBs do not readily break down and therefore may remain for very long periods of time. They can easily cycle between air, water, and soil. PCBs stick strongly to soil and will not usually be carried deep into the soil with rainwater.

Skin conditions, such as acne and rashes, may occur in people exposed to high levels of PCBs. These effects on the skin are well documented, but are not likely to result from exposures in the general population. Some studies in workers suggest that exposure to PCBs may also cause irritation of the nose and lungs, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue. Based on the evidence for cancer in animals, the Department of Health and Human Services (DHHS) has stated that PCBs may reasonably be anticipated to be carcinogens. Both USEPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans. PCBs, specifically Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260, are listed hazardous substances and pollutants by the USEPA. The USEPA Maximum Contaminant Level (MCL) for benzene in drinking water is 0.5 ug/L.

3.3 Polycyclic Aromatic Hydrocarbons (PAHs) (ATSDR, 1995)

PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco or charbroiled meat. There are more than 100 different PAHs. PAHs generally occur as complex mixtures, not as single compounds. PAHs usually occur naturally, but they can also be

manufactured as individual compounds for research purposes. As pure chemicals, PAHs generally exist as colorless, white, or pale yellow-green solids. They can also be found in substances such as crude oil, coal, coal tar pitch, creosote, and roofing tar. They are found throughout the environment in the air, water, and soil.

The movement of PAHs in the environment depends on properties such as how easily they dissolve in water, and how easily they evaporate into the air. PAHs in general do not easily dissolve in water. They are present in air as vapors or stuck to the surfaces of small solid particles. They can travel long distances before they return to earth in rainfall or particle settling. Some PAHs evaporate into the atmosphere from surface waters, but most stick to solid particles and settle to the bottoms of rivers or lakes. In soils, PAH are most likely to stick tightly to particles. Certain PAHs in soils also contaminate groundwater.

The following PAHs have been classified by USEPA as probable human carcinogens: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene. They are also listed hazardous substances, hazardous constituents, and pollutants by USEPA. The health effects of PAHs vary with the compound. Studies in animals have shown that PAHs can cause harmful effects on skin, body fluids, and the immune system after both short- and long-term exposure.

3.4 Benzene (ATSDR, 2007)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities. Some industries use benzene to make other chemicals which are used to make plastics, resins, nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke. Benzene is a significant contaminant at FMGP sites.

Industrial processes are the main source of benzene in the environment. Exposure to benzene may occur from air around hazardous waste sites or gas stations; working in industries that make or use benzene; inhalation of vapors from products such as glues, paints, furniture wax, and detergents. Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.

Breathing high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. The major effect of benzene from long-term exposure is on the blood. Benzene exposure may lead to anemia and leukemia. DHHS has determined that benzene is a known carcinogen. The IARC and the USEPA have determined that benzene is carcinogenic to humans. Benzene is classified as a hazardous substance, hazardous waste constituent, and priority pollutant by USEPA. The USEPA MCL for benzene in drinking water is 5 ug/l.

3.5 Waste/Source Conclusions

As stated in E&E's SSI report (E&E, 1991), the Laclede Coal Gas facility operated for almost 60 years, producing approximately 932,640 million cubic feet of gas (Brown's Directory of American Gas Companies, 1890 to 1940 editions). According to the Handbook on Manufactured Gas Plants, approximately 1 gallon of tar waste is accumulated for every 1000 cubic feet of gas produced. Using this conversion factor, approximately 932 million gallons of tar waste were produced at the Laclede Coal Gas facility. It has also been documented that approximately 76% of the tar waste produced from gas plant operations was sold. The other 24% was likely buried on site. It was common practice for FMGPs to bury their waste on site in pits or unlined trenches. Using this calculation, approximately 223,680,000 gallons of coal tar could be buried on site at the Laclede Coal Gas facility.

The primary contaminants of concern at the Laclede Coal Gas site originate from at least three separate sources/operations: coal gas manufacturing operations, electrical power

generation and transmission operations, and the currently operating petroleum tank farm. Coal tar wastes from coal gas operations include PAHs, BTEX compounds, and various spent iron oxides containing sulfur, cyanide, etc. PCBs are found in transformer and hydraulic oil. It is estimated that 1,107,469 cubic yards (202 gallons = 1 cubic yard) of coal tar wastes may be buried on the former Laclede Coal Gas site, which includes the Mound Street PCB's site. The quantity of PCB contaminated oil in the subsurface is unknown (E&E, 1991). The Apex Oil PFT facility has had two documented releases of oil to the site in 1986 and 1993 (E&E, 1991; PFT, 1993).

Surface and subsurface soil sampling conducted in 1991 as part of the E&E SSI investigation documented significant BTEX, PAH and cyanide contamination on-site in areas associated with FMGP operations.

4.0 GROUNDWATER PATHWAY

4.1 Hydrogeologic Setting

The following information for this section is taken from the Geology Report for the Mound Street site prepared by the Missouri Geological Survey or MGS (formerly known as the Missouri Division of Geology and Land Survey) (MDNR, 1994b).

The Laclede Coal Gas site is located on a narrow strip of alluvium between an area of limestone bedrock and the Mississippi River. The groundwater within the alluvium will move generally in the direction of the river, that is to the east or southeast where it will eventually discharge to the river. During unusually high river stages, the groundwater may temporarily flow away from the river. Since no confining layer is known to exist between the alluvial aquifer and the bedrock of Mississippian limestone, the groundwater target distance should extend for a four mile radius from the site.

The shallowest material at the site is fill material. Its thickness is unknown, but it is estimated at 15-18 feet. The alluvium consists of a mixture of stratified sediments deposited by the river. Based on findings at a nearby site, the alluvium is made up clay and silty clay in the top 10 to 30 feet, but becomes generally coarser with depth,

becoming silty sand and sand. Lenses of gravel can be found. The total thickness of the alluvium is estimated at approximately 80 feet. The alluvial aquifer can be expected to yield large quantities of fresh water. The depth to water will be approximately 20 feet.

The Mississippian System in this area is made up of a sequence of limestone, cherty limestone, and sandy or shaley limestone. This system includes, in descending order: the Ste. Genevieve Limestone, St. Louis Limestone, Salem Formation, Warsaw Formation, Burlington-Keokuk Limestone, and the Fern Glen Formation. The Salem and Warsaw formations are generally shaley limestone and do contain shale beds in the St. Louis area. However, the thickness and position of shale horizons varies within this area. The shallowest reliable aquitard in the area is the Maquoketa Shale at the top of the Ordovician System. The Mississippian aquifer might yield small quantities of fresh water in the target area, but very little data is available. Any groundwater below the Maquoketa is expected to be mineralized.

Drilling at a nearby site encountered no confining material between the alluvium and the bedrock. The alluvial aquifer is bounded by the limits of its deposition within the target area. Bedrock faulting in the area does not completely transect the Mississippian aquifer. No aquifer discontinuity exists within the target area.

The depth to groundwater is highly variable and dependent in river stage and can vary between 0-20 feet below the ground surface. The alluvial sediments at this depth may not be good aquifer material; however, the depth at which the material is saturated should be considered the aquifer.

Sinkholes and caves can be found in the Mississippian bedrock within the target area. The karst aquifer probably does not directly underlie the site, and it is not likely to be affected by contaminant migration from the site. If the site is actually on the bedrock residual area, any water that percolates down into it should move toward the alluvial aquifer since groundwater movement is typically toward the river.

4.2 Groundwater Targets

Previous investigation reports for the Laclede Coal Gas site and Mound Street PCB's site state that there were no known drinking water wells within four miles of the sites at the time the reports were completed (E&E, 1988; E&E, 1991; MDNR, 1994b). However, MDNR's Wellhead Information Management System (WIMS) database contains two certified water wells within four miles of the Laclede Coal Gas site that were installed after those initial investigations. A water well classified with "unknown" use, drilled in 2000, is located approximately 1.4 miles slightly northwest of the site within the City of St. Louis limits. A "domestic" water well, drilled in 2009, is located approximately 3.7 miles west of the site also within the City of St. Louis limits. It should be noted that locational data for wells in the WIMS database is not verified.

Based on an average of 2.2 people per household in St. Louis City (USCB, 2014), it is estimated that approximately 5 people could be served by groundwater wells within four miles of the Laclede Coal Gas site. However, the City of St. Louis and MDNR entered into a Memorandum of Understanding (MOU) in 2006 that approved Ordinance 66777 which prohibits the use or attempted use of groundwater as a potable water supply within the corporate limits of the City of St. Louis (MDNR, 2006). This would indicate that neither well within four miles of the site is being used for potable water. In addition, much of St. Louis is served by the St. Louis City public water intake (MO6010715) located approximately 9 miles upstream of the site on the Mississippi River.

The MGS databases list drilling information on all wells that were installed after 1987. Prior to 1987, MGS registry of private wells was not required. The MGS databases do not contain information on wells drilled before 1987, but only for those wells that the owner voluntarily provided information to MGS. Therefore, some existing private wells within a 4-mile radius of the site may not be listed in this report.

4.3 Groundwater Sampling

A total of nine groundwater samples, including a duplicate, field blank, rinsate, and extra volume sample were collected during E&E's 1991 SSI. Due to sub-surface debris, only two mini-wells were installed with the Geoprobe. The other samples were collected from the Corps of Engineers piezometer wells along the west side of the Mississippi River levee wall (Figure 10 in Appendix A) ranging in depth from surface to 52 feet. Samples were analyzed for VOCs, SVOCs, cyanide, total metals, and dissolved metals.

Sampling results documented SVOCs in one of the groundwater samples (sample 204) located downgradient from the site. This sample contained 3 PAHs: acenapthalene (65 ug/L), fluorene (25 ug/L), and phenanthene (46 ug/L); and 93 ug/L benzene (Table 3 in Appendix C). Cyanide was detected in all groundwater samples at concentrations above the 17 ug/L detection limit. Cyanide was not detected in the background sample. Groundwater sampling data indicated no significant dissolved metals contamination when compared to background concentrations.

4.4 Groundwater Pathway Conclusions

Sampling from mini-groundwater wells and piezometers during the 1991 SSI documented a release of benzene, 3 PAHs and cyanide to the shallow alluvial aquifer on the site. This groundwater discharges to the east southeast directly to the Mississippi River. Since the Laclede Coal Gas site is less than 500 feet from the Mississippi River, groundwater contamination discharging to the surface water and the potential threat to surface water targets is a higher concern than the threat to groundwater targets, which consist of two wells within four miles of the site.

According to MDNR's Wellhead Information Management System database there are two drinking water wells on record within a four mile radius of the Laclede Coal Gas site, serving an approximate count of 5 people. However, the City of St. Louis currently has an approved Ordinance 66777 which prohibits the use or attempted use of groundwater as a potable water supply within the corporate limits of the City of St. Louis (MDNR, 2006).

It is unlikely these wells are used for drinking water. In addition, based on the direction of groundwater flow, these two wells are not at high risk from potential groundwater contamination at this site due to the distance from the site, the depth of these wells, and the likelihood that the contaminated groundwater is discharging directly to the Mississippi River.

5.0 SURFACE WATER PATHWAY

5.1 Hydrologic Setting

The Laclede Coal Gas site is located approximately 300 feet from the west bank of the Mississippi River. All surface runoff from the site is prevented from reaching the Mississippi River directly by the flood levee wall. Because there are no drainage channels or streams in the immediate area surrounding the site, surface water must drain downgradient by overland flow and is diverted into a storm sewer system that is connected to the sanitary sewer system. The sanitary wastewater is pumped upstream for approximately two miles to the Bissell Point Treatment Plant. The treated water from the plant is then discharged into the Mississippi River at a point downstream in south St. Louis County in Section 24, Township 43N, Range 6E (MDNR, 1994b).

The drainage area for the site is less than 50 acres. The two-year, 24 hour rainfall for the area is approximately 3.35 inches (Huff and Angel, 1992). During high water events, hydraulic pressures reportedly force groundwater to the surface of the site (GEHM, 1993).

As stated above in the groundwater pathway, there is a connection between the shallow groundwater at the Laclede Coal Gas site and the Mississippi River. The site is located on a narrow strip of alluvium between an area of limestone bedrock and the Mississippi River. The groundwater within the alluvium will move generally in the direction of the river, which is to the east or southeast and will eventually discharge to the river. During unusually high river stages, the groundwater may temporarily flow away from the river.

The area of the site is subject to adverse impacts from flooding. The site is protected by a high concrete levee wall built to withstand a 500 year flood. During the height of the record flood of 1993, the site did not experience any flooding from overland flow (MDNR, 1994b).

5.2 Surface Water Targets

There are no drinking water intakes located within 15 river miles downstream of the site on the Missouri side of the Mississippi River. All City of St. Louis surface water intakes are approximately 9 miles upstream of the site (E&E, 1988). However, during E&E's 1991 SSI, the Illinois American Water Company was identified as having two drinking water intakes on the Illinois side of the river; one at Choteau Island, 10 miles north of the site, and one located approximately ¼ mile downstream from the Laclede Coal Gas site at East St. Louis, Illinois. The Illinois American Water Company serves drinking water for 73,000 metered customers in the Metro East, including Granite City with a population of 250,000 (MDNR, 2014a).

The Mississippi River is a classified stream under the Missouri Water Quality Standards (WQS) (MSS, 2010). This stretch of the Mississippi River is protected for use designations of irrigation, livestock and wildlife watering, warm water aquatic life and human health-fish consumption, secondary contact recreation, drinking water supply, and industrial (MSS, 2010). The Mississippi River is also considered a primary fishery due to commercial and sport fishing along the river (MDNR, 1994a). During 2012, a total of 161,186 pounds of fish were harvested in the open river portion (below Lock and Dam 26) of the Mississippi River (MDC, 2012).

According to the United States Fish & Wildlife Service's National Wetlands Inventory layer on ArcGIS, there are approximately 12 miles of wetlands located along the Mississippi River, the majority of which are found on the Illinois side of the river.

5.3 Surface Water Sampling

Surface water and sediment was sampled at three locations in the Mississippi River downgradient of the site during E&E's 1991 SSI (Figure 10 in Appendix A). Background surface water and sediment samples were not collected. A total of 6 surface water samples, including 2 duplicates, were collected and analyzed for total petroleum hydrocarbons, VOCs, SVOCs, cyanide, total metals, and dissolved metals. A total of 4 sediment samples were collected and analyzed for petroleum hydrocarbons, VOCs, SVOCs, cyanide, and total metals.

The only organics detected in the samples were relatively low levels of PAHs and cyanide found in the sediment samples. The only heavy metal contaminants detected were total chromium, lead, and zinc, and these metals were not detected in the dissolved fraction of these samples. Based on this one sampling event, no definitive conclusions regarding a release of FMGP contaminants from the Laclede site can be made due to the lack of a background sample and the fact that the flow rate of the Mississippi River is so large that dilution is expected; furthermore attribution is very difficult to establish.

5.4 Surface Water Pathway Conclusions

There is, however, evidence from other events to indicate that subsurface waste from the Laclede Coal Gas site is likely releasing to the Mississippi River. Between 1976 and 1987, the U.S. Coast Guard has investigated oil slicks in the Mississippi River in the vicinity of the Laclede Coal Gas site (and/or the Mound Street PCB's site). The oil slicks were reportedly originating from the basement of the Mount Street Power Plant; however no samples were collected so a specific source could not be definitively identified.

In addition, more recently, during a site visit on October 14, 2014, MDNR, USEPA, and USEPA's contractor, Tetra Tech, observed oil sheens bubbling up in the Mississippi River within 15 feet of the shore, directly east of the Laclede Coal Gas site (MDNR, 2014c). These oil sheens were continuous and spread out 2 to 5 feet in diameter before finally dispersing. Both USEPA and Tetra Tech documented this occurrence with

photographs and a video. This observed release could be waste from coal gas material and/or petroleum or asphalt residuals from the Apex Oil PFT facility.

There are no public water drinking water intakes within 15 miles downstream of the site on the Missouri side of the Mississippi River; however there is a drinking water intake located one quarter mile downstream of the site on the Illinois side of the river. The Illinois American Water Company serves drinking water for 73,000 metered customers in the Metro East, including Granite City with a population of 250,000 (MDNR, 2014a). In addition, the Mississippi River is a major fishery, and there are approximately 12 miles of wetlands located along the riverbank.

6.0 SOIL EXPOSURE AND AIR PATHWAYS

6.1 Physical Conditions

Laclede Coal Gas site is located in an industrial setting, surrounded by gravel covered lots and a section of railroad tracks. The area of the site is built up with fill material to elevate it above the normal flood level. This fill material is estimated to be 12 feet in depth and consist of demolition waste with cinders, broken brick and cobble sized stones (GEHM, 1993).

The Laclede Coal Gas site is currently covered by five large asphalt storage tanks and associated structures (estimated at 60%). The remaining portion of the site between the tanks is covered with gravel and grass. A chain-link fence surrounds the petroleum tanks on the Apex Oil PFT property. In the northeast corner of the site, the Mound Street PCB's portion is currently an open, unfenced grassy vacant lot. The total area of the Laclede Coal Gas site is approximately 4.78 acres. Located to the east of the site are several railroad tracks, a concrete flood wall, the Great Rivers Greenway Riverfront Trail and then the Mississippi River.

6.2 Soil Exposure and Air Pathways Targets

The site is located in a land use area that is predominantly industrial with an estimated population of 688 persons living within one-half mile of the site (the majority of which are living at the adjacent release center). A population of 94,794 live within 4 miles of the site. Table 3 provides a population breakdown according to various distance rings around the site's center of operations. There are 7 workers on site employed by Apex Oil PFT (USEPA, 2012).

Across North 1st Street, approximately 100 feet west of the Laclede Coal Gas site, is the St. Louis Community Release Center (Photograph 7). This center is owned by the Missouri Department of Corrections – Division of Probation and Parole and is also known as an "Honor Center". The Community Release Center is a living facility for offenders on probation or parole. As of January 2014, there were 492 offenders living at this center (Cheatham, 2014). The St. Louis Community Release Center is able to house up to 550 inmates and has 135 workers and anywhere from 5 to 15 visitors daily (MDNR, 2015).

In May 2012, a small homeless encampment called Hopeville, set up in May 2010 and located south of Mullanphy Street adjacent to the flood wall, was razed (Bogan, 2012a-2012b). During the September 2013 site visit, it was noted that there were no signs of this encampment anywhere in this vicinity (MDNR, 2013).

TABLE 2: ESTIMATED MISSOURI POPULATION LIVING WITHIN FOUR MILES OF THE LACLEDE COAL GAS SITE

RADIUS	POPULATION
0 to ¼	473
>¼ to ½	215
>½ to 1	4,624
>1 to 2	16,182
>2 to 3	29,389
>3 to 4	43,911
TOTAL	**94,794**

6.2 Soil Exposure and Air Pathways Conclusions

Previous sampling and historical information regarding the Laclede Coal Gas operations have documented significant subsurface contamination due to the practice of burying FMGP waste. There is a potential risk of exposure to Apex Oil PFT facility workers on site and residents at the neighboring St. Louis Community Release Center, as well as to future construction workers on the site, if they were to come into direct contact with the subsurface waste. Exposure to any substantial amount of contamination in surface soils is not expected.

A potentially higher risk of exposure may be present to the nearby St. Louis Community Release Center occupant via the vapor intrusion pathway. Buried volatile organic wastes can migrate through the soil and into indoor air above or near a contaminated site.

No air samples were collected as part of any of the past investigations. Threats to the air pathway are evaluated as low because there have been no observed releases via the air pathway, there are few potential receptors, and none of the buried wastes associated with this site have a potential for a direct air release. If there were a fire associated with the Apex Oil PFT facility, however, an air release from the material in the burning tanks could target the majority of the St. Louis and or East St. Louis area, depending on the prevailing wind direction.

7.0 SUMMARY AND CONCLUSIONS

The Laclede Coal Gas site, located in the City of St. Louis at the northeast corner of the intersection of Mullanphy and North 1st Streets, is the location of a former manufactured gas plant (FMGP), currently occupied by a liquid asphalt petroleum tank farm. The Laclede Coal Gas site is approximately 5 acres in size, which includes the currently operating Apex Oil Petroleum Fuel and Terminal facility (Apex Oil PFT), located on a majority of the southwest part of the site, and the 1 acre Mound Street PCB's site (MO0000093682), which is a vacant lot in the northeast corner. The site is located in a

mostly industrial area on the Mississippi River floodplain, approximately 300 feet west of the Mississippi River.

In the late 1870's, Laclede Gas Light Company Station "B" (also named Laclede Gas Co.) was constructed on two city blocks northeast of the intersection of North 1st and Mullanphy Streets. The facility operated as an FMGP until the late 1940s. Laclede also constructed an electric plant, Laclede Gas Light Company Station "E", in the late 1870's, on the second city block next to the FMGP gasometers located on the southwest corner of the intersection of Mound Street and Levee. The electric power plant operated under several different owners until 1973 (E&E, 1988). No FMGP structures have been identified on historic maps on the Station "E" property.

The operational history of this site and subsequent environmental issues and investigations are lengthy and complex. Starting in 1976, investigations were conducted in response to several oil slicks on the Mississippi River that were suspected to have originated from the former electric power plant. In the early 1980s, numerous oil spills, possibly due to flooding in the electric plant facility's basement, prompted U.S. Environmental Protection Agency (USEPA) investigations of the Station "B" FMGP location and an underground storage tank (UST) located just north of Mound Street on another property. Polychlorinated biphenyls (PCBs) were the main suspected contaminant of concern in the initial investigations; however FMGP constituents were also addressed during subsequent investigations. The various contaminant concerns addressed in multiple investigations of different media (the FMGP, oil leaks, a UST), result in a complex history with many site names and aliases for what would become two USEPA CERCLA sites. These two sites, Laclede Coal Gas (Laclede Gas Light Company Station "B") (EPA ID: MOD981715980 and address of 1700 North 1st Street) and Mound Street PCB's (Laclede Gas Light Company Station "E") (EPA ID: MO0000093682 and address of 1725 North Wharf Street), are located adjacent to each other, originally constructed on two city blocks that eventually became one city block.

The Laclede Coal Gas site was discovered in CERCLIS on August 6, 1987, with a listed alias of Mound Street Power Station SS#07CY. A Preliminary Assessment, addressed under the site name "Mound Street Power Plant", was completed in 1988 and then a Screening Site Inspection was completed in 1991, with no further action recommended at that time. In 2009, as part of a review of the inventory of FMGP sites in Missouri, MDNR and USEPA determined that the Laclede Coal Gas and Mound Street PCB's sites needed Site Reassessment investigations in order to adequately assess potential releases and the risk to human health and the environment. A review of file information documented a complex history of site names, aliases, addresses, contaminant sources and conclusions and recommendations based on numerous investigations.

The Laclede Coal Gas facility was in operation for almost 60 years and produced an estimated 932,640 million cubic feet of gas according to Brown's Directory of American Gas Companies. It was common practice for FMGPs to bury their waste on site in pits or trenches. It is estimated that approximately 223,680,000 gallons of coal tar could be buried on site.

Earlier investigations assessed PCB contamination on the Mound Street PCB's site, including the building's basement on the property and the nearby manholes, detecting no PCB contamination. PCBs were actually documented in oil from a UST located across Mound Street to the north of the Laclede Coal Gas site. It is possible that the PCB contaminated oil from the UST migrated into the manholes near the Mound Street PCB's site. It should also be noted that the past oil releases could have, and possibly still are, affecting the transport of the FMGP wastes in the subsurface.

Surface soil, subsurface soil, sediment, surface water, and groundwater samples collected in 1991 on and around the Apex Oil PFT facility, including the vicinity of the Mound Street PCB's site, document the release of arsenic, cyanide, benzene, and Polycyclic Aromatic Hydrocarbons (PAHs) to various media. Arsenic, cyanide, benzene and PAHs in surface and/or subsurface soil (down to at least 23 feet) exceeded USEPA industrial screening levels. Arsenic, cyanide, lead, and benzene in shallow groundwater exceeded

USEPA screening levels for drinking water. Lead in surface water exceeded screening levels. Arsenic, lead, and PAHs exceeded sediment quality guidelines.

The Laclede Coal Gas site is located on a narrow strip of alluvium between an area of limestone bedrock and the Mississippi River. The groundwater within the alluvium will move generally in the direction of the river, that is to the east or southeast where it will eventually discharge to the river. During unusually high river stages, the groundwater may temporarily flow away from the river.

Targets at potential risk of exposure from contaminated surface and subsurface soil and contaminated groundwater discharging to the Mississippi River and possibly causing vapor intrusion include: workers on-site and workers and residents at the nearby St. Louis Community Release; consumers of drinking water from a surface water intake located ¼ mile downstream of the site on the Illinois side of the river; aquatic life and wetlands in the river; and possibly humans consuming fish from the river.

The Mississippi River is designated for the following uses: irrigation, livestock and wildlife watering, warm water aquatic life and human health-fish consumption, secondary contact recreation, drinking water supply, and industrial. The majority of the site is an active industrial facility with seven workers on-site employed by the Apex Oil PFT. The nearest residence is the St. Louis Community Release Center located west of the site across North 1st Street. A total of 135 workers and nearly 500 residents are located at the Community Release Center. A population of 94,794, live within 4 miles of the site.

8.0 RECOMMENDATIONS

Based on the documented release of FMGP-related contaminants to environmental media and the presence of PCBs in a UST near the site, MDNR has referred the Laclede Coal Gas site to USEPA for removal assessment and/or removal action. MDNR sent a Request for Federal Action form to USEPA on April 24, 2014 (MDNR, 2014d). Approximately 930 million gallons of coal tar waste were produced at this facility. It is

estimated that approximately 76 percent of the waste was sold, with the remaining 24 percent being buried on site (E&E, 1988). This equates to approximately 1.1 million cubic yards or 224 million gallons of coal tar waste potentially buried at the site (E&E, 1991).

The Laclede Coal Gas site is problematic in that contaminants of concern for this site include not only FMGP constituents, but also petroleum related constituents (BTEX), possibly related to the current operations associated with an asphalt tank farm. The presence of petroleum related compounds could increase the potential for migration of FMGP related contamination. As a result, MDNR is also recommending that a vapor intrusion assessment be conducted at the St. Louis Community Release Center. The assessment for the Laclede Coal Gas site should include PCBs as a potential contaminant of concern because Mound Street PCB's site is located on the Laclede Coal Gas site.

Prepared by: Hillary Wakefield 6/12/15
Hillary Wakefield, Environmental Specialist — Date
Site Assessment Unit

Reviewed by: Valerie Wilder 6/12/15
Valerie Wilder, Chief — Date
Site Assessment Unit

Approved by: Dennis Stinson 6/12/15
Dennis Stinson, Chief — Date
Superfund Section

REFERENCE LIST

*No hard copies were made for references marked with an asterisk, due to their large volume. A portable document format (pdf) version is located in the electronic version of the report which can be found on the DVD.

USEPA, 1990 — U.S. Environmental Protection Agency. Hazard Ranking System, 40 CFR Part 300, Appendix A, 55 FR 51583. December 14, 1990. *http://www.epa.gov/superfund/sites/npl/hrsres/#HRS%20Rule*.

USEPA, 2004 — U.S. Environmental Protection Agency. Superfund Chemical Data Matrix (SCDM). January 2004. 53 pages with appendices. *http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.*

ATSDR, 1995 — Agency for Toxic Substances and Disease Registry. Toxicological profile for Polycyclic Aromatic Hydrocarbons (PAHs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. 1995. *http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=122&tid=25*

ATSDR, 2000 — Agency for Toxic Substances and Disease Registry. Toxicological profile for Polychlorinated Biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. 2000. *http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=142&tid=26*

ATSDR, 2007 — Agency for Toxic Substances and Disease Registry. ToxFAQs (Toxicological Fact Sheet) for Benzene. August 2007. 2 pages. *http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=40&tid=14*

Beck, 2007 — Beck, Bill. Laclede Gas and St. Louis: 150 Years of Working Together, 1857-2007. First Edition. 2007. Laclede Gas Light Company. 192 pages.

Bogan, 2012a — Bogan, Jesse. "St. Louis Officials Will Try to Vacate Homeless From 'Hopeville' - Again." Saint Louis Post-Dispatch. April 13, 2012. Retrieved from *http://www.stltoday.com/news/local/metro/st-louis-officials-will-try-to-vacate-homeless-from-hopeville/article_d0e7bbca-8585-11e1-b9ed-001a4bcf6878.html* on September 24, 2013.

Bogan, 2012b — Bogan, Jesse. "'Hopeville' Homeless Camp in St. Louis Comes Down." Saint Louis Post-Dispatch. May 11, 2012. Retrieved from *http://www.stltoday.com/news/local/govt-and-politics/hopeville-homeless-camp-in-st-louis-comes-down/article_aea3bcd8-9b9e-11e1-b5ab-001a4bcf6878.html* on September 24, 2013.

Cheatham, 2014 — Cheatham, Craig. "News 4 Investigates Growing Problem with Local Work-Release Program". KMOV News Channel 4. January 28, 2014. Retrieved from *http://www.kmov.com/news/local/News-4-investigates-growing- problem-with-work-release-program--242494641.html* on April 24, 2014. 2 pages.

City St. L, 2014a — City of St. Louis Planning & Urban Design Agency. Geo St. Louis – a guide to geospatial data about the City of St. Louis for Parcel # 023400013. Retrieved April 1, 2014 from *http://dynamic.st.louis-mo/citydata/newdesign/data*.

City St. L, 2014b City of St. Louis Planning & Urban Design Agency. Geo St. Louis – a guide to geospatial data about the City of St. Louis for Parcel # 023400051. Retrieved April 1, 2014 from *http://dynamic.st.louis- mo/citydata/newdesign/data.*

*E&E, 1988 Ecology and Environment/Field Investigation Team (E&E). Preliminary Assessment, Mound Street Power Plant, St. Louis, Missouri. June 23, 1988.

*E&E, 1991 Ecology and Environment/Field Investigation Team (E&E). Screening Site Inspection, Laclede Coal Gas, St. Louis, Missouri. October 9, 1991.

Falls, 1993 Falls, Don. Latitute and Longitude Calculation Worksheet #2 LI Using Engineer's Scale (1/60) for Mound Street PCB's. December 13, 1993. 1 page.

GEHM, 1993 GEHM Corporation. UST Removal Closure Report. October 26, 1993.

Huff & Angel, 1992 Huff, Floyd A. and James R. Angel. Rainfall Frequency Atlas of the Midwest Illinois State Water Survey, Champaign Bulletin 71, 1992.

MDC, 2012 Missouri Department of Conservation. Missouri Commercial Fish Harvest 2000-2012. Prepared by: Sara Tripp, Dave Herzog, Susan Reinagel, and Joe McMullen. *http://mdc.mo.gov/sites/default/files/resources/2014/05/commercial-fish-harvest.pdf* 58 pages.

MDNR, 1994a Missouri Department of Natural Resources. Preliminary Assessment. Mound Street PCB Site, St. Louis, Missouri. March 21, 1994.

MDNR, 1994b Missouri Department of Natural Resources. Existence of Karst Near the Mound Street Site Memorandum to Don Falls, Environmental Specialist, HWP, DEQ from Edith Starbuck, Geologist, DGLS. January 5, 1994. 6 pages.

MDNR, 2006 Missouri Department of Natural Resources. Memorandum of Understanding, Missouri Department of Natural Resources and the City of St. Louis. Use of Local Groundwater Ordinance as Environmental Institutional Control when Missouri's Risk-Based Corrective Action Process on Contaminated Sites. 2 pages with attachments. October 25, 2006. Received by City Register November 2006. *http://www.dnr.mo.gov/env/hwp/docs/StLouisGroundwaterMOU.pdf*

MDNR, 2013 Missouri Department of Natural Resources. Memorandum from Hillary Wakefield, Project Manager, Hazardous Waste Program, Superfund Section, Site Assessment Unit to Mound Street PCB's Technical File and Laclede Coal Gas Technical File. Subject: Site Visit to Mound Street PCB's & Laclede Coal Gas Sites. October 18, 2013. 2 pages with attachment.

MDNR, 2014a Missouri Department of Natural Resources. Email correspondence between Hillary Wakefield, Superfund Project Manager and Michael R. Jackson, Production Director for Illinois American Water – Center Region regarding Drinking water intakes on the Mississippi River near St. Louis. Sent March 26 through April 22, 2014. 3 pages.

MDNR, 2014b Missouri Department of Natural Resources. Point Locational Data Collection Sheet for Laclede Coal Gas. April 28, 2014. 2 pages.

MDNR, 2014c Missouri Department of Natural Resources. Memorandum from Hillary Wakefield, Project Manager, Hazardous Waste Program, Superfund Section, Site Assessment Unit to Laclede Coal Gas Technical File & Mound Street PCB's Technical File. Subject: Laclede Coal Gas and Mound Street PCB's Site Visit and meeting with USEPA and Tetra Tech. October 14, 2014. 2 pages.

MDNR, 2014d Missouri Department of Natural Resources. Missouri Department of Natural Resources Request for Federal Action for the Laclede Coal Gas site (EPA ID#:MOD981715980) by the EPA. April 24, 2014. 1 page.

MDNR, 2015 Missouri Department of Natural Resources, Hillary Wakefield, Environmental Specialist. Telephone Record: File Laclede Coal Gas and Mound Street PCB's. Date: March 30, 2015. Subject: Access to sample the property in late spring 2015. 1 page.

MSS, 1996 Missouri Secretary of State. Application for an Amended Certificate of Authority for a Foreign Corporation: Duraine U.S. Corporation to Center Point Terminal Company. May 15, 1996. 2 pages. Corporation Division Amended Certificate of Authority of a Foreign Corporation for Center Point Terminal Company. June 10, 1996. 3 pages

MSS, 2010 Missouri Secretary of State. Missouri Code of State Regulations, Title 10 - Department of Natural Resources, Division 20 - Clean Water Commission, Chapter 7 - Water Quality. May 31, 2010. 18 pages with tables. *http://www.sos.mo.gov/adrules/csr/csr.asp*

MWCW, 2013a Midwest Climate Watch, Midwestern Regional Climate Center. Historical Climate Data, Precipitation Summary, Station: 237452 ST LOUIS SCIENCE CTR, MO. Retrieved September 16, 2013 from *http://mcc.sws.uiuc.edu/climate_midwest/mwclimate_data_summaries.htm*

MWCW, 2013b Midwest Climate Watch, Midwestern Regional Climate Center. Historical Climate Data, Temperature Summary, Station: 237452 ST LOUIS SCIENCE CTR, MO. Retrieved September 16, 2013 from *http://mcc.sws.uiuc.edu/climate_midwest/mwclimate_data_summaries.htm*

NCDC, 2013 U.S. Department of Commerce, National Climatic Data Center. Climatic Maps of the United States: Mean Annual Wind Speed and Prevailing Direction. Retrieved 2013 from: *http://hurricane.ncdc.noaa.gov/climaps/wnd60a13.pdf*

PFT, 1993 Petroleum Fuel & Terminal. Terminal Manager, Randel H. Lewis letter to Fire Inspector, Charles Gay regarding a leak in terminal pipeline. Received September 30, 1993.

*Sverdrup, 1996 — Sverdrup Corporation, Inc. Screening Site Inspection Report for Site Assessment Activity at Mound Street PCB Site, St. Louis, Missouri. May 24, 1996. 54 pages with appendices.

USCB, 2014 — U.S. Census Bureau. St. Louis (city) QuickFacts from the US Census Bureau. Retrieved March 28, 2014 from: *http://quickfacts.census.gov/qfd/states/29/2965000.html*

*USEPA, 2012 — U.S. Environmental Protection Agency. Facility Response Plan Inspection – FRP07A0079 letter from USPEA Federal On-Scene Coordinator to Tim Bishop, Terminal Manager for Center Point Terminal Company – St. Louis Terminal. July 2, 2012. 25 pages including Region 7 Facility Response Plan Field Inspection Checklist and attachments.

USEPA, 2014a — U.S. Environmental Protection Agency - Enforcement and Compliance History Online (ECHO). Detailed Facility Report Facility Summary for Center Point Terminals Co Foot of Mullanphy St, St Louis, MO 63102. Retrieved March 19, 2014 from *http://echo.epa.gov/detailed_facility_report?fid=110015853138.*

USEPA, 2014b — U.S. Environmental Protection Agency -ECHO. Civil Enforcement Case, Case Number: 07-200041030, Case Name: CENTER POINT TERMINALS COMPANY – NOV. Retrieved March 19, 2014 from *http://echo.epa.gov/case_report?id=07-200041030.*

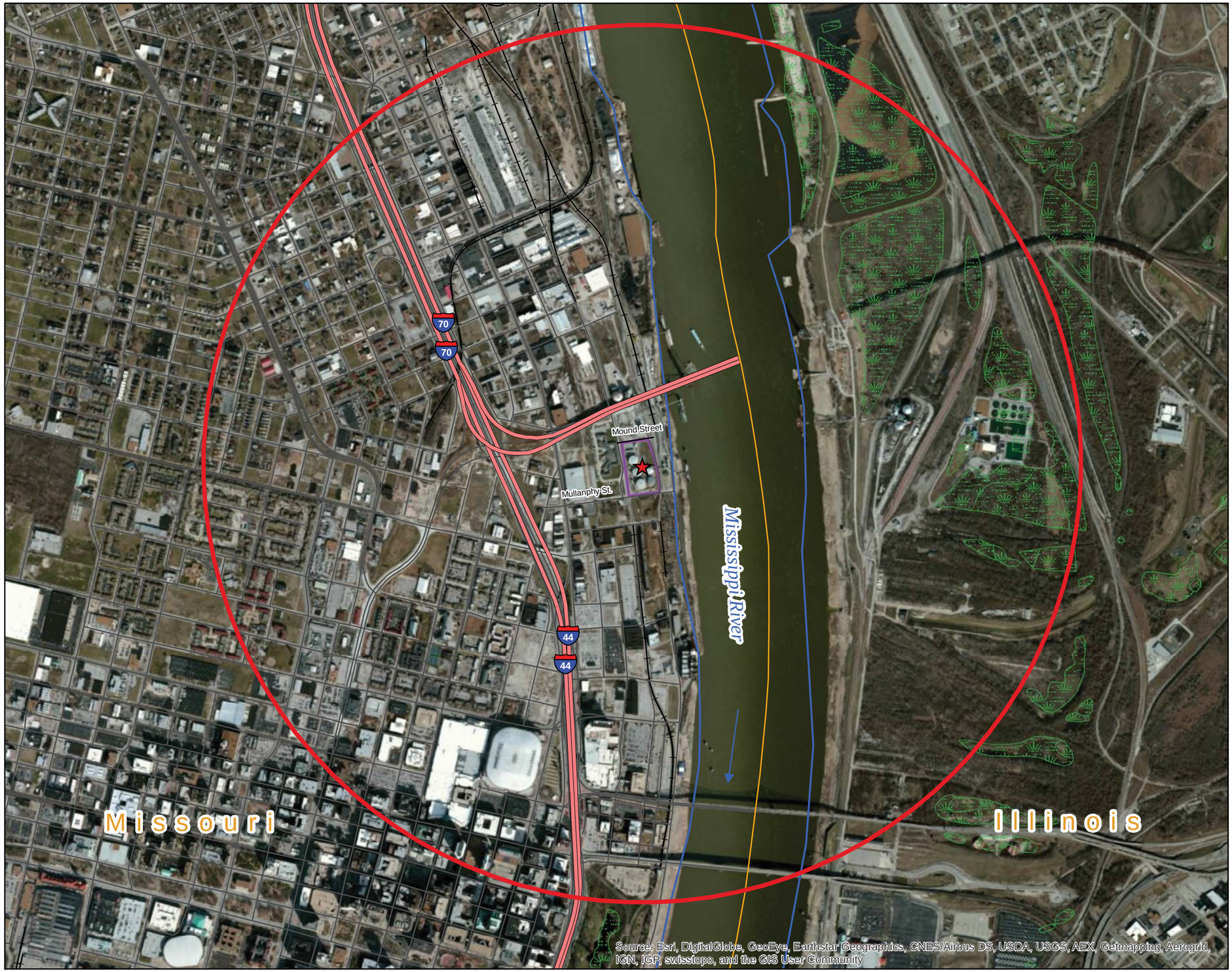
USEPA, 2014c — U.S. Environmental Protection Agency - Envirofacts. FRS Facility Detail Report for Center Point Terminals Co. Retrieved March 19, 2014 from *http://oaspub.epa.gov/enviro*

USEPA, 2014d — U.S. Environmental Protection Agency - Envirofacts. FRS Facility Detail Report for Petroleum Fuel & Terminals. Retrieved March 19, 2014 from *http://oaspub.epa.gov/enviro/fii_query_detail.disp_program_facility?p_registry_id=110012286481.*

WPT, 2013 — World Point Terminals Inc. (WPT). Center Point list of storage terminals. Retrieved January 28, 2013 from *http://www.wpo.ca/centerpoint.php*.

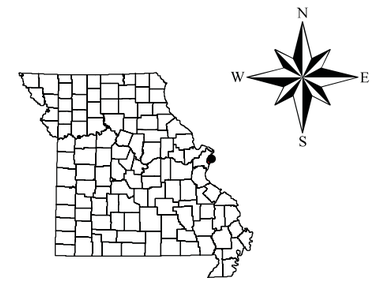
APPENDIX A
FIGURES

Figure 1a: Site Location Map
Laclede Coal Gas Site
Mullanphy and North 1st Streets
St. Louis City, Missouri 63102



Legend

- Center of Operations
- Road
- Railroad
- State Boundary
- One Mile Radius
- Laclede Coal Gas
- Wetlands



0 0.125 0.25 0.5 0.75 1 Mile

Created by Hillary Wakefield, March 2014. This map is located at M\Superfund\Laclede Coal Gas\Site_Location_Map.mxd

Overlay: Sanborn Fire Insurance Map of St. Louis, Missouri 1909, Volume 3, #18.

Although data sets used to create this map have been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

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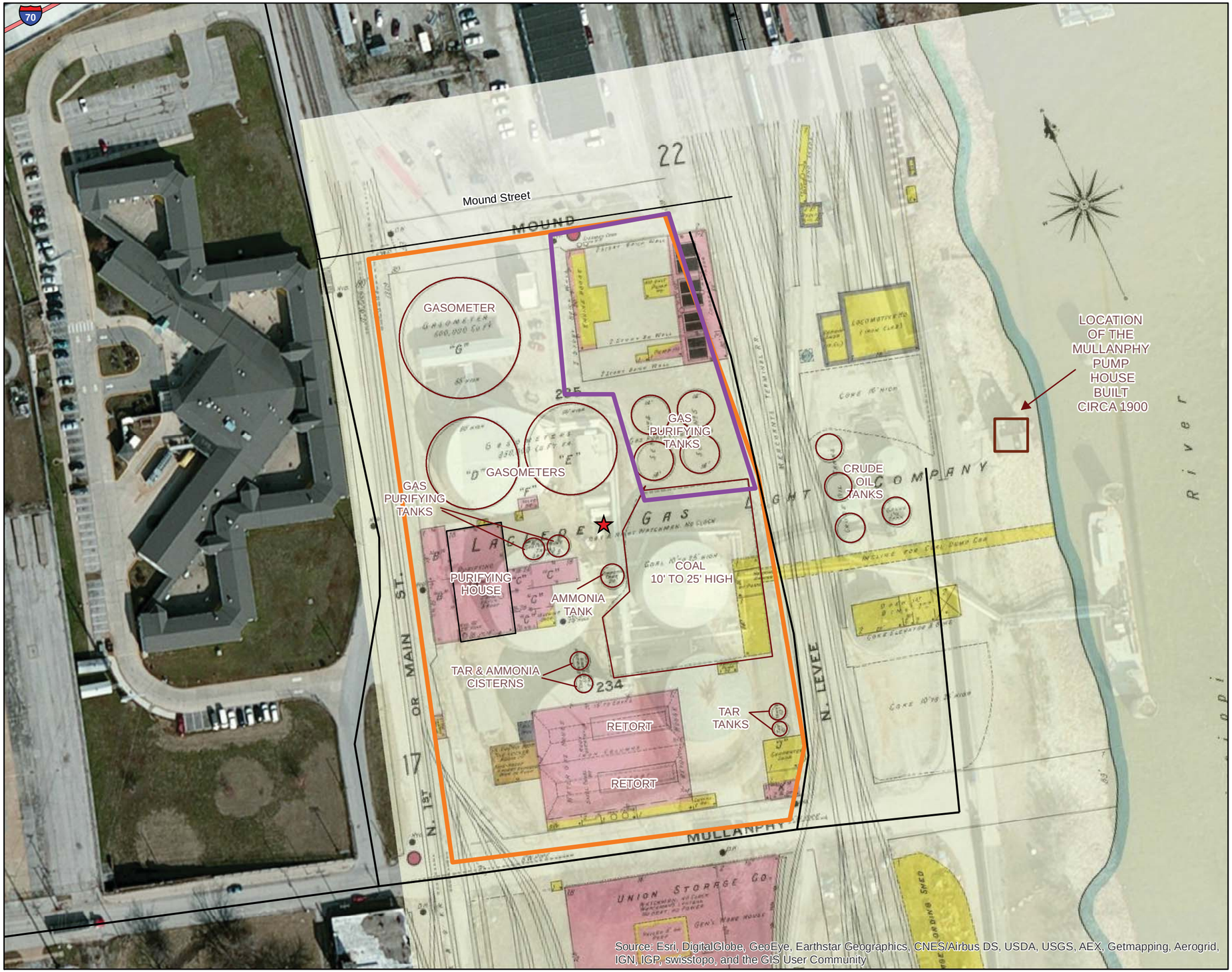
Hazardous Waste Program

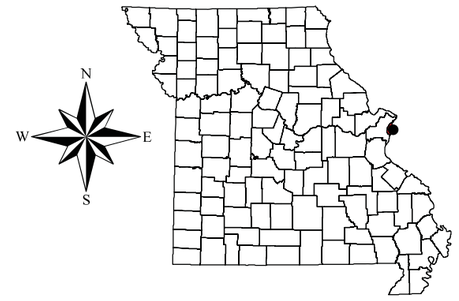
Figure 1b: Historic Operations Map
Laclede Coal Gas Site
Mullanphy and North 1st Streets
St. Louis City, Missouri 63102



0 110 220 440 660 880 Feet

Legend

- Center of Operations
- Railroad
- Boundary of Mound Street PCB's site
- Boundary of Laclede Coal Gas site



Created by Hillary Wakefield, March 2014. This map is located at M\Superfund\Laclede Coal Gas\Historic_Operations_Map_LCG.mxd

Overlay: Sanborn Fire Insurance Map of St. Louis, Missouri 1909, Volume 3, #18.

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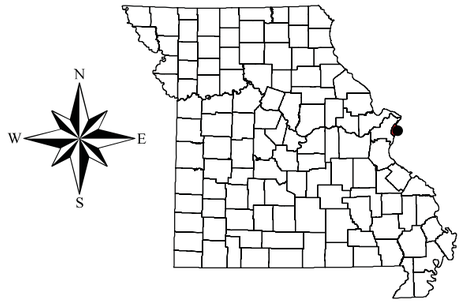
Hazardous Waste Program

Figure 1c: Current Operations Map
Laclede Coal Gas Site
Mullanphy and North 1st Streets
St. Louis City, Missouri 63102

Legend

- Center of Operations
- Road
- Railroad
- Great Rivers Greenway Riverfront Trail
- Former Homeless Encampment
- Boundary of Mound Street PCB's site
- Boundary of Laclede Coal Gas site



0 250 500 1,000 1,500 2,000 Feet

Created by Hillary Wakefield, March 2014. This map is located at M\Superfund\Laclede Coal Gas\Current_Operations_Map_LCG.mxd

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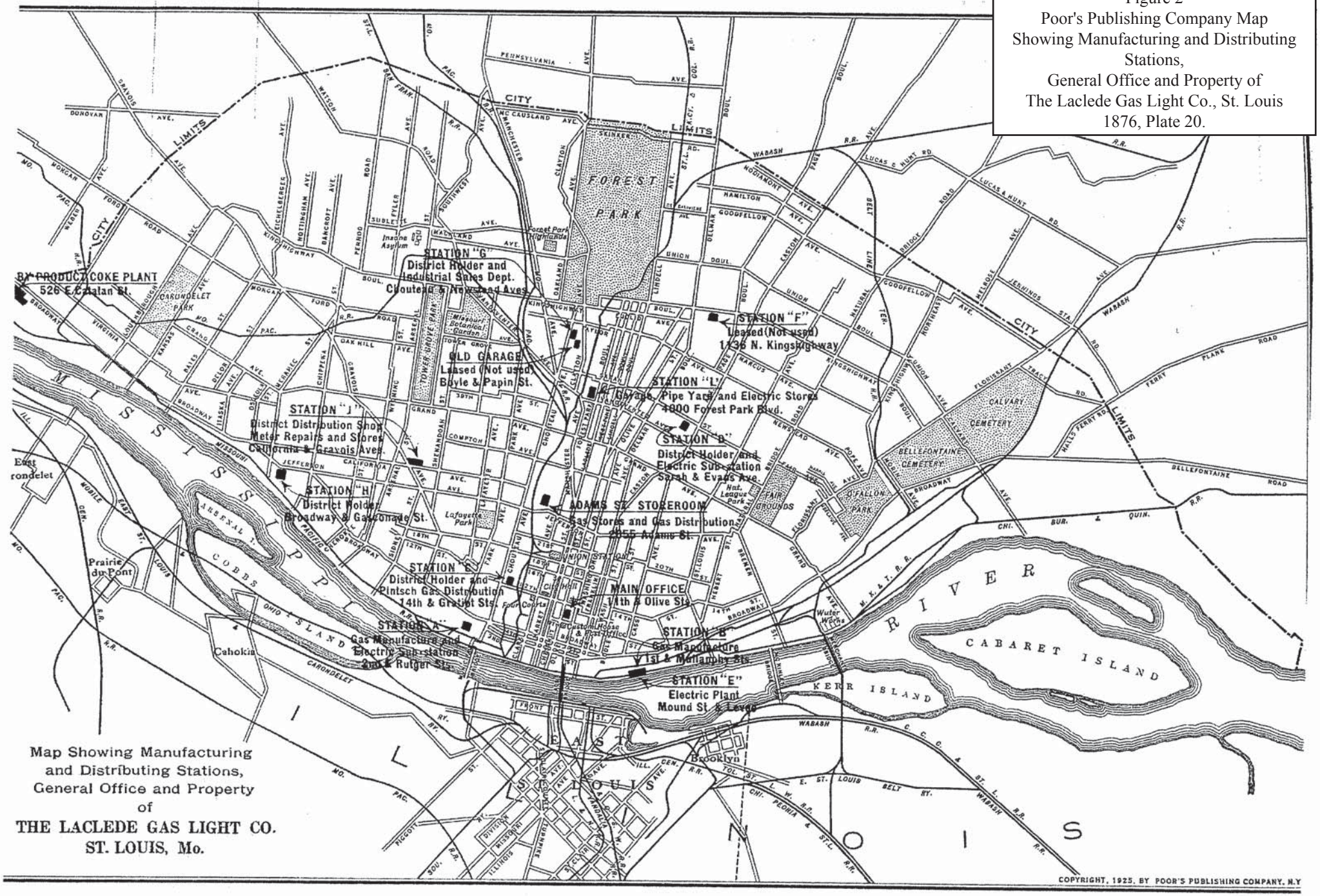
Hazardous Waste Program

Figure 2
Poor's Publishing Company Map
Showing Manufacturing and Distributing Stations,
General Office and Property of
The Laclede Gas Light Co., St. Louis
1876, Plate 20.



Map Showing Manufacturing and Distributing Stations, General Office and Property of
THE LACLEDE GAS LIGHT CO.
ST. LOUIS, Mo.

COPYRIGHT, 1925, BY POOR'S PUBLISHING COMPANY, N.Y.

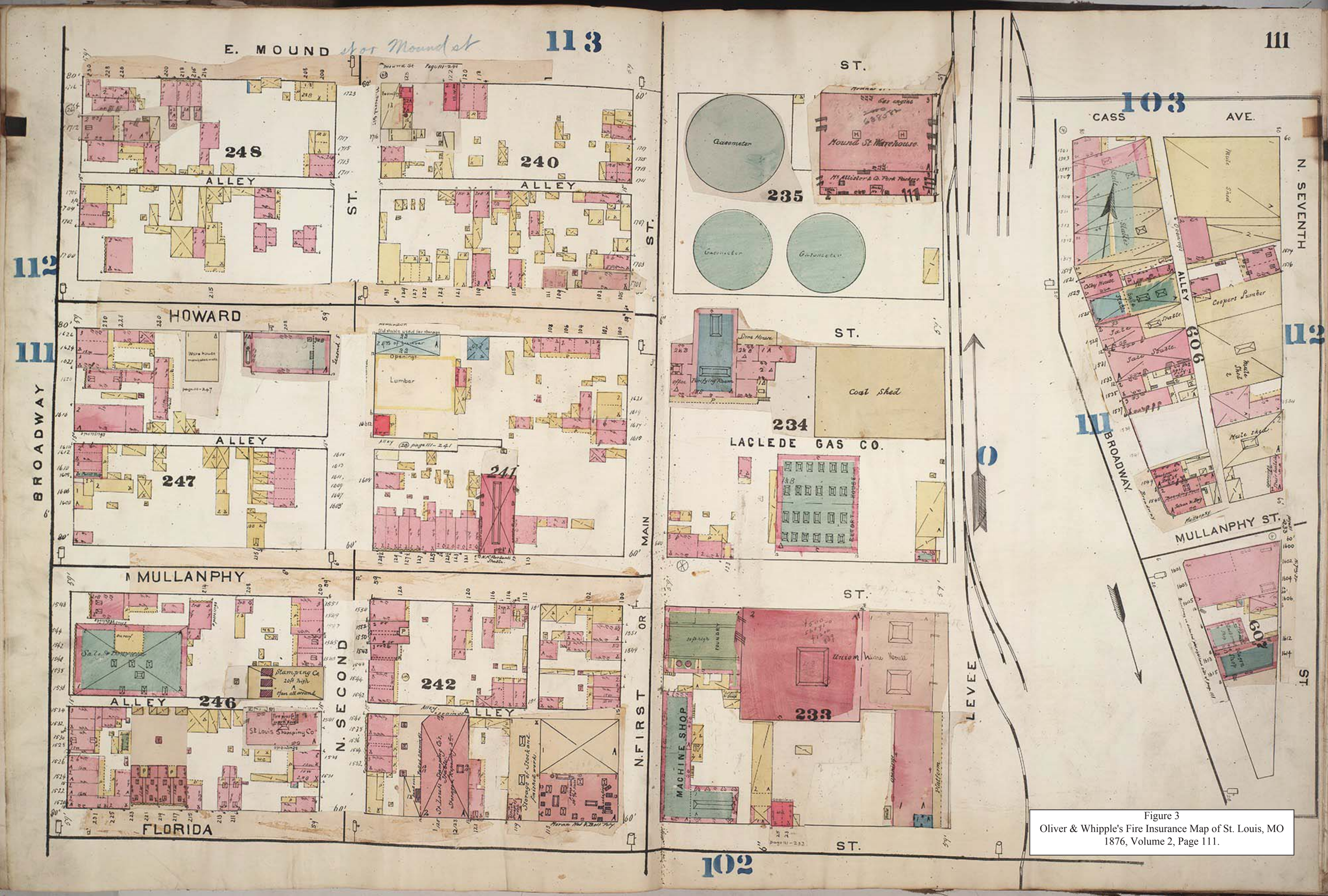


Figure 3
Oliver & Whipple's Fire Insurance Map of St. Louis, MO
1876, Volume 2, Page 111.

See page 113

Chicago & Burlington & Quincy R. R. Grounds.

ST.

MAIN ST.

COMMERCIAL ST.

Lacledé Gas Light Co's Electric Light Plant

Two floors only

No floors

Gasometer G

Gasometer D

Gasometer E

Coal bins

Iron Naphtha Tank 235

McAllister & Co. Pork Packers

Sand Drying House

Locomotive Ho.

St. Louis Ammonia Works.

F

ST.

oxyd A House 1st story fire proof

Condenser Room

Purifying Room

Ammonia Well 234

Gas Co. Station "B"

Night & Sunday watchman

Trestle work on roof for hauling Coal Shed

Engine room steel on roof

Coke elevator & coke crushing

Retort House

Generator

Iron Tank containing Naphtha

Coke Pile

Retaining wall

Incline

MULLANPHY ST.

ST.

N. FIRST

MERCHANTS BRIDGE TERMINAL R.R. YARD

LEVEE

Union Ware

Day, night & Sunday

Buckets & barrels of water

233

Alley 242

50' 1½" hose

Coke

Furnaces

office

WILSON STOVE MF'G CO.

Moran Bolt & Nut Mfg Co

Buckets & Barrels of water

Wells badly settled

Platform

ST

702

Stamping Co.

Excelsior Manufacturing Co's Stove Works

Merchant's Elevator

Figure 4
Oliver & Whipple's Fire Insurance Map of St. Louis, MO
1892, Volume 2 & 3, Page 111.

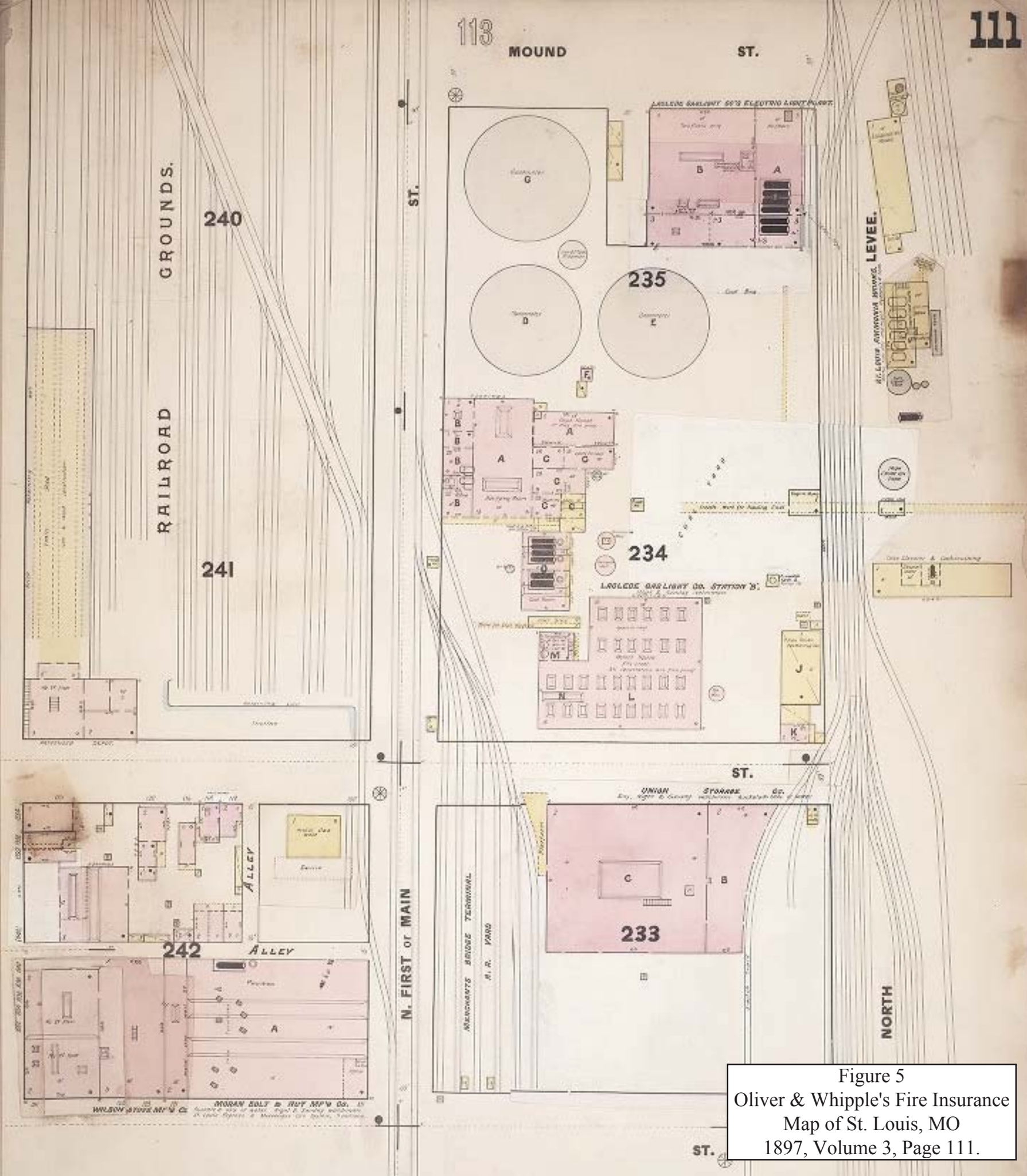


Figure 5
Oliver & Whipple's Fire Insurance Map of St. Louis, MO
1897, Volume 3, Page 111.

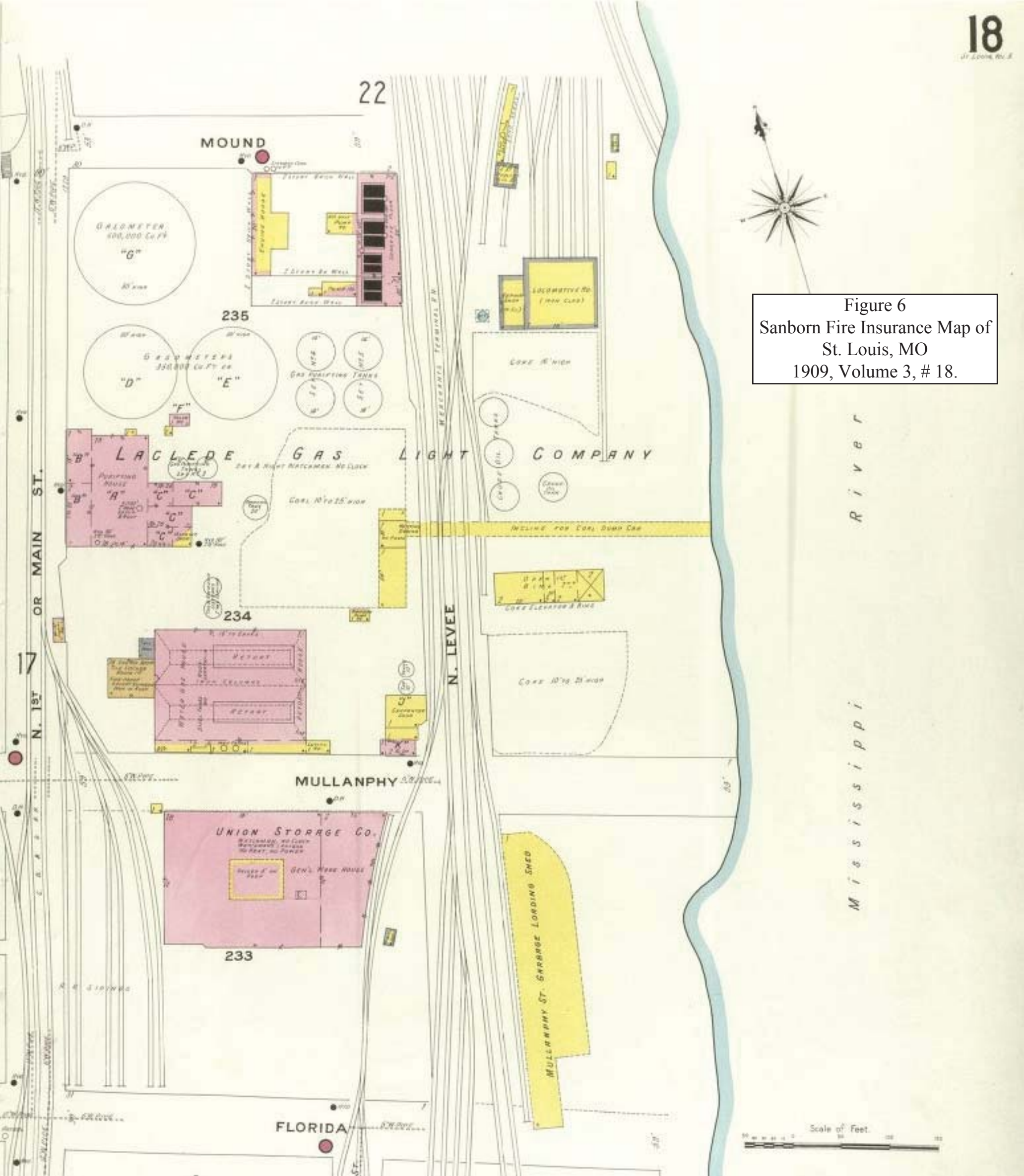


Figure 6
Sanborn Fire Insurance Map of
St. Louis, MO
1909, Volume 3, # 18.

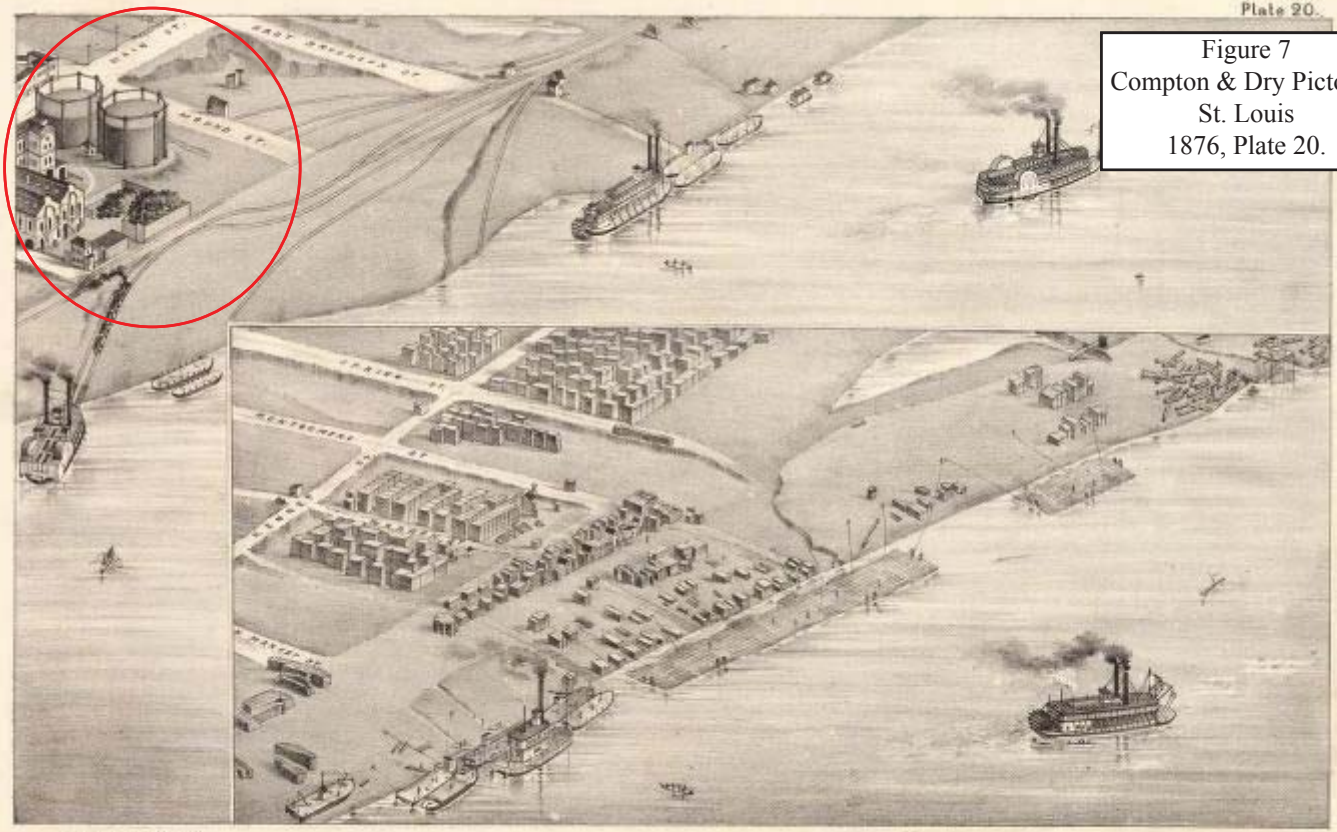
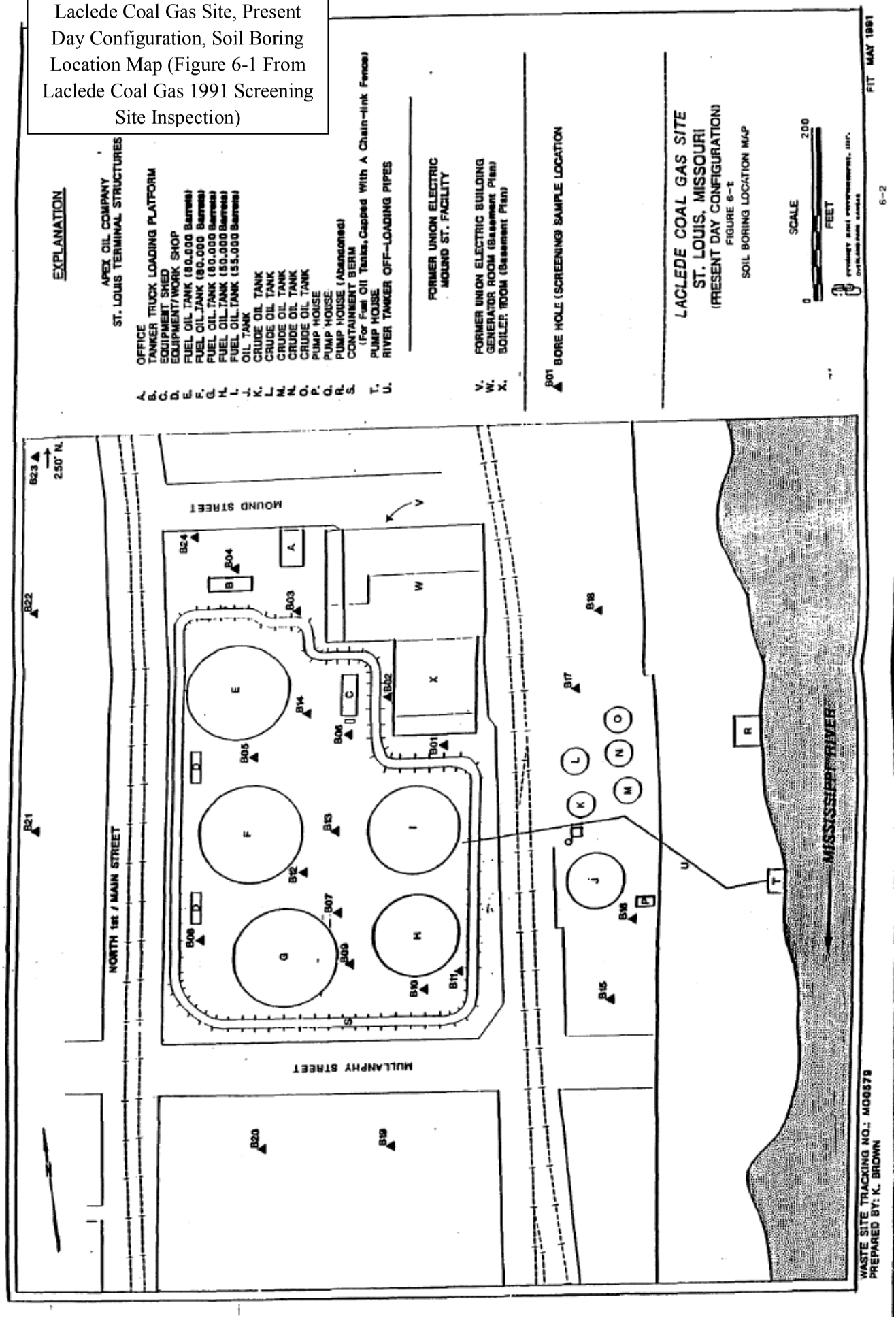


Figure 7
Compton & Dry Pictorial
St. Louis
1876, Plate 20.

Figure 8
G.M. Hopkins Atlas of the City of St. Louis, Missouri. 1883. Plate 6.

Figure 9

Laclede Coal Gas Site, Present Day Configuration, Soil Boring Location Map (Figure 6-1 From Laclede Coal Gas 1991 Screening Site Inspection)



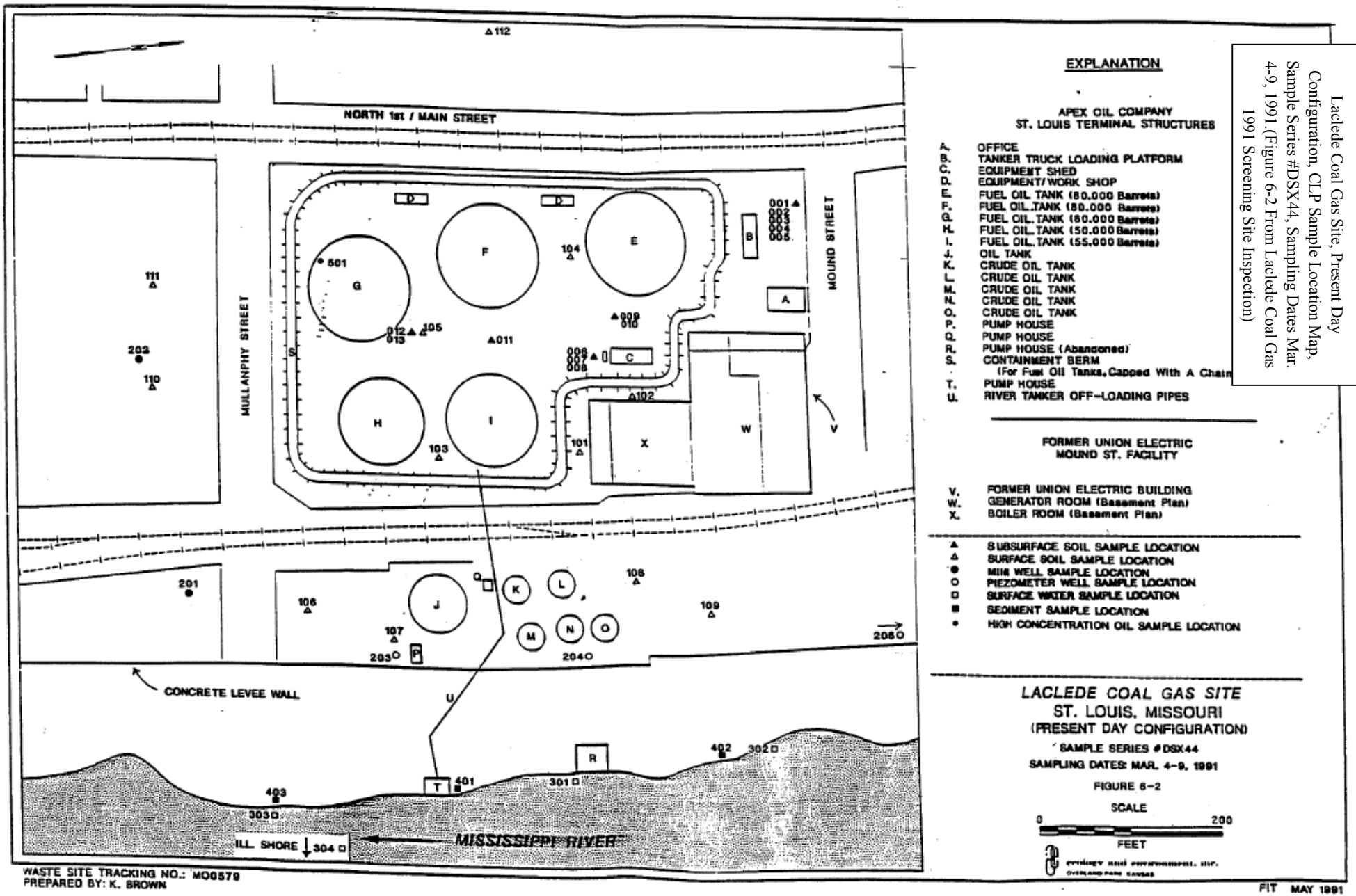


Figure 10

Laclede Coal Gas Site, Present Day Configuration, CLP Sample Location Map, Sample Series #DSX44, Sampling Dates Mar. 4-9, 1991.(Figure 6-2 From Laclede Coal Gas 1991 Screening Site Inspection)

APPENDIX B
PHOTODOCUMENTATION LOG

Photograph 1
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Property where the former manufactured gas plant, once known as Laclede Gas Light Company, Station "B" was located. The site is currently operating as a petroleum fuel terminal. View facing northeast from Mullanphy Street while driving towards Mississippi River.

Photograph 2
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Photograph of the petroleum fuel terminal's sign that is located on the southwest corner of the property. It states:
"Center Point Terminal Company
OPERATED BY PETROLEUM FUEL & TERMINAL CO."
View facing northeast from N. 1st & Mullanphy Streets.

Photograph 3
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Photograph looking west across the Mound Street PCB's site. The buildings on the site were demolished in 1991. Currently, it is a grassy vacant area. View facing west from Commercial Street.

Photograph 4
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Photograph looking at the northeast side of the petroleum fuel terminal across the grassy and vacant Mound Street PCB's site. The petroleum fuel terminal has a chain-link fence surrounding all sides of the facility. View facing southwest from Commercial Street.

Photograph 5
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Looking across the Mound Street PCB's site to the northwest, viewing the construction of the new I-70 bridge. The bridge sits where the TRRA property once was located (see Reference GEHM 1993a & 1993b). View facing northwest from Commercial Street.

Photograph 6
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

The Great Rivers Greenway Riverfront Trail (just east of the site and adjacent to the Mississippi River). View facing north along Riverfront Trail.

Photograph 7
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

Missouri Department of Corrections, Division of Probation and Parole, St. Louis Community Release Center, located to the west of the Laclede Coal Gas site. View facing south from under the I-70 bridge.

Photograph 8
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

A sign for the Mullanphy Pump House. Note: new Stan Musial 1-70 bridge over the Mississippi River in the background. View facing northeast from Riverfront Trail.

Photograph 9
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

The newly renovated Mullanphy Pump House, which, at the time the photograph was captured, was used by bicyclists and hikers to observe the construction of the new bridge. View facing east from the Riverfront Trail.

Photograph 10
Laclede Coal Gas Site
City of St. Louis, Missouri
Photograph taken September 26, 2013
by Hillary Wakefield, DEQ, HWP, SPF

A dedication plaque on the Mullanphy Pump House.
View facing east from the Riverfront Trail.

APPENDIX C
TABLES

TABLE #3: SELECTED ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES COLLECTED MARCH 1991 LACLEDE COAL GAS, ST. LOUIS, MISSOURI

- All values listed in parts per billion (ug/l) unless otherwise noted.
- J = data reported but not valid by approved Quality Control procedures
- NL denotes benchmark value not listed in reference source.
- Sample results in bold are significantly[1] above background concentrations
- Sample results in shaded cells exceed the lowest of the SCDM benchmark values
- Circled sample results exceed EPA SL

Sample Number (see Figure 10 for sample location)	202	203	204	206 background	206D duplicate	SCDM[2]	MRBCA[3] RBTL	EPA SL[4]	MO WQS[5]
Depth Collected From (feet)	**33**	**47.25**	**48**	**52**	**52**				
Metals									
Arsenic	**670**	15 J	<10	47 J	81 J	10	10	0.045	50
Cyanide	27 J	**590 J**	**1600 J**	<17	<10	200	312	200	NL
Lead	1200 J	330	350	480	481	15	15	15	15
Volatile Organic Compounds (VOCs)									
Benzene	<10	<10	**93**	<10	<10	5	5	5	5

[1] Three times the background concentration when contaminant is detected in background sample or above the Practical Quantification Limit when the background concentration is < Method Detection Limit.

[2] SCDM - Superfund Chemical Data Matrix March 31, 2012, Maximum Contaminant Level (MCL) for drinking water screening levels (SL) for groundwater/surface water pathway drinking water.

[3] MRBCA RBTL - Missouri Risk-Based Corrective Action Risk-Based Target Level for domestic water use, June 2006.

[4] EPA SL - EPA Regional Screening Levels, November 2012, tap water

[5] MO WQS - Missouri Water Quality Standards, groundwater/drinking water use catagories, Missouri Code of State Regulations, 10 CSR 20-7.031, May 31, 2012.

TABLE #4: SELECTED ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES COLLECTED MARCH 1991
LACLEDE COAL GAS, ST. LOUIS, MISSOURI

- All values listed in parts per billion (ug/l) unless otherwise noted.
- NL denotes benchmark value not listed in reference source.
- Sample results in shaded cells exceed the lowest SCDM benchmark value.
- Circled sample results exceed the MO WQS DW/GW value.
- **No background surface water sample was collected.**

Sample Number	**301***	**301D***	**302***	**303***	**304***	**304D***	**SCDM[1]**		**MO WQS[2]**				
Description of Approximate Location	**Southeast corner of abandoned pump house**	**Duplicate of 301**	**170 feet north of abandoned pump house**	**330 feet south of abandoned pump house**	**Illinois American drinking water intake in East St. Louis**	**Duplicate of 304**	**MCL**	**SC**	**CMC/CCC**	**DW / GW**	**Aq. Life**	**Fish Consmp**	**Irr. / Lvstock**
Metals													
Chromium, total	<10	<10	<10	<31	14	12	100	110	100	100	HD	NL	100
Lead	7.0	7.2	9.7	<24	(18)	(15)	15	NL	NL	15	HD	NL	NL
Zinc	<28	<26	<33	<89	54	46	NL	11000	NL	5000	HD	NL	NL

[1] SCDM - Superfund Chemical Data Matrix, March 31, 2012, maximum contaminant level (MCL), lowest of reference dose and cancer risk screening concentrations (SC) for groundwater/surface water pathway, drinking water, and lower of criteria maximum concentration and criteria continuous concentration (CMC/CCC)

[2] MO WQS - Missouri Water Quality Standards, benchmarks for drinking water, groundwater, protection of aquatic life, fish consumption, and irrigation/livestock watering use categories, Missouri Code of State Regulations, 10 CSR 20-7.031 May 31, 2013. Aquatic life protection standards adjusted for water hardness where applicable.

*Samples collected from the Mississippi River in locations marked in Figure 10: Sample Location Map for the Laclede Coal Gas Site 1991 Screening Site Inspection.

TABLE #5: SELECTED ANALYTICAL RESULTS FOR SELECT SURFACE SOIL SAMPLES (0-2 feet) COLLECTED MARCH 1991
LACLEDE COAL GAS, ST. LOUIS, MISSOURI

- All values listed in parts per million (mg/kg) unless otherwise noted.
- NL denotes benchmark value not listed in reference source.
- J = data reported but not valid by approved Quality Control procedures (not known whether biased high or low)
- Sample results in bold are significantly[1] above background concentrations
- Sample results in shaded cells exceed the lowest SCDM benchmark value
- Circled sample results exceed EPA SL for Industrial Use

Sample Number	**104**	**105**	**107**	**108**	**109**	**112 (Background)**		**MRBCA RBTL[3]**			**EPA SL[4]**			
Boring Number	**B05**	**B07**	**B16**	**B17**	**B18**	**B21**								
Description of Approximate Location	**~15 ft south of northern most fuel tank**	**South of center of site within containment berm**	**Southeast corner of site, approximately 100 feet north of B15**	**Northeast corner of site**	**Northeast corner of site approximately 150 north of B17**	**Approximately 80 feet north of North 1st Street**	**SCDM[2]**	**Res.**	**Non-Res**	**Migrn to GW**	**Res.**	**Ind.**	**Migrn to GW**	**TCLP[5] (mg/l)**
Metals														
Arsenic	6.0	7.9	8.1	14	11	33	0.43	3.89	15.9	7.22	0.39	1.6	0.29	NL
Cyanide	**220**	**190**	**14**	**98**	**35**	<6.7	1600	1220	12300	77.6	22	140	2	NL
Semi-Volatile Organic Compounds (SVOCs)														
Benzo(a)anthracene	**21**	**28**	<11	**34 J**	**4.5**	0.79	0.88	6.2	21.1	6.12	0.15	2.1	0.01	NL
Benzo(a)pyrene	**16**	**22**	<11	**20 J**	**4.2**	0.70	0.088	0.62	2.11	30.4	0.015	0.21	0.24	NL
Benzo(k)fluoranthene	<11	**12**	<11	**16 J**	**3.4**	0.68	8.8	62	211	118	1.5	21	0.35	NL
Indeno(1,2,3-cd)pyrene	<11	<12	<11	12 J	2.7	<0.41	0.88	3.77	12.8	19.7	0.15	2.1	0.2	NL
Naphthalene	<11	<12	**60**	1.1	0.51	<0.41	3100	36.3	119	0.327	3.6	18	0.00047	NL

[1] Three times the background concentration when contaminant is detected in background sample or above the Practical Quantification Limit when the background concentration is < Method Detection Limit.

[2] SCDM - Superfund Chemical Data Matrix, March 31, 2012, lower of reference dose and cancer risk benchmarks for soil pathway

[3] MRBCA RBTL- Missouri Risk-Based Corrective Action Risk-Based Target Level, June 2006. RBTLs are for soil type 2 (silty), residential and non-residential land use, and soil concentrations protective of groundwater

[4] EPA SL - EPA Regional Screening Levels, November, 2012, residential and industrial use, and migration to groundwater (DAF=1).

[5] TCLP - Toxicity Characteristic Leaching Procedure regulatory limit, 40 CFR Part 261, Subpart C.

TABLE #6: SELECTED ANALYTICAL RESULTS FOR SELECT SUBSURFACE SOIL SAMPLES COLLECTED MARCH 1991
LACLEDE COAL GAS, ST. LOUIS, MISSOURI

- All values listed in parts per million (mg/kg) unless otherwise noted.
- NL denotes benchmark value not listed in reference source.
- J = data reported but not valid by approved Quality Control procedures
- Sample results in bold are significantly[1] above background concentrations
- Sample results in shaded cells exceed the lowest SCDM benchmark value
- Circled sample results exceed EPA SL for Industrial Use

Sample Number	001	002	003	004	005	006	008	011	013	SCDM[2]	MRBCA RBTL[3]			EPA SL[4]			TCLP[5] (mg/l)
	Bkg										Res.	Non-Res	Migrn to GW	Res.	Ind.	Migrn to GW	
Description of Approximate Location	5 feet north west of B24 (on northwest corner of Apex Oil PFT property)					2.5 feet north of B06 (in the middle of the tank farm)	2 feet south of B06 (in the middle of the tank farm)	1.5 feet west of B07 (in the middle of the tank farm)	1 foot north of B13 (in the middle of the tank farm)								
Depth of Sample, feet	3-7	7-11	11-15	15-19	19-23	3-8	8-12	11-17	11-12.5								
Metals																	
Arsenic	7.7	5.7	8.1	10	6.7	4.3	**18**	7.6	10	0.43	3.89	15.9	7.22	0.39	1.6	0.29	NL
Cyanide	26	24	<6.5	<6.6	<7.4	**87**	**860**	**250**	<7.6	1600	1220	12300	77.6	22	140	2	NL
Volatile Organic Compounds (VOCs)																	
Benzene	<12	<12	<13	<13	<14	**3.5**	**150**	**18**	**1.8**	12	177	763	0.063	1.1	5.4	0.0026	NL
Semi-Volatile Organic Compounds (SVOCs)																	
Benzo(a)anthracene	1.8	<0.4	<0.44	<0.43	<0.63	**18**	**120****	**99**	**21**	0.88	6.2	21.1	6.12	0.15	2.1	0.01	NL
Benzo(a)pyrene	1.5	<0.4	<0.44	<0.43	<0.63	<11	**95**	**120**	**23**	0.088	0.62	2.11	30.4	0.015	0.21	0.24	NL
Benzo(b)fluoranthene	1.6	<0.4	<0.44	<0.43	<0.63	<11	**61**	**76**	**15**	NL	6.19	21	11.5	0.15	2.1	0.035	NL
Benzo(k)fluoranthene	1.4	<0.4	<0.44	<0.43	<0.63	<11	**52**	**89**	**17**	8.8	62	211	118	1.5	21	0.35	NL
Indeno(1,2,3-cd)pyrene	0.93	<0.4	<0.44	<0.43	<0.63	<11	**37**	**75**	<14	0.88	3.77	12.8	19.7	0.15	2.1	0.2	NL
Naphthalene	<0.37	<0.4	<0.44	<0.43	<0.63	**23**	**2200**	**30**	**55**	3100	36.3	119	0.327	3.6	18	0.00047	NL

[1] Three times the background concentration when contaminant is detected in background sample or above the Practical Quantification Limit when the background concentration is < Method Detection Limit.

[2] SCDM - Superfund Chemical Data Matrix, March 31, 2012, lower of reference dose and cancer risk benchmarks for soil pathway

[3] MRBCA RBTL- Missouri Risk-Based Corrective Action Risk-Based Target Level, June 2006. RBTLs are for soil type 2 (silty), residential and non-residential land use, and soil concentrations protective of groundwater.

[4] EPA SL - EPA Regional Screening Levels, November, 2012, residential and industrial use, and migration to groundwater (DAF=1).

[5] TCLP - Toxicity Characteristic Leaching Procedure regulatory limit, 40 CFR Part 261, Subpart C.

** first number is blacked out due to copying issues, so it is estimated at lowest number estimated for that analysis

TABLE #7: SELECTED ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED MARCH 1991 LACLEDE COAL GAS, ST. LOUIS, MISSOURI

- All values listed in parts per million (mg/kg) unless otherwise noted.
- NL denotes benchmark value not listed in reference source.
- J = data reported but not valid by approved Quality Control procedures (not known whether biased high or low)
- Sample results in bold are significantly[1] above background concentrations
- Sample results in shaded cells exceed the TEC
- Circled sample results exceed the ECOTOX benchmark
- **No Background Sample collected**

Sample Number	**402**	**403**	**Sediment Quality Guidelines**			
Date Collected	**03/06/91**	**03/07/91**				
Description of Approximate Location	**60 feet south of Surface Water Sample #302**	**33 feet south (downstream) of the southeast corner of the abandoned pump house**	**USGS TEC [2]**	**USGS PEC [2]**	**EPA EcoTox [3]**	**TCLP[4]**
Depth of Sample, inches	**0-6**	**0-6**				
Metals						
Arsenic	(8.4)	7.1	9.79	33	8.2	NL
Cyanide	0.016**	0.0065	NL	NL	NL	NL
Lead	36 J	31 J	35.8	128	47	NL
Semi-Volatile Organic Compounds (SVOCs)						
Benzo(a)anthracene	3.5	(4.2)	0.108	1.05	4	NL
Benzo(a)pyrene	(2.6)	(5.6)	0.15	1.45	0.43	NL
Benzo(k)fluoranthene	2.9	3.1	NL	NL	4	NL
Naphthalene	<0.82	<1.8	NL	NL	0.48	NL

[1] Three times the background concentration when contaminant is detected in background sample or above the Practical Quantification Limit when the background concentration is < Method Detection Limit.

[2] TEC and PEC - Threshold Effects and Probable Effects Concentration (TEC and PEC), U.S. Geological Survey Consensus-Based Sediment Quality Guidelines, June 2000

[3] EcoTox - Ecotox Thresholds, EPA Bulletin, EPA/540/F-95/038, January, 1996

[4] TCLP - Toxicity Leaching Procedure regulatory limit, 40 CFR Part 261, Subpart C.

** first number is blacked out due to copying issues, so it is estimated at lowest number estimated for that analysis

APPENDIX D
REFERENCES

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Beck, 2007

LACLEDE GAS AND ST. LOUIS

150 YEARS OF WORKING TOGETHER, 1857–2007

by Bill Beck

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JOHN PINKNEY KEISER

John Pinkney Keiser, Laclede Gas Light Company's first president, still holds the record for longest term served as company president. The Mississippi River steamboat captain was president of Laclede for 32 years, from 1868 to 1900.

Keiser was born September 23, 1833 in Boone County, Missouri. Keiser's father built the first gristmill in the county as well as the first steam mill west of St. Charles, Missouri. He also built the first paper mill in the state.

John P. Keiser first attended school at Pittsburgh, Pennsylvania, while his father was superintending the building of a steamboat. He attended Catholic School in St. Louis in the old Walnut Street Cathedral. In 1848, Keiser boarded at a private school in Hermann, Missouri, to study the German language, and later attended Jones' Commercial College in St. Louis, as well as the Howard School of Fayette, Missouri, where he completed his studies.

At the time he left school, the river transportation business was experiencing an era of great prosperity. In 1852, before he was 20 years of age, Keiser shipped out on the steamer Clendenin, with Captain Henry W. Smith, to learn river navigation. In 1853, he received his first government license as a pilot on the Missouri River.

Keiser gradually worked himself up in the fleet. In 1856, at age 23, he became commander of a steamer of the Lightning Line. In 1858, Keiser bought his first steamer, the Isabella, which yielded him rich returns in the years before the Civil War. During the Civil War he was owner and commander of several steamers. For a time following the war, Keiser was in the commission business in St. Louis with his brother, Charles W. Keiser. But the discovery of gold in Montana and the increase in passenger and freight traffic took him back to the river transportation business once again.

During the years Keiser was actively engaged in steamboating, he built, owned and controlled 58 river steamers. He was identified with the construction of the Eads Bridge for a time as general supply agent and also was successful as general manager of the Carondelet shipyards.

Keiser was made general superintendent of the Memphis & St. Louis Packet Company, which subsequently was renamed the St. Louis & New Orleans Anchor Line. He was president of the Anchor Line from 1882 until 1884, when he disposed of his entire interest in the steamship firm and severed his connection with the river interests. During the years he spent managing his transportation interests, Keiser served as president of the Laclede Gas Light Company, a position he ably filled until the company transferred its property to a reorganized corporation in 1889.

Following his retirement from the presidency of Laclede, Keiser turned his attention to private business interests, rounding out a career in which he enjoyed an enviable reputation for honor and integrity of character. He was for many years a valued member of the Merchants' Exchange and was also a member of the St. Louis University and Noonday Clubs.

He married Miss Laura R. Hough of Jefferson City, Missouri, on September 27, 1864. Keiser died on July 27, 1901, at Penatangueshene, Ontario, while spending the summer with his family

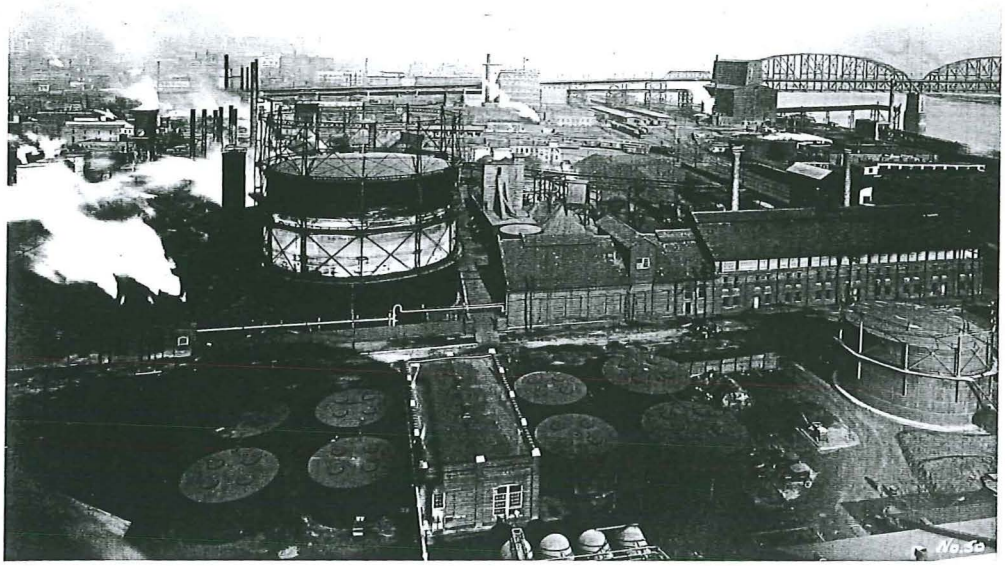
to do business throughout the city, as it existed in 1868 and as its city limits might be established in the future. The 1868 act repealed the section of the 1857 charter giving the city the right to purchase Laclede Gas Light's property, and it authorized the company to increase its stock beyond the $2 million originally authorized. Finally, it extended the rights and franchises originally conferred for 60 years to a period of perpetuity. In effect, the Legislature had granted Laclede Gas Light a St. Louis franchise that would last forever.

The Tripartite Agreement

The fact that the 1868 act amending Laclede Gas Light's charter seemed to contravene several provisions of Missouri's 1865 constitution, especially concerning the perpetual franchise, provided grist for lawsuits for the next 30 years. But the 1868 act did unequivocally grant Laclede Gas Light the authority to make and sell gas in St. Louis. In 1873, the company began extending lines from its plant at Mound and Mullanphy Streets west of Seventh Street. St. Louis Gas Light promptly brought suit to restrain what it called "the invasion of its exclusive privilege."

1873

The company began extending lines from its plant at Mound and Mullanphy Streets west of Seventh Street.



Laclede Gas Light's Station A was the utility's backbone manufactured gas plant in 1910.

stock was a vote of confidence in Laclede Gas Light.

Expanding the System

The Walker-Busch Syndicate purchased a well-run metropolitan gas utility in 1909. During the next five years, the new owners made substantial capital investments to expand the system.

Laclede Gas Light's main manufacturing facility at the time was Station A, located at Second and Rutger Streets. The longtime St. Louis gas plant made water gas for city use from seven standard Lowe water gas sets, installed between 1891 and 1904. In 1910, the new owners of Laclede Gas Light installed two new 11-foot Lowe water gas sets with separate air blowers in adjacent buildings at the Rutger Street site. The total daily generating capacity of the company's water gas plant at the time was 15 million cubic feet.

Laclede Gas Light in 1909 also made coal gas at the Rutger Street site. In 1910, shortly after the Walker-Busch Syndicate acquired control of the utility, Laclede Gas Light embarked upon a major upgrade of its coal gas facilities at Station A, installing a retort house around the corner at Convent Street. The new facility included 20 benches, each with eight retorts 20 feet long.

Three years later, in 1913, Laclede Gas Light installed a similar-sized retort house at Rutger Street that included 16 benches, each with eight retorts 16 feet long. Together, the two new retort houses gave the utility a daily capacity of 6 million cubic feet of coal gas.

Rutger Street also housed four rotary gas pumping units, eight water-tube boilers and the Pintsch gas plant for making railroad gas. In 1910, crews installed a low-pressure turbine to capture the exhaust steam at Station A. The turbine generated 500-volt DC current for use in the gas plant and for delivery to the company's growing network of electric distribution lines.

The older and smaller Station B at Main and Mullanphy Streets consisted of five standard Lowe water gas sets producing about 4 million cubic feet of water gas a day. The station also housed one retort facility that included 16 benches, each with eight retorts 16 feet long. The coal gas retort house at Station B had a daily capacity of .5 million cubic feet of coal gas. Chemical laboratories for the

1910

Shortly after the Walker-Busch Syndicate acquired control of the utility, Laclede Gas Light embarked upon a major upgrade of its coal gas facilities at Station A, installing a retort house around the corner at Convent Street.

daily testing of gas were maintained at both Station A and Station B in 1910.

Station E

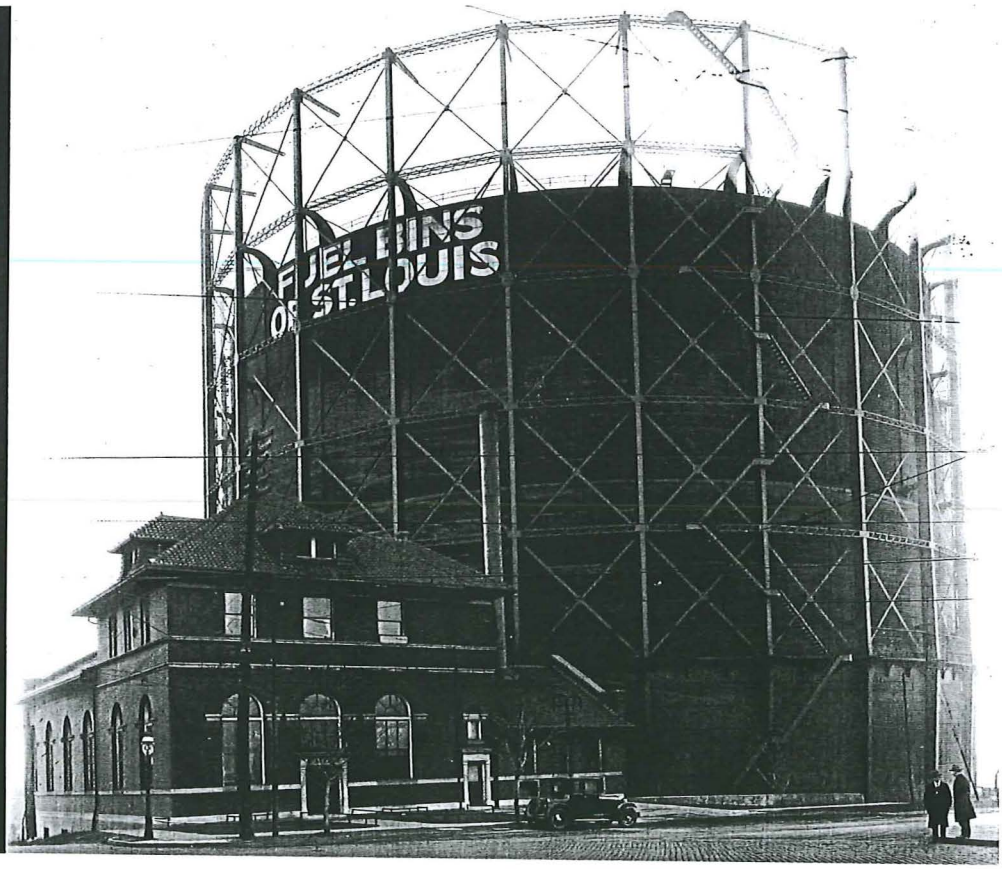
In 1911, Laclede Gas Light made a major commitment to diversify utility services and to compete with North American Company, its recent owner. The St. Louis utility completed and put into operation an electric generating station at Mound Street and the Levee that year.

Crews installed a 1,000-KVA turbine-generator and two 3,500-KVA turbine-generators at the site, which Laclede Gas Light engineers named Station E. The new turbine-generators were fed cooling water from the nearby Mississippi River by Worthington surface condensers with steam-driven dry vacuum pumps, motor-driven hot well pumps and turbine-driven circulating pumps.

The electric plant boasted two 75-kilowatt exciters to regulate the turbine-generators and two 500-kilowatt synchronous motor generator sets. A main switchboard was equipped with electrically-operated oil switches, bus bar and high-tension equipment for the transmission of power to downtown St. Louis. The boiler plant consisted of eight 500-horsepower water tube boilers.

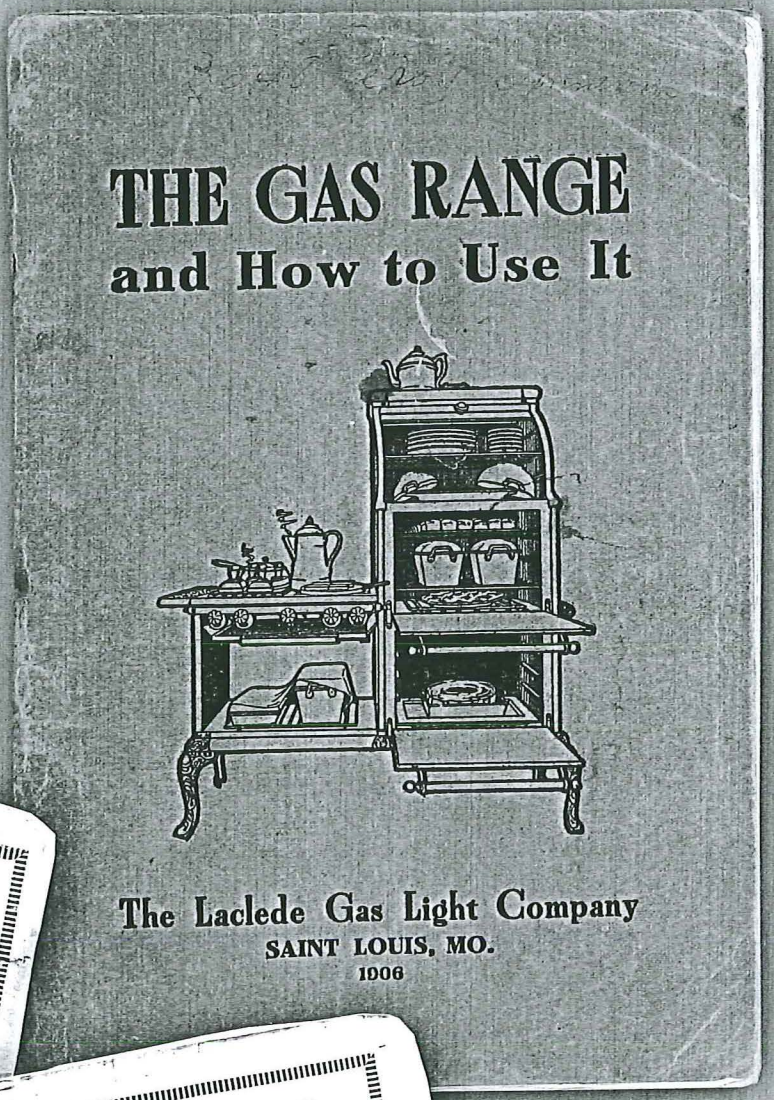
"A very complete coal and ash handling facility has been provided, which handles the coal from the cars into an overhead bin, from which it is fed by gravity to the boilers," a 1914 report noted. "The ashes are in turn handled by the same equipment from hoppers under the boilers into an overhead bin from which they are loaded directly into cars."

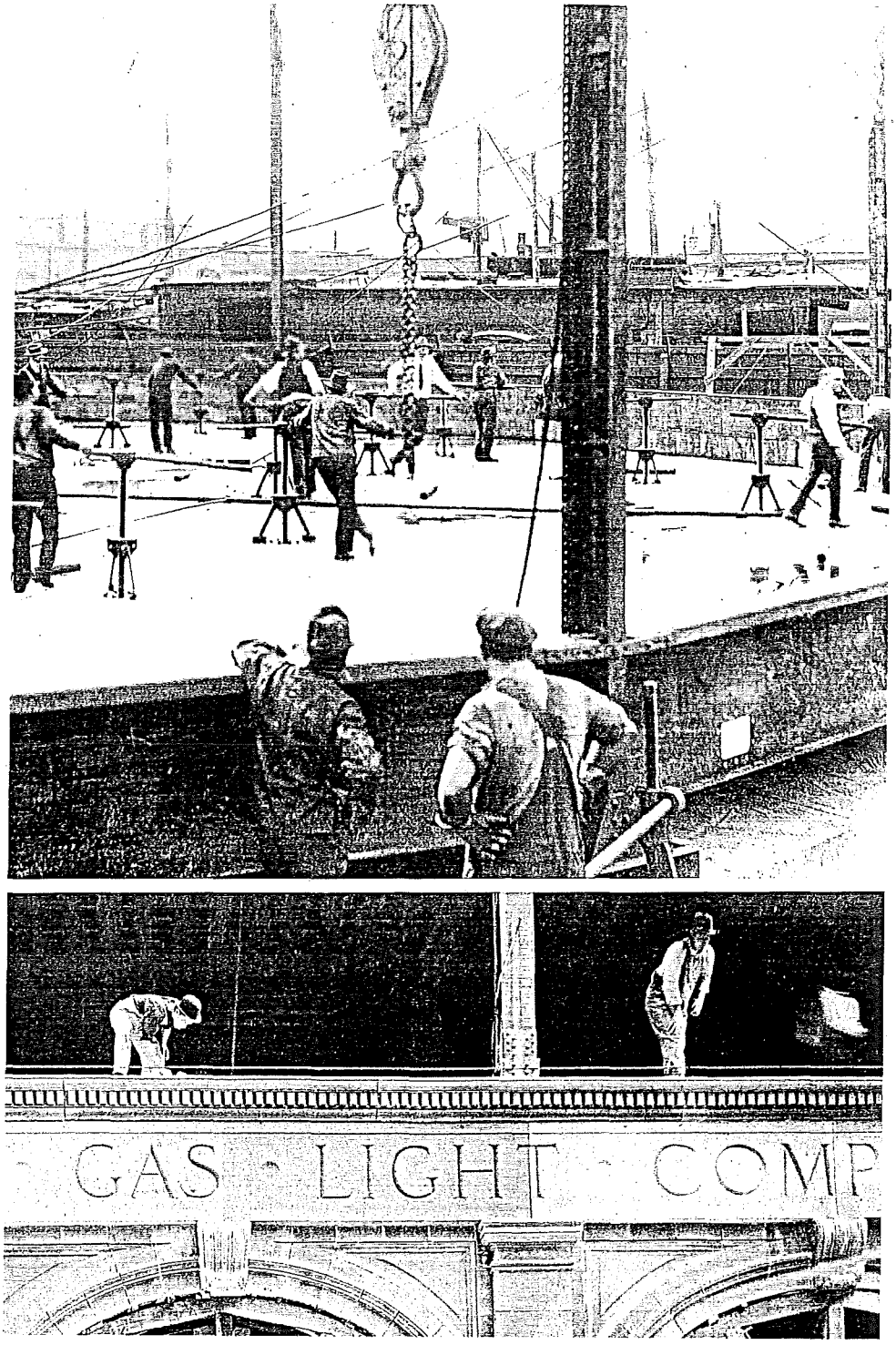
In 1911, the company operated electric substations at Sarah Street and Evans Avenue, the site of one of Laclede



The Station H telescoping gas holder was one of several in metropolitan St. Louis that stored gas during for peak use during the 1910s and 1920s.

As early as 1906, Laclede Gas Light began a customer outreach program to instruct St. Louis residents in the most efficient ways to use gas for cooking. Laclede also helped customers finance the purchase of gas appliances.




GAS · LIGHT · COMP

Between 1907 and 1917, Laclede Gas Light made hundreds of thousands of dollars in improvements to its system. At top, workers lay the foundation for a new telescoping gas holder. At bottom, masons finish the stone facade of the company's new general office building at 1017 Olive Street.

Gas Light's largest gas holders, and in the basement of an office building at 410 N. Seventh Street downtown.

A Gas Fairyland

For Laclede Gas Light Company, the biggest expansion of 1911 was the utility's announcement that it had purchased a large lot at the northeast corner of Eleventh and Olive Streets downtown. Laclede Gas Light had long since outgrown the corporate headquarters at 716 Locust Street, and the new St. Louis owners of the utility wanted to demonstrate to the community that Laclede Gas Light was becoming one of St. Louis' most influential corporate citizens.

Laclede Gas Light hired the St. Louis architectural firm of Mauran, Russell, Crowell to design a 12-story classic revival skyscraper. William DeForest Crowell, a Massachusetts native who arrived in St. Louis the year before, designed the 125,000-square-foot building in a mixture of classic and renaissance styles. The new skyscraper would be the first of a number of downtown buildings Crowell designed during the next nearly 40 years, including the Bell Telephone Co. building, the Railway Exchange building, the Missouri-Pacific Railroad building and the Federal Reserve Bank of St. Louis.

Groundbreaking took place early in the spring of 1912, and the building was completed by the early summer of 1913. When costs approached $1 million, Laclede Gas Light scaled back on plans for the building. Contractors built 10 floors and a mezzanine instead of the originally planned 12 stories.

But when the building finally opened in late July 1913, it was hailed as a "gas fairyland" by local reporters. The new building was framed by 13 ornamental street lights along Eleventh and Olive Streets, as well as 13 bronze brackets on the exterior wall holding gas lights. Inside, on the first floor and mezzanine, large grates held gas logs for heating the floor space.

The basement of the building contained the company's appliance salesroom, as well as a model house to demonstrate the appliances in action. A marble staircase led to the first floor, where St. Louis residents could apply for gas service or pay their gas bills. A mezzanine overlooking the first floor housed meeting and public rooms. The remaining floors were occupied by the utility's large and growing office staff.

Employees made the move from 716 Locust Street from noon to midnight on Saturday, July 26, 1913. A trio of three-ton electric trucks were pressed into service to move employee property to the new building, making 50 trips apiece. The last truck, carrying 65 cases of stationery, pulled up at 1017 Olive Street just 10 seconds before midnight.

With the move to the new headquarters complete, Laclede Gas Light Company looked forward to new challenges and opportunities. The onset of war in Europe less than a year later, the change to a new method of manufacturing gas in 1916 and increasing competition with the city's dominant electric utility would offer Laclede Gas Light ample challenge in the years ahead.

July 26, 1913
Employees made a 12-hour move from 716 Locust Street to 1017 Olive Street.

Wartime

The Democratic Party met in St. Louis in the summer of 1916 to re-nominate former New Jersey Governor Woodrow Wilson for the presidency. Wilson had captured the White House in 1912 when former President Teddy Roosevelt had entered the race on the Bull Moose ticket against incumbent Republican President William Howard Taft. Roosevelt and Taft had split the Republican vote, allowing Wilson to eke out a narrow victory in his quest for the White House.

In 1916, President Wilson campaigned on a platform of peace, vowing that he would do all he could to avoid sending American boys to fight and die in a European war. But when Germany resumed unrestricted submarine warfare in the late winter of 1917, Wilson and Congress responded in kind. In April, the United States declared war against Germany and its allies. Russia exited the war following the Bolshevik Revolution in the fall of 1917, leaving Great Britain, France and an untested America to face the Germans on the Western Front.

In the spring and summer of 1917, the United States had to develop a munitions industry to outfit and equip the millions of American soldiers called to the colors. For much of the 1890s and the early 1900s, the bulk of America's chemical supplies had come from Europe. A large percentage of that supply was imported from Germany. Americanization of the Koppers Co. in 1915 had brought an important chemical asset to the United States. For two of the compounds derived from the gas stream of byproduct coke ovens were absolutely essential to fighting a modern war.

Phenol and toluol, two of the common byproducts that Laclede Gas Light separated from the gas stream in its coke ovens, were the building blocks for the modern explosives industry. "The new war was fought with the products of coal," one historian noted.

Phenol was a critical ingredient in the manufacture of picric acid, which was employed in the manufacture of detonators. Phenol also was used to make ammonium picrate, which served both as a propellant powder and a charge in high explosive artillery shells.

Even more important to America's war effort was toluol, which was refined into toluene. Toluene is the second 't' in TriNitroToluene, which most recognize as TNT. Invented in Europe in 1907 as a replacement for nitroglycerine in commercial explosives, TNT quickly became the preferred explosive of all of the combatants during the First World War.

The tremendous increase in the number of Koppers byproduct coke ovens after 1915 helped the United States to solve its phenol and toluol shortage. But the federal government urged America's gas utilities to increase production of manufactured gas in order to increase the production of phenol and toluol.

On October 24, 1917, members of the executive committee of Laclede Gas Light Company met in closed session in the boardroom at 1017 Olive Street to hear from representatives of the U.S. War Department. The government officials asked the Laclede Gas Light executives

to build stripping plants at Station A and Station B for the production of toluol, "the source of all the government's explosives. The only source from which it could be obtained was from coal and water gas."

Laclede Gas Light and the nation's gas utilities stepped up to the task of increasing gas production. Toluene production jumped from 623,000 gallons in 1915 to 8.8 million gallons in 1918. The artillery barrages that paved the way for American Expeditionary Force offensives at Belleau Wood, Chateau Thierry and the Meuse Argonne in 1918 were a product of the byproduct coke ovens at Carondelet and hundreds of other sites across the United States.

Return to Normalcy

Gas service personnel who had served with the military forces during World War I began to return to Laclede Gas Light Company in the winter and spring of 1919. The company's revenues fell that year as foundries and steel stamping plants that had absorbed much of the coke and coke gas the company had produced during World War I made the transition to civilian manufacture. Laclede Gas Light, which had expanded manufactured gas operations at the urging of the federal government during the war, immediately began marketing excess coke capacity for home heating applications.

"We advertise coke in the daily press and have demonstrators who are provided with automobiles and call on every new coke customer to show him how to regulate the drafts to get satisfactory results," Henry Stith, the company's coke operations plant manager, wrote shortly after the war. "Coke makes no smoke, no soot and very few ashes. As it does not make any smoke, it is not necessary to have a large smoke pipe such as is needed to carry off the smoke when soft coal is burned."

Laclede Gas Light demonstrators noted that "coke burns freely and therefore should be burned with a very light draft. As it is lighter in weight than anthracite or soft coal, it is necessary to carry a larger amount of fuel in the furnace. The ideal way of burning coke is to open the dampers slightly and get the fire started, then shut off the pipe damper and all drafts, and hold this heat in the furnace."

In the early 1920s, Laclede Gas Light increased marketing efforts, focusing on the benefits of firing coke in the furnaces of smaller stores and downtown buildings. The company argued that the soft coal burned in many of the inadequately vented furnaces in the downtown business district poured out "large volumes of smoke which is blown and carried into stores and offices, causing great damage to fine fabrics, draperies, stationery and the temper of the afflicted."

Laclede Gas Light Company entered the 1920s full of optimism, focused on marketing clean-burning fuels to a growing industrial, commercial and residential population. The growth of St. Louis during the decade would spark corresponding growth at Laclede Gas Light Company. But the St. Louis utility would struggle with events outside its control, including two more changes in the utility's management structure.

1918
Toluene production jumped from 623,000 gallons in 1915 to 8.8 million gallons.

agencies, they proposed to trade their respective utilities. Laclede Gas agreed to sell Laclede Power & Light to Union Electric, while Union Electric reciprocated by selling St. Louis County Gas Co. to Laclede Gas.

Laclede Gas closed on the sale of Laclede Power & Light in May 1942. Union Electric paid $8.6 million for the gas company's electric power subsidiary and began preparing St. Louis County Gas Co. for sale to Laclede Gas Light Co.

Due to wartime restrictions, Laclede Gas didn't take possession of St. Louis County Gas Co. until November 1946, about a year after World War II had ended. By then, the suburban gas property was valued at more than $10 million.

But because Laclede Gas was no longer identified with far-off holding companies, banks in St. Louis stepped up to finance the purchase. Northwestern Mutual Life Insurance Co. subscribed to a mortgage bond issue, while First National, Mercantile-Commerce, Mississippi Valley, Boatmen's National and Manufacturers Banks all participated in a 10-year loan that allowed Laclede Gas to acquire its suburban counterpart.

The integration of St. Louis County Gas in 1948 also brought a backup fuel supply for Laclede Gas' anticipated source of natural gas. In 1946, St. Louis County Gas began construction of a stand-by propane gas storage facility at its Shrewsbury Gas Plant. In later years, Laclede Gas would supplement its often meager supply of natural gas with propane from the Shrewsbury storage facility, as well as three propane storage facilities that Laclede developed at manufactured gas plants in the city of St. Louis. One was at the coke plant, and the others were at Station A and Station B. The two latter plants produced a combination of natural gas and coal gas, manufactured to help in winter peak demand periods.

The 1948 acquisition of St. Louis County Gas freed Laclede Gas from the constraints of serving customers located inside the old city boundaries of St. Louis. Already by 1945, the booming suburbs of St. Louis County were approaching a population of 250,000 people. As the automobile became the preferred means of transportation in the 1950s, and federal and state governments began the process of building a controlled access, interstate highway system across America, more and more St. Louisans moved to the suburbs. Thanks to the acquisition of St. Louis County Gas, Laclede Gas could grow along with metropolitan St. Louis and the suburbs in the decades immediately following World War II.

L. Wade Childress noted that the merger of the two gas companies was weighted with promise, the promise of a new horizon for St. Louis and the promise of a "single, rational gas service system — serving better because it serves all. Another part of the promise will be realized in a single policy for distribution of straight natural gas."

Straight Natural Gas

On April 15, 1946, Laclede Gas announced its decision to convert to straight natural gas immediately upon completion of a new interstate pipeline

1942

Laclede Gas closed on the sale of Laclede Power & Light in May.

1957

With more than 350,000 residential customers, Laclede operated the second largest gas distribution utility system in the Midwest.

During his first year as president of Laclede Gas, H. Reid Derrick presided over a continuation of the tremendous growth his predecessor, Judge Robert W. Otto, had guided during the early 1950s. Despite a warm winter, Laclede's 1957 fiscal year was the second best in the utility's history. That year, Laclede celebrated its centennial with operating revenues of $45.6 million, net income of nearly $4 million, and earnings per share of common stock of $1.16.

The utility reported 5 billion cubic feet of gas in storage at the underground facility near Florissant, a capacity that allowed it to add 40,000 additional heating customers during the year. With more than 350,000 residential customers, Laclede operated the second largest gas distribution utility system in the Midwest, behind Chicago's People's Gas. Nearly half of Laclede's residential customers used gas for heating in 1957.

Laclede made changes to two of its oldest facilities during its centennial year. In the summer, the utility retired Station B, the smallest and oldest manufacturing plant on the Laclede system. First opened in 1873 following the utility's execution of the Tripartite Agreement, Station B produced gas for more than 75 years and was maintained as a backup facility following the introduction of straight natural gas in 1949. The old plant was expensive to operate and maintain, and company accountants estimated that the retirement would result in an annual savings of more than $150,000.

While crews were dismantling the Station B equipment, other employees were modernizing the Catalan Street Station, the coke plant that Laclede had built before the outbreak of World War I. Between 1955 and 1957, Laclede installed nearly four dozen propane storage tanks at Catalan Street. The big white tanks were capable of storing 1.5 million gallons of propane, more than enough to provide the equivalent of 50 million cubic feet of natural gas a day during winter peak periods.

For Bob Davis, those propane tanks still represent some vivid memories. "Before we had underground storage, we used propane to augment natural gas in extreme cold weather conditions," Davis, then a junior engineer, recalled a half-century later. "We had 30,000-gallon tanks at Catalan Street, maybe 15 or 20 of them. I remember the cold nights in the early 1950s when Bill Donnelly and I had to climb up on the tanks to open the safety valves that had closed due to the excess flow of propane. On several occasions, either Bill's wife or my wife came down with coffee and blankets. The tops of the tanks were 20 feet up. They had ice on them, and that made them very slick. Oh, they were slick."

During the late 1950s, Laclede was growing at the same pace as St. Louis. From 1940 to 1956, the population of St. Louis and surrounding St. Louis County increased by nearly one-third to 1.4 million. Jobs were plentiful in 1957 and St. Louis was aggressively courting Fortune 500 corporations to relocate to the Gateway City. Laclede was intimately involved with the community's industrial development efforts, which resulted in more than $107 million of new industrial and commercial construction in just the first six months of 1957.

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Bogan, 2012a

ST. LOUIS POST-DISPATCH

St. Louis officials will try to vacate homeless from 'Hopeville' — again

APRIL 13, 2012 11:28 AM • BY JESSE BOGAN • JBOGAN@POST-DISPATCH.COM > 314-340-8255

UPDATED *at 3:45 p.m. with comments from Mayor Francis Slay and the homeless.*

ST. LOUIS • Officials said Friday that a cluster of homeless camps on the Mississippi riverfront — Hopeville, Dignity Harbor, and Sparta — must be vacated soon because of safety and public health concerns.

"They'd be allowed (to stay) as long a people there didn't bother or hurt themselves or anybody else. That hasn't been the case," said Bill Siedhoff, director of city human services. "There have been multiple stabbings and fights and things that are a serious concern."

"We expect by the end of May that this is all going to wrapped up and concluded," he added.

An attempt to clear the camps before winter set in was unsuccessful.

But Siedhoff said this time around there are mandatory deadlines starting May 4. New public notices warn that the city will "strictly enforce" the evacuation dates.

"The solution to homelessness is homes, not temporary encampments," Mayor Francis Slay said in a prepared statement. "We are committed to offering stable, decent housing to people living in the encampments. But allowing the encampments to remain is no longer an option."

Officials estimate there are about 30 people left living there, including a dozen or so who have refused previous offers for assistance.

Several people moved to the riverfront in 2010 from an abandoned tunnel under Tucker Boulevard that was filled in. "Hopeville" was their new home. Today the community is a

hodgepodge of 30 tents and shacks, a few of which that have evolved to resemble small houses with front porches and wood stoves.

There are latrines, scores of blue tarps, wood piles, a food pantry and a mail box for 1500 Lewis Street. A grouping of trees is black from a fire that burned a shack to the ground. Large holes mark where residents have been digging for scrap metal to sell.

Jeff Shane, 43, a new arrival, said Friday that he didn't know what he was going to do to meet the looming deadline. He said he is a Navy veteran on disability and recently lost his home in south St. Louis to a fire. The Red Cross put him up for a bit. Then he stayed at New Life Evangelistic Center until his two-week time limit was up at the downtown shelter.

Now Shane shares a tent at Hopeville with a mother and daughter couple he met at a soup kitchen. He said he's on a two-year waiting list for subsidized housing.

"This is what I have right now," he said, standing under plywood as it rained. "Down here we are out of sight, out of everybody's way, and now they want to take it away."

The encampments stand near the foot of the new Mississippi bridge that's being built.

Justin Foster, 29, said he was recently treated for a major depressive disorder at St. Elizabeth's Hospital in Belleville and was given a bus voucher that he used to come to St. Louis.

"I used it to get over here because there are more jobs," he said, toiling with a copper spool.

He's been in Hopeville for three weeks and doesn't know where he's headed.

"We basically do whatever we can to survive," he said. "It may not be easy, but it's survival. . . I just had to get away from it all."

Foster has until May 11 to do that in Hopeville, according to a nearby public notice. Sparta closes May 18; Dignity Harbor closes May 4.

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Bogan, 2012b

ST. LOUIS POST-DISPATCH

'HOPEVILLE'

'Hopeville' homeless camp in St. Louis comes down

MAY 11, 2012 2:21 PM • BY JESSE BOGAN • JBOGAN@POST-DISPATCH.COM > 314-340-8255

Updated at 4:45 p.m.

ST. LOUIS • As the rumble of Bobcats and a massive front-end loader approached Hopeville on Friday, Antoinette Triplett, who heads the city's homeless services division, scuttled through the riverfront encampment in high-heeled shoes, looking for the last hold out.

"Have you all seen Angelo?" she yelled to a group of people gathered to see the homeless camp cleared.

She hurried past a torched shack, past make-shift showers, past a sea of other litter, all the way to Angelo's tent. He was gone and had left a new pair of sneakers and other belongings.

"We've been trying to reach him all week," Triplett said, walking back to a safe spot on the sidelines. "He's probably the most severe case that we have."

Hopeville was the second of three riverfront camps that the city plans to clear by May 18. The first, Dignity Harbor, was bulldozed last week. Officials said they have offered housing vouchers to residents of all the camps so they can stay in hotels and apartments.

Hopeville, the largest of the camps, formed in 2010 when people were forced out of a tunnel system under Tucker Boulevard that was filled in for a new street. Dozens of homeless people lived in Hopeville in tents and shacks.

The city wants to clear the riverfront homeless camps because of health and public safety concerns.

People like Angelo, the last man to leave Hopeville, represent the challenges of working with the homeless, even if there is housing available.

Shortly before officials like Triplett arrived on Friday, Angelo slept in a chair, near a fire pit. A caseworker made a last-ditch effort to work with him. Then Angelo walked away and was last seen headed toward downtown on North Broadway. He wore a black winter coat on a hot day and talked to himself.

"You can't help what you don't know," said Richard "Wolf" Mattson, 42, a former Hopeville resident who said Angelo liked to be left alone. "You can only do so much for someone."

Many people who lived in Hopeville had more than their fair share of struggles, said Tom Burnham, who runs a shelter for Peter and Paul Community Services. Walking through the camp Friday before the destruction began, he said he had mixed feelings about its fate.

On the worst days when he used to visit he said it was like the "Lord of the Flies." Other days, he said, it was "downright pleasant."

He expected many of the residents to benefit from the housing vouchers, but he thought a handful of them would wander back to the streets.

"There are some really sick schizophrenics down here who have little or no insight into their illness," he said.

Attorney Mark Schulte, who owns property near Hopeville, applauded city leaders for razing the camps. But he said the tent communities have been a "shame" on St. Louis because so many people watched others fall through the cracks or ignored the situation.

"As a great community we would help these people," he said. "The banks in our nation and community have been bailed out and are sitting on tens of thousands of vacant housing units."

Yet Schulte said the Rev. Larry Rice's plan to open a new homeless camp "needs to be strangled in its bed."

"This is intolerable in our nation and an attempt to replicate it will cause more harm than good," Schulte said as Hopeville was being torn down.

Rice said he will dedicate "Integrity Village," a 2-acre camp at South Vandevender Avenue and Interstate 44, near the Missouri Botanical Garden, on Monday.

Rice said the new camp will be modeled after Dignity Village in Portland, Ore. According to a press release, the new camp will be "a religious community where all faiths and all people are welcome."

Rice said he wants to hold the new camp, which will be on private property, to a much higher standard than Hopeville, where there was widespread alcohol and drug abuse.

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Cheatham, 2014

News 4 investigates growing problem with local work-release program

by Craig Cheatham / News 4

KMOV.com

Posted on January 28, 2014 at 8:14 PM

Updated Tuesday, Jan 28 at 9:20 PM

(KMOV) – Criminals are abusing their second chance after getting probation or parole by walking away from a community release center near downtown St. Louis.

One of them, a convicted sex offender, was charged with an attempted rape just last week.

News 4's Craig Cheatham dug into the growing problem and why Missouri's Department of Corrections has kept insisting no one has escaped.

Michael Smith, a convicted armed robber, is out of prison, now living at the St. Louis Community Release Center. News 4 talked with him as he was leaving for an appointment.

There's always more attention to detail after a potentially dangerous offender walks away from the center and fails to return.

Last week, convicted sex offender Shawn Akery left the center and was later charged with trying to rape a woman.

Last summer, convicted child molester Ronnell Edwards walked away from the same center, and showed up at the school where his victim went to school.

On Tuesday afternoon, the Missouri Department of Corrections revealed that there are 492 offenders living at the St. Louis Community Release Center; 121 of them are sex offenders or committed other violent crimes. Although the DOC insists no one has escaped, the department admits 72 absconded, which means they failed to return when they were supposed to.

For inmates like Michael Smith, it's another setback, trying to make it on the outside while being connected to other offenders who keep abusing the privilege that comes with living here.

The two sex offenders who walked away from the center and are now charged with new crimes are back behind bars awaiting trial.

Laclede Coal Gas, St. Louis City, Missouri
Site Reassessment, City St. L, 2014a

Geo St. Louis

a guide to geospatial data about the City of St. Louis

Tuesday, April 01, 2014
2:06:26 PM

Home | Mapping | Parcel Data | Images | Data | Log In

Parcel | Land Use | Zoning

Aerial | Oblique | Locator | Legend

General Information

Records 1 to 1 of 1

23400013

Parcel Information

- General Information
- Parcel History (13)
- Building Information (0)
- Tax Information (5)
- Permits (1)
- CSB Data (0)
- Sales History (0)
- Condemnations (0)
- Building Inspections (0)
- Images (0)
- Vacant Building (0)
- Area Snapshot
- Census
- Area Business Information

Parcel Data:03/30/2014

Permit/Inspection Data:03/31/2014

Print Report

Print Parcel

Assessor Parcel Information

Address:	1725 N WHARF ST
Zip Code:	63102
City Block:	234.00

Digital Plat | Paper Plat | Google | Plat Map

Owner Information

Parcel Geometry

Area:	43914 square feet
Perimeter:	1280 feet

Geographical Information

2000 Ward/Precinct:	5 / 4
2010 Ward:	2 / 6

Owner Name:	CENTER POINT TERMINAL MOUND
Owner Name (Secondary):	STREET LLC
Owner Address:	8235 FORSYTH BLVD STE 400 ST LOUIS, MO 63105

Parcel ID Information

9 Digit Parcel ID:	023400013
Tax Record No:	0234-00-0013-0
Handle:	10234000013

National Grid Information

USNG(1 Meter):	15S YC 45229 80911

Use Information

Assessor Class:	200 (Company)
Assessor Use:	3000 (INDUSTRIAL)
Strategic Land Use Designation:	Specialty Mixed Use
Zoning:	K (Unrestricted)

Alternate Addresses/Parcels for Map Record

Addresses | Parcel

Address: 1725 N WHARF ST

2000 Census Block:	1266.1022
Police District / Pauly Block:	4 / 907
Neighborhood:	Near North Riverfront (64)
Assessor Neighborhood:	338
CDA District/Subdistrict:	15 / 4
Historic District:	None
Preservation Review Area:	None
CORTEX:	No
Flood Plain:	None
Enterprise Zone:	Yes
Empowerment Zone:	Yes
Housing Conservation Program:	Yes

Tax/Assessment Information

Record 1

Tax Record:	0234-00-0013-0
Land:	$10,400.00
Improvements:	$0.00
Total:	$10,400.00

Legal Description

CITY OF ST. LOUIS
PLANNING & URBAN DESIGN AGENCY
FRANCIS G. SLAY, Mayor

For comments, suggestions, and feedback for the site, contact the Site Designer or call Tony Meyers Jr.(314) 657-3852

The City makes no warranty, guaranty or promise about the accuracy, currency, or completeness of the data provided and disclaims all warranties, expressed or implied.

Laclede Coal Gas, St. Louis City, Missouri
Site Reassessment, City St. L, 2014b

Geo St. Louis

a guide to geospatial data about the City of St. Louis

Wednesday, Octob
11:51:45 AM

Home Mapping Parcel Data Images Data

Parcel Land Use Zoning Aerial Obliq... Locator Legend

General Information

Records 1 to 1 of 1

234000...

Assessor Parcel Information

Address: 1700 N 1ST ST
Zip Code: 63102
City Block: 234.00

Digital Plat Paper Plat Google Plat Map

Owner Information

Owner Name: DUNRAINE U S CORP
Owner Address: 8235 FORSYTH BLVD
STE 400
ST LOUIS, MO 63105

Parcel ID Information

9 Digit Parcel ID: 023400051
Tax Record No: 0234-00-0051-0
Handle: 10234000051

National Grid Information

USNG(1 Meter): 15S YC 45192 80843

Use Information

Assessor Class: 200 (Company)
Assessor Use: 3000 (INDUSTRIAL)
Strategic Land Use Designation: Specialty Mixed Use
Zoning: K (Unrestricted)

Alternate Addresses/Parcels for Map Record

Addresses	Parcel
Address:	1700 N 1ST ST

Parcel Geometry

Area: 164304 square feet
Perimeter: 1874 feet

Geographical Information

2000 Ward/Precinct: 5 / 4
2010 Ward: 2
2000 Census Block: 1266.1022
Police Distict / Pauly Block: 4 / 907
Neighborhood: Near North Riverfront (64)
Assessor Neighborhood: 338
CDA District/Subdistrict: 15 / 4
Historic District: None
Preservation Review Area: None
CORTEX: No
Flood Plain: None
Enterprise Zone: Yes
Empowerment Zone: Yes
Housing Conservation Program: No

Tax/Assessment Information

Record 1

Tax Record:	0234-00-0051-0
Land:	$50,000.00
Improvements:	$126,200.00
Total:	$176,300.00

Legal Description

CB 234 1ST ST

Parcel I
General
Parcel H
Building In
Tax Info
Perr
CSB
Sales H
Condem
Building In
Ima
Vacant E
Area S
NEW
Area Busine
Parcel Da
Permit/Inspectio
Pri
Pri

04-1

Mound Street
MO0000093682
1.5

6.2388

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
E&E, 1988

Preliminary Assessment
Mound Street Power Plant
St. Louis, Missouri

TDD #F-07-8708-29 PAN #FM00579PA
Site #Y33 Project #001
Prepared by: E & E/FIT for Region VII EPA
Task Leader: Eric Hess, E & E/FIT
Superfund Contact: Pauletta R. France-Isetts
Date: June 23, 1988

30024048
Superfund

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SECTION 1: INTRODUCTION

The Ecology and Environment, Inc., Field Investigation Team (E & E/FIT) was tasked by the Region VII U.S. Environmental Protection Agency under Technical Directive Document (TDD) #F-07-8708-29, to conduct a Preliminary Assessment (PA) of the former Mound Street power plant, located in St. Louis, Missouri. This (PA) request was prompted by reports of oil accumulation in the facility and occasional oil releases to the Mississippi River. This preliminary assessment report will focus on potential chemical hazards associated with the current facility, and past operations on-site. E & E/FIT members Eric Hess and Kevin Hugill visited this site on September 17, 1987, to perform a site reconnaissance. In addition, oil samples were taken and analyzed for PCB contamination. EPA Preliminary Assessment Form 2070-12 is included as Appendix A.

SECTION 2: SITE DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The Mound Street Power Plant is located in St. Louis, Missouri, approximately 1 mile north of the St. Louis Arch, along the Mississippi River (Ref. 1). The legal description of the power plant is city block 234-Tract #25, St. Louis Plan. The geographic coordinates of the site are 90° 11′ 00".0 east longitude, and 38° 38′ 30".00 north latitude (Figure 2-1). The facility is located in an industrial area adjacent to the river. Several large warehouses, a petroleum tank farm, and a large grain storage facility are all located within 1/4 mile of the facility. The tank farm is adjacent to the power plant, and the two facilities separated by several yards of paved road. Currently the site is occupied by the former Mound St. Power Plant building, and the Apex Oil Company St. Louis terminal (Figure 2-2). The site is not secured and access to the grounds buildings is relatively unrestricted. There are locks on most doors and a fence surrounds the petroleum storage tanks, no other security exists.

2.2 SITE HISTORY

The purpose of this section is to convey the close association between the current Mound Street Power Plant and the former coal gasification facility once located on this site. The two facilities should be considered one site.

The earliest property records available indicate that this parcel of land was used by the Mound Street Warehouse Corporation until February 8, 1888 (Ref. 2). The Mound Street Warehouse Corporation sold the land and buildings to the Laclede Gas Light Company on February 8, 1888. The Laclede Company proceeded to construct a large coal gasification facility on the property. Figure 2-3 shows the Laclede Gas Facility at the turn of the century. Later, before 1904, the Laclede Company built an

electric power plant on the facility. This facility provided all the electric and gas power for the 1904 St. Louis Worlds Fair. On March 23, 1940, the name of the facility was changed to the Laclede Power and Light Corporation (aka Laclede Electric), and the Laclede Gas Light Company (aka Laclede Gas). This suggest that the operations were separated, at least financially. At some time between 1940 and 1945 a company called Phoenix Light, Heat and Power was involved in the Laclede operations. The exact nature of their involvement was not uncovered during the present document search. On March 23, 1945, the entire facility was sold to Union Electric Company. According to Union Electric representatives, Union Electric Company never manufactured gas at this site (Ref. 3). This indicates that 1945 is the approximate closure date of the coal gasification works. Union Electric continued to use the electric power facility until 1973. In 1969 Union Electric sold the former coal gas works to the Apex Oil Company. Between 1969 and 1972 Apex Oil dismantled the old coal gas plant and constructed a petroleum tank farm on the site. This Apex facility stored various petroleum fuels until the mid 1980s when it became one of two Apex Oil asphalt product terminals in St. Louis. Currently the terminal stores and distributes asphalt and #6 fuel oil.

On August 15, 1973, Union Electric sold the electric power plant with, all its machinery intact and operational to the Tenlis Company. The Tenlis Company dismantled the power generation and transmission equipment, including boilers, generators, and transformers. The transformer oil was allegedly removed by Midwest Oil Company, of St. Louis, Missouri (Ref. 3). The equipment was sold as scrap metal. On August 17, 1981, the Tenlis Company sold the former electric works to Azcon Corporation. The Azcon Corporation may be connected with metal recycling. On October 22, 1985, Azon Corporation sold the former electric works to the Mound Street Corporation, the present site owner. Currently the building is leased by Jim McNabb, who uses the buildings to house his electric motor stripping operation.

2.3 LACLEDE COAL GASIFICATION OPERATIONS

The Laclede coal gas facility operated for almost 60 years. An estimated production schedule for this facility is listed in Table 2-1. It should be noted that this facility was over 10 times larger, in terms of production, than the Key City facility in Dubuque, Iowa. Therefore, the Laclede facility may be the **largest** coal gasification plant in Region VII

Table 2-1
Estimated Production Record for the
Laclede Coal Gas Plant
St. Louis, Missouri

		Gas Production Rate ($ft.^3/yr.$)				By-Products (10^3 gallons)			
Year	Gas Type	Coal	Water	Coke	**Total**	Coke	Tar	Ammonia	Other
1890	Coal	1,000			1,000				
1900	Coal	1,200			1,200				
1910	Coal, Water	1,200	2,800		4,000				
1920									
1930	Coal, Water, Coke	1,692	2,323	2,022	6,037	337	4,355	2,789	821,17* lbs sulfate
1940	Coke			1,969	1,969				
1950	Coke			1,338	1,338				
AVERAGES:		**1,273**	**2,562**	**1,776**	**2,591**	**337**	**4,355**	**2,789**	

(Ref. 4)
* Sold to the U.S. Army for munition manufacture.

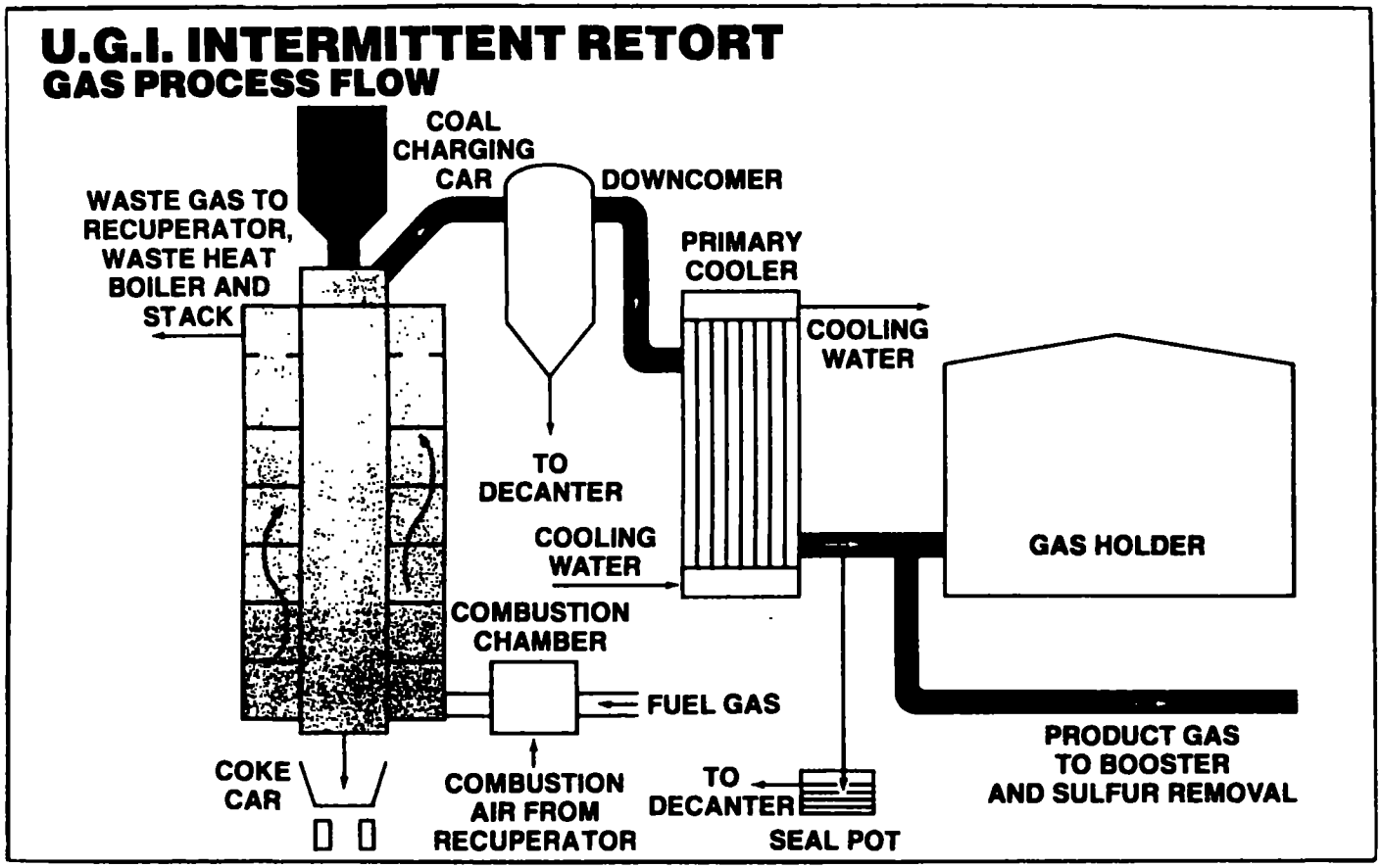
In the 19th century and the first half on the 20th century, natural gas substitutes were manufactured from coal and petroleum oils. These products were distributed for a variety of residential, commercial, and industrial uses. The diverse uses of manufactured gas included the operation of home appliances, lighting, furnaces, and internal combustion engines.

Because distribution technologies of the era were limited, manufactured gas plants were situated near areas of high demand, usually major metropolitan centers. In the late 1950s, these facilities were phased-out as petroleum and natural gas pipeline distribution facilities became widely established. Natural gas is a more convenient and economical form of energy. Many manufactured gas facilities were sold or destroyed to make way for new construction. Generally, the waste containers were left underground and in some cases were covered by new construction. Approximately 1,500 manufactured gas sites have been identified in the United States. EPA Region VII has approximately 142 coal gasification sites (Ref. 4).

The major gas manufacturing process used was the UGI intermittent retort process (Ref. 5). This method produced gas through coal carbonization (Figure 2-4). During this process, coal is heated in the retort and the resulting coal gas is removed through its top. The gas is run through a condenser and a scrubber before it is moved into the gas holder. Wastes are produced in the condenser and scrubber and in the retort itself. The coal is carbonized in batches and the resulting coke is discharged after each period of carbonization. In the latter stage of a carbonization period, steam can be introduced into the fuel bed. This displaces residual coal gas and reacts with the hot coke to produce water gas. The resulting increase in gas production is substantial. The majority of manufactured gas in the United States was produced by this process.

This manufactured gas is often called city gas, coal gas, or town gas. It is relatively rich in hydrogen, methane, and carbon monoxide, and exhibits a heating value of about 500 British thermal units/per cubic foot (Btu/cf) (Ref. 5). The coke produced by this process is highly reactive and an excellent smokeless fuel for domestic heating.

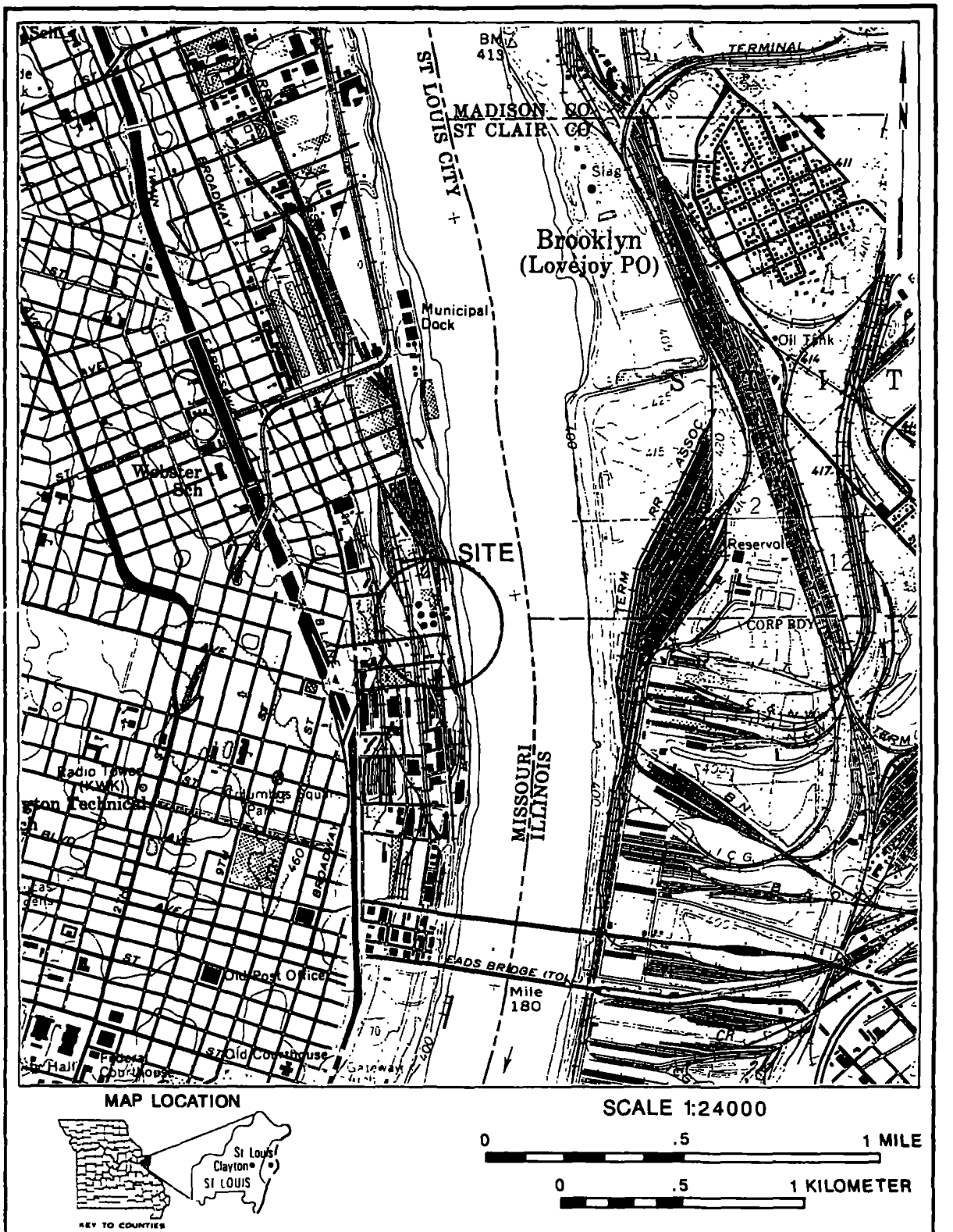
A second type of retort process is the continuous retort. It features a continuous fuel feed system and a continuous discharge of coke. An analysis of typical retort gas is listed in Table 2-2.



Reference 5

THIS MANUFACTURED GAS MACHINE WAS THE MOST COMMON TYPE IN USE DURING THE PEROID OF OPERATION FOR THE LACLEDE FACILITY.

FIGURE 2-4



MOUND STREET FACILITY
ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: C. WILLIAMS

ECOLOGY & ENVIRONMENT FIT JAN. 1988
SOURCE: USGS 7.5' GRANITE CITY, IL. QUAD. 1982

FIGURE 2-1 : SITE LOCATION

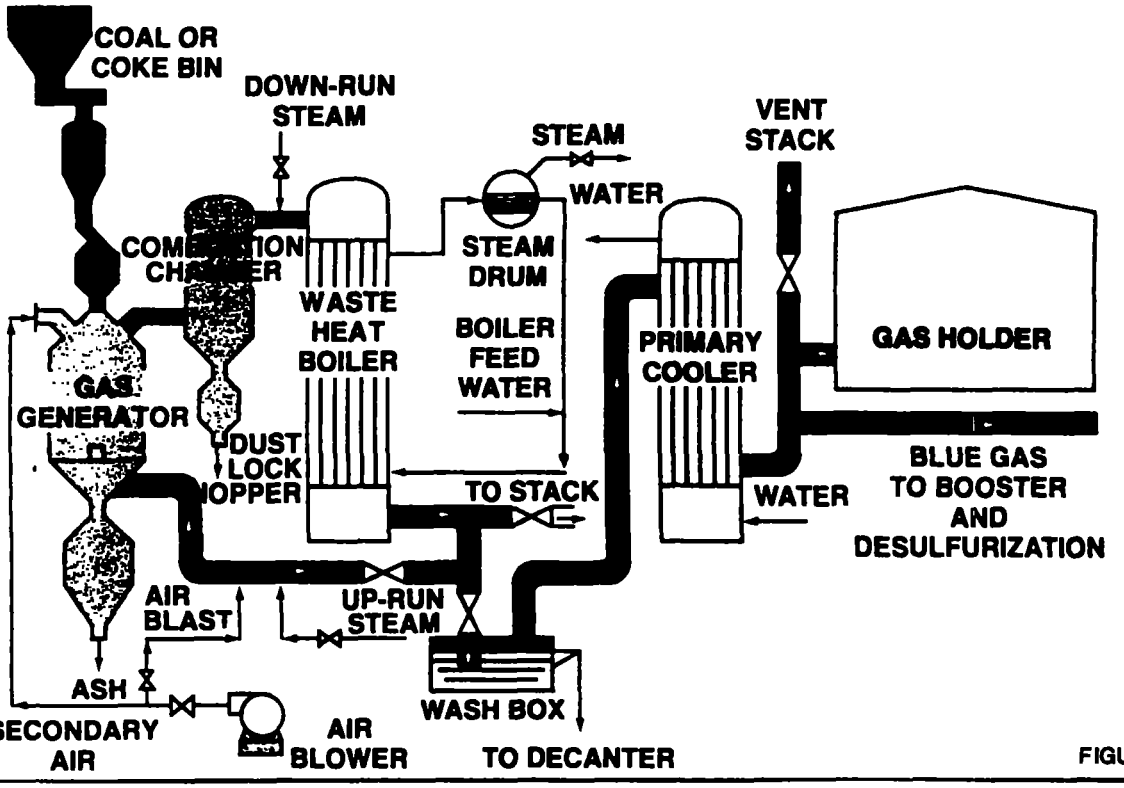
Table 2-2
Chemical Composition of Typical Retort Gas

	Volume Percent in Various Gases	
	Intermittent	Continuous
Carbon Dioxide	2.1	3.0
Illuminants	3.4	2.8
Oxygen	0.4	0.2
Carbon Monoxide	13.5	10.9
Hydrogen	51.9	54.5
Methane	24.3	24.2
Nitrogen	4.4	4.4
Btu/cf	520.0	532.0
Specific Gravity	0.42	0.42

Source: Ref. 5

Another type of manufactured gas is known as blue gas or water gas. This gas is rich in hydrogen and carbon monoxide and exhibits a heating value of approximately 300 Btu/cf (Ref. 5). This product is produced by passing steam over incandescent coal or coke in a gas generator (Figure 2-5). The resulting chemical reaction is endothermic and thus is maintained by periodically forcing air into the coal or coke beds, allowing it to combust at a controlled temperature. To avoid contaminating the blue gas with excessive nitrogen or carbon dioxide, the steam and combustion phases are cycled. A chemical analysis of a typical blue gas is listed in Table 2-3.

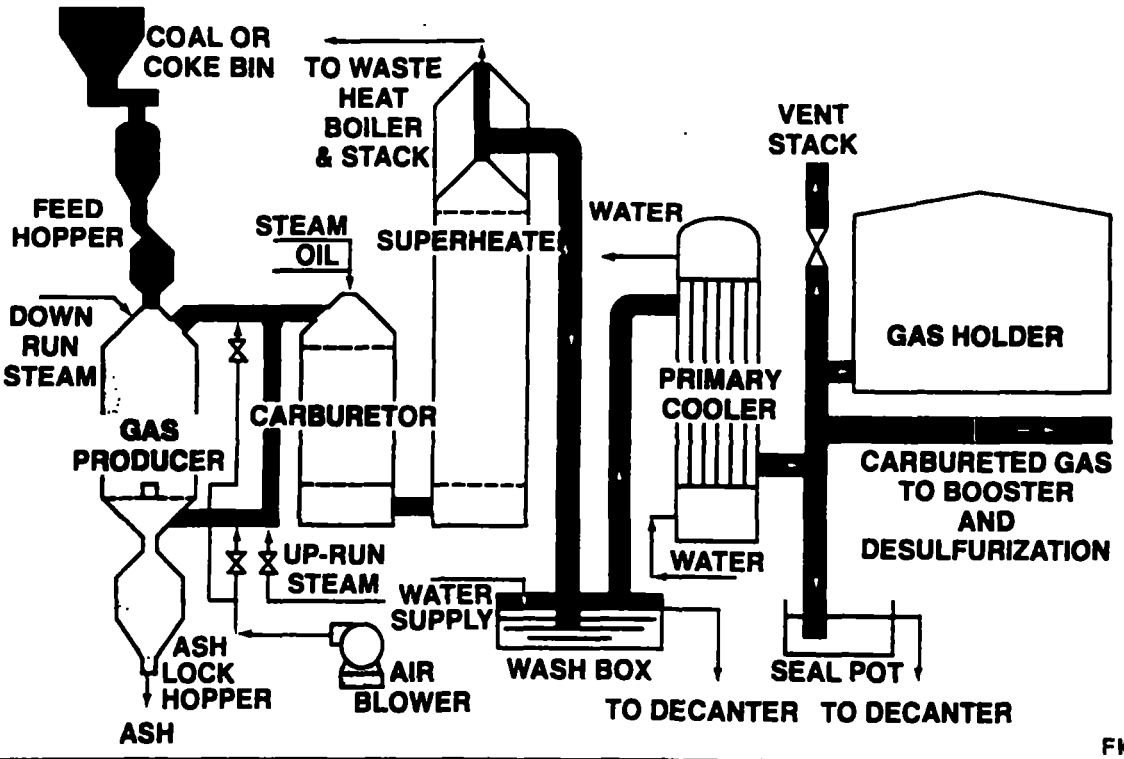
BLUE GAS PRODUCER
GAS PROCESS FLOW



Reference 5

FIGURE 2-5

CARBURETED WATER GAS PRODUCER
GAS PROCESS FLOW



Reference 5

FIGURE 2-6

OTHER MANUFACTURED GAS MACHINES COMMONLY USED DURING THE MANUFACTURED GAS ERA, 1890-1950.

Table 2-3
Chemical Composition of a Typical Blue Gas

	Volume Percent of Various Gases
Carbon Dioxide	5.5
Carbon Monoxide	37.3
Hydrogen	47.6
Methane	1.2
Nitrogen	8.4
Btu/cf	287
Specific Gravity	0.57

Source: Ref. 5

Blue gas may be enriched by cracking petroleum oil in the presence of blue gas and steam. This forms carbureted water gas (Figure 2-6). Through the proper manipulation of the oil injection, it is possible to produce a carbureted water gas with a heating value of over 1,000 Btu/cf. Analyses of typical carbureted water gases of varying heating values can be seen in Table 2-4.

Table 2-4
Chemical Composition of Typical Carbureted Water Gas

	Volume Percent of Various Gases			
Carbon Dioxide	3.4	4.3	1.6	4.4
Illuminants	8.4	12.6	18.9	27.4
Oxygen	1.2	0.7	0.2	1.1
Carbon Monoxide	30.0	30.2	21.3	9.1
Hydrogen	31.7	29.3	28.0	19.9
Methane	12.2	17.8	20.7	21.8
Ethane	0.0	0.0	4.3	5.3
Propane	0.0	0.0	0.0	0.3
Nitrogen	13.1	5.1	5.0	10.7
Btu/cf	540	695	850	1010

Source: Ref. 5

The manufacturing capacity of a gasification plant is determined by the size of the gas generator or retort, the type and size of fuel used, and the rate of air and steam injection. A standard gas generator, with a 9-foot inside diameter, can produce about 6 million cubic feet (ft^3) of blue gas per day. This is equivalent to almost 4,000 ft^3 of blue gas per square foot of gas generator per hour (Ref. 5). A retort can produce up to 15,000 ft^3 of gas per ton of coal (Ref. 6).

A conventional carbureted water gas apparatus consists of four shells: the gas generator, carburetor, superheater, and purifier (wash box) (Figure 2-6). The gas generator produces the blue gas. The blue gas is passed into a carburetor where petroleum oil is sprayed into it, producing an oil gas. This mixture is passed through the superheater where the oil vapors are converted into more simple gases. These gases are directed to a wash box for cooling, where the tars (coal tars) condense in the wash box. Unwanted constituents such as hydrogen sulfide (H_2S) also are removed at this stage. As the carburetion process is expanded, increasing the Btu/cf of the product, the production capacity of the plant is reduced.

The disposition of the by-products of the major gasification processes is presented in Table 2-5.

Table 2-5
Common By-Product Disposition
for the Average Coal Gasification Facility

By-Product	Percent of Total Produced* Sold	Unaccounted for
Tar	76	24
Coke	62	38
Ammonia	N.D.	N.D.
Naphthalene, Crude	46	54
Crude Light Oil	26	74
Light Oil Derivatives	55	46
Screenings and Breeze	13	87
Spent Iron Oxide	N.D.	N.D.
Spent Lime	N.D.	N.D.

* = Based on averages from 1925, 1927, 1929, and 1931.
N.D. = No Data.
(Ref. 4)

2.4 PAST INVESTIGATIVE ACTIVITIES

Cynthia Dillion, Marine Safety Officer-United States Coast Guard, traced the initial Coast Guard involvement with this site to 1975 (Ref. 7). Since 1976 the Coast Guard has been requested to investigate three separate oil slicks on the Mississippi River, possibly originating from the former electric power facility. Although records are not complete, it appears that the oil problem in the basement of the former electric power plant was a suspected source of these oil spills. Dillion claims that the Region VII EPA was notified of this problem in 1975. The Coast Guard never sampled the oil.

On April 8, 1987, the St. Louis Division of Health sampled the oil in the basement of the former electric power plant. Daniel Wilson, Environmental Sanitation Specialist, conducted the sampling effort. Six samples were collected and analyzed for PCB. None of the samples showed PCB contamination, although no listing of the detection limits were included on the data transmittal.

On September 17, 1987, the E & E/FIT conducted a site reconnaissance of the former electric power plant. The E & E/FIT took six liquid samples from the basement of the facility and two samples from two different manholes adjacent to the facility (Figure 2-2). All samples were screened for PCBs at a 1 ppm detection limit. No PCB contaminants were identified by the Tracor gas chromatograph. Sample #1 was taken from a pool of oil/water 6 inches to 2 feet deep. Sample #2 was taken from a pool of apparently pure oil, over 6 feet deep. Sample #3 was taken from another pool of apparently pure oil, over 6 feet deep. Sample #4 was taken from a bucket of thick oil/sludge. Sample #5 was taken from a pool of oil/water over 6 feet deep. Sample #6 was taken from a pool of clear water over 8 feet deep. Samples #7 and #8 were taken from manholes containing oil/water mixtures. All samples were collected with 1/2 inch thieving rods. Samples taken from basement locations were collected in level B personal protection while conducting initial on-site monitoring. No HNu readings above background were recorded. Oxygen levels in the basement averaged 19.8%. The MSA combination O_2/explosimeter did not indicate an explosive atmosphere.

2.5 ATTRIBUTION OF OIL CONTAMINATION IN BASEMENT

Jim McNabb, manager of operations in the power plant claims that the Apex Oil terminal has had numerous oil spills, some of which have lead to the flooding of the power plant basement (Ref. 3). McNabb claims the largest spill occurred in 1981 when a flow, several feet deep, was released down Mound Street. McNabb indicated that the large transformers associated with the power plant were drained by the Tenlis Company, and removed by the Midwest Oil Company. Midwest Oil Company could not confirm or deny this fact, due to the lack of records from the early 1970s.

Tom Kniestedt, Apex Oil Company, denied that the terminal has had any major spills (Ref. 3). Rather, he indicated that the loading platform on the river has been the source of several spills. This may explain the three spills noted by the Coast Guard. Kniestedt said that the Tenlis Company drained the transformers and hydraulic oil tanks into the basement.

Herman Gellman, current president of the Mound Street Corporation, supported McNabb's statements. Gellman, as McNabb, has been associated with this site for the past fifteen years.

Based on the interviews and the sample analysis, the most likely source of the oil in the power plant basement is from spills at the Apex Oil Terminal.

2.6 SITE CONTACTS

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SECTION 3: WASTE CHARACTERISTICS

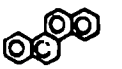
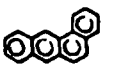
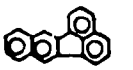
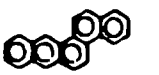
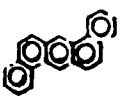
3.1 GENERAL WASTE STREAMS FOR COAL GAS SITES

The two waste products of primary concern are tar sludges (coal tars) and spent oxides. Ammonia wastes are also by-products of this production process, but are not considered hazardous. Coal tar wastes are primarily polynuclear aromatic hydrocarbons (PAHs) and phenolics produced during coal or coke combustion and during the oil injection process (Figure 3-1). Spent iron oxide wastes are produced during the gas purification process where impurities are removed from the manufactured gas. Iron oxide wastes contain sulfur compounds, cyanide compounds, and small quantities of coal tar. Light aromatics such as benzene, toluene, and xylene (volatile organic compounds) also are occasional constituents of coal tar wastes (Figure 3-1). For this study, volatile organics analysis was not requested.

Coal tars are removed from the gas in the wash box and condenser. These tars are also present in the oxide wastes. These wastes could either be sold or disposed of in pits or holding tanks. Coal tar can also be used as wood preservatives, road treatments, herbicides, or sold to coal tar refineries for further processing.

Some of the PAH compounds likely to be present in the tar wastes are carcinogenic and are listed as RCRA Part 261 hazardous wastes. All PAHs can be considered as carcinogenic as benzo(a)pyrene, a Class A carcinogen (Ref. 8). The carcinogenic potential of PAHs can be assessed through a determination of total PAH concentrations (summation of the concentrations of all PAHs detected in a given sample). Drinking water standards for PAHs are incomplete.

Iron oxide wastes are produced when manufactured gas is passed through a bed of active hydrated iron oxide. The active hydrated iron oxide is usually carried on small wood chips or corncobs. This process

Component	Formula	Structure	Boiling Point, °C
Benzene	C_6H_6		80
Toluene	C_7H_8		111
Xylenes	C_8H_{10}		138-144
Phenol	C_6H_5OH		181
Cresols	C_7H_7OH		191-202
Xylenols	C_8H_9OH		201-227
Pyridine	C_5H_5N		115
Naphthalene	$C_{10}H_8$		218
Methylnaphthalenes	$C_{11}H_{10}$	-	241-245
Dimethylnaphthalenes	$C_{12}H_{12}$	-	262-269
Acenaphthene	$C_{12}H_{10}$		277
Carbazole	$C_{12}H_9N$		355
Fluorene	$C_{13}H_{10}$		297
Anthracene	$C_{14}H_{10}$		340
Phenanthrene	$C_{14}H_{10}$		340
Fluoranthene	$C_{16}H_{10}$		393
Pyrene	$C_{16}H_{10}$		394
Chrysene	$C_{18}H_{12}$		436
Benz(a)anthracene	$C_{18}H_{12}$		438
Benzo(j)fluoranthene	$C_{20}H_{12}$		~480
Benzo(k)fluoranthene	$C_{20}H_{12}$		480
Benzo(a)pyrene	$C_{20}H_{12}$		496
Benzo(e)pyrene	$C_{20}H_{12}$		493
Perylene	$C_{20}H_{12}$		460
Benzo(g,h,i)perylene	$C_{22}H_{12}$		500
Benzo(b)chrysene	$C_{22}H_{14}$		~500
Dibenz(a,h)anthracene	$C_{22}H_{14}$		-

PAH COMPOUNDS

Reference 5

Chemical Compounds Associated with Coal Gasification

FIGURE 3-1

filters impurities from the raw manufactured gas. The spend oxide can be regenerated by contact with ambient air. It can be reused until tar accumulation and reaction with cyanide, which produces ferrocyanides, causes it to lose activity. The spend oxide waste is usually blue-gray in color, due to the presence of ferrocyanide salts (Ref. 5). Table 3-1 gives an analysis of typical spent iron oxide waste.

Table 3-1

An Analysis of Typical Spent Oxides

	Percent
Free Sulfur	44.70
Moisture	17.88
Ferric monohydrate	5.26
Ferrous monohydrate	6.25
Basic ferric sulfate	1.25
Ferric ammonium ferrocyanide	3.80
Ferrosoferric ammonium ferrocyanide	2.50
Ferric pyridic ferocyanide	1.20
Organic matter peat fiber	4.68
Tar	1.21
Silica	1.05
Naphthalene	0.72
Pyridine sulfate	0.77
Ammonium sulfate	2.06
Calcium sulfate	0.12
Ferrous sulfate	0.02
Ammonium thiocyanate	1.30
Sulfur otherwise combined	1.33
Organic matter soluble in alkalies (humus)	1.54
Combined water and loss (by difference)	2.36
TOTAL	100.00

Source: Ref. 5

3.2 ENVIRONMENTAL FATE OF COAL GASIFICATION WASTES

PAH and phenolic compounds may enter the atmosphere through volatilization. Once in this matrix, the materials may undergo molecular or advective diffusion. (All further references to dispersion characteristics will infer both molecular and advective processes). PAH compounds are likely to undergo dispersion when introduced into surface water. If this occurs, the contaminants are very susceptible to adsorption onto clay particles suspended in the water. Depending on the nature of the surface water, this material may also volatilize; thus entering the atmosphere. Once in the surface water the PAH compounds are prone to chemical alteration through biodegradation or photolysis. Phenolic compounds are likely to undergo dispersion in surface water. They are not readily absorbed to clay particles. These compounds may also undergo volatilization and limited biodegradation in surface water.

PAHs in ground water are also likely to undergo dispersion and adsorption processes. Biodergradation of these materials is unlikely, however, in this matrix (Ref. 5). Phenolic compounds in ground water can be transported through dispersion. It is possible that these chemicals may undergo limited biodegradation in ground water environments (Ref. 5).

In the soil matrix, PAHs can be involved in adsorption processes as well as biodegradation reactions. These materials may also undergo volatilization, leaching, and photolysis depending on site-specific characteristics. Phenolic compounds in the soil environment can be leached readily or removed through biodegradation (Ref. 5).

PAH compounds are stable and tend to be retained in sediments. The specific stability of a particular PAH compound is dependent on its chemical structure (Ref. 8 and 5). Generally the stability/solubility is inversely related to the molecular weight of the PAH (Figure 3-1). The arrangement of rings is also important. For example, anthracene is relatively soluble. It is a medium mass PAH composed of three linear rings. The arrangement of the rings allow this relatively massive molecule to be soluble. Benzo(a)pyrene is composed of a single ring surrounded by rings on three sides of its six sides. It is one of the more massive PAHs.

This material is more stable than anthracene, the most soluble PAH. When the rings become arranged in a step-wise fashion, they are members of the most stable PAH group. An example of this is chrysene. The basic structures of the major PAHs are found in Figure 3-1.

PAH compounds are produced by both natural and man-made processes, including most combustion events. Coal tar products are composed primarily of PAH and phenolics; petroleum products may contain trace amounts of these materials. Removal of PAH materials through volatilization is not believed to be significant. Adsorption of PAHs onto soil particles is an important barrier to transport. This process depends on the physical/chemical properties of both soil and the transported material: characteristics of the chemical itself, soil moisture, temperature, availability of exchange sites on the soil particles, and pH. All PAH compounds except napthalene are strongly adsorbed onto soil particles. PAHs may undergo microbial degradation, particularly the more water soluble and lighter compounds. For example, napthalene is readily oxidized by Pseudomonas (Ref. 5).

Phenolic compounds are generally highly water soluble (in excess of 10,000 mg/l) and have low vapor pressures (Ref. 5). The low vapor pressure reduces the tendency for this material to volatilize. Phenolics are produced through both man-made and natural processes, including coal tar production, oil and chemical refinery processes, gray iron foundry operations, human/livestock wastes, and the decay of organic matter. Typical soil background levels of phenolics can range from 0.10 to 0.50 mg/l (Ref. 5). Phenolics are not absorbed by mineral particles, and their affinity for adsorption onto organic matter is limited. The adsorption of these constituents in the soil matrix is directly proportional to the abundance of organic matter in the soil. Biodegradation of phenolics is common, although high concentrations may temporarily repress the process. An example of a bacteria that can metabolize phenolics is Pseudomonas putida (Ref. 5).

Two types of cyanide may be present at a coal gasification site: simple and complex cyanides. Simple cyanides are formed when cyanide reacts with an alkali or metal, producing a soluble material that can liberate a CN^- anion in water. Simple cyanides can be decomposed by bacteria in the soil (Ref. 5). Complex cyanides are alkali-metal cyanides that are relatively insoluble (Ref. 5). Complex cyanides, particularly the ferrocyanide compounds, are more resistant to biodegradation. These materials are associated with oxide wastes.

The trace metals most likely to be found on a coal gasification site are: arsenic, chromium, copper, iron, lead, nickel, and zinc (Ref. 5). All are readily adsorbed onto soil particles. The mobility of these constituents is controlled by the pH of the soil. As a general rule, the solubility of these metals increases as pH decreases. Low pH values also reduce the cation exchange capacity of the soil matrix due to the preferential adsorption of H^+ ions. Cation exchange is generally considered the major barrier to metals transport in soils. The strong tendency of metals to be bound to soil particles and organic matter limits their impact on ground water resources.

The migration of coal tar in ground water has been observed in several former coal gas manufacturing sites (Ref. 5 and 9). Coal tar is more dense than water and tends to migrate downward through porous material to a confining layer of less porous material. In areas where this behavior is exhibited, the following stratification (from top to bottom) may be expected: ground water with dissolved organics; ground water with trapped coal tar; and, below the confining layer, ground water with dissolved organics (Ref. 5).

3.3 GENERAL WASTE STREAMS ASSOCIATED WITH ELECTRIC POWER GENERATION AND FUEL STORAGE

Waste products of primary concern are polychlorinated biphenyls (PCB). Commerical petroleum products such as diesel and heating oil are not considered hazardous under RCRA, 40 CFR 261.

A PCB is any one of 209 compounds with the general chemical formula $C_{12}H_xCl_x$. PCB are produced by chlorinating available biphenyl compounds and the different structural arrangements make possible 209 compounds distributed among the 10 levels of chlorination (Table 3-2, Ref. 10). Commercial PCB are produced by distilling chlorinated biphenyl mixtures. The name Aroclor is frequently used interchangeably with the term PCB, though not all PCBs are Aroclors.

PCBs are commonly found in transformers, power capacitors, hydraulic fluids, diffusion pump oil, and other heat transfer applications. Since 1971, the use of PCBs in the United States has been limited to the manufacture of transformers and high voltage capacitors. As of 1975, no substitute for the high dielectric and heat resistance properties and the non-flammable characteristics of PCBs was available (Ref. 11). In 1979, Congress banned the manufacture, processing, distribution, and use of PCBs except in completely enclosed systems such as electric transformers, capacitors, and electromagnets. Since this ban, various regulations have attempted to control further distribution of PCBs, including PCB that is incidentally generated along with some other desired product (Ref. 10).

The toxic effects of PCBs range from death in the lower invertebrates, to physiological disturbances in primates and humans (Ref. 11). PCBs in conjunction with other chemicals combine synergistically to increase risks of cancer at a much lower concentration than either chemical exhibits alone. PCB compounds are classified as human suspect carcinogenic, and are toxic substances regulated under the Toxic Substance Control Act (TSCA).

3.4 ENVIRONMENTAL FATE OF PCBs

PCBs are chlorinated aromatic organic compounds. They are very stable and cannot be decomposed by bacterial, enzymic, or any other biological or environmental activity. The PCB half-life is not known. Solubility in water is very low and depends on the amount of chlorination. As the percentage of chlorination in the moleule increases, the solubility decreases. PCB are very soluble in fats, and thus, they tend to accumulate in adipose tissue. The listed water quality criteria for PCB in fresh water and marine ecosytems is 0.001 ppb (Ref. 12).

PCBs can be extracted from water solutions using hexane. It can be absorbed from solutions or vapors by activated charcoal or polymeric resins (Amberlite XAD-4 or XAD-7). A common method of destroying the PCB molecule is through the use of special industrial furnaces. The decomposition of this class of molecules occurs at 24000° F.

Table 3-2

Distribution of PCBs by Level of Chlorination

Isomer Group	Molecular Formula	No. of Compounds
Monochlorobiphenyls	$C_{12}H_9Cl$	3
Dichlorobiphenyls	$C_{12}H_8Cl_2$	12
Trichlorobiphenyls	$C_{12}H_7Cl_3$	24
Tetrachlorobiphenyls	$C_{12}H_6Cl_4$	42
Pentachlorobiphenyls	$C_{12}H_5Cl_5$	46
Hexachlorobiphenyls	$C_{12}H_4Cl_6$	42
Heptachlorobiphenyls	$C_{12}H_3Cl_7$	24
Octachlorobiphenyls	$C_{12}H_2Cl_8$	12
Nonachlorobiphenyls	$C_{12}HHCl_9$	3
Decachlorobiphenyl	$C_{12}Cl_{10}$	1
TOTAL NUMBER OF CONGENERS		209

Ref. 10

SECTION 4: PHYSICAL SETTING

4.1 TOPOGRAPHY AND DRAINAGE

The site topography is essentially flat with a very gentle slope (0 to 3 percent) to the east. Locally the slope has been modified around buildings and other facilities.

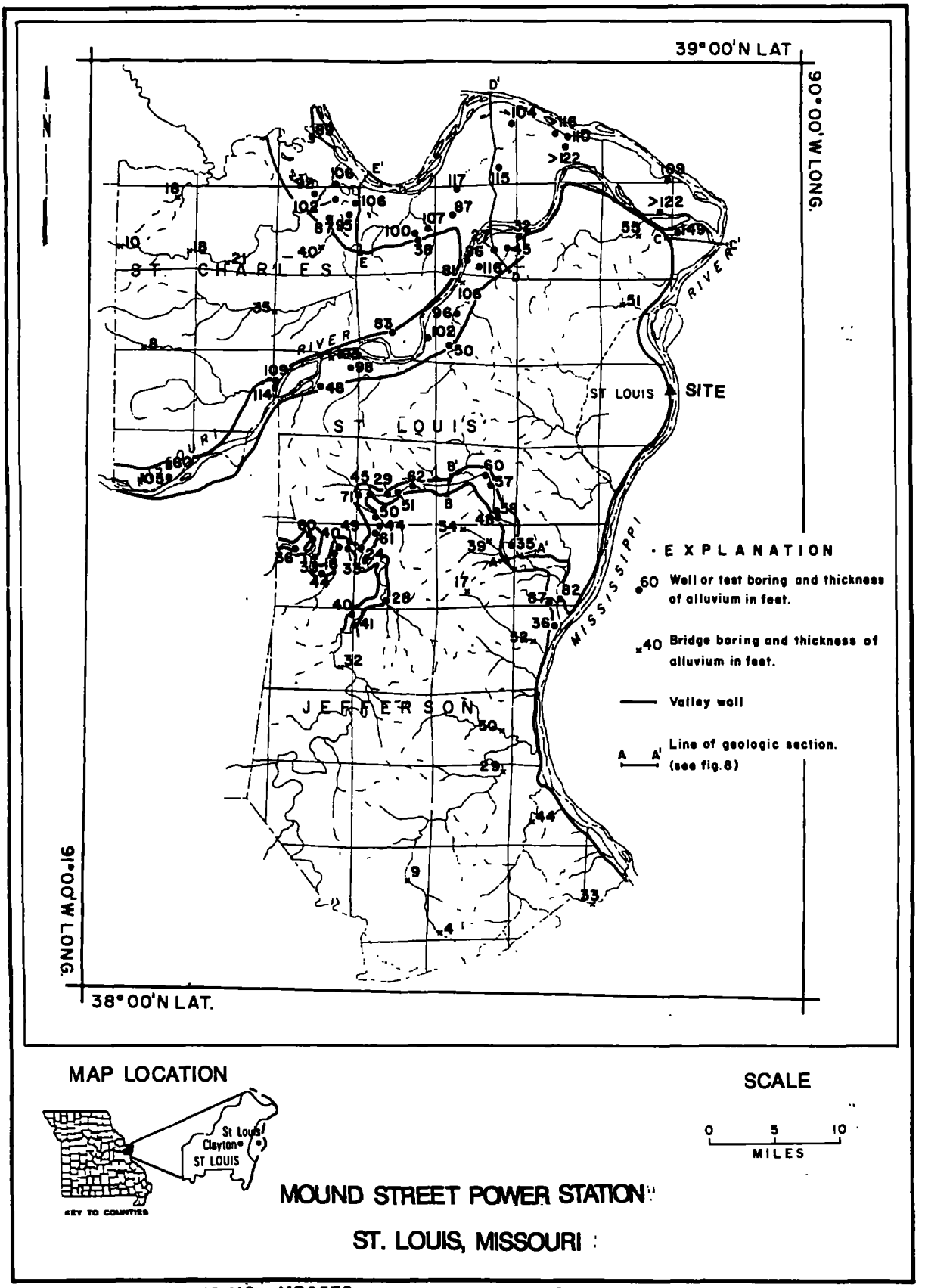
Surface drainage flows to the east directly into the Mississippi River. The site is protected from flooding by the U.S. Corps of Engineer concrete levee wall (Ref. 3).

4.2 SOILS AND STRATIGRAPHY

The soils in the area belong to the Harvester, Fishpot and Urban Land associations. These soils are classified as fine loams to fine silty clay loams. On site, the soils belong to the Urban Land, bottom land unit. This unit consists of areas in which more than 85 percent of the surface is covered by asphalt, concrete, buildings, or other impervious material.

The area was originally bottom land which was built-up to protect the site from flooding. The amount of fill in the area can range from 0 to over 200 feet. Variability of the soils in the area makes identification impractical without a detailed on-site investigation (Ref. 13). Figure 4-1 depicts the thickness of the alluvium along the Missouri, Mississippi, and Meramac rivers in St. Louis County.

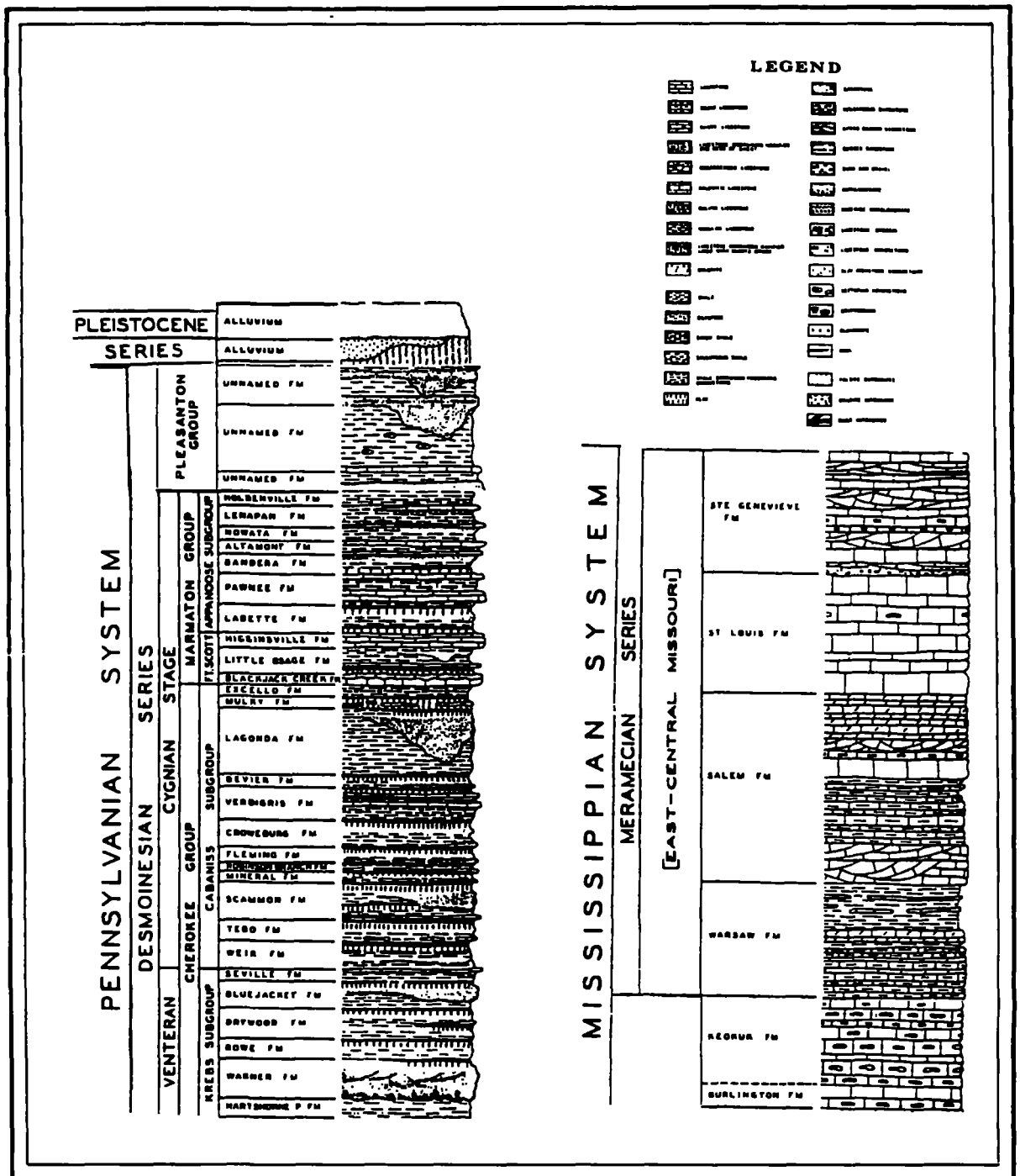
The bedrock stratigraphy beneath the site belongs to the upper Mississippian and lower Pennsylvanian systems, which are roughly 286 to 360 million years old. Figure 4-2 shows that these systems are subdivided, in descending order, into the Pleasanton, Marmaton and Cherokee groups of the Pennsylvanian System, and the Mermacian series of the Mississippian System (Ref. 14).



WASTE SITE TRACKING NO.: MO0579
PREPARED BY: JOHN C. PARKS

ECOLOGY AND ENVIRONMENT FIT DEC. 1987
SOURCE: WATER RESOURCES ST. LOUIS AREA MISSOURI

FIGURE 4-1 : ALLUVIUM THICKNESS ALONG THE MISSOURI, MISSISSIPPI AND MERAMEC RIVERS ST. LOUIS COUNTY MISSOURI



MOUND STREET POWER STATION

ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: JOHN C. PARKS

ECOLOGY AND ENVIRONMENT FIT DEC. 1987
SOURCE: STATIGRAPHIC SUCCESSION IN MISSOURI

FIGURE 4-2: GENERALIZED STRATIGRAPHIC SECTION ST.LOUIS COUNTY, MISSOURI

The Mermacian Series contains the following formations: Warsaw, Salem, St. Louis, and Ste. Genevieve. The predominant rock type is a finely crystalline, sometimes fossiliferous limestone with some dolomite. This series displays a typical cyclothemic succession (transgressive/regressive limestones with interbedded shales) though not necessarily a complete one. Chert is a very common accessory in the upper portions of the series (Ref. 14).

The overlying Pennsylvanian deposits are predominantly clastic in origin. However, numerous limestone, coal and shale beds occur. The lower groups (Cherokee and Marmation) have formal subdivisions while the Pleasanton consists of undifferentiated shales, siltstones, sandstones, coal, and, to a lesser degree, limestone (Ref. 14).

The specific stratigraphy beneath the site can be inferred from regional data. However, for more accurate information a more in depth, site specific geologic study would be useful.

4.3 HYDROGEOLOGY/WATER RESOURCES

The water needs of the city and surrounding community are met primarily through the withdrawal of surface water from the Missouri, Mississippi, and Meramac rivers. The municipal water intakes for the city of St. Louis and surrounding communities are approximately 9 miles upstream from the site (Ref. 1). The combined flow from the Missouri and Mississippi rivers averages approximately 1.12×10^{10} gallons per day. The Meramac has an average flow of 1.93×10^{9} gallons per day. Withdraw from these rivers totals nearly 1.12×10^{9} gallons per day (Ref. 7). Because there is an abundance of potable surface water, ground water is not utilized as a source of drinking water. The bedrock aquifers for the region are divided into five discrete units appropriately labeled one through five. Figure 4-3 shows the section view of the aquifers and Figure 4-4 shows the distribution. Group one, the Post-Maquoketa group, includes the strata above the Kimmswick Formation to the surface. Below this aquifer group lies the Maquoketa shale. Based on current information, the shale acts as an aquitard.

Aquifers most favorable as water sources are shaded

System	Series	Group	Formation	Aquifer group	Thickness (feet)	Dominant lithology	Water-bearing character
Quaternary	Holocene		Alluvium[1/]		0-150	Sand, gravel, silt, and clay.	Some wells yield more than 2,000 gpm.
	Pleistocene		Loess		0-110	Silt	
			Glacial till		0-55	Pebbly clay and silt.	Essentially not water yielding
Pennsylvanian	Missourian	Pleasanton	Undifferentiated		0-75	Shales, siltstones, "dirty" sandstones, coal beds and thin limestone beds.	Generally yields very small quantities of water to wells. Yields range from 0-10 gpm.
		Marmaton	Undifferentiated		0-90		
	Desmoinesian	Cherokee	Undifferentiated		0-200		
	Atokan		Undifferentiated				
Mississippian	Meramecian		Ste. Genevieve Formation		0-160	Argillaceous to arenaceous limestone.	Yields small to moderate quantities of water to wells. Yields range from 5 to 50 gpm. Higher yields are reported for this interval locally.
			St. Louis Limestone		0-180		
			Salem Formation		0-180		
			Warsaw Formation		0-110		
	Osagean		Burlington-Keokuk Limestone	1	0-240	Cherty limestone	
			Fern Glen Formation		0-105	Red limestone and shale.	
	Kinderhookian	Chouteau	Undifferentiated		0-122	Limestone, dolomitic limestone, shale, and siltstone.	
Devonian	Upper	Sulphur Springs	Bushberg Sandstone		0-60	Limestone and sandstone.	
			Glen Park Limestone				
			Grassy Creek Shale		0-50	Fissile, carbonaceous shale.	
Silurian			Undifferentiated		0-200	Cherty limestone.	
Ordovician	Cincinnatian		Maquoketa Shale		0-163	Silty, calcareous or dolomitic shale.	Probably constitutes a confining influence on water movement.
			Cape Limestone		0-5	Argillaceous limestone.	
	Champlainian		Kimmswick Formation	2	0-145	Massive limestone	Yields small to moderate quantities of water to wells. Yields range from 3 to 50 gpm. Decorah Formation probably acts as a confining bed locally.
			Decorah Formation		0-50	Shale with interbedded limestone.	
			Plattin Formation		0-240	Finely crystalline limestone.	
			Lock Lavee Formation		0-93	Dolomite and limestone, some shale.	
			Joachim Dolomite		0-135	Primarily argillaceous dolomite.	
			St. Peter Sandstone	3	0-160	Silty sandstone, cherty limestone grading upward into quartzose sandstone.	Yields moderate quantities of water to wells. Yields range from 10-140 gpm.
			Everton Formation		0-130		
	Canadian		Powell Dolomite	4	0-150	Sandy and cherty dolomites and sandstone.	Yields small to large quantities of water to wells. Yields range from 10 to 300 gpm. Upper part of aquifer group yields only small amounts of water to wells.
			Cotter Dolomite		0-320		
			Jefferson City Dolomite		0-225		
			Roubidoux Formation		0-177		
			Gasconade Dolomite Gunter Sandstone Member		0-280		
Cambrian	Upper	Elvins	Eminence Dolomite	5	0-172	Cherty dolomites, siltstones, sandstone, and shale.	Yields moderate to large quantities of water to wells. Yields range from 10 to 400 gpm.
			Potosi Dolomite		0-325		
			Derby-Doerun Dolomite		0-165		
			Davis Formation		0-150		
			Bonnaterre Formation		245-385		
			Lamotte Sandstone		233+		
Precambrian						Igneous and metamorphic rocks.	Does not yield water to wells in this area.

1/ Basal part may be of Pleistocene age.

NOTE: Stratigraphic nomenclature may not necessarily be that of the U.S. Geological Survey.

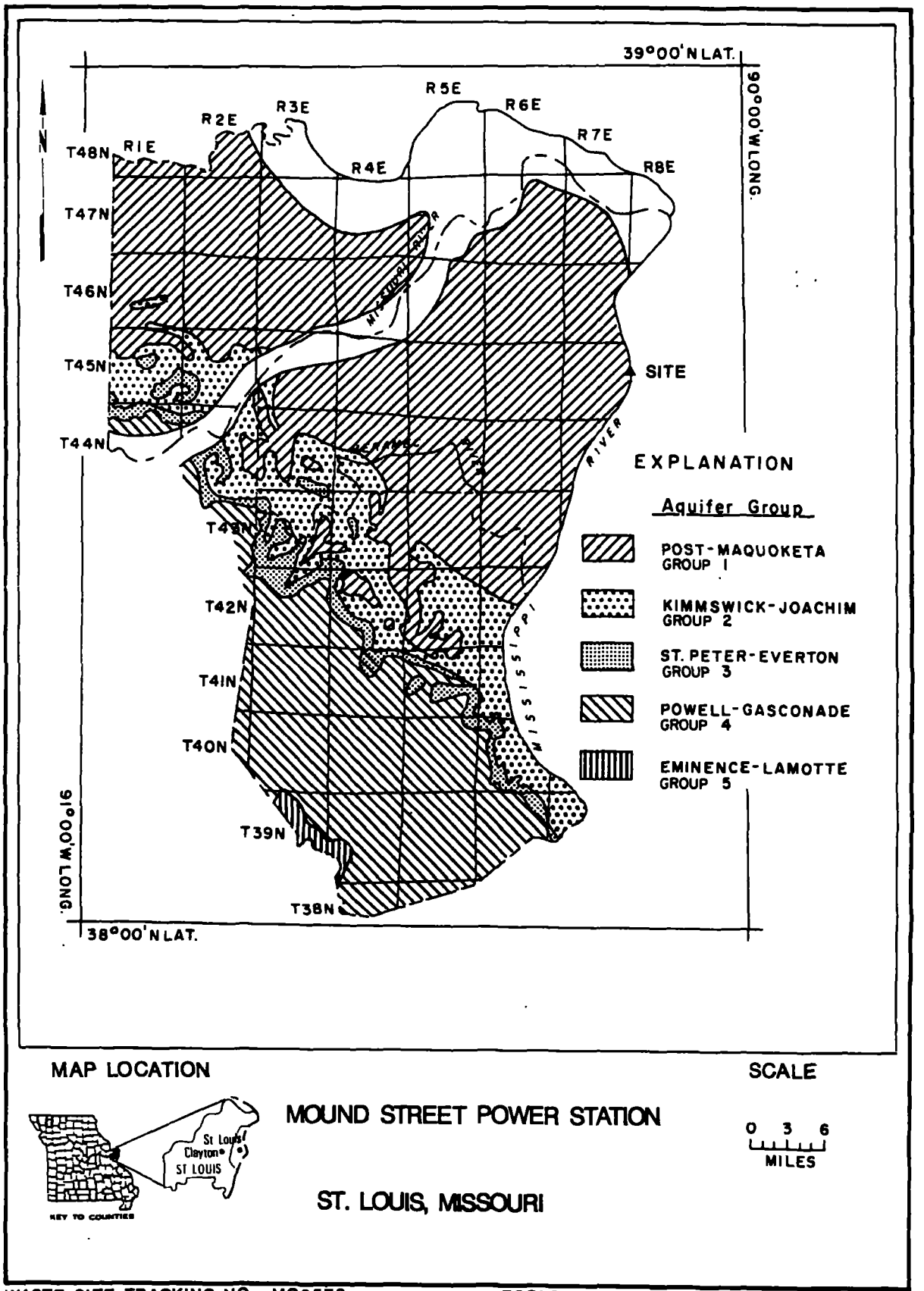
MOUND STREET POWER STATION

ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: JOHN C. PARKS

ECOLOGY AND ENVIRONMENT. FIT DEC. 1987
SOURCE: WATER RESOURCES ST. LOUIS AREA MISSOURI

FIGURE 4-3: GENERALIZED HYDROGEOLOGIC SECTION ST. LOUIS COUNTY MISSOURI



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ECOLOGY AND ENVIRONMENT FIT DEC. 1987
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FIGURE 4-4: MAJOR AQUIFER DISTRIBUTION ST. LOUIS COUNTY MISSOURI

Group two is the Ordovician age Kimmswick-Joachim aquifer. Near the top of this unit is the Decorah Formation, which probably acts as a confining bed composed of shales and interbedded limestones. The remaining lower three aquifers are separated primarily on the basis of unconformities. It is likely these aquifer groups, in descending order, the St. Peter-Everton, Powell-Gasconade and the Eminence-Lamotte are hydraulically connected.

Generally the bedrock aquifers of the region yield very small quantities of water; roughly 0 to 50 gallons per minute (gpm). The alluvial aquifers (Post-Maquoketa) completed along the Meramac, Mississippi, and Missouri rivers can provide much larger quantities. For example, the Weldon Springs Ordinance Plant production well yields almost 2,000 gpm. Other large yield industrial wells may be located near the rivers so that water would be drawn from these surface sources.

Figure 4-5 provides the specific capacities reported for wells completed in the river alluvium. Specific capacity is the rate of discharge from a well expressed as gallons per minute per feet of drawdown. Generally, the higher the specific capacity the higher the transmistivity and therefore the greater the susceptibility to contaminant migration.

City or subdivision	Owner	Well location	Depth (feet)	Well diameter (inches)	Date of test	Pumping rate (gpm)	Duration of test (hours)	Specific capacity (gpm/ft drawdown)	Draw-down (feet)	Remarks
				Ozarkian aquifers						
City of De Soto		39-4-3add	800	10	Aug. 1936	465	-	9.3	50	Potosi Dolomite (Group 3)
-	Bert Nunez Nursing Home	39-5-20dda	510	6	-	75	8	0.73	36	Lower part of Cotoosmode Dolomite Eminence Dolomite (Groups 4 & 5)
-	Robert Schroeder	39-5-31dbc	285	6	Jan. 1960	18	1	0.09	200	Jefferson City-Roubidoux (Group 4)
-	Bismarck Condo Trailer Court	40-3-32	1050	6	1967	60	6	1.33	45	Bonneterre-Lamotte (Group 5)
-	Jefferson County Memorial Hospital	40-4-17bdc	750	8	1955	88	24	0.44	176	Cotter-Lower part of Cotoosmode (Group 4)
-	Mississippi River Pool Corp. River Cement	40-4-22ada	1000	8	-	82	8	0.44	187	St. Peter-Upper part of Cotoosmode (Groups 3 & 4)
-	Dow Chemical Co.	41-4-18dcc	390	-	1956	140	12	0.98	143	St. Peter-Everton (Group 3)
City of Cedar Hill	-	42-3-25abb	902	8	May 1953	50	-	0.24	212	Cotter-Eminence (Groups 4 & 5)
-	Jefferson County Water District No. 9	42-3-31bcc	1200	8	1967	130	24	1.63	80	Powell-Roubidoux (Group 4)
-	Beaumont Boy Scout Reservation	43-4-2bca	540	8	1958	50	24	0.44	113	Plattin-St. Peter (Groups 2 & 3)
Brier-Cliff Estates	Leonard Small Realty Co.	43-4-12bdc	675	6	Sept. 1959	23	24	0.21	107	Kimmswick-Everton (Groups 2 & 3)
-	Babler State Park	45-3-28bad	1072	10	Aug 1940	182	24	1.61	113	Joachim-St. Peter (Groups 2 & 3)
-	C. Eaimann	46-7-20	655	8	Feb. 1936	120	4	0.89	135	Ste Genevieve-Burlington (Group 1)
-	Atlas Powder Co.	46-3-28ddd	811	8	Feb. 1941	13	3	0.07	200	Kimmswick-St Peter (Groups 2 & 3)
Lake St. Louis	-	47-1-27	1375	8	Mar 1970	160	4	0.76	193	Plattin-Roubidoux (Groups 2, 3, & 4)
City of O'Fallon	Well No. 3	47-3-32ada	1500	8	Oct. 1968	132	2	2.64	50	Kimmswick-Upper part of Cotoosmode (Groups 2, 3, & 4)
	Monsanto Chemical Co	47-3-23aca	1397	10	April 1967	183	24	0.53	348	Kimmswick-Roubidoux (Groups 2, 3, & 4)
City of O'Fallon	Well No. 1	47-3-29aaa	833	8	Sept. 1960	55	24	0.25	221	Kimmswick-St. Peter (Groups 2 & 3)
				Mississippi River alluvium						
Portage des Sioux	Portage des Sioux	48-6-15bcb	116	8		500	44	48	10.5	10 screen
-	Blue Wing	47-4-7cbd	100	16		2000				
-	Whistling Wing	47-4-11dba	80			1230		85	14.5	
-	Lindberg & Kenney	48-3-35cbd	106	16		2240		80	28	
-	Ore Farm	47-3-4ada	92			1690		105	16	
-	Hermitage Club	47-3-17ada	108	16		1750		175	10	
-	Webfoot Club	47-3-12cdd	95	14		1900		83	23	32-ft screen
St. Charles	St. Charles	47-4-34	107							T=36,180 cubic feet per day per foot S=.0004
	Portage Farms	48-5-23dad	107	26	Sept. 1963	1160		102	11.4	
				Missouri River alluvium						
-	Mr. Ambo	46-4-25bbd	102	16	1963	840	7	168	5	32-ft screen. Well not pumped at steady rate.
-	Mr Bolttle	46-5-17	96	12		600				32-ft screen
-	Mr. Tullman	46-6-28	83	12		900		69	13	
-	Weldon Springs Ordnance Plant	45-3-18bcc	107	15	1967	2650	47			Aquifer test. T=36,180 cubic feet per day per foot S=0.2
				Meramec River alluvium						
Valley Park	Valley Park	44-5-18dda1	63	18	Aug. 1949	504	24	72	7	15 ft of 18-inch screen
Valley Park	Valley Park	44-5-18ddag	63	18	July 1949	504	24	36	14	15 ft of 18-inch screen. Yield has increased to 47 gpm/ft after treatment for capacity loss.
Valley Park	Absorbent cotton	44-5-17adb	63	16	May 1957	580	12	83	6	15 ft of 16-inch screen gravel pack.
Valley Park	Ashland Chemical	44-5-17cbd	59	16	Oct. 1959 June 1964	503 556	- -	102 111	5 5	15 ft of 16-inch screen gravel pack.
Kirkwood	Kirkwood No. 1 Kirkwood No. 2	44-5-15 44-5-15	37 42	18 18	Dec. 1926 Nov. 1927	300 250	10 10	60 83	5 3	18 ft of 18-inch screen 30 ft of 18-inch concrete screen

MOUND STREET POWER STATION

ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: JOHN C. PARKS

ECOLOGY AND ENVIRONMENT FIT DEC. 1987
SOURCE: WATER RESOURCES ST. LOUIS AREA MISSOURI

FIGURE 4-5: WELL SUMMARY FOR ST. LOUIS AREA

SECTION 5: POTENTIAL MIGRATION AND RECEPTORS

5.1 GROUND WATER ROUTE

It is highly probably that coal gasification wastes, if they are present on-site, are being released into local ground water. Since this preliminary assessment revealed no ground water use, there are no potential targets. If uses could be documented, then a potential target population could be identified.

5.2 SURFACE WATER ROUTE

Although the site is separated from the river by a levee, it is possible that materials potentially released into the ground water are being discharged into the Mississippi River. All city of St. Louis surface water intakes are approximately 9 miles upstream of the site. The only potential target populations are recreational uses, possible commercial fishing, and industrial intakes.

The oils contained in the basement may be hydraulically connected to the river by abandoned pipelines. This is the suspected migration route for oil that was the source of the three spills noted by the U.S. Coast Guard. Any oil releases to surface water would put the same targets as risk, that are at listed above.

5.3 AIR ROUTE

None of the potential wastes associated with this site have a potential for air release unless the facility is involved in a major structural fire. Because no PCB contaminants were detected in the oil, a fire would not cause a release of dioxin. A major fire could cause an air release of PAH materials, if the fire reached potential contamination areas. If an air release occurred it would target the majority of the St. Louis and or East St. Louis populations, depending on prevailing wind direction.

5.4 ON-SITE PATHWAY

If coal gasification wastes are present at this site, there is a great potential for direct contact with wastes. The population at risk would primarily involve local workers. Presently the E & E/FIT has no estimate of the size of this population. Direct contact with these wastes or contaminated soils could pose dermal, inhalation, and ingestion hazards.

SECTION 6: CONCLUSIONS

Based on the St. Louis Health Division and the E & E/FIT sampling there is no PCB contamination of the oils present in the basement of the former electric power plant. This statement is qualified in that the PCB detection limits were 1 ppm for the E & E/FIT data, and unknown for the St. Louis data. Concentrations of PCB below the 1 ppm detection limit are possible in the E & E/FIT samples. However, no evidence was uncovered suggesting that the oil in the basement should contain PCB. The initial concerns were raised based on the existence of large electric transformers located on site. The evidence suggests that the oil in these transformers was moved off-site. The most likely point of origin of the oil is the Apex Oil Terminal located several yards up-hill from the former electric power plant. This material is contained in a concrete basement and could be easily removed and sent to an oil recycling facility.

A search of historical documents provided information identifying this site as the location of the former Laclede Coal Gasification Plant. This facility may constitute the largest coal gas facility in Region VII.

SECTION 7: REFERENCES

1. United States Geological Survey Topographic Map, Granite City, Illinois.-Missouri., 7.5 Minute Quadrangle, 1968 revised.

2. Property Records contained in the E & E/FIT project file: TDD #F-07-8708-29 Mound Street Power Plant.

3. Log Book, for PA of the Mound Street Power Plant Site, Eric Hess, E & E/FIT, September 15 thru 17, 1987.

4. Survey of Town Gas and By-Product Locations in the U.S. (1880-1950), United State Environment Protection Agency, EPA/600/57-85/004, May 1985.

5. Handbook on Manufactured Gas Plant Sites, Environmental Research and Technologies, Inc., Koppers Company, Inc., Volume I, September 1984.

6. Part 1 and 2 1/2 hours transcribed taped interview with Eugene Hingtgen, Assistant Superintendent of the Key City Gas Plant, from 1946-1956. Interviewees: Eric Hess, Ted Faile, and John H. Parks, E & E/FIT, March 23, 1987.

7. City of St. Louis - Department of Health and Hospitals, Division of Health, Project Files on Mound Street Power Plant.

8. Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons, United State Environment Protection Agency Document PB81-117806, October 1980.

9. Expanded Site Investigation of the Peoples Natural Gas Site, Dubuque, Iowa, Project F-07-8701-20/FIA0176XA, September 1987.

10. Alford-Stevens, Ann L. Analyzing PCB, Environmental Science and Technologies, 20:12:1194-1199, 1986.

11. Nemerow, Nelson, L. Industrial Water Pollution. Addison Wesley Publishing Co., Inc., Reading Massachusetts, 1971.

12. Quality Criteria for Water, United State Environment Protection Agency Washington D.C., Stock #055-001-01049-4, 1976.

13. Soil Survey of St. Louis County, Missouri, Soil Conservation Service, United State Department of Agriculture, 1979.

14. Missouri Geological Survey and Water Resources, Stratigraphic Succession in Missouri, Volume XL, 1961.

Appendix A

EPA Form 2070-12

Mound St. Power Plant

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Mound Street Power Plant	Number 2 Mound Street

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
St. Louis	Mo	63101	St. Louis		

09 COORDINATES LATITUDE	LONGITUDE
38° 38' 00".0N	090° 11'00".0E

10 DIRECTIONS TO SITE (Starting from nearest public road)

Take interstate 70 east from Kansas City to St. Louis. Exit onto interstate 55 north. Take the next exit, Memorial Dr., north. Travel on Memorial Dr. several blocks to Mound St. and turn right onto Mound St. The site is located at the end of Mound St.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
Herman Gellman, Pres. Mound St. Corp	3620 North Hall St.

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
St. Louis	MO	63147	(314 2316077

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)
none	

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
			( )

13 TYPE OF OWNERSHIP (Check one)

☒ A PRIVATE ☐ B FEDERAL _____ (Agency name) ☐ C. STATE ☐ D COUNTY ☐ E MUNICIPAL

☐ F OTHER _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ B UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES ☐ NO DATE 9 17 87 (MONTH DAY YEAR)

BY (Check all that apply)

☐ A EPA ☒ B. EPA CONTRACTOR ☐ C STATE ☐ D. OTHER CONTRACTOR

☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): Ecology & Environment, Inc.

02 SITE STATUS (Check one)	03 YEARS OF OPERATION		
☐ A. ACTIVE ☒ B INACTIVE ☐ C. UNKNOWN	approx. 1973 (BEGINNING YEAR)	1988 (ENDING YEAR)	☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

The oil in the former power plant basement may contain PCB. The wastes associated with the former coal gasification plant contain PAH, cyanide, metals, tolulene and xylene.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

The potential PCB,tolulene, xylene, PAH contaminants are carcinogenic. The potential cyanides, and metals have acute and chronic toxicities at relatively low environmental concentrations. Contact, inhalation and ingestion hazards exist for all potential contaminants.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Pauletta France-Isetts	Region Superfund	(913)236-2856

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Eric Hess	Contractor	Ecology&Envir.	(913)432-9061	1 4 88 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

Mound St. Power Plant

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☒ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS
- ☒ D. OTHER oil (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS
- CUBIC YARDS unknown
- NO. OF DRUMS

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☒ D. PERSISTENT
- ☒ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	unknown		Coal Tar
OLW	OILY WASTE	unknown		Fuel Oil or transformer oil.
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	unknown		Coal tar xylene and tolene
IOC	INORGANIC CHEMICALS	unknown		cyanide salts
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		Coal tar Associated

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SLU	Coal Tar	800745-2	unknown	unknown	
SLU	Benzo (A) pyrene	50328	unknown	unknown	
OCC	Xylene	1330207	unknown	unknown	
OCC	Tolulene	108883	unknown	unknown	
OLW	Fuel Oil	NA	Open Pools	unknown	
OLW	Transformer Oil (PCB)	1336363	Open Pools	undetected	1 ppm detect. limit.
MES	Lead	74439921			
MES	Arsenic	7440382			
IOC	Cyanide	57125			

V. FEEDSTOCKS (See Appendix for CAS Numbers) None

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

E&E/FIT Files
EP&R Files
Missouri Department of Health and Hospitals

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: MO | 02 SITE NUMBER:

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A GROUNDWATER CONTAMINATION — 02 [ ] OBSERVED (DATE: ____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION
Coal tar wastes are potentially buried in unlined pits or stored in leaking containers.

01 [X] B SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: ____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION
Oil from site may have been released into the Mississippi River. If ground water contamination exists, it may allow release of contaminants into the surface water through surface water recharge..

01 [ ] C CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ____ — 04 NARRATIVE DESCRIPTION
none observed or likely.

01 [X] D FIRE EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE: 9-17-87) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION
The basement of the former power plant contains several thousand gallons of potentially flamable oil.

01 [X] E DIRECT CONTACT — 02 [ ] OBSERVED (DATE: 9-17-87) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION
Soil contamination from coal gasification wastes is likely.
Soil contamination could allow direct contact with wastes.

01 [X] F CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE: ____) — [X] POTENTIAL — [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: unknown (Acres) — 04 NARRATIVE DESCRIPTION
Soil contamintion from coal gasification wastes is likely

01 [ ] G DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: none — 04 NARRATIVE DESCRIPTION
Drinking water for St. Louis is obtained from surface water intakes over three miles upstream.

01 [X] H. WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: ____) — [X] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION
Workers in the former power plant and at the Apex Oil St. Louis terminal (located on the former coal gas site) are not isolated from potential soil contamination.

01 [ ] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ____ — 04 NARRATIVE DESCRIPTION
none observed

Mound St. Power Plant

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: MO | 02 SITE NUMBER:

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

none observed

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

none observed

01 ☒ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

If materials are entering surface water, benthic organisms could bioaccumulate contaminants.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE 9-17-87) and ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown
04 NARRATIVE DESCRIPTION

Oils stored in open pools in basement. (observed). Coal tar wastes, if present, may be stored in unlined pits. (Potential)

01 ☐ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

none observed

01 ☒ O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: 9-17-87) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Sewers adjacent to site contain several feet of oil.

01 ☒ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Oil may be the result of unreported spills from the Apex facility.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None observed

III. TOTAL POPULATION POTENTIALLY AFFECTED: unknown

IV. COMMENTS

Currently the site is considered to involve only the oil in the former power plant. The former coal gas site should be included in consideration of this site

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

E&E/FIT files.
EP&R files
St. Louis Department of Health and Hospital files.

EPA FORM 2070-12 (7-81)

Laclede Coal Gas
Site Tech

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
E&E, 1991

Final Report
Screening Site Inspection
Laclede Coal Gas
St. Louis, Missouri

EPA ID# MOD981715980
TDD #F-07-9008-020 PAN #FM00579SA
Site #Y33 Project #002
Prepared by E & E/FIT for the
Region VII EPA RPO
Project Manager: Keith Brown
Superfund Contact: Greg Reesor
Date: October 29, 1991

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SECTION 1: INTRODUCTION

The Ecology and Environment, Inc., Field Investigation Team (E & E/FIT) was tasked by the Region VII U.S. Environmental Protection Agency (EPA), through Technical Directive Document (TDD) #F-07-9008-020 (Appendix A) and EPA CERCLIS ID #MOD981715980, to conduct a Screening Site Inspection (SSI) of the Laclede Coal Gas site located in St. Louis, Missouri, foot of Mullanphy Street. The objectives of this SSI were to determine the approximate areal and vertical extent of subsurface contamination; to determine whether contamination is present in the 0 to 2 foot interval; to determine whether contaminants have migrated via surface water runoff, or via the ground water/surface water interface; and to determine whether any coal tar wastes present have leached into the shallow ground water.

The E & E/FIT conducted a site reconnaissance on November 20, 1990, to assess current site conditions and facilitate preparation of the SSI work plan. Participating FIT members included Keith Brown, Bob Overfelt, and Chris Williams. During this site reconnaissance, the FIT observed seepage from the foundation and piping system of an abandoned pump house that was formerly owned by the Mound Street Power Plant. Because this pump house is located on the east side of the flood control levee, this leachate was observed to be seeping directly into the Mississippi River.

During the SSI, the FIT collected subsurface soil, surface soil, surface water, ground water, sediment, and product samples. Initially, 24 locations were drilled with solid stem augers. Ninety-two samples were collected from these locations and screened on site in the mobile lab. Four of the sample locations determined by FASP analyses to be the most contaminated, as well as one background sample location, were resampled with hollow stem augers. Thirteen subsurface soil samples were collected from these 5 locations. Twelve surface soil samples were collected at 12 locations. Six surface water samples were collected at 4 locations. Six ground water samples were collected at 5 locations. Four sediment samples were collected at 3 locations. Two IDW samples were collected from 17 drums, and 1 oil sample was collected from an 80,000-gallon tank located on site. Additionally, two field/trip blanks, one auger/split spoon rinsate, and one Geoprobe pipe rinsate sample were

collected.

This report describes present site condition, dicussses site history and coal gas operations, the physical and cultural setting of the site, and presents and discusses the sample results of the FIT SSI. EPA Site Inspection Form 2070-13 was completed and is included as Appendix B.

SECTION 2: SITE LOCATION AND DESCRIPTION

2.1 SITE LOCATION

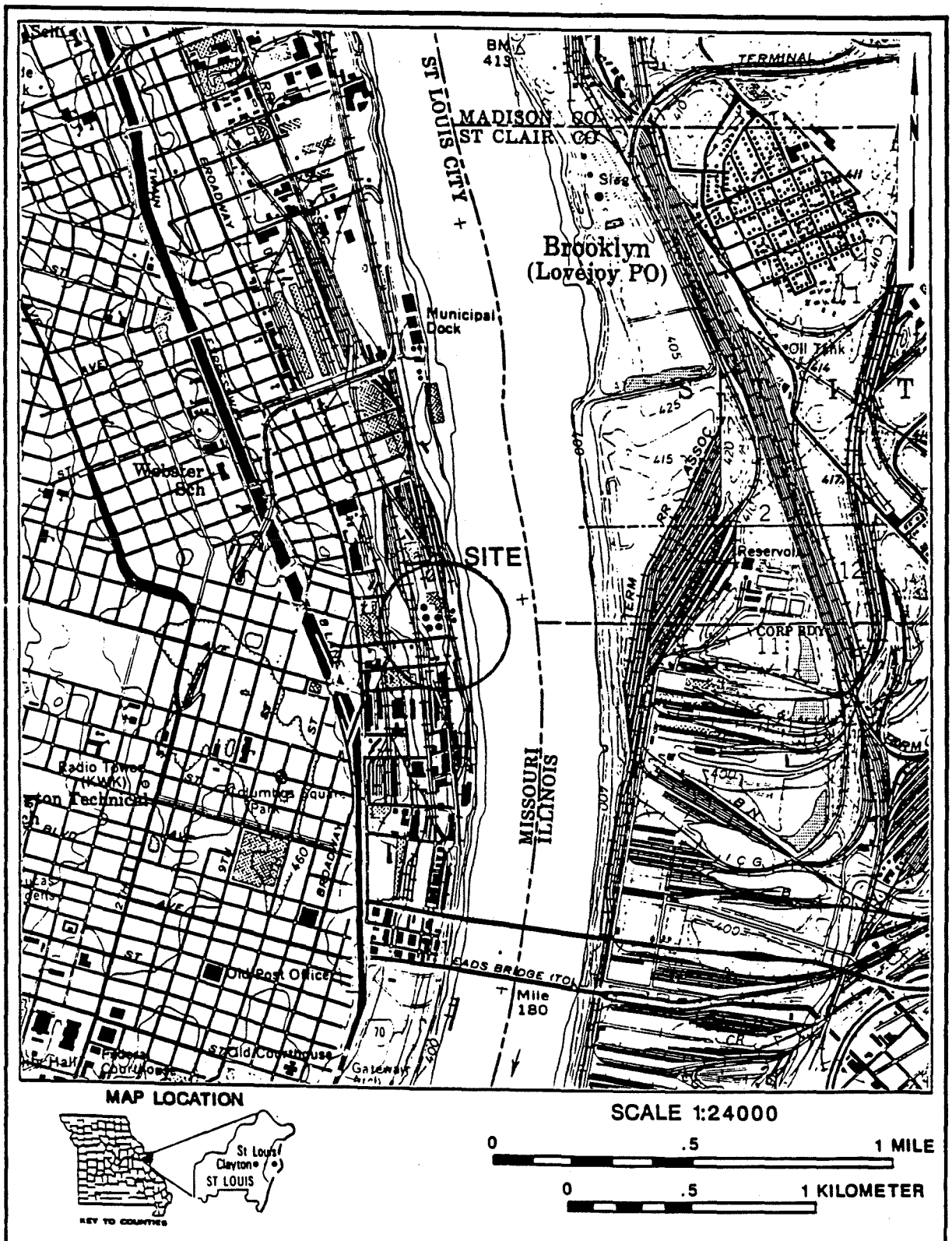
The Laclede Coal Gas site is located in St. Louis County, St. Louis, Missouri, approximately one mile north of the St. Louis Arch, along the Mississippi River at the foot of Mullanphy Street (Figure 2-1). The legal description of the site is city block 234-Tract #25, St. Louis Plan. The geographic coordinates of the site are 90° 11′ 00" west longitude, and 38° 38′ 20" north latitude. The site is situated in an industrialized area adjacent to the Mississippi River.

2.1 SITE DESCRIPTION

The site is a former manufactured gas plant (FMGP) (Figure 2-2). The dimensions of the site are approximately 600 feet by 500 feet. Currently, the site is owned and operated by Petroleum Fuels & Terminal Company (PF & T), a subsidiary of Apex Oil Company. PF & T operates a privately owned petroleum tank farm on site (Figure 2-3). The former Mound Street Power Plant building is owned by McKinley Iron and is located adjacent (northeast) to PF & T. The bulding was in the process of being raised during the SSI (E & E/FIT 1990).

The site is not secured and access to the ground is relatively unrestricted. There are locks on most of the doors of the site buildings and a fence surrounds the petroleum storage tanks. Also, there is a watchdog which lives within the fenced petroleum tank farm; no other security exists (E & E/FIT 1990).

The E & E/FIT conducted a site reconnaissance on November 20, 1990, to facilitate preparation of the work plan. The FIT observed seepage from the foundation and piping system of an abandoned pump house that was formerly owned by the Mound Street Power Plant. The pipes, which originate from the former plant, have been plugged with concrete, but seepage was still leaching through the concrete. Because this pump house is located on the east side of the flood control levee, this leachate was observed to be seeping directly into the Mississippi River.

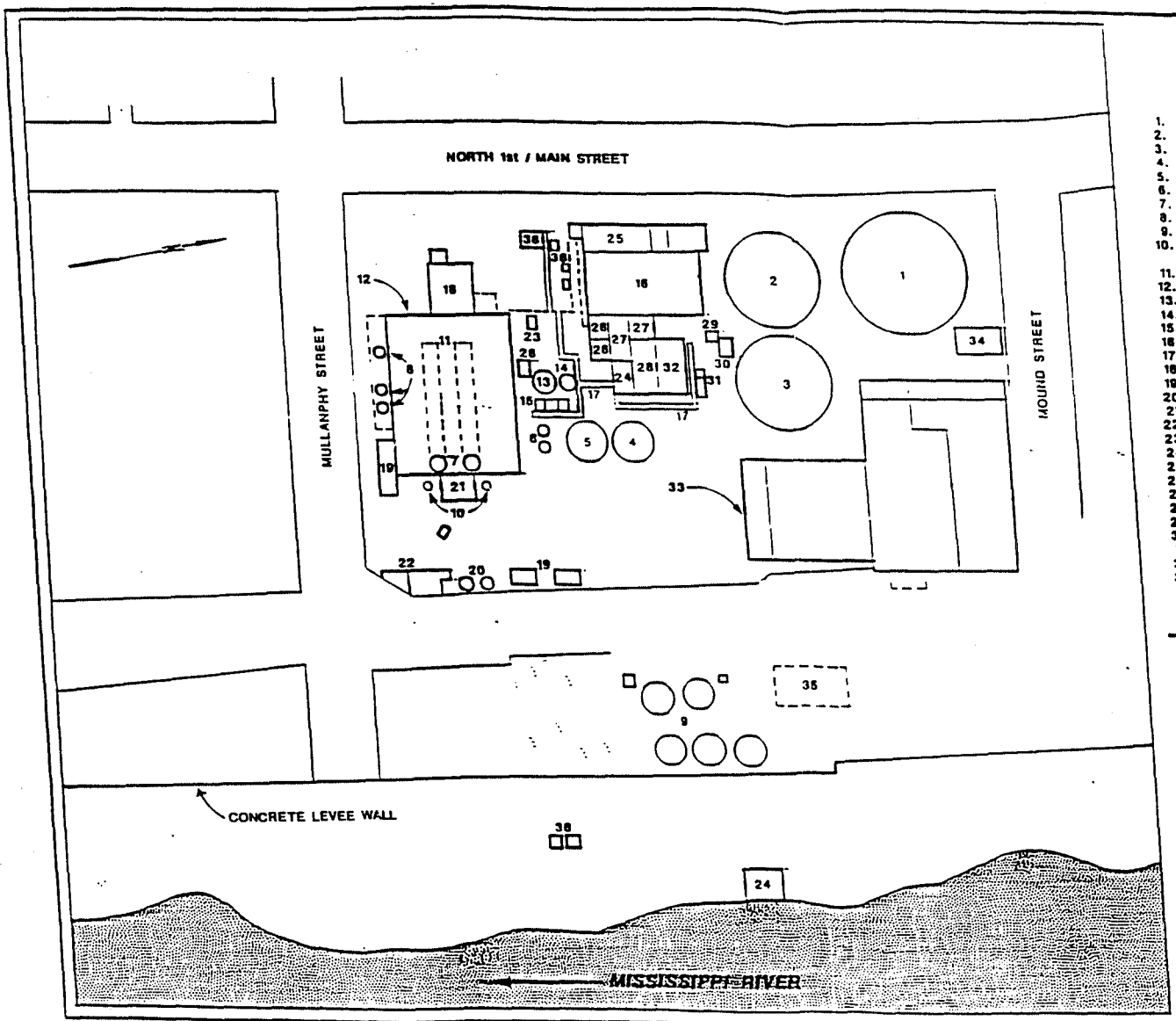


LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: C. WILLIAMS

ECOLOGY & ENVIRONMENT FIT JAN. 1988
SOURCE: USGS 7.5' GRANITE CITY, IL. QUAD. 1968

FIGURE 2-1 : SITE LOCATION



EXPLANATION

1. GAS HOLDER (787,927 Cubic Feet)
2. GAS HOLDER (656,431 Cubic Feet)
3. GAS HOLDER (337,368 Cubic Feet)
4. GAS PURIFIER (605 Cubic Yards)
5. GAS PURIFIER (605 Cubic Yards)
6. 2 - GAS SCRUBBERS (2,714 Cubic Feet Each)
7. 2 - TANKS, USE UNKNOWN (2,728 Cubic Feet Each)
8. 3 - TANKS, USE UNKNOWN (2,714 Cubic Feet Each)
9. 5 - FUEL OIL TANKS (130,725 Gallons Each)
10. 2 - RETORT SMOKE STACKS (90 Feet High And 6 Feet In Diameter Each)
11. 2 - BANKS OF RETORTS
12. RETORT HOUSE
13. AMMONIA WELL (56,111 Gallons)
14. AMMONIA WELL (22,626 Gallons)
15. TAR SEPARATOR (1,2244 Gallons)
16. PURIFIER HOUSE
17. PIPE TRENCHES (3 Feet Deep By 4 Feet Wide)
18. BLOWER HOUSE
19. GARAGE
20. TAR TANKS (53,844 Gallons Each)
21. STORAGE SHED
22. BLACKSMITH AND CARPENTER SHOP
23. STORAGE HOUSE
24. PUMP HOUSE
25. OFFICE AND METER ROOM
26. LABORATORY AND MACHINE SHOP
27. SCRUBBER HOUSE
28. CONDENSER HOUSE
29. GOVERNOR HOUSE
30. VALVE HOUSE
31. METER AND SWITCH HOUSE
32. EXHAUSTERS AND BLOWERS
33. LACLEDE ELECTRIC POWER FACILITY
34. OFFICE
35. TRANSFORMERS
36. UNKNOWN

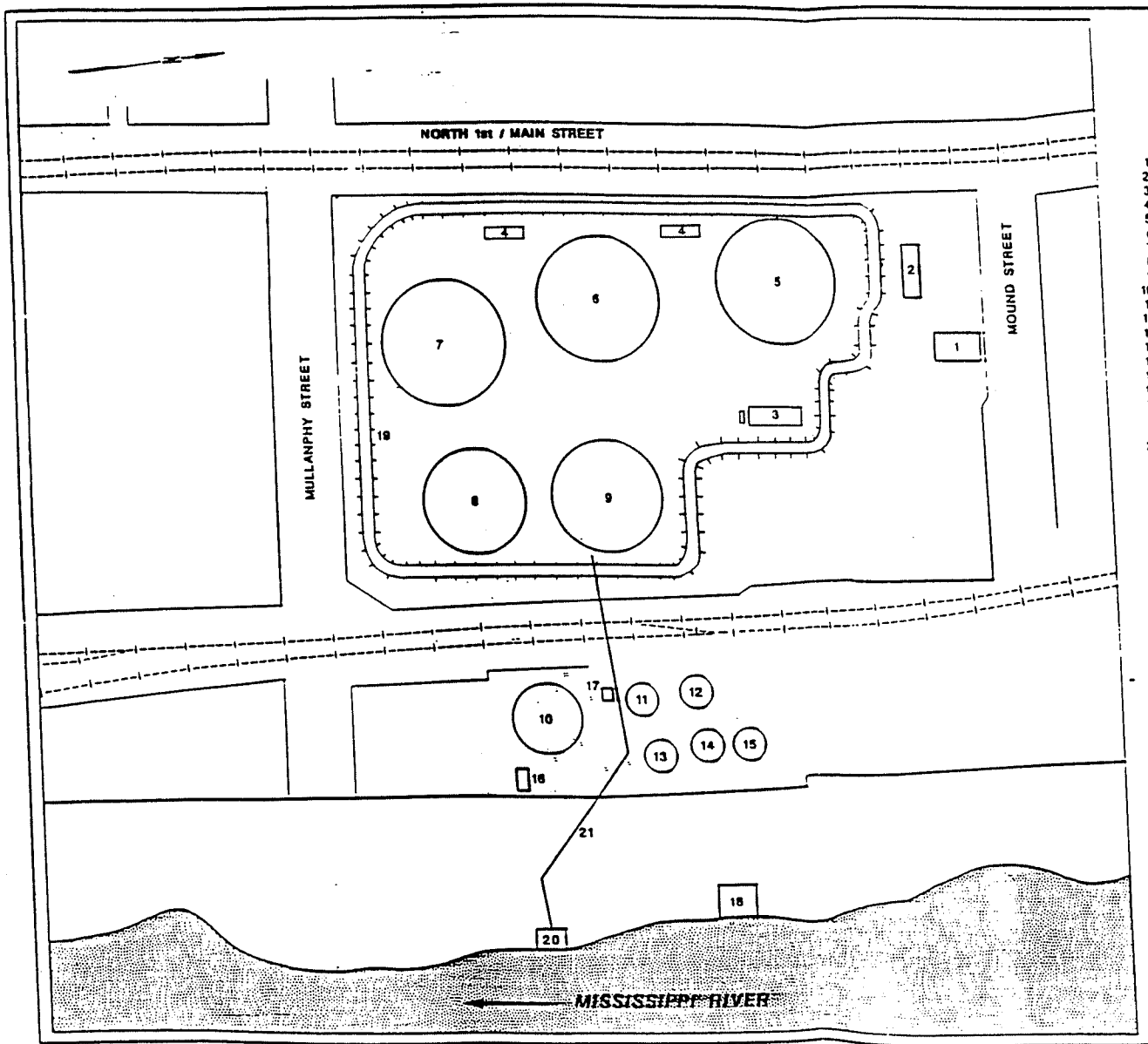
LACLEDE COAL GAS SITE
(LACLEDE GAS AND LIGHT CO.)
ST. LOUIS, MISSOURI
CIRCA 1900

SCALE
0 200
FEET

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: C. WILLIAMS

FIT JAN. 1988

FIGURE 2-2 SITE IDENTIFICATION MAP
1900 CONFIGURATION



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

1. OFFICE
2. TANKER TRUCK LOADING PLATFORM
3. EQUIPMENT SHED
4. EQUIPMENT/WORK SHOP
5. FUEL OIL TANK (80,000 Barrels)
6. FUEL OIL TANK (80,000 Barrels)
7. FUEL OIL TANK (80,000 Barrels)
8. FUEL OIL TANK (50,000 Barrels)
9. FUEL OIL TANK (55,000 Barrels)
10. OIL TANK
11. CRUDE OIL TANK
12. CRUDE OIL TANK
13. CRUDE OIL TANK
14. CRUDE OIL TANK
15. CRUDE OIL TANK
16. PUMP HOUSE
17. PUMP HOUSE
18. PUMP HOUSE (Abandoned)
19. CONTAINMENT BERM
    (For Fuel Oil Tanks, Capped With A Chain-link Fence)
20. PUMP HOUSE
21. RIVER TANKER OFF-LOADING PIPES

ecology and environment, inc.
CLOVERLEAF BUILDING 3, 6405 METCALF
OVERLAND PARK, KANSAS 66202

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI

SCALE
0 200
FEET

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: K. BROWN

FIT JAN. 1988

FIGURE 2-3: SITE IDENTIFICATION MAP
PRESENT DAY CONFIGURATION

2.3 SITE CONTACTS

Randel H. Lewis
Terminal Manager
Petroleum, Fuel & Terminal Company
Foot of Mullanphy Street
St. Louis, MO 63105
(314) 621-0522

Dick Bloch
Assistant Terminal Manager
Petroleum, Fuel & Terminal Company
Foot of Mullanphy Street
St. Louis, MO 63105
(314) 621-0522

Bob Welch
Terminal Property Manager
Petroleum, Fuel & Terminal Company
Foot of Mullanphy Street
St. Louis, MO 63105
(314) 621-0522

Greg Reesor
Missouri Coordinator
U.S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS
(913) 551-7695

See Appendix C for a breakdown of samples by property owners and for addresses and phone number of other interested parties.

SECTION 3: SITE HISTORY

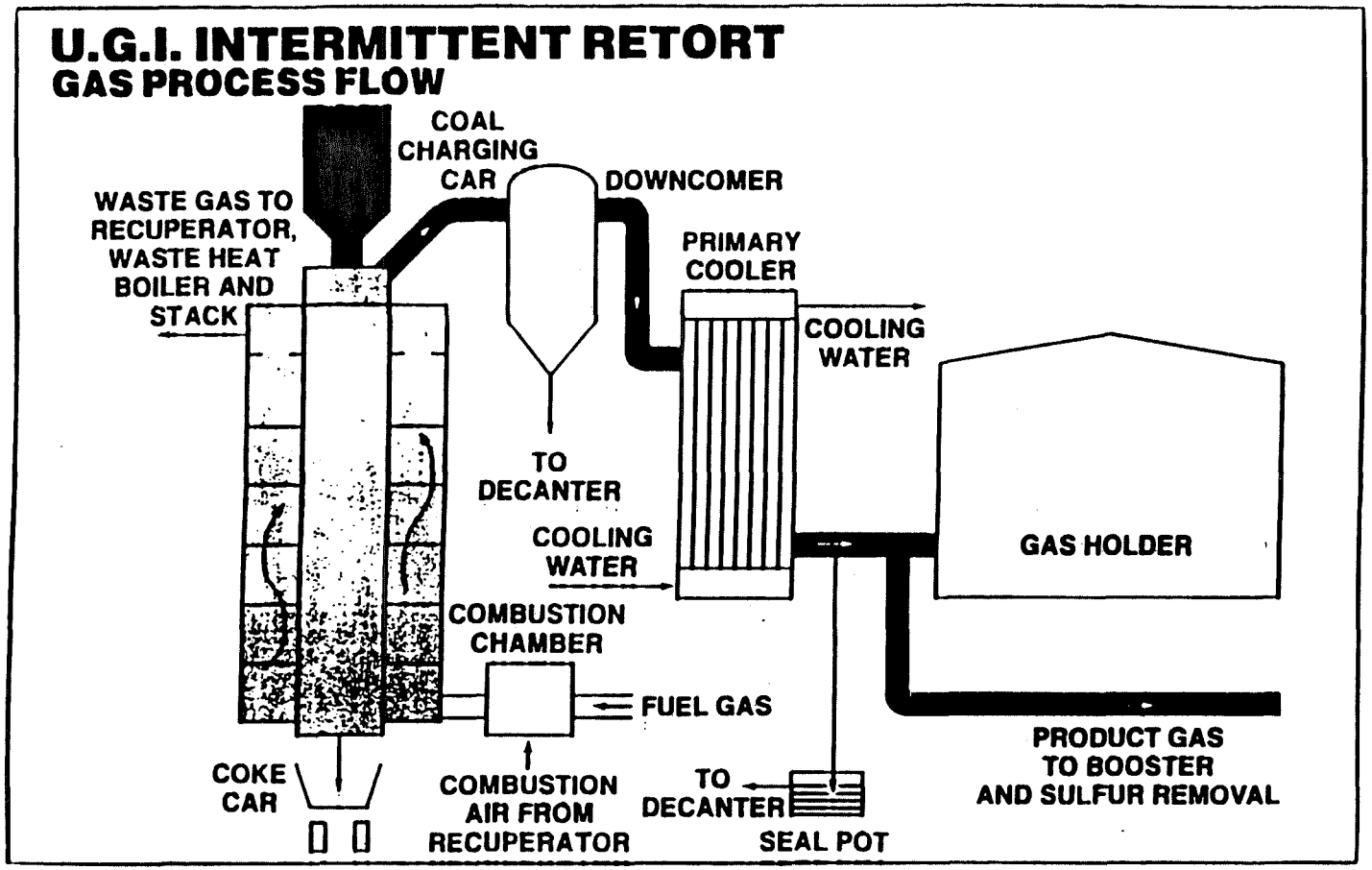
3.1 GENERAL SITE HISTORY

The earliest property records available indicate that this parcel of land was used by the Mound Street Warehouse Corporation, which sold the land and buildings to the Laclede Gas and Light Company on February 8, 1888 (E & E/FIT 1988). The Laclede Gas and Light Company constructed a large coal gasification plant on the property (Figure 2-2). According to the Brown's Directory of Manufactured Gas Plants, on March 23, 1940, the name of the facility was changed to the Laclede Power and Light Corporation (aka Laclede Electric), and the Laclede Gas Light Company (aka Laclede Gas). This suggests that the operations were separated, at least financially (Andrew 1890-1940).

Some time between 1940 and 1945, Phoenix Light, Heat and Power was involved in the Laclede operations; however, the extent of this involvement could not be determined during the background information search conducted for the work plan. On March 23, 1945, the entire facility was sold to Union Electric Company. According to Union Electric representatives, Union Electric Company never manufactured gas at this site (E & E/FIT 1988). Therefore, 1945 is the approximate closure date of the coal gasification works. Union Electric continued to use the electric power facility until 1973, though the former coal gas works was sold to the Apex Oil Company in 1969. Between 1969 and 1972, Apex Oil dismantled the old coal gas plant and constructed a petroleum tank farm on the site (Figure 2-3). This Apex facility stored various petroleum fuels until the mid 1980s when it became one of two Apex Oil asphalt product terminals in St. Louis. Currently, the terminal stores and distributes asphalt and #6 fuel oil (E & E/FIT 1988). Figure 2-2 depicts the Laclede Gas and Light Company as it appeared in the early 1900s; Figure 2-3 illustrates the current layout of the property.

3.2 FORMER SITE OPERATIONS

The major gas manufacturing process used at the Laclede FMGP was the UGI intermittent retort process (Environmental Research 1984)). This method produced gas through coal carbonization (Figure 3-1). During this process, coal is heated in the retort and the resulting coal gas is



THIS MANUFACTURED GAS MACHINE WAS THE MOST COMMON TYPE IN USE DURING THE PEROID OF OPERATION FOR THE LACLEDE FACILITY.

FIGURE 3-1

removed through its top. The gas is run through a condenser and a scrubber before it is moved into the gas holder. Wastes are produced in the condenser and scrubber and in the retort itself. The coal is carbonized in batches and the resulting coke is discharged after each period of carbonization. It was common practice in the early 1900s for manufactured gas plants to bury some of their wastes in unlined pits on site. Most of the coal tars, approximately 76 percent, were sold to coal tar refineries for further processing.

3.3 PAST INVESTIGATIONS

On April 8, 1987, Daniel Wilson, Environmental Sanitation Specialist for the St. Louis Division of Health, collected oil samples in the basement of the former Mound Street electric power plant, where hydraulic oil from electrical transformer allegedly was stored. Six samples were collected and analyzed for polychlorinated biphenyls (PCBs). According to this analytical report, none of the samples showed PCB contamination, though the detection limits were not included on the data transmittal (E & E/FIT 1988).

On September 17, 1987, the E & E/FIT conducted a site reconnaissance to aid in preparing a Preliminary Assessment report of the former Mound Street Power Plant. Six liquid samples were collected from the basement of the facility, and two samples were collected from two different manholes adjacent to the facility. All samples were screened for PCBs at a 1 part per million (ppm) detection limit. No PCB contaminants were identified by the Tracor gas chromatograph utilized by the FIT Field Analytical Support Program (FASP) (E & E/FIT 1988).

The E & E/FIT conducted a second site reconnaissance on November 20, 1990, to facilitate preparation of the work plan. The FIT observed seepage from the foundation and piping system of an abandoned pump house that was formerly owned by the Mound Street Power Plant. The pipes, which originate from the plant, had been plugged with concrete, but seepage was still leaching through the concrete. Because this pump house is located on the east side of the flood control levee, this leachate was observed to be seeping directly into the Mississippi River (E & E/FIT 1990).

SECTION 4: WASTE CHARACTERISTICS

4.1 WASTE STREAMS

The two waste products of primary concern are tar sludges (coal tars) and spent oxides. Ammonia wastes are by-products of this production process, but are not considered hazardous. Coal tar wastes are primarily polynuclear aromatic hydrocarbons (PAHs) and phenolics produced during coal or coke combustion and during the oil injection process. Some of the PAH compounds likely to be present in the tar wastes are carcinogenic and listed as RCRA Part 261 hazardous wastes. All PAHs can be considered as carcinogenic as benzo(a)pyrene, a Class A carcinogen. Spent iron oxide wastes are produced during the gas purification process where impurities are removed from the manufactured gas. Iron oxide wastes contain sulfur compounds, cyanide compounds, and small quantities of coal tar. Light aromatics such as benzene, toluene, and xylene (volatile organic compounds) also are occasionally constituents of coal tar wastes.

Two types of cyanide may be present at a coal gasification site: simple and complex cyanides. Simple cyanides are formed when cyanide reacts with an alkali or metal, producing a soluble material that can liberate a CN^- anion in water. Simple cyanides can be decomposed by bacteria in the soil (Environmental Research 1984). Complex cyanides are alkali-metal cyanides that are relatively insoluble (Environmental Research 1984). Complex cyanides, particularly the ferrocyanide compounds, are more resistant to biodegradation. These materials are associated with oxide wastes.

The trace metals most likely to be found on a coal gasification site are: arsenic, chromium, copper, iron, lead, nickel, and zinc (Environmental Research 1984). All are readily adsorbed onto soil particles. The mobility of these constituents is controlled by the pH of the soil. As a general rule, the solubility of these metals increases as pH decreases. Low pH values also reduce the cation exchange capacity of the soil matrix due to the preferential adsorption of H^+ ions. Cation exchange is generally considered the major barrier to metal transport in soils. The strong tendency of metals to be bound to soil particles and organic matter limits their impact on ground water resources.

PAH and phenolic compounds may enter the atmosphere through

volatilization. Once in this matrix, the materials may undergo molecular or advective diffusion. (All further references to dispersion characteristics will infer both molecular and advective processes). PAH compounds are likely to undergo dispersion when introduced into surface water. If this occurs, the contaminants are very susceptible to adsorption onto clay particles suspended in the water. Depending on the nature of the surface water, this material may also volatilize; thus entering the atmosphere. Once in the surface water, the PAH compounds are prone to chemical alteration through biodegradation or photolysis. They are not readily absorbed to clay particles. These compounds may also undergo volatilization and limited biodegradation in surface water (Environmental Research 1984).

PAHs in ground water are also likely to undergo dispersion and adsorption processes. However, biodegradation of these materials is unlikely in this matrix (Environmental Research 1984). Phenolic compounds in ground water can be transported through dispersion. It is possible that these chemicals may undergo limited biodegradation in ground water environments.

In the soil matrix, PAHs can be involved in the adsorption process as well as biodegradation reactions. These materials may also undergo volatilization, leaching, and photolysis depending on site-specific characteristics. Phenolic compounds in the soil environment can be leached readily or removed through biodegradation (Environmental Research 1984).

PAH compounds are stable and tend to be retained in sediments. The specific stability of a particular PAH compound is dependent on its chemical structure (Environmental Research 1984; EPA 1980). Generally, the stability/solubility is inversely related to the molecular weight of the PAH. The arrangement of rings is also important. For example, anthracene is relatively soluble. It is a medium mass PAH composed of three linear rings. The arrangement of the rings allow this relatively massive molecule to be soluble. Benzo(a)pyrene is composed of a single ring surrounded by rings of three sides of its six sides. It is one of the more massive PAHs. The basic structures of the major PAHs are shown on Figure 4-1.

Component	Formula	Structure	Boiling Point, °C
Benzene	C_6H_6		80
Toluene	C_7H_8		111
Xylenes	C_8H_{10}		138-144
Phenol	C_6H_5OH		181
Cresols	C_7H_7OH		191-202
Xylenols	C_8H_9OH		201-227
Pyridine	C_5H_5N		115
Naphthalene	$C_{10}H_8$		218
Methylnaphthalenes	$C_{11}H_{10}$	-	241-245
Dimethylnaphthalenes	$C_{12}H_{12}$	-	262-269
Acenaphthene	$C_{12}H_{10}$		277
Carbazole	$C_{12}H_9N$		355
Fluorene	$C_{13}H_{10}$		297
Anthracene	$C_{14}H_{10}$		340
Phenanthrene	$C_{14}H_{10}$		340
Fluoranthene	$C_{16}H_{10}$		393
Pyrene	$C_{16}H_{10}$		394
Chrysene	$C_{18}H_{12}$		436
Benz(a)anthracene	$C_{18}H_{12}$		438
Benzo(j)fluoranthene	$C_{20}H_{12}$		~480
Benzo(k)fluoranthene	$C_{20}H_{12}$		480
Benzo(a)pyrene	$C_{20}H_{12}$		496
Benzo(e)pyrene	$C_{20}H_{12}$		493
Perylene	$C_{20}H_{12}$		460
Benzo(g,h,i)perylene	$C_{22}H_{12}$		500
Benzo(b)chrysene	$C_{22}H_{14}$		~500
Dibenz(a,h)anthracene	$C_{22}H_{14}$		-

PAH COMPOUNDS

Source: Environmental Research 1984

Chemical Compounds Associated with Coal Gasification

FIGURE 4-1

4.2 WASTE QUANTITY

The Laclede Coal Gas facility operated for almost 60 years, producing approximately 932,640 million cubic feet of gas (Andrew 1890-1940). According to the Handbook on Manufactured Gas Plants, approximately 1 gallon of tar waste is accumulated for every 1000 cubic feet of gas produced (Environmental Research 1984). Using this conversion factor, approximately 932 million gallons of tar waste were produced at the Laclede Coal Gas facility. According to the Handbook on Manufactured Gas Plants, approximatley 76% of the tar waste produced was sold. The other 24% was probably buried on site. Therefore, approximately 223,680,000 gallons of coal tar could be buried on site. It was common practice for FMGPs to bury their waste on site in pits or unlined trenches.

SECTION 5: PHYSICAL AND CULTURAL SETTING

5.1 CLIMATOLOGY AND DEMOGRPHY

The climate of the St. Louis, Missouri, area is classified as consistent with cold winters and long, hot summers. Heavy rains occur mainly in the spring and early summer months (USDA 1982). The total annual precipitation for St. Louis is 36 inches (USDA 1982). Net precipitation is 0 inches and the one-year, 24-hour rainfall is approximately 3.0 inches (USDA 1982). The average relative humidity in mid-afternoon is about 60 percent; with a higher humidity at night and the average at dawn is about 80 percent. The prevailing wind is from the south (USDA 1982).

The total population within four miles of the site is 207,102 (EPA 1989). The nearest individual is located approximately 1/4 mile from the site. The only resource within one-half mile of the site is the Mississippi River, located directly east of the site.

According to the Missouri Department of Conservation, it is not likely that any sensitive environments or critical habitats occur within a four-mile radius of the site. The possible exception is the Sicklefin Chub, (Hybopsis meek), which occurred in the Mississippi River in 1944 and may still occur in the area (Dickneite 1991).

5.2 TOPOGRAPHY AND DRAINAGE

The site topography is essentially flat with a very gentle slope (0 to 3 percent) to the east. Locally, the slope has been modified around buildings and other facilities. All runoff is impeded by a 500-year Corps of Engineers flood wall, which separates the site from the Mississippi River (Borgestede 1990). Overland flow is diverted into a storm sewer system that is connected to a sanitary sewer line. All water entering the sanitary sewer system flows underground to the Bissle Point Treatment Plant located approximately 2.5 miles upstream from the site. The water is treated by primary settling tanks; however, construction of a secondary treatment plant is three years underway. Treated water from this plant is discharged into the Mississippi River approximately 2.5 miles north (upstream) of the site (Borgestede 1990).

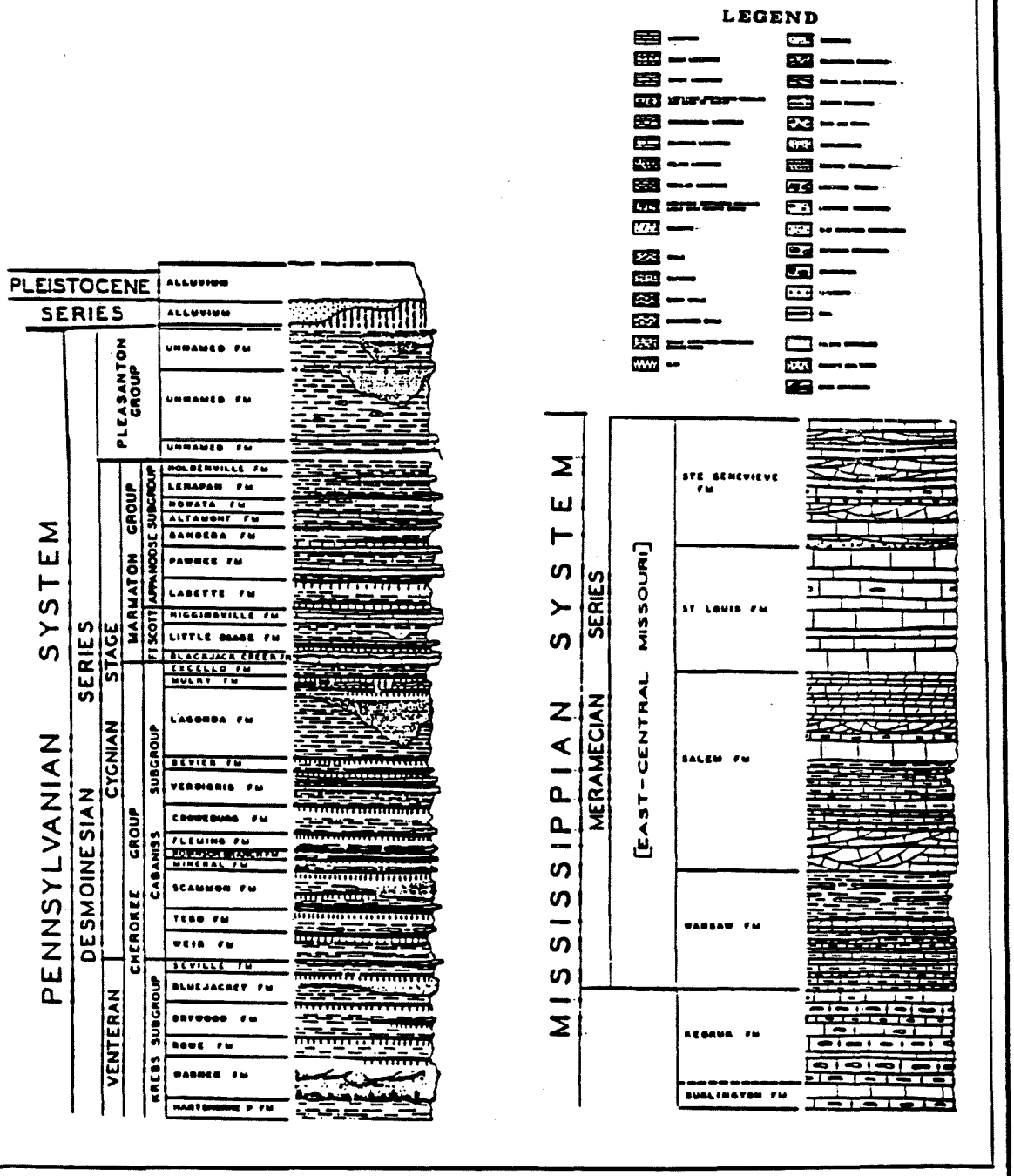
5.3 SOILS

The site is situated on Urban bottomland, which is defined as land with more than 85 percent of the surface covered by asphalt, buildings, or other impervious materials (USDA 1982). The area was built up to protect the site from flooding. The amount of fill in the area can range from 0 to over 20 feet. Because of this high degree of variability, classifying the exact nature of the area soils is impractical without a detailed on-site soil analysis. However, generally the soil types found at the Laclede Coal Gas site are periodologically characterized as loessial. These unconsolidated loess deposits of Quaternary Age can vary in thickness up to 50 feet. Residual soils underlie these loess deposits and were formed from decomposition of limestone bedrock (MGS 1971).

5.4 STRATIGRAPHY AND GROUND WATER

The upper bedrock beneath St. Louis County in east-central Missouri belongs to the Upper Mississippian and Lower Pennsylvanian systems. Figure 5-1 shows that these systems are subdivided, in descending order, into the Pleasanton, Marmaton, and Cherokee groups of the Pennsylvanian System, and the Mermacian Series of the Mississippian System (MGS 1961). Figure 5-2 is a generalized stratigraphic column primarily prepared from two well logs obtained from the Division of Geology and Land Survey, Missouri Department of Natural Resources (MDNR) and the drilling and sampling logs prepared during the SSI. The drilling and sampling logs are included in Appendix G.

According to the two well logs obtained from the MDNR and the drilling and sampling logs prepared during the SSI, the depth to bedrock varies in the site vicinity. The drilling and sampling logs (Appendix G) indicate that this depth ranges from 23 feet (at borehole 24) to 29 feet (at borehole 07). The well logs (Appendix F) indicate that the depth to bedrock is between 20 and 25 feet. However, this depth would increase as the distance to the Mississippi River decreases. To simplify the generalized stratigraphic column, the depth to bedrock was rounded to 30 feet. This 30 foot thickness is comprised of unconsolidated loess and alluvial (Mississippi River) deposits of the Quaternary System. Figure 5-3 depicts the alluvium thickness along the Mississippi River. In addition to these deposits, fill materials ranging from 0 to 20 feet or



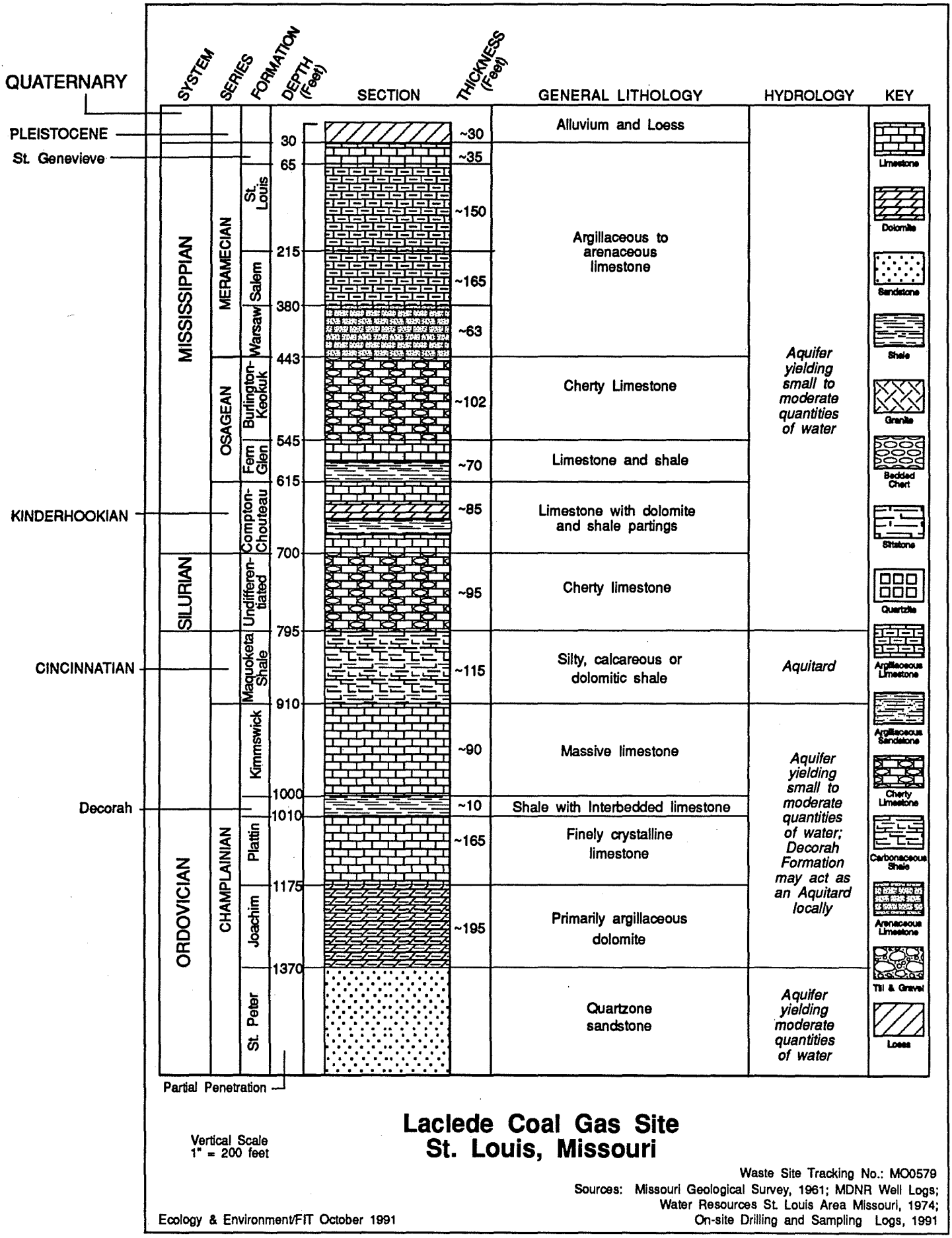
LACLEDE COAL GAS SITE

ST. LOUIS, MISSOURI

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: JOHN C. PARKS

ECOLOGY AND ENVIRONMENT FIT DEC. 1987
SOURCE: MGSWR 1961

FIGURE 5-1 : GENERALIZED STRATIGRAPHIC SECTION ST.LOUIS COUNTY, MISSOURI



Vertical Scale
1" = 200 feet

Laclede Coal Gas Site
St. Louis, Missouri

Waste Site Tracking No.: MO0579

Sources: Missouri Geological Survey, 1961; MDNR Well Logs; Water Resources St. Louis Area Missouri, 1974; On-site Drilling and Sampling Logs, 1991

Ecology & Environment/FIT October 1991

Figure 5-2: Generalized Stratigraphic Column

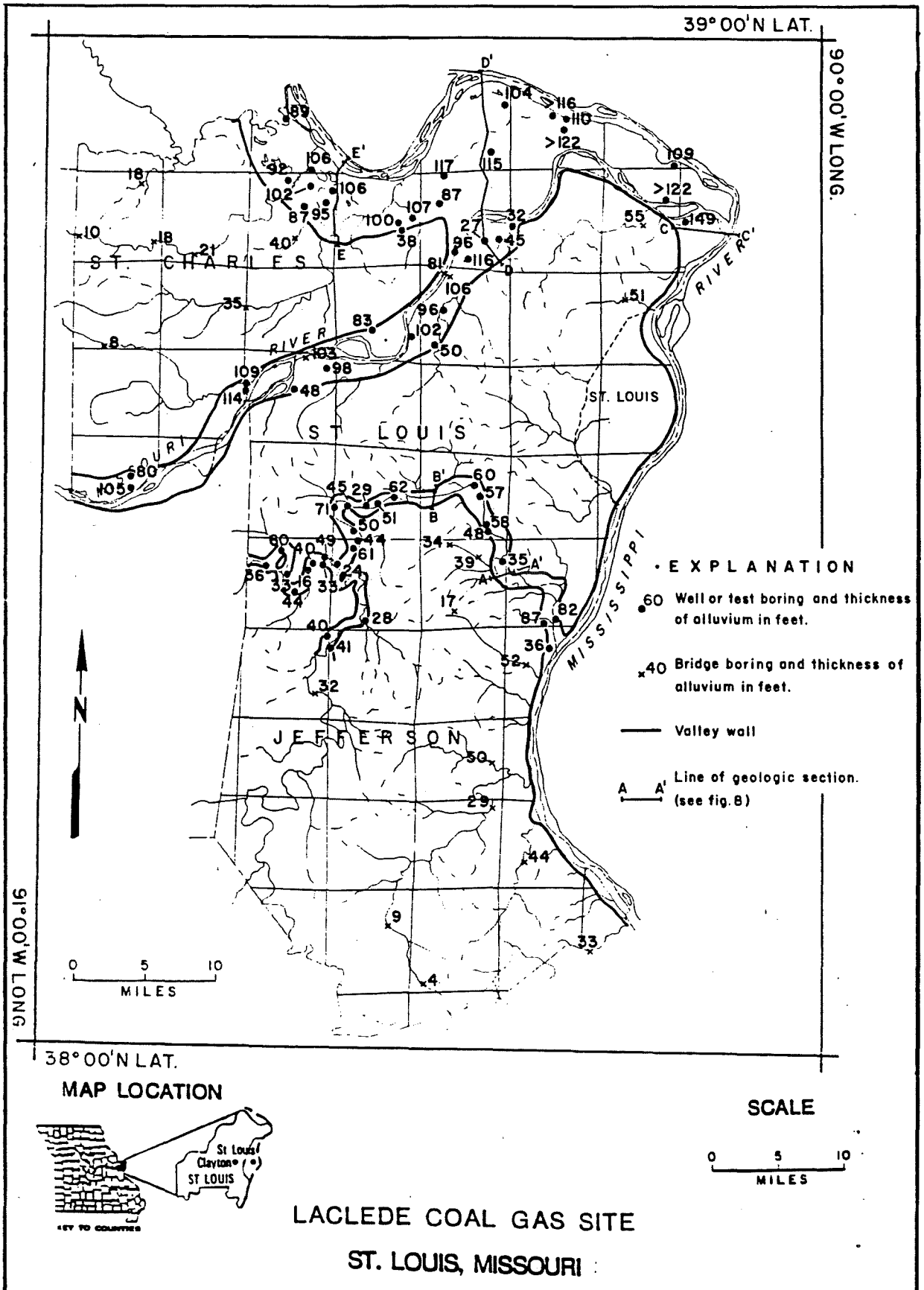


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FIGURE 5-3 : ALLUVIUM THICKNESS ALONG THE MISSOURI, MISSISSIPPI AND MERAMEC RIVERS ST. LOUIS COUNTY MISSOURI

more was placed at the site in order to protect the area from flooding.

The first bedrock encountered below the site is the Mermacian Series of the Mississippian System. The Mermacian Series consists of four formations (Fm.), which in descending order include the St. Genevieve, the St. Louis, the Salem, and the Warsaw. These formations are composed primarily of limestone and have a total thickness of 300 to 450 feet in east-central Missouri (MDNR Undated).

The St. Genevieve Fm. consists of white, massively bedded, sandy, clastic limestone. Although there are some thin beds of finely crystalline limestone, the limestone is primarily coarsely crystalline and oolitic. The lower portion of the formation is sandy, white to light tan or light olive gray, and is cross bedded and ripple marked. The middle of the formation consists of layers of red and gray chert with lenses and beds of sandstone occurring locally. Certain beds contain notable amounts of limonite which lines small cavities in the rock. Fossils are irregularly distributed in the formation. The thickness of this formation is approximately 30 feet in the county and approximately 35 feet at the site (MGS 1961; MDNR Undated).

The St. Louis Fm. consists of gray lithographic to finely crystalline, medium to massively bedded limestone which can be more than 100 feet thick in the county (MGS 1961). At the site, this formation is approximately 150 feet thick (MDNR Undated). Limestone brecia with a shale matrix between blocks of breccia is common in the lower portion of the formation. Blue to bluish-gray shale also occurs in thin beds throughout the formation. Chert is not common, but when observed it is usually brown and in the form of small angular fragments. Parts of the formation are locally dolomitic (MGS 1961).

The Salem Fm. thickest exposures are found in St. Louis, St. Genevieve, and eastern Perry Counties. The thickness of this formation generally ranges from 100 to 160 feet (MGS 1961). The thickness of this formation at the site is approximately 165 feet (MDNR Undated). The limestone contained in the formation is more dolomitic as compared to the other three formations in the Mermacian Series. The upper portion is fossiliferous and contains blastoid, crinoid, echinoid, and bryozoan debris. Also the upper portion contains speckled gray and tan chert (MGS 1961).

The Warsaw Fm. can outcrop in St. Louis County and where outcrops occur, the thickness of the formation is between 80 to 100 feet (MGS 1961). At the site, this formation is approximately 63 feet thick (MDNR Undated). This formation consists primarily of finely crystalline shaley, very fossilferous, dolomitic limestone in the lower portion, and dark, fissile shale in the upper portion (MGS 1961).

According to the MDNR well logs, the lower bedrock units beneath the site vicinity include: the Burlington-Keokuk Limestone Fm., the Fern Glen Fm., and the Compton-Chouteau Fm. of the Mississippi System; an undifferentialed fm. of the Silurian System; and the Maquoketa Shale Fm., the Kimmswick Fm., the Decorah Fm., the Plattin Fm., the Joachim Dolomite Fm., and the St. Peter Sandstone Fm. of the Ordovician System (MDNR Undated). These bedrock formations will be discussed briefly below.

The Burlington-Keokuk Fm., consists primarily of white to light buff, very coarsely crystalline, fossiliferous, crinoidal limestone. Layers of chert nodules are common, particularly in the upper portion. In east-central Missouri, the thickness of the combined formation is about 125 feet (MGS 1961). Near the site the combined formation is approximately 102 feet thick (MDNR Undated).

The Fern Glen Fm. consist of gray, grayish-green, and red limestone, and green and red calcareous shale. In central St. Louis County, the predominate color of the limestone is red. The lower portion is noncherty, whereas the upper portion contains layers of grayish chert. The total thickness of the formation in the county ranges from 20 to 45 feet (MGS 1961). In the site vicinity, the formation is approximately 70 feet thick (MDNR Undated).

The Compton-Chouteau Fm. consists of finely crystalline to sublithographic, finely bedded crinoidal limestone. The beds are separated by green shale partings. Some portions of the formation are dolomitic and contains bluish-gray to bluish-black chert. In east-central Missouri, this formation merges with the overlying Sedalia Formation and the combined formation is referred to as the undifferentialated Chouteau. The formation is relatively thin in the thickness in east-central Missouri, ranging from 6 to 12 feet (MGS 1961). However, near the site vicinity, the formation is approximately 85 feet thick (MDNR Undated).

Beneath the Mississippian-age formations in the site vicinity is a layer of undifferential Silurian-aged rocks. This unit is approximately 95 feet thick in the site area and consists primarily of cherty limestone (MDNR Undated).

Below the undifferential Silurian-aged rocks are the formations of the Ordovician System. The first formation, encountered below the site in the Ordovician System is the Maquoketa Shale Formation (MDNR Undated). This formation consists of thinly laminated, silty, calcareous or dolomitic shale with nodular and shaly lenses of limestone. The thickness ranges from 30 to 140 feet (MGS 1961). Near the site vicinity, the formation is approximately 115 feet (MDNR Undated). The next formation encountered below the site is the Kimmswick Formation. This formation consists of coarsely crystalline, white to light gray, medium bedded to massive limestone. Chert is irrregularly scattered throughout the formation. The foramtion ranges from 50 to 150 feet thick (MGS 1961). In the site vicinity, the formation is approximately 90 feet thick (MDNR Undated).

The Decorah Fm. lies below the Kimmswick formation in the site vicinity and consists of green and brown shales and interbedded limestone. The upper portion contains medium to thinly bedded, fossiliferous limestone with thin shale partings. The lower portion contains more shale with numerous, thin interbedded limestone. The formation varies in thickness from a few feet to more than 40 feet (MGS 1961). Near the site, the formation thickness is approximately 10 feet (MDNR Undated).

The Plattin Fm. underlies the Decorah Fm. near the site and consists of evenly bedded, dark gray, finely crystalline to sublithographic limestone. The formation also contains minor amounts of intercalated shale, and white chert nodules and layers are present throughout most of the formation. All of the formation in east-central Missouri is composed of dolomite. The formation can be as much as 450 feet thick north and west of Cape Girardeau County (MGS 1961). Near the site, the approximate thickness is 175 feet (MDNR Undated).

The Joachim Fm. lies below the Plattin Fm. in the site area and consists of yellowish-brown, argillaceaous dolomite which contains interbedded limestone and shale in this lower part (MGS 1961). Near the

site, the thickness of this formation is approximately 175 feet (MDNR Undated).

Below the Joachim Fm. in the site area, and the last formation to be discussed in this report is the St. Peter Sandstone Formation. This formation consist primarily of quartzose sandstone. The thickness of the formation is variable, ranging from less than 10 feet to more than 100 feet (MGS 1961).

Because there is an abundance of potable surface water in the site vicinity, ground water is not utilized as a source of drinking water. Generally, the bedrock aquifers of the region yield very small quantities of water; roughly 0 to 50 gallons per minute (gpm). The alluvial aquifers of Quaternary Age that lie along the Meramac, Mississippi, and the Missouri Rivers have much greater yields. Ground water flow in the area is generally to the south and east. The depth to the water table varies because of the variability in the depth of fill material. Generally, the water table is about two feet above the Mississippi River (Vandike 1990).

The bedrock aquifers in the region are divided into five discrete units, or groups. Group one, the Post-Maquoketa group, includes the strata above the Kimmswick Formation to the surface. Below this aquifer group lies the Maquoketa Shale, which is believed to act as an aquitard. Group two is the Ordovician-age Kimmswick-Joachim aquifer. Near the top of this unit is the Decorah Formation, which probably acts as a confining bed composed of shales and interbedded limestones. The remaining lower three aquifers are, in descending order: the St. Peter-Everton, Powell-Gascondade, and the Eminence-Lamotte. These units are separated primarily on the basis of unconformities, and are likely to be hydraulically connected. These deeper bedrock aquifers can be seen in Figure 5-4 and 5-5, which depict generalized hydrogeology of St. Louis County.

The migration of coal tar in ground water has been observed in several former coal gas manufacturing sites (Environmental Research 1984, E & E/FIT 1987). Coal tar is more dense than water and tends to migrate downward through porous material to a confining layer of less porous material. In areas where this behavior is exhibited, the following stratification (from top to bottom) may be expected: ground water with

System	Series	Group	Formation	Aquifer group	Thickness (feet)	Dominant lithology	Water-bearing character
Quaternary	Holocene		Alluvium[1]/		0-150	Sand, gravel, silt, and clay.	Some wells yield more than 2,000 gpm.
	Pleistocene		Loess		0-110	Silt	
			Glacial till		0-55	Pebbly clay and silt.	Essentially not water yielding
Pennsylvanian	Missourian	Pleasanton	Undifferentiated		0-75	Shales, siltstones, "dirty" sandstones, coal beds and thin limestone beds.	Generally yields very small quantities of water to wells. Yields range from 0-10 gpm.
		Marmaton	Undifferentiated		0-90		
	Desmoinesian	Cherokee	Undifferentiated		0-200		
	Atokan		Undifferentiated				
Mississippian	Meramecian		Ste. Genevieve Formation		0-160	Argillaceous to arenaceous limestone.	Yields small to moderate quantities of water to wells. Yields range from 5 to 50 gpm. Higher yields are reported for this interval locally.
			St. Louis Limestone		0-180		
			Salem Formation		0-180		
			Warsaw Formation		0-110		
	Osagean		Burlington-Keokuk Limestone	1	0-240	Cherty limestone	
			Fern Glen Formation		0-105	Red limestone and shale.	
	Kinderhookian	Chouteau	Undifferentiated		0-122	Limestone, dolomitic limestone, shale, and siltstone.	
Devonian	Upper	Sulphur Springs	Bushberg Sandstone		0-60	Limestone and sandstone.	
			Glen Park Limestone				
			Grassy Creek Shale		0-50	Fissile, carbonaceous shale.	
Silurian			Undifferentiated		0-200	Cherty limestone.	
Ordovician	Cincinnatian		Maquoketa Shale		0-163	Silty, calcareous or dolomitic shale.	Probably constitutes a confining influence on water movement.
			Cape Limestone		0-5	Argillaceous limestone.	
	Champlainian		Kimmswick Formation	2	0-145	Massive limestone	Yields small to moderate quantities of water to wells. Yields range from 3 to 50 gpm. Decorah Formation probably acts as a confining bed locally.
			Decorah Formation		0-50	Shale with interbedded limestone.	
			Plattin Formation		0-240	Finely crystalline limestone.	
			Rock Levee Formation		0-93	Dolomite and limestone, some shale.	
			Joachim Dolomite		0-135	Primarily argillaceous dolomite.	
			St. Peter Sandstone	3	0-160	Silty sandstone, cherty limestone grading upward into quartzose sandstone.	Yields moderate quantities of water to wells. Yields range from 10-140 gpm.
			Everton Formation		0-130		
	Canadian		Powell Dolomite	4	0-150	Sandy and cherty dolomites and sandstone.	Yields small to large quantities of water to wells. Yields range from 10 to 300 gpm. Upper part of aquifer group yields only small amounts of water to wells.
			Cotter Dolomite		0-320		
			Jefferson City Dolomite		0-225		
			Roubidoux Formation		0-177		
			Gasconade Dolomite Gunter Sandstone Member		0-280		
Cambrian	Upper		Eminence Dolomite	5	0-172	Cherty dolomites, siltstones, sandstone, and shale.	Yields moderate to large quantities of water to wells. Yields range from 10 to 400 gpm.
			Potosi Dolomite		0-325		
		Elvins	Derby-Doerun Dolomite		0-165		
			Davis Formation		0-150		
			Bonneterre Formation		245-385		
			Lamotte Sandstone		235+		
Precambrian						Igneous and metamorphic rocks.	Does not yield water to wells in this area.

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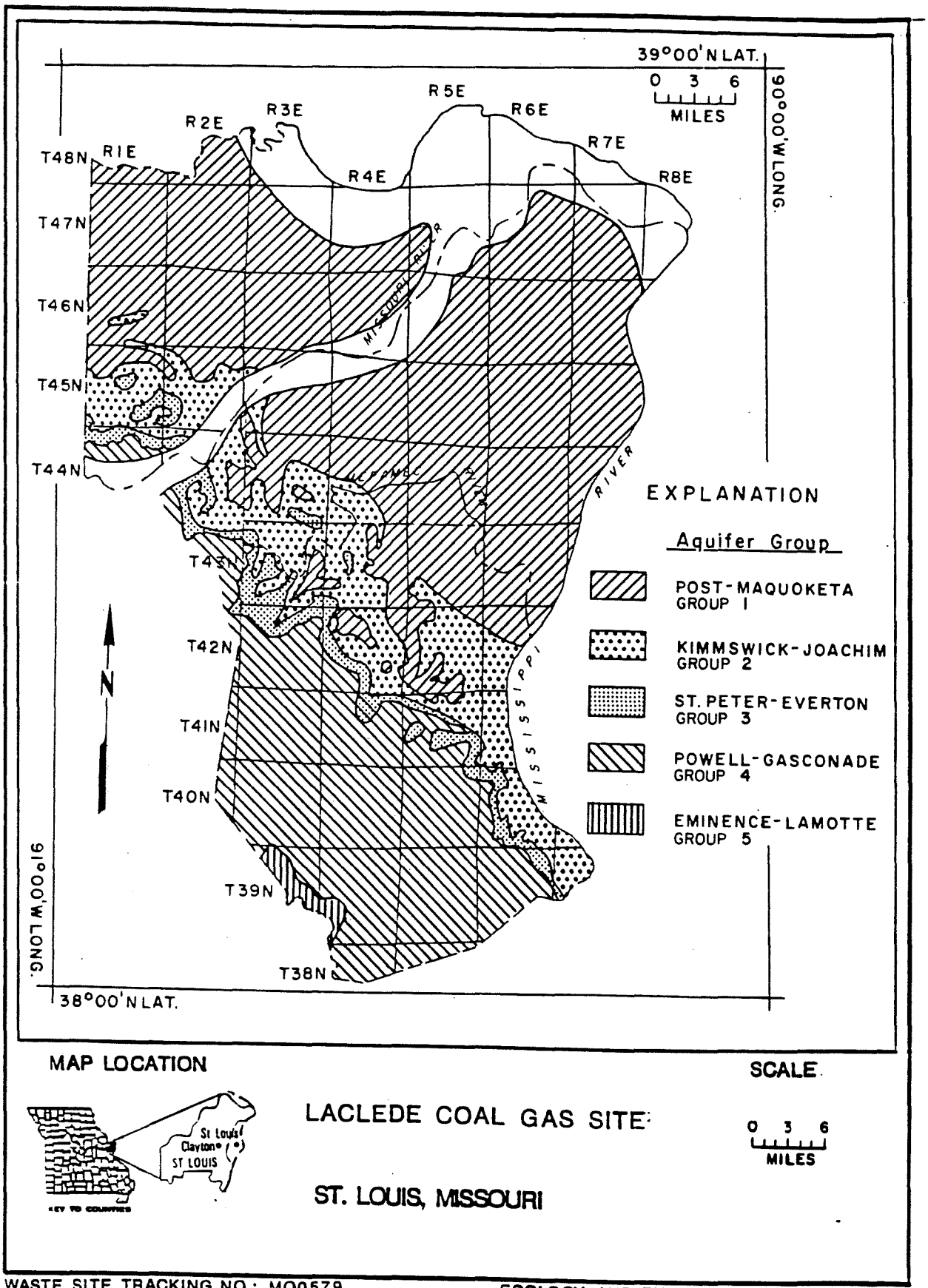
FIGURE 5-4 : GENERALIZED HYDROGEOLOGIC SECTION ST. LOUIS COUNTY MISSOURI



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Source: MGSWR 1974

FIGURE 5-5 : MAJOR AQUIFER DISTRIBUTION ST. LOUIS COUNTY MISSOURI

dissolved organics; ground water with trapped coal tar; and below the confining layer, ground water with dissolved organics.

5.5 TARGETS

The drinking water needs of the city and surrounding community are provided primarily through the withdrawal of surface water from intakes on the Missouri, Mississippi, and Meramac Rivers. Withdrawal from these rivers total nearly 1.12 by 10^9 gallons per day (City of St. Louis, Undated). The municipal water intakes for the city of St. Louis and surrounding communities are approximately nine miles upstream from the site (MGS 1974). The combined flow from the Missouri and Mississippi Rivers averages approximately 1.12 by 10^{10} gallons per day. The Meramac has an average flow of 1.92×10^9 gallons per day. The municipal intake for the community of Illinois Metro East is located at mile marker 180.8, almost directly across the Mississippi River, about 1/4 mile east of the site (Figure 2-1). About 300,000 residents are served by this water supply. Illinois American Water Company draws approximately 15 to 20 million gallons per day from this intake during the winter months; withdrawal rates in the summary are much higher (Schlosser 1990). This is the only drinking water intake within 15 miles downstream of the site. Various industries have intakes on the Mississippi River, but their use is industrial.

According to the Missouri Department of Conservation, it is not likely that any sensitive environment or critical habitats occur within 15 miles downstream of the site. The possible exception is the Sicklefin Chub, (Hybopsis meek), which occurred in the Mississippi River in 1944 and may still occur in the area (Dickneite 1991).

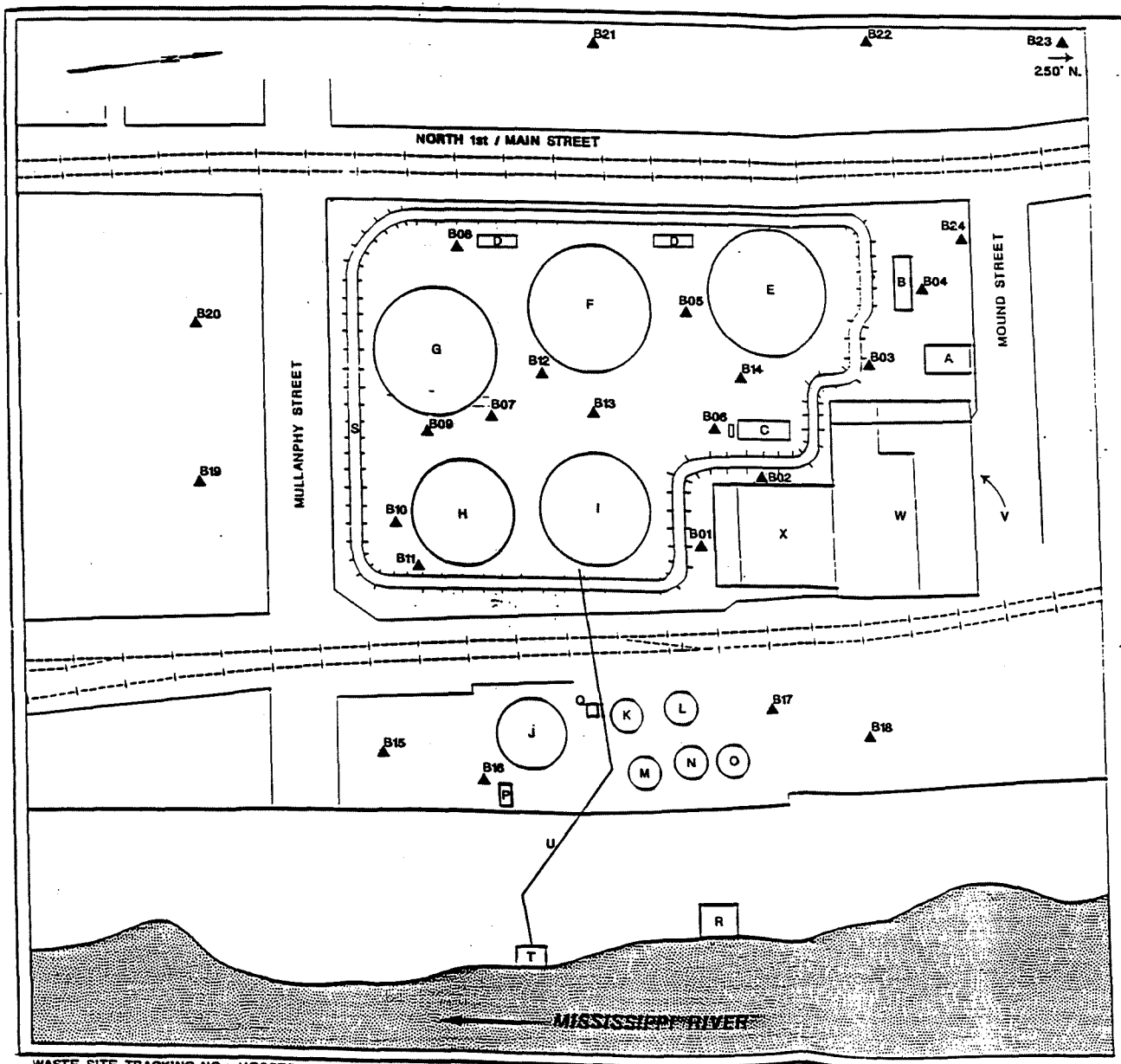
SECTION 6: FIELD ACTIVITIES

Field work was conducted March 3 through 9, 1991. The sample series assigned to this activity was DSX44. The FIT members and their respective tasks were: Keith Brown, Team Leader; Anne Melia, FASP coordinator; Chris Williams, Geoprobe operator and sampler; Patty Roberts, Assistant Geoprobe operator and sampler; Wes McCall, drilling supervisor and Site Safety Officer; John Peck, sampler and health and safety monitor; and Jon Strobel, sampler and assistant FASP coordinator. The FIT contracted John Mathes & Associates, Inc. to conduct all subsurface drilling. On-site personnel for John Mathes & Associates, Inc. were: Keith Bunselmyer, driller; and Jeff Crank and Jim Burker, driller's assistants. Additionally, William Oberle and Jacalyn Wheeler, E & E/FIT, were present on site March 6 and 7, 1991, to conduct a health and safety, and technical field audits.

The primary chemical hazards associated with the Laclede Coal Gas site involve soils contaminated with cyanide salts and/or PAHs. These materials could pose inhalation, direct contact, and ingestion hazards. Samples were collected in level-D and level-C personal protection. An HNu photo-ionization detector with 10.2 eV probe was used to monitor ambient levels of volatile compounds in the breathing zone. If the HNu registered readings above predetermined action levels, personal protection was upgraded to level-C. Otherwise, samples were collected in level-D personal protection.

6.1 SUBSURFACE SOIL SAMPLING

Subsurface soil sampling was conducted March 4 through 9, in an attempt to determine the areal and vertical extent of subsurface contamination. Initially, 24 locations were drilled with solid stem augers (Figure 6-1; Table 6-1). Their depths ranged from 2 feet to 38 feet. Originally, the work plan called for 18 locations to be drilled with solid stem augers to approximately 20 foot depths, with the exception of 1 location which was to be drilled to 50 feet deep. This deep sample was intended to determine the depth to bedrock and help assess the vertical contaminant zone. The 6 additional locations were added because subsurface rubble prohibited the advancement of the augers



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

A. OFFICE
B. TANKER TRUCK LOADING PLATFORM
C. EQUIPMENT SHED
D. EQUIPMENT/WORK SHOP
E. FUEL OIL TANK (80,000 Barrels)
F. FUEL OIL TANK (80,000 Barrels)
G. FUEL OIL TANK (80,000 Barrels)
H. FUEL OIL TANK (50,000 Barrels)
I. FUEL OIL TANK (55,000 Barrels)
J. OIL TANK
K. CRUDE OIL TANK
L. CRUDE OIL TANK
M. CRUDE OIL TANK
N. CRUDE OIL TANK
O. CRUDE OIL TANK
P. PUMP HOUSE
Q. PUMP HOUSE
R. PUMP HOUSE (Abandoned)
S. CONTAINMENT BERM
(For Fuel Oil Tanks, Capped With A Chain-link Fence)
T. PUMP HOUSE
U. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY

V. FORMER UNION ELECTRIC BUILDING
W. GENERATOR ROOM (Basement Plan)
X. BOILER ROOM (Basement Plan)

B01 BORE HOLE (SCREENING) SAMPLE LOCATION

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)
FIGURE 6-1
SOIL BORING LOCATION MAP

SCALE
0 200
FEET

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
OVERLAND PARK, KANSAS

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: K. BROWN

FIT MAY 1991

Table 6-1
Borehole Summary
Laclede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Borehole #	Depth (ft)	Approximate Location
B01	18	South of former Mound Street Power Plant
B02	21	Southwest of former Mound Street Power Plant
B03	19	South of P, F, & T Office
B04	19	North of tanker truck loading platform
B05	26	Approximately 15 feet south of northern-most fuel oil tank
B06	38	North of center of site within containment berm
B07	29	South of center of site within containment berm
B08	--	Southwest corner of site within containment berm
B09	--	South of center of site within containment berm
B10	--	Southeast corner of site within containment berm
B11	15	Southeast corner of site within containment berm
B12	11	Center of site within containment berm
B13	10	Center of site within containment berm
B14	26	North center of site within containment berm
B15	31	Southeast corner of site
B16		Southeast corner of site approximately 100 feet north of B15
B17	33	Northeast corner of site
B18	33	Northeast corner of site approximately 150 north of B17
B19	30	South of Mullanphy Street
B20	30	South of Mullanphy Street approximately 200 feet north of B19
B21	--	Approximately 80 feet north of North 1st Street
B22	--	Approximately 300 feet north of B21
B23	--	Approximately 450 feet north of B22
B24	23	Northeast corner of site

Note: See Figure 6-1 for borehole locations.

at several locations to only a few feet and, therefore, a representative sample could not be collected.

Samples were collected off the auger flights and screened on site for PAHs and VOCs in the FASP mobile laboratory (Tables 6-2 and 6-3). The samples were collected at 5 foot intervals: the PAH sample was a composite of 5 aliquots, 1 collected every foot; the VOC sample was a grab sample. Four of the sample locations determined by FASP analysis to be the most contaminated were resampled as follows: hollow stem augers equipped with continuous samplers were advanced, offset 1 to 5 feet from the screening boring (Figure 6-2, Table 6-4). A background location was sampled in the same manner. Due to subsurface rubble and debris, the continuous sampler could not be utilized at all locations. A split spoon sampler equipped with a 140 pound hammer was used at locations where the continuous sampler would not work. Samples were collected according to E & E, Inc. Standard Operation Procedures (SOPs) for borehole sampling, Gentech 5.9. Samples from the 4 locations that were resampled were submitted to EPA for volatiles, semi-volatiles, cyanides, and total metals analysis.

The background samples were inadvertently discarded along with the screening samples. This was not discovered by FIT until the SSI was completed and the team had returned to Kansas City. Split samples had been collected at all locations where samples were submitted to the EPA and which were also on PF & T property. Kathy Enright, of E & E/TAT in St. Louis, Missouri, sent the split samples collected for PF & T to E & E's Kansas City office. These samples were once again split, and 1 set was submitted to EPA to be used as the background sample. The other set was returned to PF & T.

The background samples were collected at a different location than stated in the work plan because bedrock was encountered at approximately 2 feet below the surface at this location; therefore, subsurface soil samples could not be collected there. FASP analysis had revealed that borehole #B24, the farthest upgradient screening sample, was below detection limits for all target compounds. It was known that the depth to bedrock was approximately 20 feet. Therefore, E & E/FIT relocated

Table 6-2
FASP Screening Results for Volatiles
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B01 A	1,200	380	1,700	0 - 5
B01 B	9,100	1,200	19,000	5 - 10
B01 C	18,000	710	65,000	10 - 15
B01 D	17,000	770	79,000	15 - 18
B02 A	6,300	43,000	240,000	0 - 5
B02 B	6,100	1,700	57,000	5 - 10
B02 C	69,000	110,000	570,000	10 - 15
B02 D	7,500	650	33,000	15 - 21
B03 A	1,040	22,000	22,000	0 - 5
B03 B	310	11,000	53,000	5 - 10
B03 C	1,800	6,300	3,500	10 - 15
B03 D	860	9,000	5,300	15 - 19
B04 A	< 250	450	5,600	0 - 5
B04 B	310	480	5,900	5 - 10
B04 C	< 250	250	5,100	10 - 15
B04 D	< 250	ND	440	15 - 19
B05 A	460	ND	ND	0 - 5
B05 B	ND	ND	ND	5 - 10
B05 C	ND	ND	420	10 - 15
B05 D	ND	ND	410	15 - 20
B05 E	ND	ND	ND	20 - 26
B06 A	48,000	1,700	120,000	0 - 5
B06 B	20,000	1,800	68,000	8 - 10
B06 BA	93,000	120,000	220,000	0 - 5
B06 BB	27,000	91,000	260,000	5 - 10
B06 BC	ND	ND	ND	10 - 15
B06 BD	< 250	< 250	ND	15 - 20
B06 BE	12,000	14,000	54,000	20 - 25
B06 BF	43,000	66,000	23,000	25 - 30
B06 BG	20,000	16,000	26,000	30 - 35
B06 BH	29,000	43,000	94,000	35 - 38
B07 A	1,000,000	17,000	2,500,000	3 - 8
B07 B	670,000	12,000	2,100,000	8 - 13
B07 C	370,000	ND	> 1,200,000	13 - 18
B07 D	140,000	2,500	> 21,000,000	18 - 23
B07 E	22,000	490	120,000	23 - 26
B07 F	51,000	2,800	340,000	26 - 29
B10 B	< 250	410	ND	5 - 10
B11 A	ND	ND	ND	0 - 5

Table 6-2 (cont.)

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B11 B	ND	ND	ND	5 - 10
B11 C	ND	ND	ND	10 - 15
B12 A	< 250	< 250	1,500	0 - 5
B12 B	910	1,600	4,400	5 - 11
B13 A	570	420	< 250	0 - 5
B13 B	670	450	2,300	5 - 10
B14 A	270,000	11,000	> 160,000	2 - 8
B14 B	790	9,100	> 24,000	8 - 13
B14 C	400,000	14,000	> 160,000	13 - 18
B14 D	340,000	12,000	> 210,000	18 - 23
B14 E	310,000	8,900	> 195,000	23 - 26
B14 F	2,200,000	63,000	> 1,000,000	---
B14 SS	93,000	110,000	440,000	---
B15 A	680	490	> 29,000	0 - 5
B15 B	290	ND	10,000	5 - 10
B15 C	< 250	ND	7,400	10 - 15
B15 D	< 250	ND	2,700	15 - 20
B15 E	ND	ND	ND	20 - 25
B15 F	ND	ND	ND	25 - 31
B16 A	820	860	15,000	0 - 3
B17 A	540	ND	21,000	0 - 5
B17 B	ND	ND	2,700	5 - 10
B17 C	ND	ND	ND	10 - 15
B17 D	ND	ND	ND	15 - 20
B17 E	ND	ND	ND	20 - 25
B17 F	ND	ND	ND	25 - 30
B17 G	ND	ND	ND	30 - 33
B18 A	< 250	ND	ND	0 - 5
B18 B	ND	ND	ND	5 - 10
B18 C	ND	ND	ND	10 - 15
B18 D	ND	ND	ND	15 - 20
B18 E	ND	ND	ND	20 - 25
B18 F	ND	ND	ND	25 - 30
B18 G	ND	ND	ND	30 - 33
B19 A	ND	ND	ND	0 - 5
B19 B	ND	ND	ND	5 - 10
B19 C	ND	ND	ND	10 - 15
B19 D	ND	ND	ND	15 - 20
B19 E	ND	ND	ND	20 - 25
B19 F	ND	ND	ND	25 - 30
B20 A	320	ND	ND	0 - 5
B20 B	ND	ND	ND	5 - 10
B20 C	ND	ND	ND	10 - 15
B20 D	ND	ND	ND	15 - 20

Table 6-2 (cont.)

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B20 E	ND	ND	ND	20 - 25
B20 F	ND	ND	ND	25 - 30
B22 A	ND	ND	ND	---
B23 A	ND	ND	ND	0 - 4
B24 A	ND	ND	ND	0 - 5
B24 B	ND	ND	ND	5 - 10
B24 C	< 250	ND	ND	10 - 15
B24 D	400	ND	550	15 - 20
B24 E	460	ND	430	20 - 23
401	ND	ND	ND	N/A
402	ND	ND	1,600	N/A
403	< 250	< 250	420	N/A
301	ND	ND	ND	N/A
302	ND	ND	ND	N/A
303	ND	ND	ND	N/A
304	ND	ND	ND	N/A
DW 1	188	77	1,000	N/A
DW 2	330	48	1,100	N/A
CDW	ND	ND	ND	N/A
SS-Rinsate	ND	ND	ND	N/A

Note: Detection limit for soil/sediment samples = 250 µg/kg. Detection limit for water samples = 25 µg/L. See Figures 6-1 and 6-2 for sample locations.

B01 A through B24 E = soil samples
401 through 403 = sediment samples
301 through 304 = surface water samples
DW = decon water (units are µg/L)
CDW = clean decon water
ND = no detection
N/A = not applicable
SS = split spoon

Table 6-3
FASP Screening Results for PAHs
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991
Reported in µg/kg

Sample #	Fluor-anthene	Pyrene	Benzo(k) fluoranthene	Benzo(a) pyrene	Comments
B01 A	16,000	3,700	NA	NA	
B01 B	27,000	12,000	NA	NA	
B01 C	56,000	40,000	NA	NA	
B01 D	13,000	5,200	NA	NA	
B02 A	8,000	ND	ND	ND	
B02 B	15,000	ND	ND	ND	
B02 C	ND	ND	ND	ND	
B02 D	ND	ND	ND	ND	
B03 A	ND	ND	ND	ND	
B03 B	ND	ND	ND	ND	
B03 C	ND	ND	ND	ND	
B03 D	ND	ND	ND	ND	
B04 A	ND	ND	ND	ND	
B04 B	12,000	ND	ND	ND	
B04 C	9,000	ND	ND	ND	
B04 D	< 500	ND	ND	ND	chyrsene & benzo(a) anthracene = 1,200
B05 A	ND	ND	ND	ND	
B05 B	ND	ND	ND	ND	
B05 C	ND	ND	ND	ND	
B05 D	ND	ND	ND	ND	two unknown peaks
B05 E	ND	ND	ND	ND	
B06 A	55,000	110,000	54,000	40,000	anaphthalene, fluorene, anthracene, chrysene
B06 B	Blew out GC, peaks too large to integrate				
B06 BA	ND	ND	ND	ND	
B06 BB	ND	ND	ND	ND	
B06 BC	ND	ND	32,000	11,000	other identified peaks
B06 BD	ND	ND	ND	ND	
B06 BE	ND	ND	ND	ND	
B06 BF	ND	ND	ND	ND	
B06 BG	ND	ND	ND	ND	
B06 BH	17,000	ND	ND	ND	
B07 A	Peaks too large to integrate, no time to reanalyze				
B07 B	160,000	50,000	50,000	70,000	other PAHs present
B07 C	130,000	130,000	33,000	76,000	other PAHs present
B07 D	12,000	9,600	3,700	3,900	
B07 E	3,300	3,800	3,500	3,000	other PAHs present
B07 F	20,000	19,000	4,200	8,000	other PAHs present
B10 B	14,000	16,000	7,800	9,100	other PAHs present

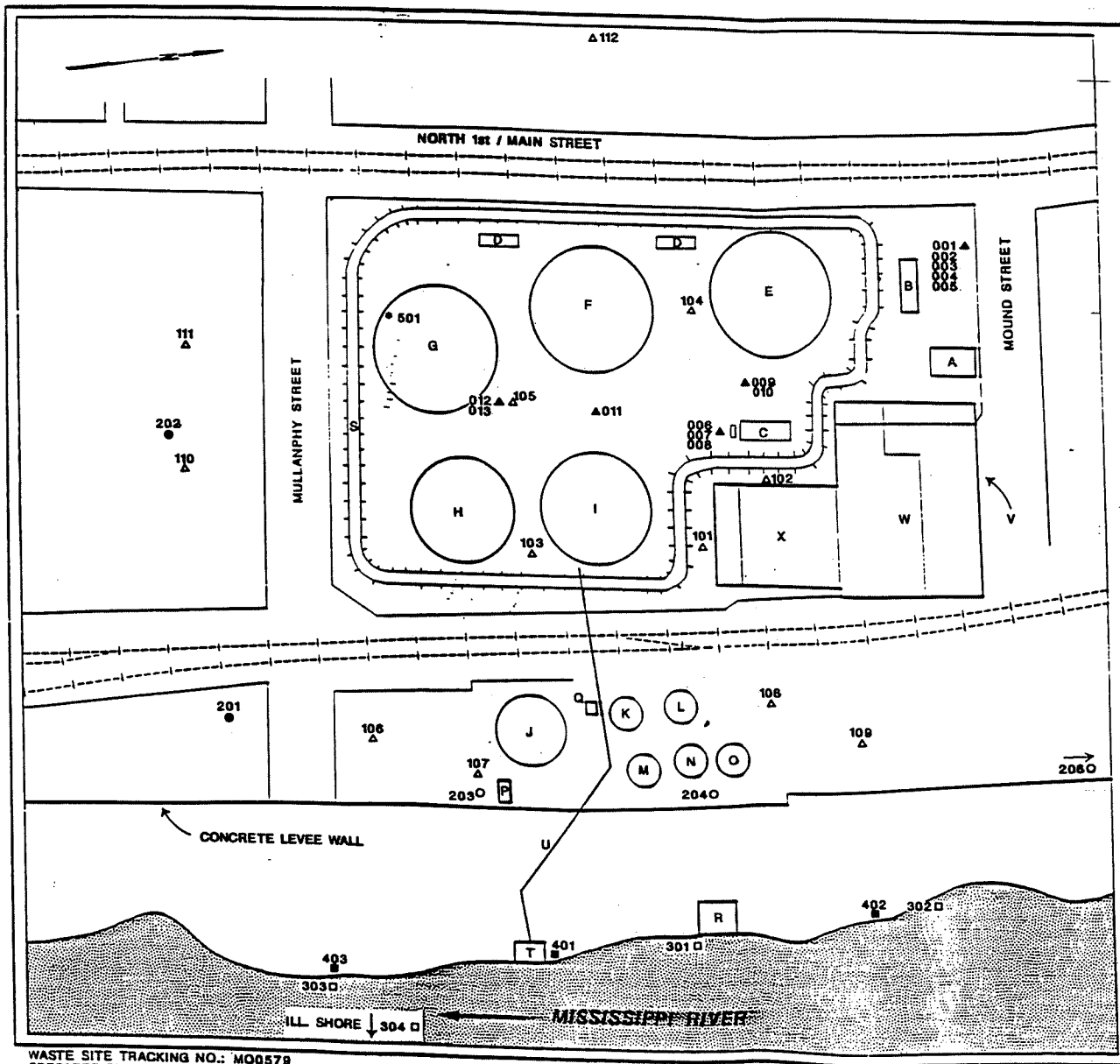
Table 6-3 (cont.)

B11 A	2,400	1,600	4,200	ND	other PAHs present
B11 B	?,100	2,100	7,000	10,000	other PAHs present
B11 C	7,800	ND	6,000	12,000	
B12 A	14,000	12,000	14,000	15,000	
B12 B	38,000	29,000	12,000	15,000	
B13 A	150,000	73,000	46,000	44,000	
B13 B	12,000	10,000	10,000	12,000	
B13 C	32,000	34,000	28,000	32,000	
B14 A	1,600,000	580,000	280,000	63,000	other identified peak
B14 B	2,200,000	1,000,000	370,000	310,000	other identified peak
B14 C	4,200,000	1,600,000	1,200,000		other identified peak
B14 D	4,300,000	1,300,000	490,000		other identified peak
B14 E	3,200,000	4,100,000	1,500,000	140,000	other identified peak
B14 F	Blew out GC, peaks too large to integrate				
B14 SS	1,400,000	880,000	230,000	130,000	
B15 A	ND	ND	ND	ND	
B15 B	4,900	1,300	ND	ND	
B15 C	ND	ND	ND	ND	
B15 D	ND	ND	ND	ND	
B15 E	ND	ND	ND	ND	
B15 F	ND	ND	ND	ND	
B16 A	19,000	30,000	ND	ND	early peaks
B17 A	ND	ND	ND	ND	
B17 B	ND	ND	ND	ND	
B17 C	ND	< 500	ND	ND	
B17 D	ND	ND	ND	ND	
B17 E	ND	ND	ND	ND	
B17 F	ND	ND	ND	ND	
B18 A	ND	ND	ND	ND	
B18 B	ND	ND	ND	ND	
B18 C	ND	ND	ND	ND	
B18 D	ND	ND	ND	ND	
B18 E	ND	ND	ND	ND	
B18 F	ND	ND	ND	ND	
B18 G	ND	ND	ND	ND	
B19 A	ND	ND	ND	ND	
B19 B	ND	ND	ND	ND	
B19 C	ND	ND	ND	ND	
B19 D	ND	ND	ND	ND	
B19 E	18,000	16,000	14,000	12,000	
B19 F	4,500	ND	2,800	ND	
B20 A	ND	2,900	< 500	ND	
B20 B	4,100	4,000	ND	545	
B20 C	ND	ND	ND	ND	
B20 D	ND	ND	ND	ND	
B20 E	ND	ND	ND	ND	
B20 F	2,600	3,200	3,500	4,500	
B22 A	3,800	3,500	2,800	ND	

Table 6-3 (cont.)

B23 A	ND	ND	ND	ND	
501	--	--	--	--	peaks close to retention time, but do not match
402	ND	ND	ND	ND	
403	2,600	5,400	4,200	3,800	
DDW	ND	ND	ND	ND	no peaks (µg/L)
SS Rinsate	ND	ND	ND	ND	no peaks (µg/L)
B24 A	ND	ND	ND	ND	
B24 B	ND	ND	ND	ND	
B24 C	ND	ND	ND	ND	
B24 D	ND	ND	ND	ND	
B24 E	ND	ND	ND	ND	

Note: Sample locations are shown on Figures 6-1 and 6-2. Sample 501 is an oil sample collected from tank #7, shown on Figure 6-2. Detection limits for soil/sediment = 500 µg/kg. Detection limits for water samples = 15 µg/l.
DDW = dirty decon water
SS = split spoon
NA = not analyzed
ND = not detected



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

- A. OFFICE
- B. TANKER TRUCK LOADING PLATFORM
- C. EQUIPMENT SHED
- D. EQUIPMENT/WORK SHOP
- E. FUEL OIL TANK (80,000 Barrels)
- F. FUEL OIL TANK (80,000 Barrels)
- G. FUEL OIL TANK (80,000 Barrels)
- H. FUEL OIL TANK (50,000 Barrels)
- I. FUEL OIL TANK (55,000 Barrels)
- J. OIL TANK
- K. CRUDE OIL TANK
- L. CRUDE OIL TANK
- M. CRUDE OIL TANK
- N. CRUDE OIL TANK
- O. CRUDE OIL TANK
- P. PUMP HOUSE
- Q. PUMP HOUSE
- R. PUMP HOUSE (Abandoned)
- S. CONTAINMENT BERM (For Fuel Oil Tanks, Capped With A Chain-link Fence)
- T. PUMP HOUSE
- U. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY

- V. FORMER UNION ELECTRIC BUILDING
- W. GENERATOR ROOM (Basement Plan)
- X. BOILER ROOM (Basement Plan)

- ▲ SUBSURFACE SOIL SAMPLE LOCATION
- △ SURFACE SOIL SAMPLE LOCATION
- ● MINI WELL SAMPLE LOCATION
- ○ PIEZOMETER WELL SAMPLE LOCATION
- □ SURFACE WATER SAMPLE LOCATION
- ■ SEDIMENT SAMPLE LOCATION
- * HIGH CONCENTRATION OIL SAMPLE LOCATION

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)

SAMPLE SERIES # DSX44
SAMPLING DATES: MAR. 4-9, 1991

FIGURE 6-2

SCALE
0 200
FEET

ENVIRONMENTAL SERVICES, INC.
OVERLAND PARK, KANSAS

WASTE SITE TRACKING NO.: MO0579
PREPARED BY: K. BROWN

FIT MAY 1991

(CLP) SAMPLE LOCATION MAP

Table 6-4
CLP Soil/Sediment Sample Summary
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Depth (feet)	Location Description
001	3 - 7	5 feet northwest of B24
002	7 - 11	5 feet northwest of B24
003	11 - 15	5 feet northwest of B24
004	15 - 19	5 feet northwest of B24
005	19 - 23	5 feet northwest of B24
006	3 - 8	2.5 feet north of B06
007	8 - 13	2.5 feet north of B06
008	8 - 12	2 feet south of B06
009	4 - 8	3 feet northwest of B14
010	12 - 14	3 feet northwest of B14
011	11 - 17	1.5 feet west of B07
012	5 - 11	1 foot north of B13
013	11 - 12.5	1 foot north of B13
101	0 - 2	B01
102	0 - 2	B02
103	0 - 2	South central tank farm
104	0 - 2	B05
105	0 - 2	B07
106	0 - 2	B15
107	0 - 2	B16
108	0 - 2	B17
109	0 - 2	B18
110	0 - 2	B19
111	0 - 2	B20
112	0 - 2	B21
401	N/A	150 feet south of southeast corner of the abandoned pump house
401D	N/A	150 feet south of southeast corner of the abandoned pump house
402	N/A	110 feet north of northeast corner of the abandoned pump house
403	N/A	330 feet south of southeast corner of the abandoned pump house

Note: Samples 001 through 013 collected from five aliquots, except VOCs were grab samples. Samples 101 through 112 collected from two aliquots. All samples were submitted to EPA for cyanide, semi-volatiles, and total metals analyses. Samples 001 through 113 and 401 through 403 were also analyzed for volatiles. Samples 401 through 403 were also analyzed for total petroleum hydrocarbons. See Figure 6-2 for sample locations.
D = Duplicate
N/A = Not applicable

the background sample location to the farthest northwest corner of PF & T property. This location is approximately 60 feet northwest (upgradient) of borehole #B04 (Figure 6-1).

6.2 SURFACE SOIL SAMPLING

Surface soil sampling was conducted March 4 through 7, to determine whether contamination was present in the 0- to 2-foot interval. Twelve samples were collected (Figure 6-2, Table 6-4). According to the work plan, these samples were to be collected using a power auger. However, due to excessive amounts of gravel and rubble present, the power auger could not be used efficiently. Therefore, all but one surface soil sample was collected with the subcontractor's drill rig.

Each sample was collected off the auger flights and consisted of two aliquots collected from one- and two-foot depths. The sample not collected with the drill rig was obtained with the use of the power auger. Three of the 12 surface soil samples collected, 110, 111, and 112, were inadvertently discarded along with the screening samples. Keith Brown and Scott Hayes returned to the site on March 13 and 14 and recollected these samples with a power auger. All samples were submitted to EPA for semi-volatile, cyanide, and total metals analyses. Samples were collected in accordance with the Region VII E & E/FIT SOP for soil sample collection, Geotech 5.17.

6.3 GROUND WATER SAMPLING

Ground water sampling was conducted March 5 through 9, to determine whether any coal tar wastes present have leached into the shallow ground water or migrated off site via the ground water. A total of 9 samples, including a duplicate, field blank, rinsate, and extra volume sample were collected (Figure 6-2, Table 6-5). The work plan called for the installation of 4 temporary mini-wells with the Geoprobe. Due to sub-surface rubble, only 2 mini-wells were installed. However, the Corps of Engineers (COE) has installed piezometer wells along the west side of the Mississippi River levee wall. The COE wells located just east of the site were sampled with the use of the Geoprobe vacuum system. One other COE piezometer well was sampled; it is located approximately 1,500 feet north (upgradient) of the site along the levee wall. This location

Table 6-5
Water Sampling Summary
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Depth (feet)	Static Water Level (SWL) (feet)	Location/Description
201	26	24	64 feet south from center of Mullanphy Street and 50 feet east of easternmost railroad
202	33	24	147 feet west of easternmost railroad and 78 feet south of center of Mullanphy Street
203	47.25	27.25	147 feet north of center of Mullanphy Street and 40 feet west of levee wall
204	48	26	363 feet north of center of Mullanphy Street and 25 feet west of levee wall
205F	N/A	N/A	Rinsate of augers and split spoon sampler
206	52	29	2,118 feet north of center of Mullanphy Street and 20 feet west of levee wall
206D			Duplicate of 206
207F	N/A	N/A	Field Blank
208	N/A	N/A	Geoprobe pipe rinsate sample
209F	N/A	N/A	Trip blank
301	Surface	N/A	Southeast corner of abandoned pump house
301D	Duplicate of above		
302	Surface	N/A	170 feet north of northeast corner of abandoned pump house
303	Surface	N/A	330 feet south of southeast corner of abandoned pump house
304	Surface	N/A	Illinois American drinking water intake in East St. Louis
304D			Duplicate of 304
501	Surface	N/A	Oil sample collected from PF & T tank #80-1

Note: See legend on next page.

Legend for Table 6-5

Note: Sample locations are shown on Figure 6-2. All water samples were submitted to EPA for volatiles, semi-volatiles, and total and dissolved metals analyses. Samples 301 through 304D were also analyzed for Total Petroleum Hydrocarbons. Sample #501 is an oil sample which was submitted to EPA for Total Petroleum Hydrocarbons, volatiles, and semi-volatiles analyses. Cyanide samples were preserved with sodium hydroxide. Metals samples were preserved with nitric acid.

D = duplicate
F = field blank or trip blank
N/A = not applicable

was chosen for the ground water background sample. The original background location could not be sampled because bedrock was only 2 feet deep. All samples were collected following the E & E Region VII SOP for ground water collection, Gentech 5.11. Total and dissolved metals samples were preserved with nitric acid; cyanide samples were preserved with sodium hydroxide; and all samples were stored on ice. Samples were delivered to EPA for volatiles, semi-volatiles, cyanide, total metals, and dissolved metals analyses. The field parameters, temperature, pH, and conductivity were measured and recorded in the field (Table 6-6).

6.4 SURFACE WATER/SEDIMENT SAMPLING

Surface water/sediment sampling was conducted March 6 through 7 to determine whether contaminants have migrated via the ground water/surface water interface. A total of 6 surface water samples were collected, including 2 duplicates (Figure 6-2, Table 6-5). All samples were collected according to the EPA Region VII SOP for surface water sample collection, 2334.7A. Samples were submitted to EPA for Total Petroleum Hydrocarbons, volatiles, semi-volatiles, cyanide, total metals, and dissolved metals analyses. Total and dissolved metals samples were preserved with nitric acid, cyanide samples were preserved with sodium hydroxide, and all samples were stored on ice. The field parameters temperature, pH, and conductivity, were measured and recorded in the field (Table 6-6).

A total of 4 sediment samples were collected, including a duplicate (Figure 6-2, Table 6-4). All samples were collected according to the EPA Region VII SOP for sediment sample collection, 2334.8A. Samples were submitted to EPA for Total Petroleum Hydrocarbons, volatiles, semi-volatiles, cyanide, and total metals analyses. Surface water and sediment samples were screened on site in the mobile lab for the presence of PAHs and VOCs (Tables 6-2 and 6-3).

6.5 PRODUCT SAMPLING

One oil sample was to be collected from the basement of the former Mound Street Power Plant, if the building was standing and oil was present in the basement. At the time of the SSI, the building was in the process of being razed. Due to the danger involved with entering

Table 6-6
Field Parameters for Water Samples
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Temperature (C°)	pH	Conductivity (umhos)
301	7	8.15	440
301D	7	8.15	440
302	6	7.87	450
303	6	7.27	360
304	3	7.05	350
304D	3	7.05	350
201	11	7.58	1,500
202	7	7.81	2,000
203	9	6.32	1,500
204	9	6.21	1,400
206	11	6.14	1,600
206D	11	6.14	1,600
207F	--	---	--
208	4	7.00	16
209F	--	----	--

Note: See Figure 6-2 for sample locations.

this building, the sample was not collected. However, an oil sample (sample 501) was collected from an 80,000-gallon tank on site (Figure 6-2). This tank contained #6 oil, the same type of oil that was spilled in 1986 and entered the basement of the former power plant. This oil sample was submitted to EPA for total petroleum hydrocarbons, VOCs, and semi-volatiles analyses. It was also screened on site in the mobile lab. The chromatogram peaks were close to the retention times for the contaminants being screened, but did not match (Table 6-3).

SECTION 7: ANALYTICAL RESULTS

7.1 SURFACE SOIL SAMPLES (0-2 FEET)

The surface soil (0-2 feet) sampling data indicated that the majority of the 7-acre site is significantly contaminated with cyanide at greater than three times the detection limit of the background sample 112 (Figure 6-2; Table 7-1). Analysis of off site samples 110, 111, and 112 revealed no cyanide contamination over their detection limits of 6.2, 6.2, and 6.7, respectively (Figure 6-2).

Surface soil PAH contamination was less extensive than the surface soil cyanide contamination. Four out of the 12 samples collected contained a total PAH content greater than five times the concentration of the background sample. These were samples 104, 105, 107 and 109 (Figure 6-2; Table 7-1).

The cyanide contamination found on site can be attributed to the FMGP based on the fact that cyanide is an oxide waste produced during the gas purification process (see Section 4 for details). There should not be any attribution from current on site activities, because cyanide is not a constituent normally found in oil or asphalt.

Attribution of PAH contamination in the surface soil samples is difficult to assess. The oil sample data indicated significant concentrations of many PAH compounds (Appendix D, Sample 501). PF & T currently stores #6 oil and asphalt on site in very large quantities. In 1986, PF & T experienced a spill of said oil which covered most of the site. Thus, surface soil PAH contamination could be attributed to PF & T activities or to the FMGP, based on the fact that it was common practice for FMGPs to bury tar and purifier waste on site. PAHs are a major constituent of coal tar waste.

7.2 SUBSURFACE SOIL SAMPLES

FASP screening results indicated that the highest PAH contamination zone was located in the central portion of the tank farm currently on site (Figure 6-1; Tables 6-2 and 6-3). The approved work plan allowed E & E/FIT to collect CLP subsurface soil samples at four locations. A total of eight samples (006-013) were collected at depths ranging from 3

Table 7-1
PAHs and Cyanide In Surface Soils
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44
(mg/kg)

Compound	101	102	103	104	105	106	107	108	109	110	111	112*
Napthalene	--	--	--	--	--	--	60	1.1	0.51	--	--	0.41U
2-Methylnaphthalene	--	--	--	--	--	--	13	2.5	--	--	--	0.41U
2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	0.41U
Acenaphthylene	--	--	--	--	--	--	--	2.4	0.46	--	--	0.41U
Acenaphthene	--	--	--	--	--	--	--	0.69	--	--	--	0.41U
Fluorene	--	--	--	--	12	--	--	3.1	--	--	--	0.41U
Phenanthrene	--	--	--	20	55	1.5	--	--	2.2	1.5	0.85	0.44
Anthracene	--	--	--	--	--	--	--	--	0.78	--	--	0.41U
Fluoranthene	--	--	--	14	38	2.0	--	--	2.8	2.2	0.77	1.3
Pyrene	--	21	13	50	83	2.2	--	--	6.7	2.3	0.81	1.4
Benzo(a)anthracene	--	--	--	21	28	1.3	--	--	4.5	1.5	0.48	0.79
Chrysene	--	--	--	29	29	1.2	--	--	4.3	1.6	0.55	0.85
Benzo(b)fluoranthene	--	--	--	--	17	1.0	--	--	4.9	1.1	0.44	0.61
Benzo(k)fluroanthene	--	--	--	--	12	0.89	--	--	3.4	1.2	0.45	0.68
Benzo(a)pyrene	--	--	--	16	22	1.1	--	--	4.2	1.3	0.44	0.70
Indeno(1,2,3-CD) Pyrene	--	--	--	--	--	0.66	--	--	2.7	0.76	--	0.41U
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	0.41U
Dibenzo(g,h,i)perylene	--	--	--	--	12	0.71	--	--	2.6	0.76	--	0.41U
Total PAH Content	--	21	13	150	308	12.5	73	9.8	40.0	14.2	4.8	6.8
Cyanide	33	--	94	220	190	--	14	98	35	--	--	6.7U

* = Background sample
-- = Undetected (U); Detection limit stated for bckground sample.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

to 17 feet. An additional five samples (001-005) were collected at a background location (Figure 6-2; Table 6-4). CLP data revealed significant PAH contamination at least five times greater than background concentration at all four sampling locations (Table 7-2). Cyanide contamination was found to be significant to a depth of 11+ feet (Table 7-2).

All the soil samples were also analyzed for total and dissolved metals, as well as volatiles. However, results proved to be negligible when compared to background concentrations with the exception of significant concentrations of benzene, toluene, ethyl benzene, and total xylenes (BTEX) in samples 006 through 011 (except no toluene in sample 011). Significant benzene was also detected in sample 013. Styrene (14J µg/kg) was detected in sample 012.

As was the case with the surface soil samples, the cyanide contamination can be attributed to the FMGP. It is probable that the deep soil PAH contamination came from both the FMGP and the petroleum tank farm. The presence of mixed BTEX compounds and PAHs indicates a mixed source, as volatiles are not considered abundant in coal tar.

7.3 GROUND WATER SAMPLES

Ground water sampling data indicated no significant dissolved metals contamination when compared to background concentrations. Some organics were detected; however, in sample 204, piezometer well located downgradient of the site. This sample contained 3 PAHs: acenapthalene (65 µg/L), fluorene (25 µg/L), and phenanthene (46 µg/L); and 93 µg/L benzene (Figure 6-2; Appendix C). Additionally, cyanide was detected in all ground water samples at concentrations above the 17 µg/L detection limit: 520J µg/L in sample 201, 27J µg/L in sample 202, 590J µg/L in sample 203, and 1,600J µg/L in sample 204. Cyanide was not detected in the background sample.

7.4 SURFACE WATER AND SEDIMENT SAMPLES

Surface water and sediment was sampled at three locations downgradient of the site. Additionally, the East St. Louis raw water intake, located across the Mississippi River from the site was sampled

Table 7-2
PAHs and Cyanide in Subsurface Soil Samples
and Product Sample
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44
(mg/kg)

Compound	(2-7') 001*	(7-11') 002*	(11-15') 003*	(17-21') 004*	(19-23') 005*	(3-8') 006	(8-13') 007	(8-12') 008	(4-8') 009	(12-14') 010	(11-17') 011	(5-11') 012	(11-12.5') 013	501
Naphthalene	—	0.40U	—	—	—	23	87	2200	68	0.89	30	—	55	700
2-methylnaphthalene	—	0.40U	—	—	—	80	43	69	84	0.98	23	—	—	4000
2-chloronapththalene	—	0.40U	—	—	—	—	—	—	—	—	—	—	—	450
Acenaphthylene	—	0.40U	—	—	—	—	—	15	—	—	20	—	—	450
Acenaphtene	—	0.40U	—	—	—	—	—	32	12	0.15	15	—	22	620
Fluorene	—	0.40U	—	—	—	20	—	J	13	0.17	24	—	21	830
Phenanthrene	1.4	0.40U	—	—	—	63	20	J	46	0.51	71	—	59	4300
Anthracene	0.38	0.40U	—	—	—	—	—	J	—	—	23	—	18	810
Fluoranthene	2.0	0.52	0.54	—	—	—	—	—	—	—	180	—	39	620
Pyrene	2.8	0.53	0.80	—	—	48	J	J	J	J	J	—	65	2800
Benzo(a)anthracene	1.8	0.40U	—	—	—	18	—	J	—	—	99	—	21	1600
Chrysene	1.8	0.40U	0.44	—	—	18	—	J	16	0.18	94	—	21	2700
Benzo(b) fluoranthene	1.6	0.40U	—	—	—	—	—	61	—	—	76	—	15	—
Benzo(k)fluoranthene	1.4	0.40U	—	—	—	—	—	52	—	—	89	—	17	—
Benzo(a)pyrene	1.5	0.40U	—	—	—	—	—	95	—	—	120	—	23	970
Indeno(1,2,3-CD) pyrene	0.93	0.40U	—	—	—	—	—	37	—	—	75	—	—	—
Dibenzo(a,h)anthracene	—	0.40U	—	—	—	—	—	—	—	—	—	—	—	—
Dibenzo(g,h,i)perylene	1.2	0.40U	—	—	—	—	—	44	—	—	88	—	—	—
Total PAH Content	16.8	1.1	1.8	—	—	270	150	2605	239	2.9	1027	—	376	20,850
Cyanide	26	24	—	—	—	87	180	860	—	48	250	170	—	—

* = Background sample
— = Undetected (U) with detection limit given for background sample 002.
J = Detected, but results are invalid.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

(304 and 304D). The most upgradient of these samples (302 and 402) generally exhibited the most contamination, though concentrations are fairly comparable (Tables 7-3 and 7-4). An exception is total chromium (12-14 µg/L), lead (15-18 µg/L), and zinc (46-54 µg/L) detected in samples 304 and 304D, collected from the surface water intake. These metals were not detected in the dissolved fraction of these samples. The only organics deteced in these samples are relatively low levels of PAHs and cyanide found in the sediment samples (Table 7-4). A background sediment and surface water sample was not collected, so that no comparisonn to background can be made for these metals. However, sample concentrations are relatively low as compared to other samples collected.

7.5 PRODUCT SAMPLE

The oil sample (501) collected from an 80,000-gallon tank (Figure 2-3, tank #7) contained significant concentrations of many PAHs (Table 7-2). Attribution of PAH contamination on site is very difficult to assess, based on the fact that in 1986, PF & T experienced a spill of the same oil (#6) which was sampled, over the entire site. It was also common practice for FMGPs to bury their tar wastes on site. PAHs are a major constitudent of coal tar wastes. Thus, surface and subsurface soil PAH contamination could be attributable to either PF & T activities or the FMGP.

Table 7-3
Selected Total Metals
Sediment and Surface Water Samples
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44

Sample #	As	Ba	Cu	Cr	Ni	Pb	Se	V	Zn
				Sediment Samples (mg/kg)					
401	3.7	140	9.1	8.7	10	30J	--.--	15	35J
401D	4.0	140	8.2	9.0	11	13J	--.--	17	36J
402	8.4	160	26	16	18	36J	2.0J	27	77J
403	7.1	160	23	12	16	31J	--.--	25	64J
				Water Samples (µg/L)					
301	--.--	--.--	--.--	--.--	--.--	7.0	--.--	--.--	--.--
301D	--.--	--.--	--.--	--.--	--.--	7.2	--.--	--.--	--.--
302	--.--	--.--	--.--	--.--	--.--	9.7	--.--	--.--	--.--
303	--.--	280	--.--	--.--	--.--	24U	I*	62	89U
304	--.--	--.--	--.--	14	--.--	18	--.--	--.--	54
304D	--.--	--.--	--.--	12	--.--	15	--.--	--.--	--.--

* = Invalid analysis, but 11 µg/L dissolved selenium was detected in this sample.
U = Undetected; detection limit given if above detected values.
J = Results are reported, but invalid by approved QC procedures.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

Table 7-4
PAHs, Cyanide, and Total Hydrocarbons
Sediment Samples
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44

(µg/kg)	401	401D	402	403
Phenanthene	---	---	2900	4400
Fluoranthene	---	750	5000	5100
Pyrene	---	960	8000	6400J
Benzo(a)anthracene	---	460	3500	4200
Di-n-octyl phthalate	--	470	3900	4900
Benzo(k)fluoranthene	---	---	2900	3100
Benzo(a)pyrene	---	430	2600	5600
Benzo(GHI)perylene	---	---	3500	4100
Cyanide	---	---	1600	---
Total hydrocarbons	3100	3100U	8200	4900

J = Results are reported, but invalid by approved QC procedures.
U = Undetected, with detection limit given.
--- Indicated undetected with detection limits below detected values.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

SECTION 8: SUMMARY AND CONCLUSIONS

A screening site inspection was conducted at the Laclede Coal Gas site, St. Louis, Missouri. The Laclede site is a FMGP presently occupied partially by a petroleum tank farm. The site was originally investigated as the Mound Street Power Plant, due to observed oily waste releases to the adjacent Mississippi River. Previous oil sampling has not detected polychlorinated biphenyls (PCBs). The Laclede FMGP is thought to be the largest FMGP in EPA Region 7. The presence of a surface water intake located almost directly across the Mississippi River from the site, prompted EPA to request an SSI of the site. The purpose of the investigation was to evaluate the potential threat this site poses to the ground water, surface water, air and on-site pathways. These objectives were addressed through both non-sampling and sampling data collection strategies. Non-sampling data allowed the development of a detailed background on all potential targets. The sampling allowed identification of on-site contaminants, and gathered data on the areal and vertical extent of contamination.

Non-sampling data indicated that the only potential primary targets for the site included a population of approximately 300,000 people who receive drinking water from the intake located directly across the Mississippi River from the site. Sampling data, however, indicated that these people are secondary targets because no significant contamination was found in the surface water samples (including an intake sample).

Thirteen subsurface soil, twelve surface soil, six surface water, four sediment, six ground water, and one oil sample were collected and submitted to the CLP for volatiles, semi-volatiles, metals, and cyanides analysis. Additionally, the FASP screened 92 samples on-site to help select CLP sample locations. Seventeen drums of IDW were generated and a subcontractor used for soil sampling.

The sampling data identified cyanides, BTEX compounds, and PAHs as the major on-site contaminants. The cyanide contamination was found throughout the site in the 0 to 2 feet deep soil samples. Deeper soil samples revealed cyanide contamination at depths as great as at least 11 feet. PAH contamination, both in shallow and deep soil samplings, was restricted to small areas within the site as evidenced by FASP data and

was found at depths as great as 38 feet. The greatest area of PAH contamination was found within the bermed tank farm (Figure 6-2). Only one ground water sample (204) showed PAH contamination, but all contained cyanide. Benzene was also detected in sample 204.

Attribution is difficult to assess because PF & T currently stores #6 oil on site in large quantities. The total PAH content of this oil is very high. PF & T experienced a spill of this oil over the entire site in 1986. BTEX compounds were found at relatively high concentrations in several subsurface soil samples, indicating BTEX wastes are sometimes mixed with PAH wastes. It is known tht FMGPs frequently buried coal tar waste on site. PAHs are a major constituent of coal tars. Thus, both the FMGP and PF & T could be responsible for the PAH contamination found abundantly in on-site soils, and to a much lesser extent in the ground water. The cyanide contamination, however, is assumed to largely be a result of the FMGP as cyanide is not considered a significant constituent of most oils.

SECTION 9: BIBLIOGRAPHY

Andrew, H.O. ed., 1890 to 1940 editions, Brown's Directory of American Gas Companies, Robins Publishing Company, Inc., New York.

Borgestede, Lloyd, Engineering Associate, Metropolitan Sewer District, December 20, 1990 telephone conversation with Keith Brown, E & E/FIT.

City of St. Louis, Department of Health and Hospitals, Undated, Division of Health, Project Files on Mound Street Power Plant.

Dickneite, Dan, Environmental Administrator, Missouri Department of Conservation, January 8, 1991, letter to Keith Brown, E & E/FIT.

Ecology and Environment, Inc., Field Investigation Team (E & E/FIT), 1987, Expanded Site Investigation of the Peoples Natural Gas Site, Dubuque, Iowa, project F-07-8701-20/FIA0176XA.

Ecology and Environment, Inc., Field Investigation Team (E & E/FIT), June 23, 1988, Preliminary Assessment of the Mound Street Power Plant site, TDD #F-07-8708-029.

Ecology and Environment, Inc., Field Investigation Team (E & E/FIT), November 20, 1990, Site Reconnaissance of the Laclede FMGP, TDD #F-07-9008-020.

Environmental Research and Technologies, Inc., September 1984, Handbook on Manufactured Gas Plant Sites, Vol. 1, Koppers Company, Inc., Pittsburgh, Pennsylvania.

Missouri Department of Natural Resources, Undated, Well Logs No. 25548 and No. 1874, obtained from the Division of Geology and Land Survey, Rolla, Missouri.

Missouri Geological Survey and Water Resources, 1961, The Stratigraphic Succession In Missouri, Volume LX, 2nd Series, Rolla, Missouri.

Missouri Geological Survey and Water Resources, 1971 Engineering Geologic Map of St. Francois County, Missouri, Series No. 4, St. Louis, Missouri.

Missouri Geological Survey and Water Resources, 1974, Water Resources of the St. Louis Area, Report No. 30, Washington, D.C.

Schlosser, Wayne, Community Relations Manager, Illinois American Water Company, December 7, 1990, telephone conversation with Keith Brown, E & E/FIT.

U.S Department of Agriculture, 1982, Soil Survey of St. Louis County and City, Missouri, Washington, D.C.

U.S. Department of Commerce, 1968, Climatic Atlas of the United States, Asheville, North Carolina.

U.S. Environmental Protection Agency, October 1980, Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons, Document PF81-117806.

U.S. Environmental Protection Agency, March 1989, Graphical Exposure Modeling System, Washington, D.C.

U.S. Geological Survey, 1968, revised, 7.5 Minute Series Topographic Map, Granite City Quadrangle, Missouri, Washington, D.C.

Vandike, Jim, Geologist, Missouri Division of Geological and Land Survey, December 21, 1990, telephone conversation with Keith Brown, E & E/FIT.

Appendices for
Screening Site Inspection
for
Laclede Coal Gas
EPA ID#
MOD981715280

APPENDIX A

Technical Directive Document

SPM

KB

1A. Cost Center: FT1307	FIT ZONE II CONTRACT Contract Number 68-01-7347 TECHNICAL DIRECTIVE DOCUMENT (TDD)	2. TDD Number: F 097-9008-020
1B. Account Number: FM005[illegible]		2A. Amendment: [X] Administrative [ ] Technical

3A. Priority:	3B. Key EPA Contact:
[ ] High [X] Medium [ ] Low	Name: GREG REESOR Phone: 551-7695

4A. Estimate of Technical Hours:	4B. Subcontract:	4C. Estimate of Subcontract Cost:	5A. SSID Number:	5B. CERID Number:
*1315	T&M IDW DISPOSAL T&M DRILLING	*NTE 35,882 22,000	UNASSIGNED	MOD981715980

5C. EPA Site Name:	5D. City/County/State:
LACLEDE COAL GAS SITE	ST. LOUIS/ST. LOUIS/MISSOURI

6. Desired Report Format:	7A. Activity Start Date:	7B. Estimated Completion Date:
[X] Formal Report [ ] Standard Report [ ] Other (Specify): [ ] Letter Report [ ] Formal Briefing	8/29/90	10/31/91

8A. Type of Activity:	8B. FIT/SCAP Goal: Will Deliverable Meet a Unit of the Goal?
[ ] PA [ ] RCRA-PA [ ] HRS Support [ ] Enforcement Support [ ] Training [X] SI [ ] RCRA-SI [ ] QA Support [ ] Program Management [ ] General Technical Assistance [ ] ESI [ ] Special Studies [ ] Equipment Maintenance	[X] Yes [ ] No

9. General Task Description: PERFORM A SCREENING SITE INVESTIGATION OF THE LACLEDE COAL GAS SITE LOCATED IN ST. LOUIS, MISSOURI.

RECEIVED
SEP 18 1991
E & E K.C.K.

10. Specific Elements:	11. Interim Deadlines:
1. REVIEW BACKGROUND INFORMATION	
2. PREPARE DRAFT HRS SCORE	
3. CONDUCT SITE RECONNAISSANCE	
4. PREPARE WORK PLAN	
5. PREPARE BID SPECS AND SUBCONTRACT PACKAGES	
6. IMPLEMENT WORK PLAN AND PRODUCE TRIP AND FINAL REPORTS (DRAFT)*	6. EST. 10/15/91 *
7. *OVERSEE SUBCONTRACTOR SAMPLE AND DISPOSAL OF IDW DRUMS	
[ ] Additional Scope Attached	

12. Comments: *AMENDED TO ADD TWO SUBCONTRACTOR (IDW) OVERSIGHT TRIPS TO SITE (60 HOURS). ONLY DRAFT FINAL REPORT IS EXPECTED BY CONTRACT COMPLETION.

13. Authorizing:	14. Date:
Pete [signature] (Signature) [X] RPO [ ] DPO [ ] PO	9/16/91

15. Received by:	16. Date:
Sharon P. Martin (Contractor FITOM Signature) [X] Accepted [ ] Accepted with Exceptions (Attached) [ ] Rejected	9/18/91

Distribution: Sheet 1 (White)—FITOM Copy; Sheet 2 (Green)—RPO Copy; Sheet 3 (Canary)—ZPM, WDC Copy; Sheet 4 (Pink)—PO, WDC Copy; Sheet 5 (Goldenrod)—CO, WDC Copy

F001A097

APPENDIX B

EPA Site Inspection Form 2070-13

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Laclede Coal Gas	Foot of Mullanphy Street				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
St. Louis	MO	63105			

09 COORDINATES		10 TYPE OF OWNERSHIP (Check one)
LATITUDE	LONGITUDE	x A. PRIVATE ___B. FEDERAL _____ ___C. STATE ___D. COUNTY ___E. MUNICIPAL
38° 38′ 20.0"	090° 11′ 00.0"	___F. OTHER _____ ___G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION		
3/3/91	x ACTIVE	1888	1945	___UNKNOWN
MO/DAY/YR	___INACTIVE	BEGINNING YEAR	ENDING YEAR	

04 AGENCY PERFORMING INSPECTION (Check all that apply)

___A. EPA x B. EPA CONTRACTOR E & E/FIT (Name of firm) ___C. MUNICIPAL ___D. MUNICIPAL CONTRACTOR _____ (Name of firm)

___E. STATE ___F. STATE CONTRACTOR _____ (Name of firm) ___G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Keith A. Brown	Environmental Scientist	E & E/FIT	(913) 432-9961
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Anne Melia	Chemist	E & E/FIT	(913) 432-9961
Chris Williams	Geologist	E & E/FIT	(913) 432-9961
Well McCall	Geologist	E & E/FIT	(913) 432-9961
John Peck John Strobel	Geologist Chemist	E & E/FIT	(913) 432-9961
Patty Roberts	Environmental Scientist	E & E/FIT	(913) 432-9961
13 SITE REPRESENTATIVES INTERVIEWED	**14 TITLE**	**15 ADDRESS**	**16 TELEPHONE NO.**
Randel Lewis	Terminal Manager	Foot of Mullanphy Street	(314) 621-0522
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
x PERMISSION ___ WARRANT	NA	

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Greg Reesor	EPA/Superfund	(913) 551-7695

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Keith A. Brown	E & E	FIT	(913) 432-9961	10/30/91

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- x A. SOLID
- ___ B. POWDER, FINES
- x C. SLUDGE
- ___ D. OTHER (Specify)
- ___ E. SLURRY
- x F. LIQUID
- ___ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS: Unknown
- CUBIC YARDS:
- NO. OF DRUMS:

03 WASTE CHARACTERISTICS (Check all that apply)

- x A. TOXIC
- ___ B. CORROSIVE
- ___ C. RADIOACTIVE
- x D. PERSISTENT
- ___ E. SOLUBLE
- ___ F. INFECTIOUS
- ___ G. FLAMMABLE
- ___ H. IGNITABLE
- ___ I. HIGHLY VOLATILE
- ___ J. EXPLOSIVE
- ___ K. REACTIVE
- ___ L. INCOMPATIBLE
- ___ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Unknown		Coal tars
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS	Unknown		Purifier wastes
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
IOC	Cyanides	143-33-9	Burial	>500	ppm
		151-50-8			
SLU	Poly Aromatic	8007452	Burial	>100	ppm
	hydrocarbons (PAHs)				

V. FEEDSTOCKS (See Appendix for CAS Numbers) NA

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 x A. GROUND WATER CONTAMINATION — 02 X OBSERVED (DATE: 3/1991) x POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: None known — 04 NARRATIVE DESCRIPTION

Three PAHs and benzene were detected in a downgradient well. No ground water in the surrounding area is known to be used for drinking.

01 x B. SURFACE WATER CONTAMINATION — 02 ___ OBSERVED (DATE:) x POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 300,000 — 04 NARRATIVE DESCRIPTION

There is a strong potential for a ground water to surface water release of contamination, however, no contamination was detected immediately downgradient of the site. Low potential for release to surface water intake located across the Mississippi River.

01 x C. CONTAMINATION OF AIR — 02 ___ OBSERVED (DATE:) x POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ___ — 04 NARRATIVE DESCRIPTION

Low potential for air contamination due to site's gravel covering.

01 ___ D. FIRE/EXPLOSIVE CONDITIONS — 02 ___ OBSERVED (DATE:) ___ POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ___ — 04 NARRATIVE DESCRIPTION

None known in relation to FMGP.

01 x E. DIRECT CONTACT — 02 x OBSERVED (DATE: 3/1991) x POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: on-site workers — 04 NARRATIVE DESCRIPTION

Surface soils within the site boundaries are contaminated with cyanide and PAHs.

01 x F. CONTAMINATION OF SOIL — 02 x OBSERVED (DATE: 3/1991) ___ POTENTIAL ___ ALLEGED

03 AREA POTENTIALLY AFFECTED: unknown to date (Acres) — 04 NARRATIVE DESCRIPTION

Cyanide in the 10 to 100s ppm range. Total PAHs in the 10 to 1000s ppm range.

01 ___ G. DRINKING WATER CONTAMINATION — 02 ___ OBSERVED (DATE:) ___ POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ___ — 04 NARRATIVE DESCRIPTION

None known.

01 x H. WORKER EXPOSURE/INJURY — 02 ___ OBSERVED (DATE:) ___ POTENTIAL ___ ALLEGED

03 WORKERS POTENTIALLY AFFECTED: ___ — 04 NARRATIVE DESCRIPTION

See Direct Contact above.

01 ___ I. POPULATION EXPOSURE/INJURY — 02 ___ OBSERVED (DATE:) ___ POTENTIAL ___ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ___ — 04 NARRATIVE DESCRIPTION

None known.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. HAZARDOUS CONDITIONS AND INCIDENTS (CONTINUED)

01 ___ J. DAMAGE TO FLORA — 02 ___ OBSERVED (DATE: _____) ___ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION

None observed.

01 ___ K. DAMAGE TO FAUNA — 02 ___ OBSERVED (DATE: _____) ___ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION (Include name(s) of species)

None observed.

01 _x_ L. CONTAMINATION OF FOOD CHAIN — 02 ___ OBSERVED (DATE: _____) _x_ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION

This may occur if surface water is contaminated, however, present sampling did not detect significant surface water contamination.

01 _x_ M. UNSTABLE CONTAINMENT OF WASTES — 02 ___ OBSERVED (DATE: _____) _x_ POTENTIAL ___ ALLEGED

(Spills/runoff/standing liquids/leaking drums)

03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Waste may be land applied or buied in unlined pits.

01 ___ N. DAMAGE TO OFF-SITE PROPERTY — 02 ___ OBSERVED (DATE: _____) ___ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION

None known.

01 ___ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ___ OBSERVED (DATE: _____) ___ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION

None known.

01 ___ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ___ OBSERVED (DATE: _____) ___ POTENTIAL ___ ALLEGED

04 NARRATIVE DESCRIPTION

None known.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

E & E/FIT observed oil and coal tars leaching directly in Mississippi River via an abandoned pump house pipes. The pipes have been sealed with concrete, but contaminants are leaching through the concrete plugs.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 300,000

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT on site reconnaissance, November 20, 1990
E & E/FIT files
E & E/FIT SSI, March 3-9, 1991

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
___ A. NPDES				
___ B. UIC				
___ C. AIR				
___ D. RCRA				
___ E. RCRA INTERIM STATUS				
___ F. SPCC PLAN				
___ G. STATE (Specify)				
___ H. LOCAL (Specify)				
___ I. OTHER (Specify)				
_x_ J. NONE KNOWN				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
___ A. SURFACE IMPOUNDMENT		
___ B. PILES		
___ C. DRUMS, ABOVE GROUND		
_x_ D. TANK, ABOVE GROUND	Present land use	
___ E. TANK, BELOW GROUND		
___ F. LANDFILL		
___ G. LANDFARM		
___ H. OPEN DUMP		
_x_ I. OTHER Buried pits (Specify)	Unknown	FMGP

04 TREATMENT (Check all that apply)

___ A. INCINERATION
___ B. UNDERGROUND INJECTION
___ C. CHEMICAL/PHYSICAL
___ D. BIOLOGICAL
___ E. WASTE OIL PROCESSING
___ F. SOLVENT RECOVERY
___ G. OTHER RECYCLING/RECOVERY
___ H. OTHER _____ (Specify)

05 Other

_x_ A. BUILDINGS ON SITE

06 AREA OF SITE

~7 (Acres)

07 COMMENTS

A petroleum tank farm currently occupies the site. Subsurface exploration reveals that most of the old coal gas plant rubble and other construction debris underlies the site.

IV. CONTAINMENT

1 CONTAINMENT OF WASTES (Check one)

___ A. ADEQUATE, SECURE ___ B. MODERATE ___ C. INADEQUATE, POOR _x_ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Coal tar and purifier waste was generally disposed of on site or sold.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ___ YES _x_ NO

02 COMMENTS

Most of the site is covered with gravel.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files
E & E/FIT SSI, March 3-9, 1991

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. x	B. ___
NON-COMMUNITY	C. x	D. ___

02 STATUS

NA

ENDANGERED	AFFECTED	MONITORED
A. ___	B. ___	C. ___
D. ___	E. ___	F. ___

03 DISTANCE TO SITE

Greater than nine miles up-gradient & directly across Mississippi River.

A. _____ (mi)

B. _____ (mi)

III. GROUND WATER

01 GROUND WATER USE IN VICINITY (Check one)

___A. ONLY SOURCE FOR DRINKING
___B. DRINKING (Other sources available)
___C. COMMERCIAL, INDUSTRIAL IRRIGATION (Limited other sources available)
x D. NOT USED, UNUSEABLE

COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)

02 POPULATION SERVED BY GROUND WATER: None known

03 DISTANCE TO NEAREST DRINKING WATER WELL: Unknown (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
25-30 (ft)	Southeast	25 (ft)	Unknown (gpd)	___YES x NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

No wells are known within four miles of the site. Ground water is not used in the vicinity due to the abundance of surface water.

10 RECHARGE AREA		11 DISCHARGE AREA	
___YES x NO	COMMENTS	x YES ___NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

x A. RESERVOIR, RECREATION DRINKING WATER SOURCE
___B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
x C. COMMERCIAL, INDUSTRIAL
___D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Mississippi River	___	< 1/4 (mi)
	___	(mi)
	___	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 6586	B. 32,564	C. 100,924
NO. OF PERSONS	NO. OF PERSONS	NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION: < 1/4 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: Heavy industrial area

04 DISTANCE TO NEAREST OFF-SITE BUILDING: < 1/2 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Densely populated urban area.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one) Unknown

___A. 10^{-6} - 10^{-8} cm/sec ___B. 10^{-4} - 10^{-6} cm/sec ___C. 10^{-4} - 10^{-3} cm/sec ___D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) Unknown

___A. IMPERMEABLE (Less than 10^{-6} cm/sec) ___B. RELATIVELY IMPERMEABLE (10^{-4} - 10^{-6} cm/sec) ___C. RELATIVELY PERMEABLE (10^{-2} - 10^{-4} cm/sec) ___D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
2-30 (ft)	20 (ft)	Unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
0 (in)	3 (in)	0-5 %	Easterly	1-2 %

09 FLOOD POTENTIAL
SITE IS IN 500 YEAR FLOODPLAIN

10 ___ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)
ESTUARINE: A. greater than 4 (mi)
OTHER: B. greter than 4 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)
< 1 (mi)
ENDANGERED SPECIES: Sicklefin Chub

13 LAND USE IN VICINITY
DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	PRIME AG LAND	AG LAND
A. <1 (mi)	B. < 1 (mi)	C. Unknown (mi)	D. ___ (mi)

4 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is located on the flood plain of the Mississippi River.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUND WATER	6	CLP	Current
SURFACE WATER	6	CLP	Current
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL/Sediment	25/4	CLP	Current
VEGETATION			
OTHER (Product)	1	CLP	Current

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
FASP	92 soil, 3 sediment, and 4 surface water samples were collected and screened on site in a mobile lab. These samples were not submitted for CLP analysis.
Parameters	pH, conductivity, and temperature were recorded for ground and surface water samples.

IV. PHOTOGRAPHS AND MAPS

01 TYPE x GROUND ___ AERIAL

02 IN CUSTODY OF E & E/FIT
(Name of organization or individual)

03 MAPS
x YES
___ NO

04 LOCATION OF MAPS
E & E/FIT

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. BOX, RFD #, ETC.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Petroleum, Fuel & Terminal Co.		Foot of Mullanphy		St. Louis	MO	63105

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. BOX, RFD #, ETC.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
Apex Oil						

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Laclede Gas & Light Co.		Unknown				
Mound Street Warehouse Corp.		Unknown				

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER	04 SIC CODE
NA		
03 STREET ADDRESS (P.O. BOX, RFD #, ETC.)		
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER	

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER	13 SIC CODE
12 STREET ADDRESS (P.O. BOX, RFD #, ETC.)		
14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER	04 SIC CODE
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION 1888-1945	09 NAME OF OWNER DURING THIS PERIOD	

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER	13 SIC CODE
12 STREET ADDRESS (P.O. Box, RFD #, etc.)		
14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER	04 SIC CODE
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	

10 NAME	11 D+B NUMBER	13 SIC CODE
12 STREET ADDRESS (P.O. Box, RFD #, etc.)		
14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER	04 SIC CODE
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	

10 NAME	11 D+B NUMBER	13 SIC CODE
12 STREET ADDRESS (P.O. Box, RFD #, etc.)		
14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MO	D981715980

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
NA	

03 STREET ADDRESS (P.O. BOX, RFD #, ETC.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION 01 STATE: MO | 02 SITE NUMBER: D981715980

II. PAST RESPONSE ACTIVITIES

01 ___ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 _x_ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
It was common practice for FMGPs to bury tar and purifier wastes on site.

01 ___ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION 01 STATE: MO 02 SITE NUMBER: D981715980

II. PAST RESPONSE ACTIVITIES (Continued)

01 ___R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 _x_1. ACCESS TO SITE RESTRICTED (partially) — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
A locked eight-foot chain-linked fence with barb wire running across the top surrounds the tank farm area.

01 ___2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

01 ___3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____

04 DESCRIPTION
None known.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE MO	02 SITE NUMBER D981715980

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ___YES x NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

None known.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E/FIT files

APPENDIX C

Site Contacts and Property Owners

Site Contacts

Randel H. Lewis
Terminal Manager
Petroleum, Fuel & Terminal Company
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Greg Reesor
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U.S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS
(913) 551-7695

Property Owner Information

Property Owner	Sample #'s
Richard Weidner TRRA 2016 Madison Ave. Granite City, IL 62040	110, 111 201, 202
Marty Anamosa Glacier Park Co. 1011 Western Ave., Ste. 700 Seattle, WA 98104	112
David Bohm City Hall City Counselor's Office, Rm. 314 St. Louis, MO 63103	301 - 303 401 - 403
Doug Mitchem Illinois American Water Co. 300 N. Water Works Dr. Belleville, IL 62223	304, 304D
Randall Lewis PF & T Foot of Mullanphy St. St. Louis, MO 63105	001 - 013 101 - 109 501

APPENDIX D

EPA Data Transmittal

ICF Technology Incorporated
NSI Technology Services Corporation
The Bionetics Corp.

EPA Region VII Laboratory
25 Funston Rd.
Kansas City, KS 66115
(913) 236-3881

To: Larry Marchin & Barry Evans
Data Review Task Monitors

Thru: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA

From: Laleh A. Jonooby
Senior Scientist, ESAT

Thru: Ronald A. Ross
Region VII ESAT Team Leader, NSI-TS

Date: April 19, 1991

Subject: Review of organic data for **Laclede Coal Gas**
TID #: 07-9103-535
ICF Acct. #: 302-26-535-02
NSI Sales Order : 1073-535
Activity Number : **DSX44**
ESAT Document Control #:.. ESAT-VII-535-0011
Assignment Number : 764

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," and the Region VII Organic Data Review Training Manual as guidance. The following comments and attached data sheets are a result of the ESAT review of the above mentioned data from the contract laboratory.

SAS NO.: **6082-G**
SITE: **Laclede Coal Gas**
REVIEWER: **A. Jonooby**
MATRIX: **Water, Soil and Oil**

LABORATORY: **RECRA ENV., INC.**
METHOD NO.: **418.1**
EPA ACTIVITY NO.: **DSX44**

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
6082-001	DSX44301	6082-009	DSX44401D
6082-002	DSX44301D	6082-010	DSX44402
6082-003	DSX44302	6082-011	DSX44403
6082-004	DSX44304	6082-012	DSX44501
6082-005	DSX44304D		
6082-006	DSX44207F		
6082-007	DSX44303		
6082-008	DSX44401		

And QC samples DSX44304 (MS), 303 (DUP), 401 (DUP), 401D (MS), 501 (MS), 501 (DUP), 910M, 911M and 912M.

General

This data review assignment covers SEVEN WATER samples (DSX44301 - 304 and 207F), FOUR SOIL samples (DSX44401 - 403) and ONE OIL sample (DSX44501) analyzed for total petroleum hydrocarbons (TPHs). Field blank and field duplicate were included in this assignment. TPHs traffic reports were present.

1. Holding Times and Preservation

There are no established holding times for TPHs. Sample preservation is to keep cold at 4 degrees C.

2. Method Blanks / Field Blanks

All of the method blanks and field blank were reported below method detection limits. For the water samples, the field blank and the method blank were reported as <0.5 mg/L, for soil samples, the method blank was reported to be <25 mg/L and the method blank analyzed with the oil sample was reported to be <1000 mg/L.

3. Initial Calibrations

A six point calibration curve using reference oil #1 as the source at an absorbance of 2930 cm-1 was established for this activity. A correlation coefficient of 0.9999 was achieved with this curve.

4. Matrix Spike

A matrix spike was run with each set of matrices. Percent recovery of the MS for the water samples was 84.8%, for soils, the MS recovery was 96.8% and the MS recovery for the oil sample was 105.5%.

5. Lab Duplicate

A lab duplicate was run with each set of matrices. The relative percent difference between the water sample and its duplicate was not calculated because they were reported to be less than the method detection limits. A 15% relative percent difference was calculated for the soil samples and 1.2% relative percent difference was reported for the oil sample.

Discussion

Sample DSX44301 was broken accidently by RECRA Environmental lab before any TPH analysis could be done on it. Therefore, there is no data available for this sample in this package. However, RECRA Environmental, Inc. did contact SMO with regards to this matter as mentioned in their memo and since there was a duplicate for that sample (DSX44301D) no action was taken by the EPA to re-sample.

All of the water samples were extracted using 1L from each sample. The TPHs were reported less than the method detection limits (<0.5 mg/L).

A sample weight of 20g was used for the soil samples and only a 0.5g was used for the oil sample with a dilution factor of 50.

Summary

From the evaluation of the QC mentioned above, this data meets the requirements for overall accuracy, precision and completeness.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM – ZONE II

ICF Technology Incorporated

NSI Technology Services Corp.

The Bionetics Corp.

ESAT Region VII
NSI Technology Services
25 Funston Road
Kansas City, KS 66115
(913) 236-3881

MEMORANDUM

TO: Larry Marchin, Chemist, CLQA/LABO/ENSV
THRU: Harold Brown, Ph.D, DPO/LABO/ENSV

FROM: Peggy Cox, QA/QC Chemist/ESAT/MANTECH
THRU: Ronald Ross, Manager/ESAT/MANTECH

DATE: April 17, 1991

SUBJECT: Review of data for LACLEDE COAL GAS
TID#: 07-9103-535
ASSIGNMENT#: 760
ICF ACCT#: 302-26-535-02
MANTECH S.O.#: 1073-535
ESAT DOCUMENT#: ESAT-VII-535-0008

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1, 1988 revision.

The following comments and attached data sheets are a result of ManTech Environmental Technology, Inc.'s review of the above mentioned data from the contract laboratory.

CASE/SAS NO.: 15978
CONTRACT NO.: 68-D0-0108
SITE: LACLEDE COAL GAS
REVIEWER: P. COX

LABORATORY: SKINER
METHOD NO.: CS0390I
EPA ACTIVITY: DSX44
MATRIX: WATER

SMO SAMPLE NO.	EPA SAMPLE NO.
MGH515	DSX44201
MGH517	DSX44202
MGH519	DSX44301
MGH521	DSX44301D
MGH523	DSX44302
MGH525	DSX44304
MGH527	DSX44304D
MGH529	DSX44900P

GENERAL

Case 15978 contained 8 environmental and 6 QC water samples analyzed for total metals and cyanide at the low level concentration. No field blank, two field duplicates, and one performance evaluation sample were included in this data review assignment. Data review was performed at level 2.

1. **TECHNICAL HOLDING TIMES and PRESERVATION**

A. Technical holding times and required preservation were within quality control limit requirements.

2. **INITIAL and CONTINUING CALIBRATION**

A. Initial and continuing calibrations were within quality control limit requirements.

3. **BLANKS**

A. No analytes were detected above the contract required detection limit (CRDL) in any blank.

B. Levels of analytes greater than the instrument detection limit (IDL) were detected for aluminum (Al), barium (Ba), calcium (Ca), cadmium (Cd), iron (Fe), nickel (Ni), silver (Ag), and zinc (Zn). Analytes greater than the instrument detection limit (IDL) but less than 5 times the highest level detected in the blank were qualified with a "U" code. Cadmium (Cd) in sample DSX44900P and zinc (Zn) in samples DSX44301, DSX44301D, and DSX44302 were qualified with a "U" code according to the blank rules.

4. **ICP INTERFERENCE CHECK**

A. All analytes contained in the ICP interference check sample were within quality control limit requirements. Antimony (Sb), potassium (K), and sodium (Na) were found but not elements present in the AB ICP interference check solution. Since levels detected were below the intrument detection limit (IDL) or levels found in the samples were significantly higher, no data were qualified by the ICP interference check sample.

5. **LABORATORY CONTROL SAMPLE**

A. All laboratory control samples analyzed were within quality control limit requirements.

6. **DUPLICATES**

A. All analytes were within quality control limit requirements except aluminum (Al) and cyanide (CN^-). Aluminum (Al) in samples DSX44201, DSX44202, DSX44301, DSX44301D, DSX44302, DSX44304, DSX44304D, DSX44202S, and DSX44901C and cyanide (CN^-) in samples DSX44201, DSX44202, DSX44304D, DSX44900P, and DSX44202S were qualified with a "J" code according to the duplicate rules.

7. **MATRIX SPIKE**

A. All analytes were within quality control limit requirements for percent recovery except selenium (Se) and thallium (Tl). Selenium had a 0.0% recovery due to the original sample being diluted. No samples were qualified for selenium (Se) but thallium (Tl) in sample DSX44901C was qualified with a "J" code according to the spike rules.

8. **GRAPHITE FURNACE ATOMIC ABSORPTION (GFAA) SPECTROSCOPY**

A. All quality control limit requirement criteria for graphite furnace atomic absorption (GFAA) spectroscopy were met. Selenium (Se) and thallium (Tl) in several samples had post digestion spike recoveries outside quality control limits, but since the results were non-detect, no data were qualified.

B. The method of standard additions was performed for arsenic (As) and selenium (Se) in sample DSX44900P and lead (Pb) in sample DSX44202. The correlation coefficient for lead (Pb) in sample DSX44202 and selenium (Se) in sample DSX44900P was outside quality control limit requirements (less than 0.995) and were qualified with a "J" code according to the standard addition rules.

9. **PERFORMANCE EVALUATION AUDIT SAMPLE**

A. Performance evaluation audit sample DSX44900P was submitted to the laboratory for analysis with all analytes containined in the audit being identified.

10. **ICP SERIAL DILUTION**

A. All analytes were within quality control limit requirements except copper (Cu). Copper (Cu) in samples DSX44201, DSX44202, DSX44202S, DSX44201L, and DSX44901C were qualified with a "J" code according to the ICP serial dilution rules.

11. **SUMMARY**

A. Cadmium (Cd) in sample DSX44900P and zinc (Zn) in samples DSX44301, DSX44301D, and DSX44302 were qualified with a "U" code due to blank contamination.

B. Aluminum (Al) in samples DSX44201, DSX44202, DSX44301, DSX44301D, DSX44302, DSX44304, DSX44304D, DSX44202S, and DSX44901C and cyanide (CN^-) in samples DSX44201, DSX44202, DSX44304D, DSX44900P, and DSX44202S were qualified with a "J" code due to poor duplicate precision.

C. Thallium (Tl) in sample DSX44901C was qualified with a "J" code due to poor spike recovery.

D. Lead (Pb) in sample DSX44202 and selenium (Se) in sample DSX44900P were qualified with a "J" code according to the standard addition rules.

E. Copper (Cu) in samples DSX44201, DSX44202, DSX44202S, DSX44201L, and DSX44901C were qualified with a "J" code according to the ICP serial dilution rules.

F. Several compounds were "U" coded due to the compound concentrations being greater than the instrument detection limit (IDL) but less than the contract required detection limit (CRDL).

G. This data package generally meets the requirements for precision, accuracy, and completeness as described in SOW for Inorganic Analysis dated March 1990, with the exceptions noted above.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM -- ZONE II

ICF Technology Incorporated

NSI Technology Services Corp.

The Bionetics Corp.

ESAT Region VII
NSI Technology Services
25 Funston Road
Kansas City, KS 66115
(913) 236-3881

MEMORANDUM

TO: Larry Marchin, Chemist, CLQA/LABO/ENSV
THRU: Harold Brown, Ph.D, DPO/LABO/ENSV

FROM: Peggy Cox, QA/QC Chemist/ESAT/MANTECH Pc for KL
THRU: Ronald Ross, Manager/ESAT/MANTECH

DATE: April 23rd, 1991

SUBJECT: Review of data for LACLEDE COAL GAS
TID#: 07-9103-535
ASSIGNMENT#: 761
ICF ACCT#: 302-26-535-02
MANTECH S.O.#: 1073-535
ESAT DOCUMENT#: ESAT-VII-535-0010

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1, 1988 revision.

The following comments and attached data sheets are a result of ManTech Environmental Technology, Inc.'s review of the above mentioned data from the contract laboratory.

CASE/SAS NO.: 15978
CONTRACT NO.: 68-D0-0108
SITE: LACLEDE COAL GAS
REVIEWER: P. COX

LABORATORY: SKINER
METHOD NO.: CS0390I
EPA ACTIVITY: DSX44
MATRIX: WATER

SMO SAMPLE NO.	EPA SAMPLE NO.
MGH516	DSX44201
MGH518	DSX44202
MGH520	DSX44301
MGH522	DSX44301D
MGH524	DSX44302
MGH526	DSX44304
MGH528	DSX44304D
MGH530	DSX44900P

GENERAL

Case 15978 contained 8 environmental and 6 QC water samples analyzed for dissolved metals at the low level concentration. No field blank, two field duplicates, and one performance evaluation sample were included in this data review assignment. Data review was performed at level 2.

1. **TECHNICAL HOLDING TIMES and PRESERVATION**

A. Technical holding times and required preservation were within quality control limit requirements.

2. **INITIAL and CONTINUING CALIBRATION**

A. Initial and continuing calibrations were within quality control limit requirements.

3. **BLANKS**

A. No analytes were detected above the contract required detection limit (CRDL) in any blank.

B. Levels of analytes greater than the instrument detection limit (IDL) were detected for barium (Ba), calcium (Ca), copper (Cu), and zinc (Zn). Analytes greater than the instrument detection limit (IDL) but less than 5 times the highest level detected in the blank were qualified with a "U" code. Since all associated data were non-detect, no data were qualified by the blank rules.

4. **ICP INTERFERENCE CHECK**

A. All analytes contained in the ICP interference check sample were within quality control limit requirements. Antimony (Sb), potassium (K), and sodium (Na) were found but not elements present in the AB ICP interference check solution. Since levels detected were below the intrument detection limit (IDL) or levels found in the samples were significantly higher, no data were qualified by the ICP interference check sample.

5. **LABORATORY CONTROL SAMPLE**

A. All laboratory control samples analyzed were within quality control limit requirements.

6. **DUPLICATES**

A. All analytes were within quality control limit requirements except lead (Pb). Lead (Pb) in samples DSX44201, DSX44301D, DSX44900P, DSX44201S, and DSX44903C were qualified with a "J" code according to the duplicate rules.

7. **MATRIX SPIKE**

A. All analytes were within quality control limit requirements for percent recovery except selenium (Se) and thallium (Tl). Selenium (Se) in samples DSX44900P and DSX44903C and thallium (Tl) in sample DSX44903C were qualified with a "J" code according to the spike rules.

8. **GRAPHITE FURNACE ATOMIC ABSORPTION (GFAA) SPECTROSCOPY**

A. All quality control limit requirement criteria for graphite furnace atomic absorption (GFAA) spectroscopy were met. Selenium (Se) and thallium (Tl) in several samples had post digestion spike recoveries outside quality control limits, but since the results were non-detect, no data were qualified.

B. The method of standard additions was performed for arsenic (As) in sample DSX44202. The correlation coefficient for arsenic (As) in sample DSX44202 was outside quality control limit requirements (less than 0.995) and was qualified with a "J" code according to the standard addition rules.

9. **PERFORMANCE EVALUATION AUDIT SAMPLE**

A. Performance evaluation audit sample DSX44900P was submitted to the laboratory for analysis with all analytes containined in the audit being identified.

10. **ICP SERIAL DILUTION**

A. All analytes were within quality control limit requirements except iron (Fe). Iron (Fe) in samples DSX44201, DSX44202, DSX44201S, DSX44201L, and DSX44903C were qualified with a "J" code according to the ICP serial dilution rules.

11. **SUMMARY**

A. Lead (Pb) in samples DSX44201, DSX44301D, DSX44900P, DSX44201S, and DSX44903C were qualified with a "J" code due to poor duplicate precision.

B. Selenium (Se) in samples DSX44900P and DSX44903C and thallium (Tl) in sample DSX44903C were qualified with a "J" code due to poor spike recovery.

C. Arsenic (As) in sample DSX44202 was qualified with a "J" code according to the standard addition rules.

D. Iron (Fe) in samples DSX44201, DSX44202, DSX44201S, DSX44201L, and DSX44903C were qualified with a "J" code according to the ICP serial dilution rules.

E. Several compounds were "U" coded due to the compound concentrations being greater than the instrument detection limit (IDL) but less than the contract required detection limit (CRDL).

F. This data package generally meets the requirements for precision, accuracy, and completeness as described in SOW for Inorganic Analysis dated March 1990, with the exceptions noted above.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM -- ZONE II

ICF Technology Incorporated

NSI Technology Services Corp.

The Bionetics Corp.

ESAT Region VII
NSI Technology Serv.
25 Funston Road
Kansas City, KS 66115
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To: Larry Marchin & Barry Evans
Data Review Task Monitors
Thru: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA
From: Janet Muse
Senior Scientist, ESAT
Thru: Ronald A. Ross
Region VII ESAT Team Leader, Mantech

Date: April 26, 1991
Subject: Review of organic data for **Laclede Coal Gas**

ASGN #: 777
TID #: 07-9103-535
ICF Acct. #: 302-26-535-02
ManTech Sales Order : 1073-535
ESAT Doc. Control #:..... ESAT-VII-535-0024

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," and the Region VII Organic Data Review Training Manual as guidance. The following comments and attached data sheets are a result of the ESAT review of the above mentioned data from the contract laboratory.

Hi. Conc 9/88

CASE NO.: 15978
SITE: Laclede Coal Gas
REVIEWER: J. MUSE
MATRIX: Oil

LABORATORY: EIRA
METHOD NO.: CS03900
EPA ACTIVITY NO.: DSX44

Sample No.	EPA Sample No.
GJ894	DSX44501

And QC samples DSX44919M, 919G, and 919H.

General

This data review assignment covers ONE OIL sample analyzed for High Concentration volatile organics and extractables **SOW 9/88.** No field blanks or field duplicates, and 4 QC samples were included in this assignment. The organic traffic report was present.

1. Holding Times and Preservation

There are no holding time requirements for volatile organics in oil samples.

Preservation of samples was refrigeration at 4 degrees C and protection from light.

2. GC/MS Performance

All CLP criteria for GC/MS performance were met for a 50 nanogram injection of 4-bromofluorobenzene.

All CLP criteria for GC/MS performance were met for a 50 nanogram injection of DFTPP.

3. Method Blanks

Positive hits for target compounds in the blanks were only reported positive in the sample after the blank rule was applied. That is, positive hits for methylene chloride in the sample were reported and coded with a "U" unless they were greater than 10-times the level in the daily blank. Methylene chloride was reported in the VOC method blank. No target compounds for the extractables were found in the method blank.

4. Initial Calibration

VOCS: All response factors met applicable criteria. All compounds met the 35% criteria for RSD.

Extractables: A three point initial calibration was done before analysis of the samples. All response factors met applicable criteria. All compounds met the 35% criteria for RSD.

5. Continuing Calibration

VOCS: The sample and QC samples were analyzed the same day of the initial calibration, so no continuing calibration std. needed to be run.

Extractables: All compounds were within the 25% difference criteria for response factors on the continuing calibration of 3/29/91, except for a few target compounds. Since no positive hits were found for these outliers in the sample, no data was qualified due to the continuing calibration.

6. Surrogate Recoveries

VOCS: Surrogate recoveries were within control limits in all cases.

Extractables: Surrogates were diluted out of the sample due to large quantities of target compounds. No data were qualified due to this.

7. Internal Standard Areas

VOCS: Met applicable criteria.

Extractables: Perylene-d12 and chrysene-d12 were less then the lower limit criteria in the method blank. No data was qualified due to this.

8. **Control Matrix Spike**

A control matrix spike was done for both parameters, VOCS and extractables. Recoveries were within control limits for both control matrix spikes.

Summary

This data package mets acceptability in terms of the requirements for overall accuracy, precision and completeness.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM – ZONE II

ICF Technology Incorporated

ManTech Environmental Technology, Inc.

The Bionetics Corp.

ESAT Region VII
ManTech Env. Tech., Inc.
25 Funston Road
Kansas City, KS 66115
(913) 236-3881

TO: Barry Evans, Data Review Task Monitor/ENSV
THRU: Harold Brown, Ph.D., ESAT Contract Manager/ENSV

FROM: Rebecca K. Estep, ESAT Data Reviewer/ManTech RE RE
THRU: Albert Iannacone, ESAT QA/QC Coordinator/ManTech

DATE: April 29, 1991
SUBJECT: Review of organic data for Laclede Coal Gas.

TID#:	07-9103-535
ASSIGNMENT#:	769
ICF ACCT#:	302-26-535-02
ManTech S.O.#:	1073-535
ESAT Document#:	ESAT-VII-535-0014

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," February 1, 1988 revision.

The following comments and attached data sheets are a result of ManTech Environmental Technology, Inc.'s review of the above mentioned data from the contract laboratory.

CASE NO.:	15978	LABORATORY:	RECMD
CONTRACT NO.:	68-D0-0158	METHOD NO:	CS03900
SITE:	Laclede Coal Gas	EPA ACTIVITY:	DSX44
REVIEWER:	Rebecca K. Estep	MATRIX:	Soil

Samples for Semivolatile Analysis

SMO SAMPLE NO.	EPA SAMPLE NO.	SMO SAMPLE NO.	EPA SAMPLE NO.
GJ879	DSX44108	GK983	DSX44002
GJ880	DSX44109	GK984	DSX44003
*GJ890	*DSX44401	GK985	DSX44004
*GJ891	*DSX44401D	GK986	DSX44005
*GJ892	*DSX44402	GK987	DSX44110
*GJ893	*DSX44403	GK988	DSX44111
GK982	DSX44001	GK989	DSX44112

* Also analyzed for volatiles.

GENERAL

Case 15978 contained low level soil samples for volatile and base/neutral and acid analyses. 14 samples for semivolatile analysis, 4 which were also analyzed for volatiles (18 actual;13 QC). This package includes no field blanks, one field duplicate, and no performance evaluation sample. Data review was performed at level 2.

1. TECHNICAL HOLDING TIMES and PRESERVATION

A. No technical holding times are specified for soil samples. All samples were within holding time specifications from extraction to analysis for base/neutral and acids.

2. GC/MS Tuning

A. All volatile GC/MS tunings and mass calibrations were within quality control limit requirements for bromofluorobenzene (BFB).

B. All base/neutral and acid GC/MS tunings and mass calibratons were within quality control limit requirements for decafluorotriphenylphosphine (DFTPP).

3. INITIAL and CONTINUING CALIBRATION

A. All average relative response factors and percent relative standard deviations were within quality control limit requirements for the volatile initial calibration.

B. Bromoform and 4-methyl-2-pentanone were outside quality control limit requirements for percent difference (%D) (greater than 25%) on the volatile continuing calibration dated 3/14/91. Since these compounds were non-detect in all samples no data were qualified by the calibration rules.

C. All average relative response factors and percent relative standard deviations were within quality control limit requirements for the base/neutral and acid initial calibrations except for the one dated 4/8/91 where 4-chlorophenyl-phenyl ether, fluorene, and bis(2-ethylhexyl)phthalate were outside the quality control limit requirements for percent relative standard deviation (%RSD) (greater than 30%). This resulted in fluorene being "J" coded in sample DSX44109, and bis(2-ethylhexyl)phthalate "J" coded in samples DSX44001, DSX44002, DSX44003, DSX44004, and DSX44005.

D. Several compounds (anywhere from 2 to 7) were outside quality control limit requirements for percent difference (%D) (greater than 25%) on the base/neutral and acid continuing calibrations. Pyrene was "J" coded in sample DSX44402 from the continuing calibration dated 4/3/91. Bis(2-ethylhexyl)phthalate would have been "J" coded in samples DSX44001, DSX44002, DSX44003, DSX44004, and DSX44005 from the continuing calibration dated 4/10/91, however this compound was previously "J" coded in these same 5 samples due to the initial calibration rules.

4. INTERNAL STANDARD RESPONSE

A. All internal standard response areas were within a factor of 2 when comparing samples and their associated continuing calibration response areas for volatile analysis.

B. The internal standard response areas were out by more than a factor of 2 between the samples and their associated continuing calibration response areas for base/neutral and acid analysis in sample DSX44108 and the reanalysis of DSX44108 for phenanthrene-d10 and chrysene-d12. DSX44108 was also out for perylene-d12. This resulted in carbazole being "J" coded for sample DSX44108.

5. BLANKS

A. One method blank was analyzed for the volatile fraction with acetone, methylene chloride, and 2-butanone detected. This resulted in methylene chloride and acetone being "U" coded in samples DSX44401D, DSX44402, DSX44401S, and DSX44401W, and only acetone in sample DSX44403 according to the blank rules. Methylene chloride and 2-butanone, in the method blank, were detected above the instrument detection limit (IDL) but less than the contract required quantitaion limit (CRQL), thus their results were raised to the CRQL and "U" coded.

B. Four method blanks were analyzed for the base/neutral and acid fraction with bis(2-ethylhexyl)phthalate detected in all 4 samples. No qualifications were made because the concentrations in all corresponding samples were greater than ten times the blank concentrations. In addition, butylbenzylphthalate was detected in sample DSX44924M and DSX44925M, and diethylphthalate and di-n-butylphthalate were detected in sample DSX44926M. Since these compounds were non-detect no data were qualified due to the blank rules.

6. SURROGATE RECOVERY

A. All surrogates were within quality control limit requirements for percent recovery for the volatile fraction except 1,2-dichloroethane-d4 in sample DSX44401W. No data were qualified due to the surrogate recovery rules.

B. All surrogates were within quality control limit requirements for percent recovery for the base/neutral and acid fraction except 2-fluorobiphenyl and terphenyl-d14 in sample DSX44108DL. Phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, and benzo(g,h,i)perylene were "J" coded in sample DSX44108 due to the fact that the concentrations for these base/neutral compounds were reported from the dilution and the dilution was qualified due to the surrogate rules. Terphenyl-d14 was also out for samples DSX44108 and DSX44108RE, however no data were qualified.

7. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE**

A. A matrix spike/matrix spike duplicate was analyzed for volatiles with percent recovery and relative percent difference within quality control limit requirements.

B. A matrix spike/matrix spike duplicate was analyzed for the base/neutral and acid fraction with the percent recovery for pyrene low and the relative percent difference for acenaphthene and pyrene outside the advisory limits. No data were qualified due to the matrix spike/matrix spike duplicate rules.

8. **PERFORMANCE EVALUATION SAMPLE**

A. No performance evaluation sample was submitted to the laboratory for analysis associated with this case and SDG number.

9. **COMPOUND IDENTIFICATION and QUANTITATION**

A. All target compound identifications were supported by good agreement between sample and standard mass spectra submitted for each positive sample response.

B. Several compounds in all samples for both volatile and base/neutral and acid analyses were detected above the instrument detection limit (IDL) but below the contract required quantitation limit (CRQL). These results were raised to the CRQL and "U" coded.

10. **SUMMARY**

A. Samples DSX44401D, DSX44402, DSX44403, DSX44401S, and DSX44401W for volatile analysis detected methylene chloride and/or acetone which were "U" coded due to the blank rule.

B. Anthracene was "J" coded in sample DSX44108 due to the high concentration encountered in both the original analysis and the dilution which were detected above the calibration range.

C. Fluorene was "J" coded in sample DSX44109, and bis(2-ethylhexyl)phthalate was "J" coded in samples DSX44001, DSX44002, DSX44003, DSX44004, and DSX44005 due to the initial calibration rules.

D. Pyrene was "J" coded in sample DSX44402 due to the continuing calibration rules.

E. Carbazole was "J" coded in sample DSX44108 due to the internal standard rules.

F. Several compounds in all samples for volatile and base/neutral and acid analyses were detected above the IDL but less than the CRQL, thus these compounds were raised to the CRQL and "U" coded.

G. Phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, and benzo(g,h,i)perylene were "J" coded in sample DSX44108 due to the surrogate rules.

H. This data package generally meets the requirements for precision, accuracy, and completeness as described in SOW for Organic Analysis dated March 1990, with the exceptions noted above.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM -- Zone II

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TO: Larry Marchin and Barry Evans
Data Review Task Monitors
THRU: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA

FROM: Paula Woodland PAW
ESAT Scientist
THRU: Ronald A. Ross
ESAT Team Manager

DATE: April 29, 1991
SUBJECT: Review of VOA/BNA data for Laclede Coal Gas

TID# 07-9103-535
ASSIGNMENT# 768
ICF ACCT# 26-535-02
ManTech S.O.# 1073-535
ESAT Document #: ESAT-VII-535-0013

These data were reviewed primarily according to the Special Analytical Services Request and the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," February 1988 revision with changes given in the Region VII Organic Data Review Training Manual and EPA memorandums and the 3/90 SOW.

The following comments and attached data sheets are a result of the ESAT review, according to EPA policies, of the following data from the contract laboratory.

CASE NO.: 15978
SITE: Laclede Coal Gas
REVIEWER: Paula Woodland

LABORATORY: RECMD
METHOD NO.: CS03900
EPA ACTIVITY NO.: DSX44
MATRIX: SOIL

VOA

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
GJ859	DSX44001	GJ865	DSX44007
GJ860	DSX44002	GJ866	DSX44008
GJ861	DSX44003	GJ867	DSX44009
GJ862	DSX44004	GJ868	DSX44010
GJ863	DSX44005	GJ869	DSX44011
GJ864	DSX44006	GJ870	DSX44012
		GJ871	DSX44013

BNA

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
GJ864	DSX44006	GJ872	DSX44101
GJ865	DSX44007	GJ873	DSX44102
GJ866	DSX44008	GJ874	DSX44103
GJ867	DSX44009	GJ875	DSX44104
GJ869	DSX44011	GJ876	DSX44105
GJ870	DSX44012	GJ877	DSX44106
GJ871	DSX44013	GJ878	DSX44107

GENERAL

This data review assignment covers 12 SOIL samples analyzed for VOA and 14 SOIL samples analyzed for BNA. There were no field blanks, duplicates, or performance evaluation samples included with this assignment. DSX44010 (GJ868) was originally sent along with this SDG number, however SMO removed the sample to another SDG number because the matrix was defined incorrectly.

1. Holding Times and Preservation

VOA: Technical holding times have not been established for soil samples.

BNA: Collection to extraction holding times have not been established for soil samples, however the extraction to analysis holding times were within the established criteria.

2. GC/MS Tuning

All relative ion abundances were within the established control limits of the 3/90 SOW for both VOA and BNA analysis.

3. Initial and Continuing Calibration

VOA: The %RSD was out of control for acetone in the initial calibration curve ran on 1/8/91. All positive results for this compound in samples DSX44005 and DSX44913M were coded J. All criteria were within the established control limits for the other initial calibration curve. The %D was out of control for several compounds in the continuing calibration check, however no other samples were coded.

BNA: All criteria were within established control limits for the initial calibration curve. The %D was out of control for pyrene and several other compounds on 3-22-91, 3-26-91, and 3-28-91. All positive results for pyrene in samples DSX44007, -009, -011, -101S, and -101W were coded J.

4. **Internal Standard Response**

VOA: The internal standard area was out of control for chlorobenzene-d^5 in sample DSX44012 and the re-analysis of DSX44012. The positive result for the corresponding compound, styrene, in DSX44012 was coded J. The original analytical result was reported because the internal standard response was slightly better than the re-analysis. All other internal standard criteria were within control limits.

BNA: The internal standard area was out of control for naphthalene-d^8 in sample DSX44008 and the re-analysis, but only non-detect compounds were reported from these injections so no coding was performed. The internal standard response was within the established criteria for the dilution of DSX44008 so the diluted results for naphthalene and 2-methylnaphthalene were not coded. All other internal standard criteria were within control limits.

5. **Blanks**

VOA: Methylene chloride and acetone were detected in the blanks. Corresponding sample results were qualified according to the blank rule using ten times the highest blank value. Acetone was qualified in samples DSX44001, -002, -003, -004, -012, and -001S. Methylene chloride was qualified in samples DSX44001, -002, -001S, and -001W.

BNA: Bis(2-ethylhexyl)phthalate was detected in the blanks, however no qualifications were performed.

6. **Surrogate Recovery**

The surrogate compound recoveries were within established control limits.

7. **Matrix Spike/Matrix Spike Duplicate Recovery**

VOA: Matrix spike/matrix spike duplicate criteria were within established control limits.

BNA: The % recovery of the medium level soil matrix spike and matrix spike duplicate was out of control for 6 and 2 of the 11 compounds, respectively. The %RPD was out of control for 3 of the 11 compounds. No coding was performed. A low level matrix spike and matrix spike duplicate from a different SDG# (GJ879) was included in this SDG# GJ859 for the one low level sample (DSX44106). This was not evaluated because it was from another case.

8. **Compound Identification and Quantitation**

Due to the requested review level, results listed on the summary forms were used for the review. These results were not checked against the raw data for accuracy, and calculations were not verified.

VOA: Xylene was coded J in sample DSX44008 because it was detected over the calibration range. A re-analysis was not performed by the lab.

BNA: For DSX44008, nine compounds were over the calibration range so a dilution was made. In this dilution, seven of the nine compounds were below the CRQL. These seven compounds were reported using the original undiluted results and coded J for exceeding the calibration range. The seven compounds that were coded J in DSX44008 were fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, and chrysene.

9. **Summary**

VOA: Acetone was coded J for sample DSX44012 because the internal standard response was too low. Also, acetone was coded J for samples DSX44005 and -913M because of an initial calibration %RSD outlier. Xylene was coded J for sample DSX44008 because it was over the calibration range. Several samples were qualified by the blank rule for methylene chloride and acetone.

BNA: Pyrene was coded J for samples DSX44007, -009, -011, -101S, and -101W because the %D was outside of control limits for the corresponding continuing calibration standard. An improper dilution was made for sample DSX44008 which resulted in the coding of several compounds (see Compound Identification and Quantitation section above). A low level soil matrix spike and matrix spike duplicate was not included with this SDG number.

The EPADA data sheets are attached. This data review is complete. If you have any questions, please contact me.

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TO: Larry Marchin/Barry Evans
Data Review Task Monitor
THRU: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA

FROM: Kevin Ludwikoski
ESAT Data Reviewer
THRU: **Ronald A. Ross**
ESAT Team Manager

DATE: April 29, 1991
SUBJECT: Review of inorganic data for **Laclede Coal Gas Co.**

TID# 07-9103-535
ASSIGNMENT# 762
ICF ACCT# 302-26-535-02
ManTech S.O.# 1073-535
ESAT Document No. ESAT-VII-535-0025

These data were reviewed primarily according to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1988 revision with changes given in the Region VII Inorganic Data Review Training Manual and EPA memorandums.

The following comments and attached data sheets are a result of the ESAT review, according to EPA policies, of the following data from the contract laboratory.

CASE NO.: **15978**
SITE: **Laclede Coal Gas Co.**
REVIEWER: Kevin Ludwikoski

LABORATORY: **SKINER**
METHOD NO.: CS0390I
EPA ACTIVITY NO.: **DSX44**
MATRIX: **WATER/SOIL**

TOTAL METALS and CN
(SOIL)

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
MGG558	DSX44006	MGG568	DSX44103
MGG559	DSX44007	MGG569	DSX44104
MGG560	DSX44008	MGG570	DSX44105
MGG561	DSX44009	MGG571	DSX44106
MGG562	DSX44010	MGG572	DSX44107
MGG563	DSX44011	MGG573	DSX44108
MGG564	DSX44012	MGG574	DSX44109
MGG565	DSX44013	MGG590	DSX44401
MGG566	DSX44101	MGG591	DSX44401D
MGG567	DSX44102	MGG592	DSX44402

DISSOLVED METALS
(WATER)

SMO Sample No.	EPA Sample No.
MGG576	DSX44203
MGG578	DSX44204
MGG583	DSX44206D
MGG585	DSX44207F
MGG587	DSX44208
MGG589	DSX44303

GENERAL

This data review assignment covers SIX WATER samples analyzed for DISSOLVED METALS and TWENTY SOIL samples analyzed for TOTAL METALS and CYANIDE for case number 15978. There was one field blank and one field duplicate for Dissolved Metals and one field duplicate for Total Metals and Cyanide included with this assignment.

1. Technical Holding Times / Preservation

A. Technical holding times were observed for all analytes.

B. Technical holding times are not specified for soil samples.

2. Initial and Continuing Calibration

A. All percent recoveries were within control limits for water samples.

B. All percent recoveries were within control limits for soil samples.

3. Blanks

A. Several analytes were detected in the blanks. Corresponding sample results were qualified according to the blank rule using five times the highest blank value. Sample results requiring modification are reported as non-detect on the attached data sheets.

DISSOLVED METALS
(WATER)

Analyte	5 x Highest Blank (µg/L)	Qualified Samples
Al	186	None qualified
Ca	1360	None qualified
Cu	24	None qualified
Fe	180	DSX44208
Pb	11	DSX44203, -204, -206D, -203L
Mg	372	None qualified
Na	1055	None qualified
V	14	None qualified
Zn	49	None qualified
Mn	9	None qualified

3. **Blanks (cont.)**

B. TOTAL METALS and CN^- (SOILS)

Analyte	5 x Highest Blank (mg/kg)	Qualified Samples
Al	30	None qualified
Sb	20	None qualified
Ba	2.4	None qualified
Ca	60	None qualified
Co	3.3	None qualified
Cu	2.8	None qualified
Fe	26	None qualified
Mg	66	None qualified
Mn	6.6	None qualified
Na	78	None qualified
Zn	3.3	None qualified

4. **ICP Interference Check**

A. Recoveries of solution AB analytes were within control limits for Dissolved Metals. Sb, K, and Na were found but not present in the ICS solution. All absolute values for these analytes were below the CRDL and IDL; therefore, no data were qualified by the ICP interference check sample.

B. Recoveries of solution AB analytes were within control limits for Total Metals and Cyanide. Sb, K, and Na were found but not present in the ICS solution. All absolute values for these analytes were below the CRDL and IDL; therefore, no data were qualified by the ICP interference check sample.

5. **Laboratory Control Standard (LCS)**

A. LCS results were within established control limits for Dissolved Metals.

B. LCS results were within established control limits for Total Metals and CN^-

6. **Duplicates**

A. The RPD for all analytes were within control limits for Dissolved Metals.

B. The RPD for Pb exceeded control limits for Total Metals. The sample results that were coded J are listed below.

TOTAL METALS and CN
(SOIL)

Analyte	Samples Qualified	Code
Pb	DSX44006-013, DSX44101-109, -401, -401D -401S, -402, -922C	J

7. **Matrix Spike Sample**

A. Se and Tl were out of range for matrix spike recovery for Dissolved Metals. The samples that had data qualified are listed below.

DISSOLVED METALS
(WATER)

Analyte	% Rec	Sample No.	Code
Se	45.6	DSX44303, -921C	J
Tl	34.1	DSX44921C	J

B. Sb was out of range for matrix spike recovery for Total Metals. The samples that had data qualified are listed below.

TOTAL METALS and CN
(SOIL)

Analyte	% Rec	Sample No.	Code
Sb	37.5	DSX44922C	J

8. **ICP Serial Dilution**

A. The ICP serial dilution results for Zn were outside control limits for Dissolved Metals. The samples that had results qualified are listed below.

DISSOLVED METALS
(WATER)

Analyte	Samples Qualified	Code
Zn	DSX44203, -204, -206D, -204S, -203L, -921C	J

B. The ICP serial dilution results for Zn were outside control limits for Total Metals. The samples that had results qualified are listed below.

TOTAL METALS and CN
(SOIL)

Analyte	Samples Qualified	Code
Zn	DSX44006, -007, -008, -009, -010, -011, -012, -013, -101, -102, -103, -104, -105, -106, -107, -108, -109, -401, -401D, -401L, -401S, -402, -922C	J

9. **Furnace Atomic Absorption**

A. The analytical scheme was followed for Furnace AA analysis for Dissolved Metals. MSA correlation coefficients were acceptable for As in sample DSX44206D (cc=.9987) and for Se in sample DSX44303 (cc=.9964).

B. The analytical scheme was followed for Furnace AA analysis for Total Metals. MSA correlation coefficients were not acceptable for Se in samples DSX44103, -401L, -401D, and -402 (best cc=.9869, .9878, .9565, and .9800 respectively). Only sample DSX44402 had Se found above the CRDL, and was "J" coded accordingly.

10. **Summary**

A. Nine analytes were qualified by the blank rule, one by the the spike rule, and one analyte was qualified by serial dilution outliers.

B. Eleven analytes were qualified by the blank rule, one by the spike rule, one by the duplicate rule, one by the serial dilution rule, and one analyte in one sample was "J" coded due to the rules of standard additions.

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THRU: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA

FROM: Kevin Ludwikoski
ESAT Data Reviewer

THRU: Ronald A. Ross
ESAT Team Manager

DATE: May 2, 1991
SUBJECT: Review of inorganic data for **Laclede Coal Gas Co.**

TID# 07-9103-535
ASSIGNMENT# 772
ICF ACCT# 302-26-535-02
ManTech S.O.# 1073-535
ESAT Document No. ESAT-VII-535-0017

These data were reviewed primarily according to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1988 revision with changes given in the Region VII Inorganic Data Review Training Manual and EPA memorandums.

The following comments and attached data sheets are a result of the ESAT review, according to EPA policies, of the following data from the contract laboratory.

CASE NO.: **15978**
SITE: **Laclede Coal Gas Co.**
REVIEWER: Kevin Ludwikoski

LABORATORY: **SKINER**
METHOD NO.: CS0390I
EPA ACTIVITY NO.: **DSX44**
MATRIX: **SOIL**

TOTAL METALS and CN^-
(SOIL)

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
MGG593	DSX44403	MGH535	DSX44005
MGH531	DSX44001	MGH536	DSX44110
MGH532	DSX44002	MGH537	DSX44111
MGH533	DSX44003	MGH538	DSX44112
MGH534	DSX44004		

GENERAL

This data review assignment covers NINE SOIL samples analyzed for TOTAL METALS and CYANIDE for case number 15978. There were no field blanks, field duplicates or PE samples included with this assignment.

1. Technical Holding Times / Preservation

Technical holding times have not been specified for soils.

2. Initial and Continuing Calibration

All percent recoveries were within control limits.

3. Blanks

Several analytes were detected in the blanks. Corresponding sample results were qualified according to the blank rule using five times the highest blank value. Sample results requiring modification are reported as non-detect on the attached data sheets.

TOTAL METALS and CN^- (SOIL)

Analyte	5 x Highest Blank (mg/kg)	Qualified Samples
Sb	20	DSX44111
Ag	5	None qualified
Ca	15	None qualified
Cu	7	None qualified
Pb	2.2	None qualified
Mg	32	None qualified
Na	65	None qualified
Zn	9	None qualified

4. ICP Interference Check

Recoveries of solution AB analytes were within control limits. Sb, K, Zn, and Na were found but not present in the ICS solution. All absolute values for these analytes were below the CRDL and IDL; therefore, no data were qualified by the ICP interference check sample.

5. Laboratory Control Standard (LCS)

LCS results were within established control limits.

6. **Duplicates**

The RPD for Pb exceeded control limits. The sample results that were coded J are listed below.

TOTAL METALS and CN
(SOIL)

Analyte	Samples Qualified	Code
Pb	DSX44001, -002, -003, -004, -005, -110 -111, -112, -403, -403S, -928C	J

7. **Matrix Spike Sample**

Sb and Mn were out of range for matrix spike recovery. The samples that had data qualified are listed below.

TOTAL METALS and CN
(SOIL)

Analyte	% Rec	Sample No.	Code
Sb	41.5	DSX44928C	J
Mn	260.8	DSX44001, -002, -003, -004, -005, -110 -111, -112, -403, -403L, -928C	J

Note: Sb in sample DSX44111 was above CRDL, but had been previously "U" coded by the blank rule.

8. **ICP Serial Dilution**

The ICP serial dilution results were within control limits for all analytes of interest.

9. **Furnace Atomic Absorption**

The analytical scheme was followed for Furnace AA analysis. MSA correlation coefficients were not acceptable for Se in samples DSX44002, -003, -004, -110, -112 and -403L. Samples DSX44003 and -004 were below the CRDL and therefore not affected. The other samples were "J" coded accordingly.

10. **Summary**

One analyte in one sample was qualified by the blank rule, one analyte by the duplicate rule, two by the spike rule and four samples had Se "J" coded due to standard addition outliers.

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MEMORANDUM

TO: Larry Marchin, Chemist, CLQA/LABO/ENSV
THRU: Harold Brown, Ph.D, DPO/LABO/ENSV

FROM: Peggy Cox, QA/QC Chemist/ESAT/ManTech
THRU: Ronald Ross, Manager/ESAT/ManTech

DATE: ~~April 25~~ May 2, 1990

SUBJECT: Review of data for LACLEDE COAL GAS
TID#: 07-9103-535
ASSIGNMENT#: 767
ICF ACCT#: 302-26-535-02
NSI S.O.#: 1073-535
ESAT DOCUMENT#: ESAT-VII-535-0018

These data were reviewed according to the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," February 1, 1988 revision and the "Laboratory Data Validation Functional Guidelines for Evaluating Pesticides and PCBs."

The following comments and attached data sheets are a result of ManTech Environmental Technology, Inc.'s review of the above mentioned data from the contract laboratory.

CASE/SAS NO.: 15978
CONTRACT NO.: 68-D0-0158
SITE: LACLEDE COAL GAS
REVIEWER: P. COX

LABORATORY: RECMD
METHOD NO.: CS0390O
EPA ACTIVITY: DSX44
MATRIX: WATER

SMO SAMPLE NO.	EPA SAMPLE NO.	SMO SAMPLE NO.	EPA SAMPLE NO.
GJ881	DSX44203	GK958	DSX44201
GJ882	DSX44204	GK959	DSX44202
**GJ883	**DSX44205	GK960	DSX44301
GJ884	DSX44206	GK961	DSX44301D
GJ885	DSX44206D	GK962	DSX44302
GJ886	DSX44207F	GK963	DSX44304
**GJ887	**DSX44208	GK964	DSX44304D
*GJ888	*DSX44209F	GK965	DSX44900P
GJ889	DSX44303	GJ868	DSX44010

* Volatile analysis only.
** Rinsate blanks.

GENERAL

Case 15978 contained 18 water environmental and 18 QC samples analyzed for volatiles and base/neutrals and acids at the low level concentration. Two field blanks, three field duplicates, and one performance evaluation sample were included in this data review assignment. Data review was performed at level 2.

1. **TECHNICAL HOLDING TIMES and PRESERVATION**

A. Technical holding times for volatile analyses were exceeded by 3-6 days for aromatic compounds in samples DSX44209F, DSX44303, and DSX44010 and all compounds by 16 days in samples DSX44206RE and DSX44206DRE. Benzene, ethylbenzene, and total xylenes in sample DSX44010 were qualified with a "J" code according to the holding time/preservation rules.

B. Technical extraction and analysis holding times and required preservation were within quality control limit requirements on all samples for base/neutral and acid analyses.

2. **GC/MS TUNING**

A. All volatile GC/MS tunings and mass calibrations were within quality control limit requirements for bromofluorobenzene (BFB).

B. All base/neutral and acid GC/MS tunings and mass calibration were within quality control limit requirements for decafluorotriphenylphosphine (DFTPP).

3. **INITIAL and CONTINUING CALIBRATION**

A. Acetone, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone were outside quality control limit requirements for percent relative standard deviation (greater than 30%) on the initial volatile calibrations. Since all associated data were non-detect or qualified by other rules, no data were qualified based on the initial calibration rules.

B. Acetone, 2-butanone, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, and carbon disulfide were outside quality control limit requirements for percent difference (%D) (greater than 25%) on the volatile continuing calibrations. Acetone in sample DSX44908M was qualified with a "J" code based on the continuing calibration rules.

C. 2,4-dinitrophenol, 4-nitrophenol, pentachlorophenol, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, hexachlorocyclopentadiene, 4,6-dinitro-2-methyl phenol, pyrene, and butylbenzylphthalate were outside quality control limit requirements for percent difference (%D) (greater than 25%) on the base/neutral and acid continuing calibrations. 4-nitrophenol and bis(2-ethylhexyl)phthalate in sample DSX44900P and pyrene in sample DSX44010 were qualified with a "J" by the calibration rules.

D. All compounds were within quality control limit requirements for average relative response factor and response factor on the volatile and base/neutral and acid initial and continuing calibrations.

4. **INTERNAL STANDARD RESPONSE**

A. All internal standard response areas were within a factor of 2 when comparing samples and their associated continuing calibration response areas.

5. **BLANKS**

A. Six method blanks were analyzed for the volatile fraction with methylene chloride and acetone reported at levels greater than the instrument detection limit (IDL) but less than the contract required quantitation limit (CRQL) (except acetone in sample DSX44908M which was greater than the CRQL). Acetone in samples DSX44301D and DSX44302 were qualified with a "U" code according to the blank rules.

B. Two method blanks were analyzed for base/neutrals and acids with phenol and bis(2-ethylhexyl)phthalate reported levels greater than the instrument detection limit (IDL) but less than the contract required quantitation limit (CRQL). Since all associated data were non-detect, no data were qualified by the blank rules.

C. Two field blanks, DSX44207F and DSX44209F and two rinsate blanks, DSX44205 and DSX44208 were analyzed for volatiles with methylene chloride, chloroform, and toluene reported at levels greater than the instrument detection limit (IDL) but less than the contract required quantitation limit (CRQL). Methylene chloride in sample DSX44900P was qualified with a "U" code according to the blank rules.

D. One field blank, DSX44207F and two rinsate blanks, DSX44205 and DSX44208 were analyzed for base/neutrals and acids with bis(2-ethylhexyl)phthalate reported at levels greater than the instrument detection limit (IDL) but less than the contract required quantitation limit (CRQL). Since all associated data were non-detect, no data were qualified by the blank rules.

6. **SURROGATE RECOVERY**

A. All surrogates were within quality control limit requirements for percent recovery for the volatile fraction except toluene-d8 in samples DSX44206D and DSX44206MS. Upon reanalysis of the samples, the surrogates were within quality control limit requirements. Data was reported from the original sample due to the holding time criterion being exceeded and since all compounds were non-detect, no data were qualified by the surrogate recovery rules.

B. All base/neutral and acid surrogates were within quality control limit requirements for percent recovery.

7. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE**

A. A matrix spike/matrix spike duplicate was analyzed for volatiles and was within quality control limit requirements for percent recovery and relative percent difference.

B. A matrix spike/matrix spike duplicate was analyzed for base/neutrals and acids with 4-nitrophenol outside quality control limit requirements for percent recovery in the matrix spike and matrix spike duplicate and 2,4-dinitrotoluene for percent recovery in the matrix spike duplicate. All spiking compounds were within quality control limits for relative percent difference. No data were qualified by the matrix spike/matrix spike duplicate rules.

8. **PERFORMANCE EVALUATION SAMPLE**

A. Performance evaluation sample, DSX44900P, was submitted to the laboratory for volatile analysis with all compounds contained in the audit identified except dichloromethane and 2-chloroethyl ethyl ether. O-dichlorobenzene was reported as an isomer. No data were qualified by the performance evaluation sample.

B. Performance evaluation sample, DSX44900P, was submitted to the laboratory for base/neutral and acid analysis with all compounds contained in the audit identified except 4-chlorobenzotrifluoride, m-chlorotoluene, 2,4-dichlorotoluene, 1,3,5-trichlorobenzene or 1,2,3,-trichlorobenzene, and 2,4,6-trichloroaniline. 1,3,5-trichlorobenzene or 1,2,3-trichlorobenzene was reported as an unknown trichlorobenzene and 1,2,4,5-tetrachlorobenzene and 1,2,3,4-tetrachlorobenzene as an unknown tetrachlorobenzenes. Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were also reported. No data were qualified by the performance evaluation sample.

9. **COMPOUND IDENTIFICATION and QUANTITATION**

A. All target compound identifications were supported by good agreement between sample and standard mass spectra submitted for each positive sample response.

B. In a level 2 review, no calculations from raw data (quantitation reports) are performed.

C. Several compounds in each fraction were "U" coded due to the concentration being greater than the instrument detection limit (IDL) but less than the contract required quantitation limit (CRQL).

10. **SUMMARY**

A. Benzene, ethylbenzene, and total xylenes in sample DSX44010 were qualified with a "J" code due to the holding times being exceeded.

B. Acetone in volatile sample DSX44908M was qualified with a "J" code due to the continuing calibration criterion for percent difference being exceeded.

C. 4-nitrophenol and bis(2-ethylhexyl)phthalate in base/ neutral and acid sample DSX44900P and pyrene in sample DSX44010 were qualified with a "J" due to the continuing calibration criterion for percent difference being exceeded.

D. Acetone in samples DSX44301D and DSX44302 and methylene chloride in sample DSX44900P were qualified with a "U" code due to blank contamination.

E. This data package generally meets the requirements for precision, accuracy, and completeness as described in SOW for Organic Analysis dated March 1990, with the exceptions noted above.

ENVIRONMENTAL SERVICES ASSISTANCE TEAM – ZONE II

ICF Technology Incorporated

NSI Technology Services Corp.

The Bionetics Corp.

ESAT Region VII
NSI Technology Services
25 Funston Road
Kansas City, KS 66115
(913) 236-3881

TO: Larry Marchin/Barry Evans
Data Review Task Monitor

THRU: Harold Brown, Ph.D.
ESAT Deputy Project Officer, EPA

FROM: Kevin Ludwikoski
ESAT Data Reviewer

THRU: Ronald A. Ross
ESAT Team Manager

DATE: May 7, 1991
SUBJECT: Review of inorganic data for **Laclede Coal Gas Co.**

TID# 07-9103-535
ASSIGNMENT# 779
ICF ACCT# 302-26-535-02
ManTech S.O.# 1073-535
ESAT Document No. ESAT-VII-535-0026

These data were reviewed primarily according to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1988 revision with changes given in the Region VII Inorganic Data Review Training Manual and EPA memorandums.

The following comments and attached data sheets are a result of the ESAT review, according to EPA policies, of the following data from the contract laboratory.

CASE NO.: **15978**
SITE: **Laclede Coal Gas Co.**
REVIEWER: Kevin Ludwikoski

LABORATORY: **SKINER**
METHOD NO.: CS0390I
EPA ACTIVITY NO.: **DSX44**
MATRIX: **WATER**

TOTAL METALS and CN^-
(WATER)

SMO Sample No.	EPA Sample No.	SMO Sample No.	EPA Sample No.
MGG575	DSX44203	MGG582	DSX44206D
MGG577	DSX44204	MGG584	DSX44207F
MGG579	DSX44205F	MGG586	DSX44208F
MGG580	DSX44206	MGG588	DSX44303
(MGG581	DSX44206)*		

* See discussion

GENERAL

This data review assignment covers EIGHT WATER samples analyzed for TOTAL METALS and CYANIDE for case number 15978. There was one field blank (DSX44207F), two rinsates (DSX44205F and DSX44208F), and one field duplicate included with this assignment.

1. Technical Holding Times / Preservation

Technical holding times were observed for all analytes.

2. Initial and Continuing Calibration

All percent recoveries were within control limits.

3. Blanks

Several analytes were detected in the blanks. Corresponding sample results were qualified according to the blank rule using five times the highest blank value. Sample results requiring modification are reported as non-detect on the attached data sheets.

TOTAL METALS and CN^-
(WATER)

Analyte	5 x Highest Blank (µg/L)	Qualified Samples
Al	1550	None qualified
Ag	11	None qualified
Ca	250500	DSX44203, -204, -206, -206L, -206D, -208F, -303, -920C
Cr	78	DSX44206D, -303
Co	12	None qualified
Cu	985	DSX44203, -204, -206, -206L, -206D, -206S, -920C
Pb	158	DSX44205F, -207F, -303, -920C
Mg	96500	DSX44203, -204, -206, -206D, -206L, -303, -920C
Na	92500	DSX44204, -303, -920C
Ni	43	None qualified
K	19900	DSX44206, -206D, -206L, -303
Zn	316	DSX44205F, -207F, -303
As	10	None qualified
Ba	247	None qualified
Fe	24850	DSX44204, -205F, -920C
Mn	196	DSX44205F
CN^-	64	None qualified

4. **ICP Interference Check**

Recoveries of solution AB analytes were within control limits. K, Sb, Zn, and Na were found but not present in the ICS solution. All absolute values for these analytes were below the CRDL and IDL; therefore, no data were qualified by the ICP interference check sample.

5. **Laboratory Control Standard (LCS)**

LCS results were within established control limits.

6. **Duplicates**

The RPD for As exceeded control limits. The sample results that were coded J are listed below.

TOTAL METALS and CN^-
(WATER)

Analyte	Samples Qualified	Code
As	DSX44203, -206, -206D, -206S, -920C	J

7. **Matrix Spike Sample**

As, Cr, Se, Tl and CN^- were out of range for matrix spike recovery. The samples that had data qualified are listed below.

TOTAL METALS
(WATER)

Analyte	% Rec	Sample No.	Code
As	63.4	DSX44203, -206, -206D, -206L, -920C	J
Cr	74.3	DSX44208F -920C	J
Se	0.0	DSX44203, -204, -205, -206, -206D, -206L -207F, -208, -303	I
		DSX44920C	J
Tl	14.5	DSX44203, -204, -205, -206, -206D, -206L -207F, -208, -303	I
		DSX44920C	J
CN^-	66.9	DSX44203, -204, -205	J

Note: Samples DSX44206D and DSX44303 were above the CRDL, but had been previously "U" coded for Cr according to the blank rule.

Note: All samples that were "J" coded for As, with the exception of DSX44206L, had been "J" coded for As according to the duplicate rule.

8. **ICP Serial Dilution**

The ICP serial dilution results were within control limits for all analytes of interest.

9. **Furnace Atomic Absorption**

The analytical scheme was followed for Furnace AA analysis. MSA correlation coefficients were acceptable for As in sample DSX44206 (cc=.9970).

10. **Discussion**

Sample numbers MGG580 and MGG581 both had an EPA sample number DSX44206. Sample MGG581 had been filtered in the field for Dissolved Metals analysis but was included in the Total Metals package. Both aliquots were analyzed as different samples for Total Metals. Therefore, sample MGG580 was reported as DSX44206 and MGG581 was not reported.

11. **Summary**

Ten analytes had samples that were qualified by the blank rule, one by the duplicate rule, and five by the spike rule.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
25 FUNSTON ROAD
KANSAS CITY, KANSAS 66115

DATE: 3/26/91

SUBJECT: Activity Number: DSX44
Site Description: Lacleede Coal Gas

FROM: D. Simmons D Simmons
CLQA-LABO-ENSV

TO: LABO Primary File

Comments regarding the subject activity are as follows:

#301 TPHs sample was broken.

TABLE OF CODES

SAMP. NO. = SAMPLE IDENTIFICATION NUMBER
QCC = QUALITY CONTROL SAMPLE/AUDIT CODE
M = MEDIA OF SAMPLE (A=AIR, T=TISSUE, H=HAZARDOUS MATERIAL, S=SEDIMENT/SOIL, W=WATER)
AIRS/STORET LOC. NO. = A SAMPLING SITE LOCATION IDENTIFICATION NUMBER
BEG. DATE = THE DATE SAMPLING WAS STARTED
BEG. TIME = THE TIME SAMPLING WAS STARTED
END. DATE = THE DATE SAMPLING WAS ENDED
END. TIME = THE TIME SAMPLING WAS STOPPED
A = RESERVED
B = RESERVED
PES = PESTICIDES BY CONTRACT
= DIOXINS/FURANS BY EPA
E = EXPLOSIVES BY CONTRACT
FLD = FIELD MEASUREMENTS BY EPA
G = MINERALS & DISSOLVED MATERIALS BY EPA
HER = HERBICIDES BY EPA
I = ION CHROMATOGRAPHY ANALYSES BY EPA
MC = METALS BY CONTRACT
BNC = BASE NEUTRALS BY CONTRACT
L = FISH PHYSICAL DATA BY EPA
MET = METALS BY EPA
N = FISH TISSUE PARAMETERS BY EPA
VC = VOLATILES BY CONTRACT
P = PESTICIDES BY EPA
Q = FLASH POINT ANALYSES BY EPA
R = RESERVED
BN = SEMIVOLATILE BY EPA
T = CYANIDE PHENOL BY EPA
U = RESERVED
VOA = VOLATILE ORGANICS BY EPA
HC = HERBICIDES BY CONTRACT
X = RESERVED
Y = RESERVED
TRK = ACTIVITY TRACKING PARAMETERS BY EPA

STORET DETECTION IDENTIFIERS
BLANK = NO REMARKS
J = DATA REPORTED BUT NOT VALID BY APPROVED QC PROCEDURES
I = INVALID SAMPLE/DATA - VALUE NOT REPORTED
U = LESS THAN (MEASUREMENT DETECTION LIMIT)
M = DETECTED BUT BELOW THE LEVEL FOR ACCURATE QUANTIFICATION
D = PARAMETER NOT ANALYZED

CONTRACTOR/ IN HOUSE / FIELD MEDIA GROUPS
FIELD = * * * = AF,HF,SF,TF,WF,ZZ
CONTRACTOR = * = HA,HC,HJ,HK,HO,SC,SJ,SK,SO,SW,TC,TJ, TK,TO,TW,WA,WC,WE,WJ,WK,WO,WW
IN HOUSE = * = ALL OTHERS

QUALITY CONTROL AUDIT CODES
A = TRUE VALUE FOR CALIBRATION STANDARD
B = CONCENTRATION RESULTING FROM DUPLICATE LAB SPIKE
C = MEASURED VALUE FOR CALIBRATION STANDARD
D = MEASURED VALUE FOR FIELD DUPLICATE
F = MEASURED VALUE FOR FIELD BLANK
G = MEASURED VALUE FOR METHOD STANDARD
H = TRUE VALUE FOR METHOD STANDARD
K = CONCENTRATION RESULTING FROM DUPLICATE FIELD SPIKE
L = MEASURED VALUE FOR LAB DUPLICATE
M = MEASURED VALUE FOR LAB BLANK
N = MEASURED VALUE FOR DUPLICATE FIELD SPIKE
P = MEASURED VALUE FOR PERFORMANCE STANDARD
R = CONCENTRATION RESULTING FROM LAB SPIKE
S = MEASURED VALUE FOR LAB SPIKE
T = TRUE VALUE OF PERFORMANCE STANDARD
W = MEASURED VALUE FOR DUPLICATE LAB SPIKE
Y = MEASURED VALUE FOR FIELD SPIKE
Z = CONCENTRATION RESULTING FROM FIELD SPIKE

MEDIA CODES
A = AIR
T = BIOLOGICAL (PLANT & ANIMAL) TISSUE
H = HAZARDOUS MATERIALS/MAN MADE PRODUCTS
S = SEDIMENT, SLUDGE & SOIL
W = WATER

UNITS
NA = NOT APPLICABLE
PG = PICOGRAMS (1 X 10-12 GRAMS)
NG = NANOGRAMS (1 X 10-9 GRAMS)
UG = MICROGRAMS (1 X 10-6 GRAMS)
MG = MILLIGRAMS (1 X 10-3 GRAMS)
M3 = METER CUBED
MPH = MILES PER HOUR
SCM = STANDARD (1 ATM, 25 C) CUBIC METER
KG = KILOGRAM
L = LITER
C = CENTIGRADE DEGREES
SU = STANDARD (PH) UNITS
# = NUMBER
LB = POUNDS
IN = INCHES
M/F = MALE/FEMALE
M2 = SQUARE METER
I.D. = SPECIES IDENTIFICATION
GPM = GALLONS PER MINUTE
CFS = CUBIC FEET PER SECOND
MGD = MILLION GALLONS PER DAY
1000G= FLOW, 1000 GALLONS PER COMPOSITE
UMHOS= CONDUCTIVITY UNITS (1/OHMS)
NTU = TURBIDITY UNITS
PC/L = PICO (1 X 10-12) CURRIES PER LITER
MV = MILLIVOLT
SQ FT= SQUARE FEET
P/CM2= PICOGRAMS PER SQ. CENTIMETER
U/CM2= MICROGRAMS PER SQ. CENTIMETER

ANALYSIS REQUEST REPORT

VALIDATED DATA

FOR ACTIVITY: DSX44

S P F D

06/12/91 16:34:32

* FINAL REPORT

FY: 91 ACTIVITY: DSX44 DESCRIPTION: LACLEDE COAL GAS LOCATION: MISSOURI

STATUS: ACTIVE TYPE: SAMPLING - CONTRACT LAB ANALYSIS PROJECT: A34

LABO DUE DATE IS 5/14/91. REPORT DUE DATE IS 5/28/91.

INSPECTION DATE: 3/14/91 ALL SAMPLES RECEIVED DATE: 03/15/91

ALL DATA APPROVED BY LABO DATE: 06/12/91 FINAL REPORT TRANSMITTED DATE: 06/21/91

EXPECTED LABO TURNAROUND TIME IS 60 DAYS EXPECTED REPORT TURNAROUND TIME IS 75 DAYS

ACTUAL LABO TURNAROUND TIME IS 89 DAYS ACTUAL REPORT TURNAROUND TIME IS 99 DAYS

SAMP. NO.	QCC	M	DESCRIPTION	SAMPLE STATUS	# CONT.	CITY	STATE	AIRS/ STORET LOC NO	BEG. DATE	BEG. TIME	END. DATE	END. TIME
001		S	BACKGROUND SAMPLE-CSI-A	1	4	ST. LOUIS	MISSOURI		03/07/91	15:36	/ /	:
002		S	BACKGROUND SAMPLE-CSI-B	1	4	ST. LOUIS	MISSOURI		03/07/91	11:00	/ /	:
003		S	BACKGROUND SAMPLE-CSI-C	1	4	ST. LOUIS	MISSOURI		03/07/91	16:45	/ /	:
004		S	BACKGROUND SAMPLE-CSI-D	1	4	ST. LOUIS	MISSOURI		03/07/91	16:55	/ /	:
005		S	BACKGROUND SAMPLE-CSI-E	1	4	ST. LOUIS	MISSOURI		03/07/91	17:15	/ /	:
006		S	BORING LOCAL.#6-B-06-CS2	1	4	ST. LOUIS	MISSOURI		03/08/91	09:20	/ /	:
007		S	BORING LOCAL.#6-R-06-CS2	1	4	ST. LOUIS	MISSOURI		03/08/91	09:35	/ /	:
008		S	R-06-CS3 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	11:07	/ /	:
009		S	B-14-CS4 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	13:50	/ /	:
010		W	B14-CS4 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	14:20	/ /	:
011		S	B-07-CS6 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	17:35	/ /	:
012		S	R13-CS7 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/09/91	09:24	/ /	:
013		S	B13-CS7 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/09/91	09:45	/ /	:
101		S	BORING LOCATION-01/MOUND STR POWER	1	3	ST. LOUIS	MISSOURI		03/04/91	13:05	/ /	:
102		S	BORING LOCATION 02	1	3	ST. LOUIS	MISSOURI		03/02/91	14:20	/ /	:
103		S	SURFACE SOIL AT EAST CENTRAL OF TANK	1	3	ST. LOUIS	MISSOURI		03/04/91	15:30	/ /	:
104		S	BORING LOCATION 05	1	3	ST. LOUIS	MISSOURI		03/04/91	17:25	/ /	:
105		S	BETWEEN TANKS 7-8/BORING 07	1	3	ST. LOUIS	MISSOURI		03/05/91	13:50	/ /	:
106		S	BORING LOCATION-15	1	3	ST. LOUIS	MISSOURI		03/06/91	14:10	/ /	:
107		S	BORING LOCATION -16	1	3	ST. LOUIS	MISSOURI		03/06/91	15:15	/ /	:
108		S	BORING LOCATION-17	1	3	ST. LOUIS	MISSOURI		03/06/91	15:45	/ /	:
109		S	BORING LOCATION-18	1	3	ST. LOUIS	MISSOURI		03/06/91	16:53	/ /	:
110		S	R19-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/14/91	07:45	/ /	:
111		S	R20-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/14/91	07:30	/ /	:
112		S	B21-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/13/91	17:30	/ /	:

VALIDATED DATA

SAMP. NO.	QCC	M	DESCRIPTION	SAMPLE STATUS	# CONT.	CITY	STATE	AIRS/ STORET LOC NO	BEG. DATE	BEG. TIME	END. DATE	END. TIME
201		W	SAMPLE LOCATION-MULLANPHY STR./RR TRAC	1	8	ST. LOUIS	MISSOURI		03/05/91	17:15	/ /	:
202		W	SAMPLE LOCATION-TERMINAL RR ASSOC. ETC	1	8	ST. LOUIS	MISSOURI		03/06/91	10:00	/ /	:
203		W	ENGINEERING TEST WELL(147 FT. NORTH)	1	7	ST. LOUIS	MISSOURI		03/07/91	14:30	/ /	:
204		W	ENGINEERING TEST WELL-363FT.NORTH	1	7	ST. LOUIS	MISSOURI		03/07/91	16:45	/ /	:
205	F	W	EQUIPMENT RINSATE BLANK	1	4	ST. LOUIS	MISSOURI		03/09/91	08:30	/ /	:
206		W	ENGINEERING TEST WELL-20FT. WEST	1	7	ST. LOUIS	MISSOURI		03/09/91	10:27	/ /	:
206	D	W	ENGINEERING TEST WELL-20FT. WEST	1	7	ST. LOUIS	MISSOURI		03/09/91	10:27	/ /	:
207	F	W	LACLEDE COAL GAS FIELD BLANK	1	6	ST. LOUIS	MISSOURI		03/09/91	12:18	/ /	:
208	F	W	GEOPROBE PIPE RINSATE BLANK SAMPLE	1	5	ST. LOUIS	MISSOURI		03/08/91	11:00	/ /	:
209	F	W	LACLEDE COAL GAS TRIP BLANK	1	1	ST. LOUIS	MISSOURI		03/09/91	12:30	/ /	:
301		W	SAMPLE LOCATION-ABANDONED PUMP HOUSE	1	9	ST. LOUIS	MISSOURI		03/06/91	14:45	/ /	:
301	D	W	DUP. SAMPLE-LOC/ABANDONED PUMP HOUSE	1	9	ST. LOUIS	MISSOURI		03/06/91	14:45	/ /	:
302		W	SAMPLE LOCATION-UPSTREAM OF NE CORN.	1	9	ST. LOUIS	MISSOURI		03/06/91	17:15	/ /	:
303		W	SW SAMPLE/MISS. RIVER	1	8	ST. LOUIS	MISSOURI		03/07/91	14:00	/ /	:
304		W	SAMPLE LOCATION-ILL.AMERICAN DRNK.WATR	1	9	ST. LOUIS	MISSOURI		03/07/91	08:55	/ /	:
304	D	W	DUP. SAMPLE-LOC/ILL. AMERICAN DRNK.H2O	1	9	ST. LOUIS	MISSOURI		03/07/91	08:55	/ /	:
401		S	SEDIMENT SAMPLE/GRAB SAMPLE	1	5	ST. LOUIS	MISSOURI		03/06/91	15:30	/ /	:
401	D	S	SEDIMENT SAMPLE/GRAB SAMPLE	1	5	ST. LOUIS	MISSOURI		03/06/91	15:30	/ /	:
402		S	SEDIMENT SAMPLE/GRAB-SW SAMPLE#302	1	5	ST. LOUIS	MISSOURI		03/06/91	17:35	/ /	:
403		S	SEDIMENT SAMPLE/GRAB/MISS RIVER	1	5	ST. LOUIS	MISSOURI		03/07/91	14:15	/ /	:
501		S	LACLEDE COAL GAS-OIL SAMPLE	0	0	ST. LOUIS	MISSOURI		03/09/91	09:15	/ /	:

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

	COMPOUND	UNITS	001		002		003		004		005	
SM01	SILVER BY ICAP	MG/KG	2.4	U	2.3	U	2.6	U	2.6	U	2.9	U
SM02	ALUMINUM BY ICAP	MG/KG	7500		8600		13000		15000		14000	
SM03	ARSENIC BY ICAP	MG/KG	7.7		5.7		8.1		10		6.7	
SM04	BARIUM BY ICAP	MG/KG	130		120		170		120		230	
SM05	BERYLLIUM BY ICAP	MG/KG	1.2	U	1.2	U	1.3	U	1.3	U	1.5	U
SM06	CADMIUM BY ICAP	MG/KG	1.2	U	1.2	U	1.3	U	1.3	U	1.5	U
SM07	COBALT BY ICAP	MG/KG	12	U	12	U	13	U	13	U	15	U
SM08	CHROMIUM BY ICAP	MG/KG	11		9.9		14		14		15	
SM09	COPPER BY ICAP	MG/KG	56		33		26		20		22	
SM10	IRON BY ICAP	MG/KG	29000		76000		19000		21000		19000	
SM11	MANGANESE BY ICAP	MG/KG	320	J	430	J	1700	J	660	J	920	J
SM12	MOLYBDENUM BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM13	NICKEL BY ICAP	MG/KG	17		14		20		18		22	
SM14	LEAD BY ICAP	MG/KG	250	J	78	J	52	J	19	J	26	J
SM15	ANTIMONY BY ICAP	MG/KG	14	U	14	U	16	U	16	U	18	U
SM16	SELENIUM BY ICAP	MG/KG	3.0		2.6	J	1.3	U	1.3	U	1.5	U
SM17	TITANIUM BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM18	THALLIUM BY ICAP	MG/KG	2.4	U	2.3	U	2.6	U	2.6	U	2.9	U
SM19	VANADIUM BY ICAP	MG/KG	25		23		33		32		33	
SM20	ZINC BY ICAP	MG/KG	120		85		65		53		64	
SM21	CALCIUM BY ICAP	MG/KG	59000		47000		16000		3200		15000	
SM22	MAGNESIUM BY ICAP	MG/KG	2300		2500		2900		2900		1900	
SM23	SODIUM BY ICAP	MG/KG	1200	U	1200	U	1300	U	1300	U	1500	U
SM24	POTASSIUM BY ICAP	MG/KG	1200	U	1200	U	1300	U	1400		2100	
SS01	PHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS02	CARBAZOLE	UG/KG	370	U	400	U	440	U	430	U	630	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	001		002		003		004		005	
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	370	U	400	U	440	U	430	U	630	U
SS04 2-CHLOROPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS05 1,3-DICHLOROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS06 1,4-DICHLOROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS07 BENZYL ALCOHOL	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS08 1,2-DICHLOROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	370	U	400	U	440	U	430	U	630	U
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	370	U	400	U	440	U	430	U	630	U
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	370	U	400	U	440	U	430	U	630	U
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS13 HEXACHLOROETHANE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS14 NITROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS15 ISOPHORONE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS16 2-NITROPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS17 2,4-DIMETHYLPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS18 BENZOIC ACID	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS20 2,4-DICHLOROPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS22 NAPHTHALENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS23 4-CHLOROANILINE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS24 HEXACHLOROBUTADIENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U
SS26 2-METHYLNAPHTHALENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	370	U	400	U	440	U	430	U	630	U

COMPOUND	UNITS	001		002		003		004		005	
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS30 2-CHLORONAPHTHALENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS31 2-NITROANILINE	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS32 DIMETHYLPHTHALATE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS33 ACENAPHTHYLENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS34 3-NITROANILINE	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS35 ACENAPHTHENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS36 2,4-DINITROPHENOL	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS37 4-NITROPHENOL	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS38 DIBENZOFURAN	UG/KG	370	U	400	U	440	U	430	U	630	U
SS39 2,4-DINITROTOLUENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS40 2,6-DINITROTOLUENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS41 DIETHYLPHTHALATE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	370	U	400	U	440	U	430	U	630	U
SS43 FLUORENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS44 4-NITROANILINE	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS46 N-NITROSODIPHENYLAMINE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	370	U	400	U	440	U	430	U	630	U
SS48 HEXACHLOROBENZENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS49 PENTACHLOROPHENOL	UG/KG	900	U	970	U	1100	U	1000	U	1500	U
SS50 PHENANTHRENE	UG/KG	1400		400	U	440	U	430	U	630	U
SS51 ANTHRACENE	UG/KG	380		400	U	440	U	430	U	630	U
SS52 DI-N BUTYL PHTHALATE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS53 FLUORANTHENE	UG/KG	2000		520		540		430	U	630	U
SS54 PYRENE	UG/KG	1800		530		800		430	U	630	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	001		002		003		004		005	
SS55 BUTYL BENZYL PHTHALATE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS57 BENZO(A)ANTHRACENE	UG/KG	800		400	U	440	U	430	U	630	U
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	960	J	1300	J	1200	J	1600	J	2500	J
SS59 CHRYSENE	UG/KG	1800		400	U	440		430	U	630	U
SS60 DI-N-OCTYL PHTHALATE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS61 BENZO(B)FLUORANTHENE	UG/KG	1600		400	U	440	U	430	U	630	U
SS62 BENZO(K)FLUORANTHENE	UG/KG	1400		400	U	440	U	430	U	630	U
SS63 BENZO(A)PYRENE	UG/KG	1500		400	U	440	U	430	U	630	U
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	930		400	U	440	U	430	U	630	U
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	370	U	400	U	440	U	430	U	630	U
SS66 BENZO(G,H,I)PERYLENE	UG/KG	1200		400	U	440	U	430	U	630	U
ST09 CYANIDE	MG/KG	26		24		6.5	U	6.6	U	7.4	U
SV03 CHLOROMETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV04 BROMOMETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV05 VINYL CHLORIDE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV06 CHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV07 METHYLENE CHLORIDE	UG/KG	20	U	27	U	13	U	13	U	14	U
SV08 1,1-DICHLOROETHYLENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV09 1,1-DICHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV10 TRANS-1,2-DICHLOROETHYLENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV11 CHLOROFORM	UG/KG	12	U	12	U	13	U	13	U	14	U
SV12 1,2-DICHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV13 1,1,1-TRICHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV14 CARBON TETRACHLORIDE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV15 BROMODICHLOROMETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	001		002		003		004		005	
SV16 1,2-DICHLOROPROPANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV17 BENZENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV18 TRANS-1,3-DICHLOROPROPENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV19 TRICHLOROETHYLENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV20 CIS-1,3-DICHLOROPROPENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV21 DIBROMOCHLOROMETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV22 1,1,2-TRICHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV24 BROMOFORM	UG/KG	12	U	12	U	13	U	13	U	14	U
SV25 1,1,2,2-TETRACHLOROETHENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV26 TOLUENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV27 1,1,2,2-TETRACHLOROETHANE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV28 CHLOROBENZENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV29 ETHYL BENZENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV30 ACETONE	UG/KG	16	U	63	U	40	U	33	U	53	J
SV31 CARBON DISULFIDE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV32 2-BUTANONE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV33 VINYL ACETATE	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SV34 2-HEXANONE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV35 4-METHYL-2-PENTANONE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV36 STYRENE	UG/KG	12	U	12	U	13	U	13	U	14	U
SV37 XYLENES, TOTAL	UG/KG	12	U	12	U	13	U	13	U	14	U
Z201 SAMPLE NUMBER	NA	001		002		003		004		005	
Z202 ACTIVITY CODE	NA	DSX44		DSX44		DSX44		DSX44		DSX44	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND		UNITS	3-8' 006		8-13 007		5-12 008		4-8' 009		010
SM01 SILVER	BY ICAP	MG/KG	2.2	U	2.6	U	2.6	U	2.8	U	
SM02 ALUMINUM	BY ICAP	MG/KG	2500		8600		9300		4500		
SM03 ARSENIC	BY ICAP	MG/KG	4.3		8.5		18		8.5		
SM04 BARIUM	BY ICAP	MG/KG	92		260		160		250		
SM05 BERYLLIUM	BY ICAP	MG/KG	1.1	U	1.3	U	1.3	U	1.4	U	
SM06 CADMIUM	BY ICAP	MG/KG	1.1	U	1.3	U	1.3	U	1.4	U	
SM07 COBALT	BY ICAP	MG/KG	11	U	13	U	13	U	14	U	
SM08 CHROMIUM	BY ICAP	MG/KG	9.5		12		13		14		
SM09 COPPER	BY ICAP	MG/KG	32		20		27		21		
SM10 IRON	BY ICAP	MG/KG	7200		17000		41000		16000		
SM11 MANGANESE	BY ICAP	MG/KG	170		720		430		180		
SM12 MOLYBDENUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	
SM13 NICKEL	BY ICAP	MG/KG	9.0	U	20		16		11	U	
SM14 LEAD	BY ICAP	MG/KG	78	J	55	J	57	J	580	J	
SM15 ANTIMONY	BY ICAP	MG/KG	13	U	16	U	16	U	17	U	
SM16 SELENIUM	BY ICAP	MG/KG	2.1		1.3	U	1.3	U	1.4	U	
SM17 TITANIUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	
SM18 THALLIUM	BY ICAP	MG/KG	2.2	U	2.6	U	2.6	U	2.8	U	
SM19 VANADIUM	BY ICAP	MG/KG	11	U	22		29		18		
SM20 ZINC	BY ICAP	MG/KG	110	J	53	J	71	J	200	J	
SM21 CALCIUM	BY ICAP	MG/KG	35000		5200		3100		25000		
SM22 MAGNESIUM	BY ICAP	MG/KG	3100		3000		2400		1800		
SM23 SODIUM	BY ICAP	MG/KG	1100	U	1300	U	1300	U	1400	U	
SM24 POTASSIUM	BY ICAP	MG/KG	1100	U	1300	U	1300	U	1400	U	
SS01 PHENOL		UG/KG	11000	U	12000	U	13000	U	12000	U	
SS02 CARBAZOLE		UG/KG	11000	U							

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006		007		008		009		010
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS30 2-CHLORONAPHTHALENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS31 2-NITROANILINE	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS32 DIMETHYLPHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS33 ACENAPHTHYLENE	UG/KG	11000	U	12000	U	15000		12000	U	
SS34 3-NITROANILINE	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS35 ACENAPHTHENE	UG/KG	11000	U	12000	U	32000		12000		
SS36 2,4-DINITROPHENOL	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS37 4-NITROPHENOL	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS38 DIBENZOFURAN	UG/KG	11000	U	12000	U	25000		12000	U	
SS39 2,4-DINITROTOLUENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS40 2,6-DINITROTOLUENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS41 DIETHYLPHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS43 FLUORENE	UG/KG	20000		12000	U	[redacted]		3000		
SS44 4-NITROANILINE	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS46 N-NITROSODIPHENYLAMINE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS48 HEXACHLOROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS49 PENTACHLOROPHENOL	UG/KG	58000	U	59000	U	69000	U	59000	U	
SS50 PHENANTHRENE	UG/KG	63000		20000		[redacted]		6000		
SS51 ANTHRACENE	UG/KG	11000	U	12000	U	[redacted]		12000	U	
SS52 DI-N-BUTYL PHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS53 FLUORANTHENE	UG/KG	11000	U	12000	U	[redacted]		12000	U	
SS54 PYRENE	UG/KG	18000		[redacted]						

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006		007		008		009		010
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS04 2-CHLOROPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS05 1,3-DICHLOROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS06 1,4-DICHLOROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS07 BENZYL ALCOHOL	UG/KG	NA	O	NA	O	NA	O	NA	O	
SS08 1,2-DICHLOROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS13 HEXACHLOROETHANE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS14 NITROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS15 ISOPHORONE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS16 2-NITROPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS17 2,4-DIMETHYLPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS18 BENZOIC ACID	UG/KG	NA	O	NA	O	NA	O	NA	O	
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS20 2,4-DICHLOROPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS22 NAPHTHALENE	UG/KG	23000		87000		2200000		68000		
SS23 4-CHLOROANILINE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS24 HEXACHLOROBUTADIENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS26 2-METHYLNAPHTHALENE	UG/KG	30000		43000		69000		84000		
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	11000	U	12000	U	13000	U	12000	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006		007		008		009		010
SS55 BUTYL BENZYL PHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS57 BENZO(A)ANTHRACENE	UG/KG	18000		12000	U	20000		12000	U	
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS59 CHRYSENE	UG/KG	28000		12000	U	19000		16000		
SS60 DI-N-OCTYL PHTHALATE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS61 BENZO(B)FLUORANTHENE	UG/KG	11000	U	12000	U	61000		12000	U	
SS62 BENZO(K)FLUORANTHENE	UG/KG	11000	U	12000	U	52000		12000	U	
SS63 BENZO(A)PYRENE	UG/KG	11000	U	12000	U	35000		12000	U	
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	11000	U	12000	U	37000		12000	U	
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	11000	U	12000	U	13000	U	12000	U	
SS66 BENZO(G,H,I)PERYLENE	UG/KG	11000	U	12000	U	44000		12000	U	
ST09 CYANIDE	MG/KG	87		180		860		7.0	U	
SV03 CHLOROMETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV04 BROMOMETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV05 VINYL CHLORIDE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV06 CHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV07 METHYLENE CHLORIDE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV08 1,1-DICHLOROETHYLENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV09 1,1-DICHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV10 TRANS-1,2-DICHLOROETHYLENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV11 CHLOROFORM	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV12 1,2 DICHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV13 1,1,1-TRICHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV14 CARBON TETRACHLORIDE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV15 BROMODICHLOROMETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006		007		008		009		010
SV16 1,2-DICHLOROPROPANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV17 BENZENE	UG/KG	3500		140000		150000		19000		
SV18 TRANS-1,3-DICHLOROPROPENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV19 TRICHLOROETHYLENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV20 CIS-1,3-DICHLOROPROPENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV21 DIBROMOCHLOROMETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV22 1,1,2-TRICHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV24 BROMOFORM	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV25 1,1,2,2-TETRACHLOROETHENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV26 TOLUENE	UG/KG	1700		26000		58000		1500	U	
SV27 1,1,2,2-TETRACHLOROETHANE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV28 CHLOROBENZENE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV29 ETHYL BENZENE	UG/KG	24000		46000		96000		5500		
SV30 ACETONE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV31 CARBON DISULFIDE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV32 2-BUTANONE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV33 VINYL ACETATE	UG/KG	NA	O	NA	O	NA	O	NA	O	
SV34 2-HEXANONE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV35 4-METHYL-2-PENTANONE	UG/KG	1500	U	12000	U	16000	U	1500	U	
SV36 STYRENE	UG/KG	1500	U	42000		16000	U	1500	U	
SV37 XYLENES, TOTAL	UG/KG	28000		230000		[redacted]		9400		
WM01 SILVER BY ICAP	UG/L									ATTACHMENT
WM02 ALUMINUM BY ICAP	UG/L									ATTACHMENT
WM03 ARSENIC BY ICAP	UG/L									ATTACHMENT
WM04 BARIUM BY ICAP	UG/L									ATTACHMENT
WM05 BERYLLIUM BY ICAP	UG/L									ATTACHMENT

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

	COMPOUND	UNITS	006	007	008	009	010	
WM06	CADMIUM BY ICAP	UG/L					ATTACHMENT	
WM07	COBALT BY ICAP	UG/L					ATTACHMENT	
WM08	CHROMIUM BY ICAP	UG/L					ATTACHMENT	
WM09	COPPER BY ICAP	UG/L					ATTACHMENT	
WM10	IRON BY ICAP	UG/L					ATTACHMENT	
WM11	MANGANESE BY ICAP	UG/L					ATTACHMENT	
WM12	MOLYBDENUM BY ICAP	UG/L					ATTACHMENT	
WM13	NICKEL BY ICAP	UG/L					ATTACHMENT	
WM14	LEAD BY ICAP	UG/L					ATTACHMENT	
WM15	ANTIMONY BY ICAP	UG/L					ATTACHMENT	
WM16	SELENIUM BY ICAP	UG/L					ATTACHMENT	
WM17	TITANIUM BY ICAP	UG/L					ATTACHMENT	
WM18	THALLIUM BY ICAP	UG/L					ATTACHMENT	
WM19	VANADIUM BY ICAP	UG/L					ATTACHMENT	
WM20	ZINC BY ICAP	UG/L					ATTACHMENT	
WM21	CALCIUM, TOTAL BY ICAP	MG/L					ATTACHMENT	
WM22	MAGNESIUM, TOTAL BY ICAP	MG/L					ATTACHMENT	
WM23	SODIUM, TOTAL BY ICAP	MG/L					ATTACHMENT	
WM24	POTASSIUM, TOTAL BY ICAP	MG/L					ATTACHMENT	
WS01	PHENOL	UG/L					150	U
WS03	BIS(2-CHLOROETHYL) ETHER	UG/L					150	U
WS04	2-CHLOROPHENOL	UG/L					150	U
WS05	1,3-DICHLOROBENZENE	UG/L					150	U
WS06	1,4 DICHLOROBENZENE	UG/L					150	U
WS07	BENZYL ALCOHOL	UG/L					150	U
WS08	1,2-DICHLOROBENZENE	UG/L					150	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006	007	008	009	010	
WS09 2-METHYLPHENOL (O-CRESOL)	UG/L					150	U
WS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/L					150	U
WS11 4-METHYLPHENOL (P-CRESOL)	UG/L					150	U
WS12 N-NITROSO-DIPROPYLAMINE	UG/L					150	U
WS13 HEXACHLOROETHANE	UG/L					150	U
WS14 NITROBENZENE	UG/L					150	U
WS15 ISOPHORONE	UG/L					150	U
WS16 2-NITROPHENOL	UG/L					150	U
WS17 2,4-DIMETHYLPHENOL	UG/L					150	U
WS18 BENZOIC ACID	UG/L					150	U
WS19 BIS(2-CHLOROETHYOXY) METHANE	UG/L					150	U
WS20 2,4-DICHLOROPHENOL	UG/L					150	U
WS21 1,2,4-TRICHLOROBENZENE	UG/L					150	U
WS22 NAPHTHALENE	UG/L					890	
WS23 4-CHLOROANILINE	UG/L					150	U
WS24 HEXACHLOROBUTADIENE	UG/L					150	U
WS25 4-CHLORO-3-METHYLPHENOL	UG/L					150	U
WS26 2-METHYLNAPHTHALENE	UG/L					980	
WS27 HEXACHLOROCYCLOPENTADIENE	UG/L					150	U
WS28 2,4,6-TRICHLOROPHENOL	UG/L					150	U
WS29 2,4,5-TRICHLOROPHENOL	UG/L					150	U
WS30 2-CHLORONAPHTHALENE	UG/L					150	U
WS31 2-NITROANILINE (ORTHO NITROANILINE)	UG/L					150	U
WS32 DIMETHYLPHTHALATE	UG/L					150	U
WS33 ACENAPHTHYLENE	UG/L					150	U
WS34 3-NITROANILINE	UG/L					150	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006	007	008	009	010	
WS35 ACENAPHTHENE	UG/L					150	
WS36 2,4-DINITROPHENOL	UG/L					150	U
WS37 4-NITROPHENOL	UG/L					150	U
WS38 DIBENZOFURAN	UG/L					150	U
WS39 2,4-DINITROTOLUENE	UG/L					150	U
WS40 2,6-DINITROTOLUENE	UG/L					150	U
WS41 DIETHYLPHTHALATE	UG/L					150	U
WS42 4-CHLOROPHENYL PHENYL ETHER	UG/L					150	U
WS43 FLUORENE	UG/L					170	
WS44 4-NITROANILINE	UG/L					380	U
WS45 4,6-DINITRO-2-METHYLPHENOL	UG/L					380	U
WS46 N-NITROSODIPHENYLAMINE	UG/L					150	U
WS47 4-BROMOPHENYL PHENYL ETHER	UG/L					150	U
WS48 HEXACHLOROBENZENE	UG/L					150	U
WS49 PENTACHLOROPHENOL	UG/L					380	U
WS50 PHENANTHRENE	UG/L					610	
WS51 ANTHRACENE	UG/L					150	U
WS52 DI-N-BUTYL PHTHALATE	UG/L					150	U
WS53 FLUORANTHENE	UG/L					150	U
WS54 PYRENE	UG/L					[redacted]	
WS55 BUTYL BENZYL PHTHALATE	UG/L					150	U
WS56 3,3'-DICHLOROBENZIDINE	UG/L					150	U
WS57 BENZO(A)ANTHRACENE	UG/L					150	U
WS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/L					150	U
WS59 CHRYSENE	UG/L					180	
WS60 DI-N-OCTYL PHTHALATE	UG/L					150	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006	007	008	009	010	
WS61 BENZO(B)FLUORANTHENE	UG/L					150	U
WS62 BENZO(K)FLUORANTHENE	UG/L					150	U
WS63 BENZO(A)PYRENE	UG/L					150	U
WS64 INDENO(1,2,3-CD)PYRENE	UG/L					150	U
WS65 DIBENZO(A,H)ANTHRACENE	UG/L					150	U
WS66 BENZO(G,H,I)PERYLENE	UG/L					150	U
WS67 CARBAZOLE	UG/L					150	U
WT09 CYANIDE, TOTAL	MG/L					ATTACHMENT	
WV03 CHLOROMETHANE	UG/L					200	U
WV04 BROMOMETHANE	UG/L					200	U
WV05 VINYL CHLORIDE	UG/L					200	U
WV06 CHLOROETHANE	UG/L					200	U
WV07 METHYLENE CHLORIDE	UG/L					200	U
WV08 1,1-DICHLOROETHENE	UG/L					200	U
WV09 1,1-DICHLOROETHANE	UG/L					200	U
WV10 1,2-DICHLOROETHENE, TOTAL	UG/L					200	U
WV11 CHLOROFORM	UG/L					200	U
WV12 1,2-DICHLOROETHANE	UG/L					200	U
WV13 1,1,1-TRICHLOROETHANE	UG/L					200	U
WV14 CARBON TETRACHLORIDE	UG/L					200	U
WV15 BROMODICHLOROMETHANE	UG/L					200	U
WV16 1,2-DICHLOROPROPANE	UG/L					200	U
WV17 BENZENE	UG/L					3100	J
WV19 TRICHLOROETHENE	UG/L					200	U
WV20 CIS 1,3-DICHLOROPROPENE	UG/L					200	U
WV21 DIBROMOCHLOROMETHANE	UG/L					200	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	006	007	008	009	010	
WV22 1,1,2-TRICHLOROETHANE	UG/L					200	U
WV24 BROMOFORM	UG/L					200	U
WV25 TETRACHLOROETHENE	UG/L					200	U
WV26 TOLUENE	UG/L					200	U
WV27 1,1,2,2-TETRACHLOROETHANE	UG/L					200	U
WV28 CHLOROBENZENE	UG/L					200	U
WV29 ETHYL BENZENE	UG/L					280	J
WV30 ACETONE	UG/L					200	U
WV31 CARBON DISULFIDE	UG/L					200	U
WV32 2-BUTANONE	UG/L					200	U
WV33 VINYL ACETATE	UG/L					200	U
WV34 2-HEXANONE	UG/L					200	U
WV35 4-METHYL-2-PENTANONE	UG/L					200	U
WV36 STYRENE	UG/L					200	U
WV37 XYLENES, TOTAL	UG/L					290	J
WV40 TRANS-1,3-DICHLOROPROPENE	UG/L					200	U
ZZ01 SAMPLE NUMBER	NA	006	007	008	009	010	
ZZ02 ACTIVITY CODE	NA	DSX44	DSX44	DSX44	DSX44	DSX44	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND		UNITS	011		012		013		101		102	
SM01 SILVER	BY ICAP	MG/KG	2.5	U	2.8	U	3.0	U	2.4	U	2.5	U
SM02 ALUMINUM	BY ICAP	MG/KG	7100		4600		3400		8400		4400	
SM03 ARSENIC	BY ICAP	MG/KG	7.6		12		10		21		12	
SM04 BARIUM	BY ICAP	MG/KG	230		56		61	U	220		78	
SM05 BERYLLIUM	BY ICAP	MG/KG	1.3	U	1.4	U	1.5	U	1.2	U	1.3	U
SM06 CADMIUM	BY ICAP	MG/KG	1.3	U	1.4	U	1.5	U	1.2	U	1.3	U
SM07 COBALT	BY ICAP	MG/KG	13	U	14	U	15	U	12	U	13	U
SM08 CHROMIUM	BY ICAP	MG/KG	11		21		17		19		9.6	
SM09 COPPER	BY ICAP	MG/KG	24		83		130		140		36	
SM10 IRON	BY ICAP	MG/KG	30000		120000		19000		45000		23000	
SM11 MANGANESE	BY ICAP	MG/KG	260		210		150		350		140	
SM12 MOLYBDENUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM13 NICKEL	BY ICAP	MG/KG	17		24		15		28		17	
SM14 LEAD	BY ICAP	MG/KG	130	J	160	J	250	J	300	J	120	J
SM15 ANTIMONY	BY ICAP	MG/KG	15	U	17	U	18	U	15	U	15	U
SM16 SELENIUM	BY ICAP	MG/KG	1.6		1.4	U	1.5	U	2.4		3.2	
SM17 TITANIUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM18 THALLIUM	BY ICAP	MG/KG	2.5	U	2.8	U	3.0	U	2.4	U	2.5	U
SM19 VANADIUM	BY ICAP	MG/KG	19		24		18		29		18	
SM20 ZINC	BY ICAP	MG/KG	72	J	79	J	98	J	700	J	130	J
SM21 CALCIUM	BY ICAP	MG/KG	19000		19000		6200		11000		12000	
SM22 MAGNESIUM	BY ICAP	MG/KG	1800		1400	U	1500	U	2000		1300	
SM23 SODIUM	BY ICAP	MG/KG	1300	U	1400	U	1500	U	1500		1300	U
SM24 POTASSIUM	BY ICAP	MG/KG	1300	U	1400	U	1500	U	1200	U	1300	
SS01 PHENOL		UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS02 CARBAZOLE		UG/KG					14000	U	12000	U	14000	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	011		012		013		101		102	
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS04 2-CHLOROPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS05 1,3-DICHLOROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS06 1,4-DICHLOROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS07 BENZYL ALCOHOL	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS08 1,2-DICHLOROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS13 HEXACHLOROETHANE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS14 NITROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS15 ISOPHORONE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS16 2-NITROPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS17 2,4-DIMETHYLPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS18 BENZOIC ACID	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS20 2,4-DICHLOROPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS22 NAPHTHALENE	UG/KG	30000		13000	U	55000		12000	U	14000	U
SS23 4-CHLOROANILINE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS24 HEXACHLOROBUTADIENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS26 2-METHYLNAPHTHALENE	UG/KG	23000		13000	U	14000	U	12000	U	14000	U
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	011		012		013		101		102	
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS30 2-CHLORONAPHTHALENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS31 2-NITROANILINE	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS32 DIMETHYLPHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS33 ACENAPHTHYLENE	UG/KG	20000		13000	U	14000	U	12000	U	14000	U
SS34 3-NITROANILINE	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS35 ACENAPHTHENE	UG/KG	15000		13000	U	22000		12000	U	14000	U
SS36 2,4-DINITROPHENOL	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS37 4-NITROPHENOL	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS38 DIBENZOFURAN	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS39 2,4-DINITROTOLUENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS40 2,6-DINITROTOLUENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS41 DIETHYLPHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS43 FLUORENE	UG/KG	24000		13000	U	21000		12000	U	14000	U
SS44 4-NITROANILINE	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS46 N-NITROSODIPHENYLAMINE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS48 HEXACHLOROBENZENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS49 PENTACHLOROPHENOL	UG/KG	66000	U	66000	U	74000	U	62000	U	73000	U
SS50 PHENANTHRENE	UG/KG	31000		13000	U	59000		12000	U	14000	U
SS51 ANTHRACENE	UG/KG	3000		13000	U	8000		12000	U	14000	U
SS52 DI-N-BUTYL PHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS53 FLUORANTHENE	UG/KG	80000		13000	U	9000		12000	U	14000	U
SS54 PYRENE	UG/KG	210000	J	13000	U	5000		12000	U	1000	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	011		012		013		101		102	
SS55 BUTYL BENZYL PHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS57 BENZO(A)ANTHRACENE	UG/KG	99000		13000	U	21000		12000	U	14000	U
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS59 CHRYSENE	UG/KG	94000		13000	U	21000		12000	U	14000	U
SS60 DI-N-OCTYL PHTHALATE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS61 BENZO(B)FLUORANTHENE	UG/KG	76000		13000	U	15000		12000	U	14000	U
SS62 BENZO(K)FLUORANTHENE	UG/KG	89000		13000	U	17000		12000	U	14000	U
SS63 BENZO(A)PYRENE	UG/KG	120000		13000	U	23000		12000	U	14000	U
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	75000		13000	U	14000	U	12000	U	14000	U
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	13000	U	13000	U	14000	U	12000	U	14000	U
SS66 BENZO(G,H,I)PERYLENE	UG/KG	88000		13000	U	14000	U	12000	U	14000	U
ST09 CYANIDE	MG/KG	250		170		7.6	U	33		6.3	U
SV03 CHLOROMETHANE	UG/KG	3100	U	13	U	1700	U				
SV04 BROMOMETHANE	UG/KG	3100	U	13	U	1700	U				
SV05 VINYL CHLORIDE	UG/KG	3100	U	13	U	1700	U				
SV06 CHLOROETHANE	UG/KG	3100	U	13	U	1700	U				
SV07 METHYLENE CHLORIDE	UG/KG	3100	U	13	U	1700	U				
SV08 1,1-DICHLOROETHYLENE	UG/KG	3100	U	13	U	1700	U				
SV09 1,1-DICHLOROETHANE	UG/KG	3100	U	13	U	1700	U				
SV10 TRANS-1,2-DICHLOROETHYLENE	UG/KG	3100	U	13	U	1700	U				
SV11 CHLOROFORM	UG/KG	3100	U	13	U	1700	U				
SV12 1,2-DICHLOROETHANE	UG/KG	3100	U	13	U	1700	U				
SV13 1,1,1-TRICHLOROETHANE	UG/KG	3100	U	13	U	1700	U				
SV14 CARBON TETRACHLORIDE	UG/KG	3100	U	13	U	1700	U				
SV15 BROMODICHLOROMETHANE	UG/KG	3100	U	13	U	1700	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	011		012		013		101	102
SV16 1,2-DICHLOROPROPANE	UG/KG	3100	U	13	U	1700	U		
SV17 BENZENE	UG/KG	18000		13	U	1800			
SV18 TRANS-1,3-DICHLOROPROPENE	UG/KG	3100	U	13	U	1700	U		
SV19 TRICHLOROETHYLENE	UG/KG	3100	U	13	U	1700	U		
SV20 CIS-1,3-DICHLOROPROPENE	UG/KG	3100	U	13	U	1700	U		
SV21 DIBROMOCHLOROMETHANE	UG/KG	3100	U	13	U	1700	U		
SV22 1,1,2-TRICHLOROETHANE	UG/KG	3100	U	13	U	1700	U		
SV24 BROMOFORM	UG/KG	3100	U	13	U	1700	U		
SV25 1,1,2,2-TETRACHLOROETHENE	UG/KG	3100	U	13	U	1700	U		
SV26 TOLUENE	UG/KG	3100	U	13	U	1700	U		
SV27 1,1,2,2-TETRACHLOROETHANE	UG/KG	3100	U	13	U	1700	U		
SV28 CHLOROBENZENE	UG/KG	3100	U	13	U	1700	U		
SV29 ETHYL BENZENE	UG/KG	34000		13	U	1700	U		
SV30 ACETONE	UG/KG	3100	U	39	U	1700	U		
SV31 CARBON DISULFIDE	UG/KG	3100	U	13	U	1700	U		
SV32 2-BUTANONE	UG/KG	3100	U	13	U	1700	U		
SV33 VINYL ACETATE	UG/KG	NA	O	NA	O	NA	O		
SV34 2-HEXANONE	UG/KG	3100	U	13	U	1700	U		
SV35 4-METHYL-2-PENTANONE	UG/KG	3100	U	13	U	1700	U		
SV36 STYRENE	UG/KG	3100	U	14	J	1700	U		
SV37 XYLENES, TOTAL	UG/KG	25000		13	U	1700	U		
Z201 SAMPLE NUMBER	NA	011		012		013		101	102
Z202 ACTIVITY CODE	NA	DSX44		DSX44		DSX44		DSX44	DSX44

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

	COMPOUND	UNITS	103		104		105		106		107	
SM01	SILVER	BY ICAP	MG/KG	2.4	U	2.3	U	2.3	U	2.4	U	2.2	U
SM02	ALUMINUM	BY ICAP	MG/KG	4200		5700		5200		7700		5000	
SM03	ARSENIC	BY ICAP	MG/KG	5.3		6.0		7.9		5.3		8.1	
SM04	BARIUM	BY ICAP	MG/KG	71		110		190		190		86	
SM05	BERYLLIUM	BY ICAP	MG/KG	1.2	U	1.1	U	1.1	U	1.2	U	1.1	U
SM06	CADMIUM	BY ICAP	MG/KG	1.2	U	1.1	U	1.1	U	1.2	U	1.1	U
SM07	COBALT	BY ICAP	MG/KG	12	U	11	U	11	U	12	U	11	U
SM08	CHROMIUM	BY ICAP	MG/KG	7.0		15		11		11		8.2	
SM09	COPPER	BY ICAP	MG/KG	13		37		38		19		19	
SM10	IRON	BY ICAP	MG/KG	8300		22000		18000		14000		10000	
SM11	MANGANESE	BY ICAP	MG/KG	300		380		240		370		230	
SM12	MOLYBDENUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM13	NICKEL	BY ICAP	MG/KG	9.8		13		12		15		9.2	
SM14	LEAD	BY ICAP	MG/KG	66	J	59	J	81	J	59	J	200	J
SM15	ANTIMONY	BY ICAP	MG/KG	14	U	14	U	14	U	14	U	13	U
SM16	SELENIUM	BY ICAP	MG/KG	1.2	U	1.1	U	1.1	U	1.3		1.1	U
SM17	TITANIUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM18	THALLIUM	BY ICAP	MG/KG	2.4	U	2.3	U	2.3	U	2.4	U	2.2	U
SM19	VANADIUM	BY ICAP	MG/KG	12		20		17		20		12	
SM20	ZINC	BY ICAP	MG/KG	53	J	110	J	170	J	71	J	77	J
SM21	CALCIUM	BY ICAP	MG/KG	58000		59000		26000		29000		79000	
SM22	MAGNESIUM	BY ICAP	MG/KG	7000		9600		2300		5000		7600	
SM23	SODIUM	BY ICAP	MG/KG	1200	U	1100	U	1100	U	12000		1100	U
SM24	POTASSIUM	BY ICAP	MG/KG	1200	U	1100	U	1100	U	1500		1100	U
SS01	PHENOL		UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS02	CARBAZOLE		UG/KG	10000	U	11000	U	12000	U	380	U	11000	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	103		104		105		106		107	
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS04 2-CHLOROPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS05 1,3-DICHLOROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS06 1,4-DICHLOROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS07 BENZYL ALCOHOL	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS08 1,2-DICHLOROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS13 HEXACHLOROETHANE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS14 NITROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS15 ISOPHORONE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS16 2-NITROPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS17 2,4-DIMETHYLPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS18 BENZOIC ACID	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS20 2,4-DICHLOROPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS22 NAPHTHALENE	UG/KG	10000	U	11000	U	12000	U	380	U	60000	
SS23 4-CHLOROANILINE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS24 HEXACHLOROBUTADIENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS26 2-METHYLNAPHTHALENE	UG/KG	10000	U	11000	U	12000	U	380	U	13000	
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	103		104		105		106		107	
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS30 2-CHLORONAPHTHALENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS31 2-NITROANILINE	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS32 DIMETHYLPHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS33 ACENAPHTHYLENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS34 3-NITROANILINE	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS35 ACENAPHTHENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS36 2,4-DINITROPHENOL	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS37 4-NITROPHENOL	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS38 DIBENZOFURAN	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS39 2,4-DINITROTOLUENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS40 2,6-DINITROTOLUENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS41 DIETHYLPHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS43 FLUORENE	UG/KG	10000	U	11000	U	12000		380	U	11000	U
SS44 4-NITROANILINE	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS46 N-NITROSODIPHENYLAMINE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS48 HEXACHLOROBENZENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS49 PENTACHLOROPHENOL	UG/KG	54000	U	58000	U	60000	U	2000	U	57000	U
SS50 PHENANTHRENE	UG/KG	10000	U	20000		55000		1500		11000	U
SS51 ANTHRACENE	UG/KG	10000	U	11000	U	15000		380	U	11000	U
SS52 DI N-BUTYL PHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS53 FLUORANTHENE	UG/KG	10000	U	14000		38000		2000		11000	U
SS54 PYRENE	UG/KG	13000		50000		83000		2200		11000	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	103		104		105		106		107	
SS55 BUTYL BENZYL PHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS57 BENZO(A)ANTHRACENE	UG/KG	10000	U	21000		28000		1300		11000	U
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS59 CHRYSENE	UG/KG	10000	U	29000		29000		1200		11000	U
SS60 DI-N-OCTYL PHTHALATE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS61 BENZO(B)FLUORANTHENE	UG/KG	10000	U	11000	U	17000		1000		11000	U
SS62 BENZO(K)FLUORANTHENE	UG/KG	10000	U	11000	U	12000		890		11000	U
SS63 BENZO(A)PYRENE	UG/KG	10000	U	16000		22000		1100		11000	U
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	10000	U	11000	U	12000	U	660		11000	U
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	10000	U	11000	U	12000	U	380	U	11000	U
SS66 BENZO(G,H,I)PERYLENE	UG/KG	10000	U	11000	U	12000		710		11000	U
ST09 CYANIDE	MG/KG	94		220		190		5.9	U	14	
ZZ01 SAMPLE NUMBER	NA	103		104		105		106		107	
ZZ02 ACTIVITY CODE	NA	DSX44		DSX44		DSX44		DSX44		DSX44	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

	COMPOUND	UNITS	108		109		110		111		112	
SM01	SILVER	BY ICAP	MG/KG	2.6	U	2.4	U	2.5	U	2.5	U	2.7	U
SM02	ALUMINUM	BY ICAP	MG/KG	5200		6600		11000		3800		7600	
SM03	ARSENIC	BY ICAP	MG/KG	14		11		10		7.8		33	
SM04	BARIUM	BY ICAP	MG/KG	160		150		220		96		170	
SM05	BERYLLIUM	BY ICAP	MG/KG	1.3	U	1.2	U	1.2	U	1.2	U	1.3	U
SM06	CADMIUM	BY ICAP	MG/KG	8.2		1.2	U	1.2	U	1.2	U	1.3	U
SM07	COBALT	BY ICAP	MG/KG	13	U	12	U	12	U	12	U	13	U
SM08	CHROMIUM	BY ICAP	MG/KG	20		15		23		15		12	
SM09	COPPER	BY ICAP	MG/KG	270		93		56		72		43	
SM10	IRON	BY ICAP	MG/KG	21000		28000		29000		33000		24000	
SM11	MANGANESE	BY ICAP	MG/KG	180		390		470	J	320	J	870	J
SM12	MOLYBDENUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM13	NICKEL	BY ICAP	MG/KG	14		20		23		27		23	
SM14	LEAD	BY ICAP	MG/KG	270	J	230	J	230	J	150	J	300	J
SM15	ANTIMONY	BY ICAP	MG/KG	15	U	14	U	15	U	15	U	16	U
SM16	SELENIUM	BY ICAP	MG/KG	2.3		1.6		3.0	J	1.9		1.5	J
SM17	TITANIUM	BY ICAP	MG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SM18	THALLIUM	BY ICAP	MG/KG	2.6	U	2.4	U	2.5	U	2.5	U	2.7	U
SM19	VANADIUM	BY ICAP	MG/KG	25		23		32		17		23	
SM20	ZINC	BY ICAP	MG/KG	2500	J	550	J	360		250		530	
SM21	CALCIUM	BY ICAP	MG/KG	2700		33000		28000		3600		37000	
SM22	MAGNESIUM	BY ICAP	MG/KG	1300	U	2300		3300		1200	U	6400	
SM23	SODIUM	BY ICAP	MG/KG	1300	U	1200	U	1200	U	1200	U	1300	U
SM24	POTASSIUM	BY ICAP	MG/KG	1300	U	1200	U	1200		1200	U	1300	
SS01	PHENOL		UG/KG	390	U	420	U	390	U	390	U	410	U
SS02	CARBAZOLE		UG/KG	420	J	500		390	U	390	U	410	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	108		109		110		111		112	
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	390	U	420	U	390	U	390	U	410	U
SS04 2-CHLOROPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U
SS05 1,3-DICHLOROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS06 1,4-DICHLOROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS07 BENZYL ALCOHOL	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS08 1,2-DICHLOROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	390	U	420	U	390	U	390	U	410	U
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	390	U	420	U	390	U	390	U	410	U
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	390	U	420	U	390	U	390	U	410	U
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS13 HEXACHLOROETHANE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS14 NITROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS15 ISOPHORONE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS16 2-NITROPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U
SS17 2,4-DIMETHYLPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U
SS18 BENZOIC ACID	UG/KG	NA	O	NA	O	NA	O	NA	O	NA	O
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS20 2,4-DICHLOROPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS22 NAPHTHALENE	UG/KG	1100		510		390	U	390	U	410	U
SS23 4-CHLOROANILINE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS24 HEXACHLOROBUTADIENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U
SS26 2-METHYLNAPHTHALENE	UG/KG	2500		420	U	390	U	390	U	410	U
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	390	U	420	U	390	U	390	U	410	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	108		109		110		111		112	
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS30 2-CHLORONAPHTHALENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS31 2-NITROANILINE	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS32 DIMETHYLPHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS33 ACENAPHTHYLENE	UG/KG	2400		460		390	U	390	U	410	U
SS34 3-NITROANILINE	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS35 ACENAPHTHENE	UG/KG	690		420	U	390	U	390	U	410	U
SS36 2,4-DINITROPHENOL	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS37 4-NITROPHENOL	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS38 DIBENZOFURAN	UG/KG	1100		420	U	390	U	390	U	410	U
SS39 2,4-DINITROTOLUENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS40 2,6-DINITROTOLUENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS41 DIETHYLPHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	390	U	420	U	390	U	390	U	410	U
SS43 FLUORENE	UG/KG	3100		460	J	390	U	390	U	410	U
SS44 4-NITROANILINE	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS46 N-NITROSODIPHENYLAMINE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	390	U	420	U	390	U	390	U	410	U
SS48 HEXACHLOROBENZENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS49 PENTACHLOROPHENOL	UG/KG	940	U	1000	U	950	U	940	U	990	U
SS50 PHENANTHRENE	UG/KG	43000	J	2200		1500		850		440	
SS51 ANTHRACENE	UG/KG	4700	J	780		390	U	390	U	410	U
SS52 DI-N-BUTYL PHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS53 FLUORANTHENE	UG/KG	40000	J	2800		2200		770		1300	
SS54 PYRENE	UG/KG	58000	J	5700		2300		810		1400	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	108		109		110		111		112	
SS55 BUTYL BENZYL PHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS57 BENZO(A)ANTHRACENE	UG/KG	34000	J	1500		1500		480		790	
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS59 CHRYSENE	UG/KG	34000	J	4300		1600		550		850	
SS60 DI-N-OCTYL PHTHALATE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS61 BENZO(B)FLUORANTHENE	UG/KG	16000	J	4900		1100		440		610	
SS62 BENZO(K)FLUORANTHENE	UG/KG	390	U	3400		1200		450		680	
SS63 BENZO(A)PYRENE	UG/KG	20000	J	4200		1300		440		700	
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	12000	J	2700		760		390	U	410	U
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	390	U	420	U	390	U	390	U	410	U
SS66 BENZO(G,H,I)PERYLENE	UG/KG	14000	J	2600		760		390	U	410	U
ST09 CYANIDE	MG/KG	98		35		6.2	U	6.2	U	6.7	U
ZZ01 SAMPLE NUMBER	NA	108		109		110		111		112	
ZZ02 ACTIVITY CODE	NA	DSX44		DSX44		DSX44		DSX44		DSX44	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201		202		203		204		205F	
WF01 WATER TEMP	'C	11.0		7.0		9.0		9.0			
WF05 PH, FIELD	SU	7.58		7.81		6.32		6.21			
WF10 CONDUCTIVITY (FIELD)	UMHOS	1500		2000		1500		1400			
WM01 SILVER BY ICAP	UG/L	10	U	10	U	10	U	10	U	10	U
WM02 ALUMINUM BY ICAP	UG/L	45000	J	15000	J	200	U	200	U	200	U
WM03 ARSENIC BY ICAP	UG/L	40		670		15	J	10	U	10	U
WM04 BARIUM BY ICAP	UG/L	2100		890		1000		630		200	U
WM05 BERYLLIUM BY ICAP	UG/L	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
WM06 CADMIUM BY ICAP	UG/L	5.0	U	5.0	U	19		21		5.0	U
WM07 COBALT BY ICAP	UG/L	50	U	50	U	50	U	50	U	50	U
WM08 CHROMIUM BY ICAP	UG/L	68		29		10	U	10	U	10	U
WM09 COPPER BY ICAP	UG/L	84	J	91	J	37	U	27	U	200	
WM10 IRON BY ICAP	UG/L	110000		53000		30000		15000	U	320	U
WM11 MANGANESE BY ICAP	UG/L	5600		850		1300		630		32	U
WM12 MOLYBDENUM BY ICAP	UG/L	NA	O	NA	O	NA	O	NA	O	N/A	O
WM13 NICKEL BY ICAP	UG/L	95		40	U	40	U	40	U	40	U
WM14 LEAD BY ICAP	UG/L	58		1200	J	330		350		3.6	U
WM15 ANTIMONY BY ICAP	UG/L	60	U	60	U	60	U	60	U	60	U
WM16 SELENIUM BY ICAP	UG/L	25	U	25	U	NA	I	NA	I	N/A	I
WM17 TITANIUM BY ICAP	UG/L	NA	O	NA	O	NA	O	NA	O	N/A	O
WM18 THALLIUM BY ICAP	UG/L	10	U	50	U	NA	I	NA	I	N/A	I
WM19 VANADIUM BY ICAP	UG/L	77		50	U	50	U	50	U	50	U
WM20 ZINC BY ICAP	UG/L	4200		1100		40000		35000		41	U
WM21 CALCIUM, TOTAL BY ICAP	MG/L	520		320		210	U	230	U	50	
WM22 MAGNESIUM, TOTAL BY ICAP	MG/L	66		44		37	U	34	U	19	
WM23 SODIUM, TOTAL BY ICAP	MG/L	110		150		99		64	U	19	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201	202	203	204	205F
WM24 POTASSIUM, TOTAL BY ICAP	MG/L	53	46	33	26	5.0 U
WM35 SILVER,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	
WM36 ALUMINUM,DISSOLVED BY ICAP	UG/L	200 U	200 U	200 U	200 U	
WM37 ARSENIC,DISSOLVED BY ICAP	UG/L	13	80 J	14 U	10 U	
WM38 BARIUM,DISSOLVED BY ICAP	UG/L	490	260	650	490	
WM39 BERYLLIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	
WM40 CADMIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	
WM41 COBALT,DISSOLVED BY ICAP	UG/L	50 U	50 U	50 U	50 U	
WM42 CHROMIUM,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	
WM43 COPPER,DISSOLVED BY ICAP	UG/L	25 U	25 U	25 U	25 U	
WM44 IRON,DISSOLVED BY ICAP	UG/L	1500 J	14000 J	20000	11000	
WM45 MANGANESE,DISSOLVED BY ICAP	UG/L	1500	540	1100	600	
WM46 MOLYBDENUM,DISSOLVED BY ICAP	UG/L	NA O	NA O	NA O	NA O	
WM47 NICKEL,DISSOLVED BY ICAP	UG/L	40 U	40 U	34 U	40 U	
WM48 LEAD,DISSOLVED BY ICAP	UG/L	5.0 J	3.0 U	3.8 U	5.3 U	
WM49 ANTIMONY,DISSOLVED BY ICAP	UG/L	60 U	60 U	60 U	60 U	
WM50 SELENIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	20 U	
WM51 TITANIUM,DISSOLVED BY ICAP	UG/L	NA O	NA O	NA O	NA O	
WM52 THALLIUM,DISSOLVED BY ICAP	UG/L	10 U	50 U	10 U	10 U	
WM53 VANADIUM,DISSOLVED BY ICAP	UG/L	50 U	50 U	50 U	50 U	
WM54 ZINC,DISSOLVED BY ICAP	UG/L	44	23	690 J	3400 J	
WM55 CALCIUM,DISSOLVED BY ICAP	MG/L	170	270	220	250	
WM56 MAGNESIUM,DISSOLVED BY ICAP	MG/L	41	42	39 U	35	
WM57 SODIUM,DISSOLVED BY ICAP	MG/L	100	150	100	66	
WM58 POTASSIUM,DISSOLVED BY ICAP	MG/L	33	44	NA O	26	
WS01 PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201		202		203		204		205F	
WS03 BIS(2-CHLOROETHYL) ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS04 2-CHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS05 1,3-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS06 1,4-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS07 BENZYL ALCOHOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS08 1,2-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS09 2-METHYLPHENOL (O-CRESOL)	UG/L	10	U	10	U	10	U	10	U	10	U
WS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS11 4-METHYLPHENOL (P-CRESOL)	UG/L	10	U	10	U	10	U	10	U	10	U
WS12 N-NITROSO-DIPROPYLAMINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS13 HEXACHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WS14 NITROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS15 ISOPHORONE	UG/L	10	U	10	U	10	U	10	U	10	U
WS16 2-NITROPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS17 2,4-DIMETHYLPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS18 BENZOIC ACID	UG/L	50	U	50	U	50	U	50	U	50	U
WS19 BIS(2-CHLOROETHYOXY) METHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WS20 2,4-DICHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS21 1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS22 NAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS23 4-CHLOROANILINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS24 HEXACHLOROBUTADIENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS25 4-CHLORO 3-METHYLPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U
WS26 2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS27 HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS28 2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201		202		203		204		205F	
WS29 2,4,5-TRICHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS30 2-CHLORONAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS31 2-NITROANILINE (ORTHO NITROANILINE)	UG/L	25	U	25	U	25	U	25	U	25	U
WS32 DIMETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS33 ACENAPHTHYLENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS34 3-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	25	U
WS35 ACENAPHTHENE	UG/L	10	U	10	U	10	U	65		10	U
WS36 2,4-DINITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS37 4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS38 DIBENZOFURAN	UG/L	10	U	10	U	10	U	10	U	10	U
WS39 2,4-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS40 2,6-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS41 DIETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS42 4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS43 FLUORENE	UG/L	10	U	10	U	10	U	25		10	U
WS44 4-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	25	U
WS45 4,6-DINITRO-2-METHYLPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS46 N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS47 4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS48 HEXACHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS49 PENTACHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS50 PHENANTHRENE	UG/L	10	U	10	U	10	U	16		10	U
WS51 ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS52 DI N-BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS53 FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS54 PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201		202		203		204		205F	
WS55 BUTYL BENZYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS56 3,3'-DICHLOROBENZIDINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS57 BENZO(A)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS59 CHRYSENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS60 DI-N-OCTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS61 BENZO(B)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS62 BENZO(K)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS63 BENZO(A)PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS64 INDENO(1,2,3-CD)PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS65 DIBENZO(A,H)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS66 BENZO(G,H,I)PERYLENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS67 CARBAZOLE	UG/L	10	U	10	U	10	U	10	U	10	U
WT09 CYANIDE, TOTAL	MG/L	0.52	J	0.027	J	0.590	J	1.6	J	0.013	J
WV03 CHLOROMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV04 BROMOMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV05 VINYL CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV06 CHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV07 METHYLENE CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV08 1,1-DICHLOROETHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV09 1,1-DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV10 1,2-DICHLOROETHENE, TOTAL	UG/L	10	U	10	U	10	U	10	U	10	U
WV11 CHLOROFORM	UG/L	10	U	10	U	10	U	10	U	17	
WV12 1,2 DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV13 1,1,1-TRICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV14 CARBON TETRACHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	201	202	203	204	205F
WV15 BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV16 1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV17 BENZENE	UG/L	10 U	10 U	10 U	93	10 U
WV19 TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV20 CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV21 DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV22 1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV24 BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U
WV25 TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV26 TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV27 1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV28 CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV29 ETHYL BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV30 ACETONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV31 CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U
WV32 2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV33 VINYL ACETATE	UG/L	10 U	10 U	10 U	10 U	10 U
WV34 2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV35 4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV36 STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV37 XYLENES, TOTAL	UG/L	10 U	10 U	10 U	10 U	10 U
WV40 TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U
Z201 SAMPLE NUMBER	NA	201	202	203	204	205
Z202 ACTIVITY CODE	NA	DSX44	DSX44	DSX44	DSX44	DSX44

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206		206D		207F		208F		209F
WF01 WATER TEMP	'C	11.0		11.0						
WF05 PH. FIELD	SU	6.14		6.14						
WF10 CONDUCTIVITY (FIELD)	UMHOS	1600		1600						
WM01 SILVER BY ICAP	UG/L	10	U	10	U	10	U	10	U	
WM02 ALUMINUM BY ICAP	UG/L	200	U	200	U	200	U	310		
WM03 ARSENIC BY ICAP	UG/L	47	J	81	J	10	U	10	U	
WM04 BARIUM BY ICAP	UG/L	490		590		200	U	200	U	
WM05 BERYLLIUM BY ICAP	UG/L	5.0	U	5.0	U	5.0	U	5.0	U	
WM06 CADMIUM BY ICAP	UG/L	35		140		5.0	U	5.0	U	
WM07 COBALT BY ICAP	UG/L	50	U	50	U	50	U	50	U	
WM08 CHROMIUM BY ICAP	UG/L	10	U	10	U	10	U	16	J	
WM09 COPPER BY ICAP	UG/L	32	U	190	U	25	U	25	U	
WM10 IRON BY ICAP	UG/L	29000		34000		100	U	5000		
WM11 MANGANESE BY ICAP	UG/L	410		440		15	U	39		
WM12 MOLYBDENUM BY ICAP	UG/L	NA	O	NA	O	NA	O	N/A	O	
WM13 NICKEL BY ICAP	UG/L	40	U	40	U	40	U	40	U	
WM14 LEAD BY ICAP	UG/L	480		1500		3.6	U	32		
WM15 ANTIMONY BY ICAP	UG/L	60	U	60	U	60	U	60	U	
WM16 SELENIUM BY ICAP	UG/L	NA	I	NA	I	NA	O	N/A	I	
WM17 TITANIUM BY ICAP	UG/L	NA	O	NA	O	NA	O	N/A	O	
WM18 THALLIUM BY ICAP	UG/L	NA	I	NA	I	NA	O	N/A	I	
WM19 VANADIUM BY ICAP	UG/L	50	U	50	U	50	U	50	U	
WM20 ZINC BY ICAP	UG/L	26000		80000		21	U	63		
WM21 CALCIUM, TOTAL BY ICAP	MG/L	220	U	220	U	5.0	U	7.3	U	
WM22 MAGNESIUM, TOTAL BY ICAP	MG/L	52	U	52	U	5.0	U	5.0	U	
WM23 SODIUM, TOTAL BY ICAP	MG/L	230		230		5.0	U	5.0	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206		206D		207F		208F		209F
WM24 POTASSIUM, TOTAL BY ICAP	MG/L	12	U	12	U	5.0	U	5.0	U	
WM35 SILVER,DISSOLVED BY ICAP	UG/L	10	U	10	U	10	U	10	U	
WM36 ALUMINUM,DISSOLVED BY ICAP	UG/L	200	U	200	U	200	U	200	U	
WM37 ARSENIC,DISSOLVED BY ICAP	UG/L	29	J	41		10	U	10	U	
WM38 BARIUM,DISSOLVED BY ICAP	UG/L	400		440		200	U	200	U	
WM39 BERYLLIUM,DISSOLVED BY ICAP	UG/L	5	U	5.0	U	5.0	U	5.0	U	
WM40 CADMIUM,DISSOLVED BY ICAP	UG/L	5	U	5.0	U	5.0	U	5.0	U	
WM41 COBALT,DISSOLVED BY ICAP	UG/L	50	U	50	U	50	U	50	U	
WM42 CHROMIUM,DISSOLVED BY ICAP	UG/L	10	U	10	U	10	U	10	U	
WM43 COPPER,DISSOLVED BY ICAP	UG/L	25	U	25	U	25	U	25	U	
WM44 IRON,DISSOLVED BY ICAP	UG/L	24000	U	27000		100	U	100	U	
WM45 MANGANESE,DISSOLVED BY ICAP	UG/L	380		400		15	U	15	U	
WM46 MOLYBDENUM,DISSOLVED BY ICAP	UG/L	NA	O	NA	O	NA	O	N/A	O	
WM47 NICKEL,DISSOLVED BY ICAP	UG/L	40	U	40	U	40	U	40	U	
WM48 LEAD,DISSOLVED BY ICAP	UG/L	4.0	U	4.8	U	3.0	U	3.0	U	
WM49 ANTIMONY,DISSOLVED BY ICAP	UG/L	60	U	60	U	60	U	60	U	
WM50 SELENIUM,DISSOLVED BY ICAP	UG/L	NA	I	20	U	5.0	U	5.0	U	
WM51 TITANIUM,DISSOLVED BY ICAP	UG/L	NA	O	NA	O	NA	O	N/A	O	
WM52 THALLIUM,DISSOLVED BY ICAP	UG/L	NA	I	10	U	10	U	10	U	
WM53 VANADIUM,DISSOLVED BY ICAP	UG/L	50	U	50	U	50	U	50	U	
WM54 ZINC,DISSOLVED BY ICAP	UG/L	2000		3200	J	20	U	20	U	
WM55 CALCIUM,DISSOLVED BY ICAP	MG/L	220	U	240		5.0	U	5.0	U	
WM56 MAGNESIUM,DISSOLVED BY ICAP	MG/L	51	U	55		5.0	U	5.0	U	
WM57 SODIUM,DISSOLVED BY ICAP	MG/L	230		230		5.0	U	5.0	U	
WM58 POTASSIUM,DISSOLVED BY ICAP	MG/L	12	U	12		5.0	U	5.0	U	
WS01 PHENOL	UG/L	10	U	10	U	10	U	10	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206		206D		207F		208F		209F
WS03 BIS(2-CHLOROETHYL) ETHER	UG/L	10	U	10	U	10	U	10	U	
WS04 2-CHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	
WS05 1,3-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS06 1,4-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS07 BENZYL ALCOHOL	UG/L	10	U	10	U	10	U	10	U	
WS08 1,2-DICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS09 2-METHYLPHENOL (O-CRESOL)	UG/L	10	U	10	U	10	U	10	U	
WS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/L	10	U	10	U	10	U	10	U	
WS11 4-METHYLPHENOL (P-CRESOL)	UG/L	10	U	10	U	10	U	10	U	
WS12 N-NITROSO-DIPROPYLAMINE	UG/L	10	U	10	U	10	U	10	U	
WS13 HEXACHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	
WS14 NITROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS15 ISOPHORONE	UG/L	10	U	10	U	10	U	10	U	
WS16 2-NITROPHENOL	UG/L	10	U	10	U	10	U	10	U	
WS17 2,4-DIMETHYLPHENOL	UG/L	10	U	10	U	10	U	10	U	
WS18 BENZOIC ACID	UG/L	50	U	50	U	50	U	50	U	
WS19 BIS(2-CHLOROETHYOXY) METHANE	UG/L	10	U	10	U	10	U	10	U	
WS20 2,4-DICHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	
WS21 1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS22 NAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	
WS23 4-CHLOROANILINE	UG/L	10	U	10	U	10	U	10	U	
WS24 HEXACHLOROBUTADIENE	UG/L	10	U	10	U	10	U	10	U	
WS25 4-CHLORO-3-METHYLPHENOL	UG/L	10	U	10	U	10	U	10	U	
WS26 2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	
WS27 HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U	10	U	10	U	
WS28 2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U	10	U	10	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206		206D		207F		208F		209F
WS29 2,4,5-TRICHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	
WS30 2-CHLORONAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	
WS31 2-NITROANILINE (ORTHO NITROANILINE)	UG/L	25	U	25	U	25	U	25	U	
WS32 DIMETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	
WS33 ACENAPHTHYLENE	UG/L	10	U	10	U	10	U	10	U	
WS34 3-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	
WS35 ACENAPHTHENE	UG/L	10	U	10	U	10	U	10	U	
WS36 2,4-DINITROPHENOL	UG/L	25	U	25	U	25	U	25	U	
WS37 4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	
WS38 DIBENZOFURAN	UG/L	10	U	10	U	10	U	10	U	
WS39 2,4-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	
WS40 2,6-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	
WS41 DIETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	
WS42 4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	
WS43 FLUORENE	UG/L	10	U	10	U	10	U	10	U	
WS44 4-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	
WS45 4,6-DINITRO-2-METHYLPHENOL	UG/L	25	U	25	U	25	U	25	U	
WS46 N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U	10	U	10	U	
WS47 4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	
WS48 HEXACHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	
WS49 PENTACHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	
WS50 PHENANTHRENE	UG/L	10	U	10	U	10	U	10	U	
WS51 ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	
WS52 DI-N-BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	
WS53 FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	
WS54 PYRENE	UG/L	10	U	10	U	10	U	10	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206		206D		207F		208F		209F	
WS55 BUTYL BENZYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U		
WS56 3,3'-DICHLOROBENZIDINE	UG/L	10	U	10	U	10	U	10	U		
WS57 BENZO(A)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U		
WS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U		
WS59 CHRYSENE	UG/L	10	U	10	U	10	U	10	U		
WS60 DI-N-OCTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U		
WS61 BENZO(B)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U		
WS62 BENZO(K)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U		
WS63 BENZO(A)PYRENE	UG/L	10	U	10	U	10	U	10	U		
WS64 INDENO(1,2,3-CD)PYRENE	UG/L	10	U	10	U	10	U	10	U		
WS65 DIBENZO(A,H)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U		
WS66 BENZO(G,H,I)PERYLENE	UG/L	10	U	10	U	10	U	10	U		
WS67 CARBAZOLE	UG/L	10	U	10	U	10	U	10	U		
WT09 CYANIDE, TOTAL	MG/L	0.017	U	0.010	U	0.010	U	0.010	U		
WV03 CHLOROMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV04 BROMOMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV05 VINYL CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV06 CHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV07 METHYLENE CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV08 1,1-DICHLOROETHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV09 1,1-DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV10 1,2-DICHLOROETHENE TOTAL	UG/L	10	U	10	U	10	U	10	U	10	U
WV11 CHLOROFORM	UG/L	10	U	10	U	10	U	10	U	10	U
WV12 1,2-DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV13 1,1,1-TRICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV14 CARBON TETRACHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	206	206D	207F	208F	209F
WV15 BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV16 1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV17 BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV19 TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV20 CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV21 DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV22 1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV24 BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U
WV25 TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV26 TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV27 1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WV28 CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV29 ETHYL BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV30 ACETONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV31 CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U
WV32 2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV33 VINYL ACETATE	UG/L	10 U	10 U	10 U	10 U	10 U
WV34 2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV35 4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U
WV36 STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV37 XYLENES, TOTAL	UG/L	10 U	10 U	10 U	10 U	10 U
WV40 TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U
WV86 HYDROCARBONS, TOTAL PETROLEUM	MG/L			0.5 U		
ZZ01 SAMPLE NUMBER	NA	206	206	207	208	209
ZZ02 ACTIVITY CODE	NA	DSX44	DSX44	DSX44	DSX44	DSX44

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301	301D	302	303	304
WF01 WATER TEMP	°C	7.0	7.0	6.0	6.0	3.0
WF05 PH, FIELD	SU	8.15	8.15	7.87	7.27	7.05
WF10 CONDUCTIVITY (FIELD)	UMHOS	440	440	450	360	350
WM01 SILVER BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM02 ALUMINUM BY ICAP	UG/L	5100 J	4800 J	5000 J	28000	10000 J
WM03 ARSENIC BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM04 BARIUM BY ICAP	UG/L	200 U	200 U	200 U	280	200 U
WM05 BERYLLIUM BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
WM06 CADMIUM BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
WM07 COBALT BY ICAP	UG/L	50 U	50 U	50 U	50 U	50 U
WM08 CHROMIUM BY ICAP	UG/L	10 U	10 U	10 U	31 U	14
WM09 COPPER BY ICAP	UG/L	25 U	25 U	25 U	25 U	25 U
WM10 IRON BY ICAP	UG/L	5500	5300	5500	27000	11000
WM11 MANGANESE BY ICAP	UG/L	250	250	250	600	450
WM12 MOLYBDENUM BY ICAP	UG/L	NA O	NA O	NA O	NA O	NA O
WM13 NICKEL BY ICAP	UG/L	40 U	40 U	40 U	40 U	40 U
WM14 LEAD BY ICAP	UG/L	7.0	7.2	9.7	24 U	18
WM15 ANTIMONY BY ICAP	UG/L	60 U	60 U	60 U	60 U	60 U
WM16 SELENIUM BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	NA I	5.0 U
WM17 TITANIUM BY ICAP	UG/L	NA O	NA O	NA O	NA O	NA O
WM18 THALLIUM BY ICAP	UG/L	10 U	10 U	10 U	NA I	10 U
WM19 VANADIUM BY ICAP	UG/L	50 U	50 U	50 U	62	50 U
WM20 ZINC BY ICAP	UG/L	28 U	26 U	33 U	89 U	54
WM21 CALCIUM, TOTAL BY ICAP	MG/L	53	54	54	51 U	58
WM22 MAGNESIUM, TOTAL BY ICAP	MG/L	18	18	18	19 U	23
WM23 SODIUM, TOTAL BY ICAP	MG/L	36	36	36	30 U	19

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301	301D	302	303	304
WM24 POTASSIUM, TOTAL BY ICAP	MG/L	6.2	6.1	6.2	8.8 U	5.2
WM35 SILVER,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM36 ALUMINUM,DISSOLVED BY ICAP	UG/L	200 U	200 U	200 U	200 U	200 U
WM37 ARSENIC,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM38 BARIUM,DISSOLVED BY ICAP	UG/L	200 U	200 U	200 U	200 U	200 U
WM39 BERYLLIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
WM40 CADMIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
WM41 COBALT,DISSOLVED BY ICAP	UG/L	50 U	50 U	50 U	50 U	50 U
WM42 CHROMIUM,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM43 COPPER,DISSOLVED BY ICAP	UG/L	25 U	25 U	25 U	25 U	25 U
WM44 IRON,DISSOLVED BY ICAP	UG/L	100 U	100 U	100 U	100 U	100 U
WM45 MANGANESE,DISSOLVED BY ICAP	UG/L	17	15 U	15 U	15 U	15 U
WM46 MOLYBDENUM,DISSOLVED BY ICAP	UG/L	NA O	NA O	NA O	NA O	NA O
WM47 NICKEL,DISSOLVED BY ICAP	UG/L	40 U	40 U	40 U	40 U	40 U
WM48 LEAD,DISSOLVED BY ICAP	UG/L	3.0 U	3.3 J	3.0 U	3.0 U	3.0 U
WM49 ANTIMONY,DISSOLVED BY ICAP	UG/L	60 U	60 U	60 U	60 U	60 U
WM50 SELENIUM,DISSOLVED BY ICAP	UG/L	5.0 U	5.0 U	5.0 U	11 J	5.0 U
WM51 TITANIUM,DISSOLVED BY ICAP	UG/L	NA O	NA O	NA O	NA O	NA O
WM52 THALLIUM,DISSOLVED BY ICAP	UG/L	10 U	10 U	10 U	10 U	10 U
WM53 VANADIUM,DISSOLVED BY ICAP	UG/L	50 U	50 U	50 U	50 U	50 U
WM54 ZINC,DISSOLVED BY ICAP	UG/L	20 U	20 U	20 U	20 U	20 U
WM55 CALCIUM,DISSOLVED BY ICAP	MG/L	52	52	54	46	53
WM56 MAGNESIUM,DISSOLVED BY ICAP	MG/L	17	17	18	15	20
WM57 SODIUM,DISSOLVED BY ICAP	MG/L	36	37	38	30	19
WM58 POTASSIUM,DISSOLVED BY ICAP	MG/L	5.3	5.2	5.4	5.2	5.0 U
WS01 PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301	301D	302	303	304
WS03 BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U
WS04 2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS05 1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS06 1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS07 BENZYL ALCOHOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS08 1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS09 2-METHYLPHENOL (O-CRESOL)	UG/L	10 U	10 U	10 U	10 U	10 U
WS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U
WS11 4-METHYLPHENOL (P-CRESOL)	UG/L	10 U	10 U	10 U	10 U	10 U
WS12 N-NITROSO-DIPROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U
WS13 HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WS14 NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS15 ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U
WS16 2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS17 2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS18 BENZOIC ACID	UG/L	50 U	50 U	50 U	50 U	50 U
WS19 BIS(2-CHLOROETHYOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U
WS20 2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS21 1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS22 NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS23 4-CHLOROANILINE	UG/L	10 U	10 U	10 U	10 U	10 U
WS24 HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS25 4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U
WS26 2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS27 HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U
WS28 2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301		301D		302		303		304	
WS29 2,4,5-TRICHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS30 2-CHLORONAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS31 2-NITROANILINE (ORTHO NITROANILINE)	UG/L	25	U	25	U	25	U	25	U	25	U
WS32 DIMETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS33 ACENAPHTHYLENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS34 3-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	25	U
WS35 ACENAPHTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS36 2,4-DINITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS37 4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS38 DIBENZOFURAN	UG/L	10	U	10	U	10	U	10	U	10	U
WS39 2,4-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS40 2,6-DINITROTOLUENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS41 DIETHYLPHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS42 4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS43 FLUORENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS44 4-NITROANILINE	UG/L	25	U	25	U	25	U	25	U	25	U
WS45 4,6-DINITRO-2-METHYLPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS46 N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS47 4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U	10	U	10	U	10	U
WS48 HEXACHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS49 PENTACHLOROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U
WS50 PHENANTHRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS51 ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS52 DI-N-BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS53 FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS54 PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301		301D		302		303		304	
WS55 BUTYL BENZYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS56 3,3'-DICHLOROBENZIDINE	UG/L	10	U	10	U	10	U	10	U	10	U
WS57 BENZO(A)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS59 CHRYSENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS60 DI-N-OCTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U
WS61 BENZO(B)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS62 BENZO(K)FLUORANTHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS63 BENZO(A)PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS64 INDENO(1,2,3-CD)PYRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS65 DIBENZO(A,H)ANTHRACENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS66 BENZO(G,H,I)PERYLENE	UG/L	10	U	10	U	10	U	10	U	10	U
WS67 CARBAZOLE	UG/L	10	U	10	U	10	U	10	U	10	U
WT09 CYANIDE, TOTAL	MG/L	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
WV03 CHLOROMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV04 BROMOMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV05 VINYL CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV06 CHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV07 METHYLENE CHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV08 1,1-DICHLOROETHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV09 1,1-DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV10 1,2-DICHLOROETHENE, TOTAL	UG/L	10	U	10	U	10	U	10	U	10	U
WV11 CHLOROFORM	UG/L	10	U	10	U	10	U	10	U	10	U
WV12 1,2 DICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV13 1,1,1-TRICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV14 CARBON TETRACHLORIDE	UG/L	10	U	10	U	10	U	10	U	10	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	301		301D		302		303		304	
WV15 BROMODICHLOROMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV16 1,2-DICHLOROPROPANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV17 BENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV19 TRICHLOROETHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV20 CIS-1,3-DICHLOROPROPENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV21 DIBROMOCHLOROMETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV22 1,1,2-TRICHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV24 BROMOFORM	UG/L	10	U	10	U	10	U	10	U	10	U
WV25 TETRACHLOROETHENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV26 TOLUENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV27 1,1,2,2-TETRACHLOROETHANE	UG/L	10	U	10	U	10	U	10	U	10	U
WV28 CHLOROBENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV29 ETHYL BENZENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV30 ACETONE	UG/L	10	U	11	U	10	U	10	U	10	U
WV31 CARBON DISULFIDE	UG/L	10	U	10	U	10	U	10	U	10	U
WV32 2-BUTANONE	UG/L	10	U	10	U	10	U	10	U	10	U
WV33 VINYL ACETATE	UG/L	10	U	10	U	10	U	10	U	10	U
WV34 2-HEXANONE	UG/L	10	U	10	U	10	U	10	U	10	U
WV35 4-METHYL-2-PENTANONE	UG/L	10	U	10	U	10	U	10	U	10	U
WV36 STYRENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV37 XYLENES, TOTAL	UG/L	10	U	10	U	10	U	10	U	10	U
WV40 TRANS-1,3-DICHLOROPROPENE	UG/L	10	U	10	U	10	U	10	U	10	U
WV86 HYDROCARBONS, TOTAL PETROLEUM	MG/L	NA	O	0.5	U	0.5	U	0.5	U	0.5	U
Z201 SAMPLE NUMBER	NA	301		301		302		303		304	
Z702 ACTIVITY CODE	NA	DSX44		DSX44		DSX44		DSX44		DSX44	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

	COMPOUND	UNITS	304D	401	401D	402	403
SM01	SILVER BY ICAP	MG/KG		2.6 U	2.6 U	2.6 U	2.6 U
SM02	ALUMINUM BY ICAP	MG/KG		5500	6800	12000	10000
SM03	ARSENIC BY ICAP	MG/KG		3.7	4.0	8.4	7.1
SM04	BARIUM BY ICAP	MG/KG		140	140	160	160
SM05	BERYLLIUM BY ICAP	MG/KG		1.3 U	1.3 U	1.3 U	1.3 U
SM06	CADMIUM BY ICAP	MG/KG		1.3 U	1.3 U	1.3 U	1.3 U
SM07	COBALT BY ICAP	MG/KG		13 U	13 U	13 U	13 U
SM08	CHROMIUM BY ICAP	MG/KG		8.7	9.0	16	12
SM09	COPPER BY ICAP	MG/KG		9.1	8.2	26	23
SM10	IRON BY ICAP	MG/KG		9800	10000	19000	14000
SM11	MANGANESE BY ICAP	MG/KG		250	300	320	250 J
SM12	MOLYBDENUM BY ICAP	MG/KG		NA O	NA O	NA O	NA O
SM13	NICKEL BY ICAP	MG/KG		10	11	18	16
SM14	LEAD BY ICAP	MG/KG		30 J	13 J	36 J	31 J
SM15	ANTIMONY BY ICAP	MG/KG		15 U	15 U	16 U	16 U
SM16	SELENIUM BY ICAP	MG/KG		1.3 U	1.3 U	2.0 J	1.3 U
SM17	TITANIUM BY ICAP	MG/KG		NA O	NA O	NA O	NA O
SM18	THALLIUM BY ICAP	MG/KG		2.6 U	2.6 U	2.6 U	2.6 U
SM19	VANADIUM BY ICAP	MG/KG		15	17	27	25
SM20	ZINC BY ICAP	MG/KG		35 J	36 J	77 J	64
SM21	CALCIUM BY ICAP	MG/KG		6400	6300	6500	5700
SM22	MAGNESIUM BY ICAP	MG/KG		2700	2900	3000	3600
SM23	SODIUM BY ICAP	MG/KG		1300 U	1300 U	1300 U	1300 U
SM24	POTASSIUM BY ICAP	MG/KG		1300 U	1300 U	1700	1600
SS01	PHENOL	UG/KG		420 U	410 U	820 U	1800 U
SS02	CARBAZOLE	UG/KG		420 U	410 U	820 U	1800 U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401		401D		402		403	
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG			420	U	410	U	820	U	1800	U
SS04 2-CHLOROPHENOL	UG/KG			420	U	410	U	820	U	1800	U
SS05 1,3-DICHLOROBENZENE	UG/KG			420	U	410	U	820	U	1800	U
SS06 1,4-DICHLOROBENZENE	UG/KG			420	U	410	U	820	U	1800	U
SS07 BENZYL ALCOHOL	UG/KG			NA	O	NA	O	NA	O	NA	O
SS08 1,2-DICHLOROBENZENE	UG/KG			420	U	410	U	820	U	1800	U
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG			420	U	410	U	820	U	1800	U
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG			420	U	410	U	820	U	1800	U
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG			420	U	410	U	820	U	1800	U
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG			420	U	410	U	820	U	1800	U
SS13 HEXACHLOROETHANE	UG/KG			420	U	410	U	820	U	1800	U
SS14 NITROBENZENE	UG/KG			420	U	410	U	820	U	1800	U
SS15 ISOPHORONE	UG/KG			420	U	410	U	820	U	1800	U
SS16 2-NITROPHENOL	UG/KG			420	U	410	U	820	U	1800	U
SS17 2,4-DIMETHYLPHENOL	UG/KG			420	U	410	U	820	U	1800	U
SS18 BENZOIC ACID	UG/KG			NA	O	NA	O	NA	O	NA	O
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG			420	U	410	U	820	U	1800	U
SS20 2,4-DICHLOROPHENOL	UG/KG			420	U	410	U	820	U	1800	U
SS21 1,2,4-TRICHLOROBENZENE	UG/KG			420	U	410	U	820	U	1800	U
SS22 NAPHTHALENE	UG/KG			420	U	410	U	820	U	1800	U
SS23 4-CHLOROANILINE	UG/KG			420	U	410	U	820	U	1800	U
SS24 HEXACHLOROBUTADIENE	UG/KG			420	U	410	U	820	U	1800	U
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG			420	U	410	U	820	U	1800	U
SS26 2-METHYLNAPHTHALENE	UG/KG			420	U	410	U	820	U	1800	U
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG			420	U	410	U	820	U	1800	U
SS28 2,4,6-TRICHLOROPHENOL	UG/KG			420	U	410	U	820	U	1800	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D	401		401D		402		403	
SS29 2,4,5-TRICHLOROPHENOL	UG/KG		1000	U	990	U	2000	U	4300	U
SS30 2-CHLORONAPHTHALENE	UG/KG		420	U	410	U	820	U	1800	U
SS31 2-NITROANILINE	UG/KG		1000	U	990	U	2000	U	4300	U
SS32 DIMETHYLPHTHALATE	UG/KG		420	U	410	U	820	U	1800	U
SS33 ACENAPHTHYLENE	UG/KG		420	U	410	U	820	U	1800	U
SS34 3-NITROANILINE	UG/KG		1000	U	990	U	2000	U	4300	U
SS35 ACENAPHTHENE	UG/KG		420	U	410	U	820	U	1800	U
SS36 2,4-DINITROPHENOL	UG/KG		1000	U	990	U	2000	U	4300	U
SS37 4-NITROPHENOL	UG/KG		1000	U	990	U	2000	U	4300	U
SS38 DIBENZOFURAN	UG/KG		420	U	410	U	820	U	1800	U
SS39 2,4-DINITROTOLUENE	UG/KG		420	U	410	U	820	U	1800	U
SS40 2,6-DINITROTOLUENE	UG/KG		420	U	410	U	820	U	1800	U
SS41 DIETHYLPHTHALATE	UG/KG		420	U	410	U	820	U	1800	U
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG		420	U	410	U	820	U	1800	U
SS43 FLUORENE	UG/KG		420	U	410	U	820	U	1800	U
SS44 4-NITROANILINE	UG/KG		1000	U	990	U	2000	U	4300	U
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG		1000	U	990	U	2000	U	4300	U
SS46 N-NITROSODIPHENYLAMINE	UG/KG		420	U	410	U	820	U	1800	U
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG		420	U	410	U	820	U	1800	U
SS48 HEXACHLOROBENZENE	UG/KG		420	U	410	U	820	U	1800	U
SS49 PENTACHLOROPHENOL	UG/KG		1000	U	990	U	2000	U	4300	U
SS50 PHENANTHRENE	UG/KG		420	U	410	U	2900		4400	
SS51 ANTHRACENE	UG/KG		420	U	410	U	820	U	1800	U
SS52 DI-N-BUTYL PHTHALATE	UG/KG		420	U	410	U	820	U	1300	U
SS53 FLUORANTHENE	UG/KG		420	U	750		5000		5100	
SS54 PYRENE	UG/KG		420	U	960		6400	J	6000	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D	401		401D		402		403	
SS55 BUTYL BENZYL PHTHALATE	UG/KG		420	U	410	U	820	U	1800	U
SS56 3,3'-DICHLOROBENZIDINE	UG/KG		420	U	410	U	820	U	1800	U
SS57 BENZO(A)ANTHRACENE	UG/KG		420	U	60		3500		4200	
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG		420	U	410	U	820	U	1800	U
SS59 CHRYSENE	UG/KG		420	U	70		3900		4900	
SS60 DI-N-OCTYL PHTHALATE	UG/KG		420	U	410	U	820	U	1800	U
SS61 BENZO(B)FLUORANTHENE	UG/KG		420	U	410	U	3600		3600	
SS62 BENZO(K)FLUORANTHENE	UG/KG		420	U	410	U	900		3100	
SS63 BENZO(A)PYRENE	UG/KG		420	U	130		2600		5600	
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG		420	U	410	U	3000		2900	
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG		420	U	410	U	820	U	1800	U
SS66 BENZO(G,H,I)PERYLENE	UG/KG		420	U	410	U	500		4100	
ST09 CYANIDE	MG/KG		6.4	U	6.4	U	6		6.5	U
SV03 CHLOROMETHANE	UG/KG		13	U	13	U	13	U	14	U
SV04 BROMOMETHANE	UG/KG		13	U	13	U	13	U	14	U
SV05 VINYL CHLORIDE	UG/KG		13	U	13	U	13	U	14	U
SV06 CHLOROETHANE	UG/KG		13	U	13	U	13	U	14	U
SV07 METHYLENE CHLORIDE	UG/KG		13	U	15	U	13	U	14	U
SV08 1,1-DICHLOROETHYLENE	UG/KG		13	U	13	U	13	U	14	U
SV09 1,1-DICHLOROETHANE	UG/KG		13	U	13	U	13	U	14	U
SV10 TRANS-1,2-DICHLOROETHYLENE	UG/KG		13	U	13	U	13	U	14	U
SV11 CHLOROFORM	UG/KG		13	U	13	U	13	U	14	U
SV12 1,2-DICHLOROETHANE	UG/KG		13	U	13	U	13	U	14	U
SV13 1,1,1-TRICHLOROETHANE	UG/KG		13	U	13	U	13	U	14	U
SV14 CARBON TETRACHLORIDE	UG/KG		13	U	13	U	13	U	14	U
SV15 BROMODICHLOROMETHANE	UG/KG		13	U	13	U	13	U	14	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D	401	401D	402	403
SV16 1,2-DICHLOROPROPANE	UG/KG		13 U	13 U	13 U	14 U
SV17 BENZENE	UG/KG		13 U	13 U	13 U	14 U
SV18 TRANS-1,3-DICHLOROPROPENE	UG/KG		13 U	13 U	13 U	14 U
SV19 TRICHLOROETHYLENE	UG/KG		13 U	13 U	13 U	14 U
SV20 CIS-1,3-DICHLOROPROPENE	UG/KG		13 U	13 U	13 U	14 U
SV21 DIBROMOCHLOROMETHANE	UG/KG		13 U	13 U	13 U	14 U
SV22 1,1,2-TRICHLOROETHANE	UG/KG		13 U	13 U	13 U	14 U
SV24 BROMOFORM	UG/KG		13 U	13 U	13 U	14 U
SV25 1,1,2,2-TETRACHLOROETHENE	UG/KG		13 U	13 U	13 U	14 U
SV26 TOLUENE	UG/KG		13 U	13 U	13 U	14 U
SV27 1,1,2,2-TETRACHLOROETHANE	UG/KG		13 U	13 U	13 U	14 U
SV28 CHLOROBENZENE	UG/KG		13 U	13 U	13 U	14 U
SV29 ETHYL BENZENE	UG/KG		13 U	13 U	13 U	14 U
SV30 ACETONE	UG/KG		13 U	26 U	24 U	30 U
SV31 CARBON DISULFIDE	UG/KG		13 U	13 U	13 U	14 U
SV32 2-BUTANONE	UG/KG		13 U	13 U	13 U	14 U
SV33 VINYL ACETATE	UG/KG		NA O	NA O	NA O	NA O
SV34 2-HEXANONE	UG/KG		13 U	13 U	13 U	14 U
SV35 4-METHYL-2-PENTANONE	UG/KG		13 U	13 U	13 U	14 U
SV36 STYRENE	UG/KG		13 U	13 U	13 U	14 U
SV37 XYLENES, TOTAL	UG/KG		13 U	13 U	13 U	14 U
SV54 HYDROCARBONS, TOTAL PETROLEUM	MG/KG		31	31 U	82	49
WF01 WATER TEMP	°C	3.0				
WF05 PH, FIELD	SU	7.05				
WF10 CONDUCTIVITY (FIELD)	UMHOS	350				
WM01 SILVER BY ICAP	UG/L	10 U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401	401D	402	403
WM02 ALUMINUM BY ICAP	UG/L	9700	J				
WM03 ARSENIC BY ICAP	UG/L	10	U				
WM04 BARIUM BY ICAP	UG/L	200	U				
WM05 BERYLLIUM BY ICAP	UG/L	5.0	U				
WM06 CADMIUM BY ICAP	UG/L	5.0	U				
WM07 COBALT BY ICAP	UG/L	50	U				
WM08 CHROMIUM BY ICAP	UG/L	12					
WM09 COPPER BY ICAP	UG/L	25	U				
WM10 IRON BY ICAP	UG/L	11000					
WM11 MANGANESE BY ICAP	UG/L	430					
WM12 MOLYBDENUM BY ICAP	UG/L	NA	O				
WM13 NICKEL BY ICAP	UG/L	40	U				
WM14 LEAD BY ICAP	UG/L	15					
WM15 ANTIMONY BY ICAP	UG/L	60	U				
WM16 SELENIUM BY ICAP	UG/L	5.0	U				
WM17 TITANIUM BY ICAP	UG/L	NA	O				
WM18 THALLIUM BY ICAP	UG/L	10	U				
WM19 VANADIUM BY ICAP	UG/L	50	U				
WM20 ZINC BY ICAP	UG/L	46					
WM21 CALCIUM, TOTAL BY ICAP	MG/L	57					
WM22 MAGNESIUM, TOTAL BY ICAP	MG/L	22					
WM23 SODIUM, TOTAL BY ICAP	MG/L	19					
WM24 POTASSIUM, TOTAL BY ICAP	MG/L	5.1					
WM35 SILVER,DISSOLVED BY ICAP	UG/L	10	U				
WM36 ALUMINUM,DISSOLVED BY ICAP	UG/L	200	U				
WM37 ARSENIC,DISSOLVED BY ICAP	UG/L	10	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401	401D	402	403
WM38 BARIUM,DISSOLVED BY ICAP	UG/L	200	U				
WM39 BERYLLIUM,DISSOLVED BY ICAP	UG/L	5.0	U				
WM40 CADMIUM,DISSOLVED BY ICAP	UG/L	5.0	U				
WM41 COBALT,DISSOLVED BY ICAP	UG/L	50	U				
WM42 CHROMIUM,DISSOLVED BY ICAP	UG/L	10	U				
WM43 COPPER,DISSOLVED BY ICAP	UG/L	25	U				
WM44 IRON,DISSOLVED BY ICAP	UG/L	100	U				
WM45 MANGANESE,DISSOLVED BY ICAP	UG/L	15	U				
WM46 MOLYBDENUM,DISSOLVED BY ICAP	UG/L	NA	O				
WM47 NICKEL,DISSOLVED BY ICAP	UG/L	40	U				
WM48 LEAD,DISSOLVED BY ICAP	UG/L	3.0	U				
WM49 ANTIMONY,DISSOLVED BY ICAP	UG/L	60	U				
WM50 SELENIUM,DISSOLVED BY ICAP	UG/L	5.0	U				
WM51 TITANIUM,DISSOLVED BY ICAP	UG/L	NA	O				
WM52 THALLIUM,DISSOLVED BY ICAP	UG/L	10	U				
WM53 VANADIUM,DISSOLVED BY ICAP	UG/L	50	U				
WM54 ZINC,DISSOLVED BY ICAP	UG/L	20	U				
WM55 CALCIUM,DISSOLVED BY ICAP	MG/L	55					
WM56 MAGNESIUM,DISSOLVED BY ICAP	MG/L	21					
WM57 SODIUM,DISSOLVED BY ICAP	MG/L	20					
WM58 POTASSIUM,DISSOLVED BY ICAP	MG/L	5.0	U				
WS01 PHENOL	UG/L	10	U				
WS03 BIS(2-CHLOROETHYL) ETHER	UG/L	10	U				
WS04 2-CHLOROPHENOL	UG/L	10	U				
WS05 1,3-DICHLOROBENZENE	UG/L	10	U				
WS06 1,4-DICHLOROBENZENE	UG/L	10	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401	401D	402	403
WS07 BENZYL ALCOHOL	UG/L	10	U				
WS08 1,2-DICHLOROBENZENE	UG/L	10	U				
WS09 2-METHYLPHENOL (O-CRESOL)	UG/L	10	U				
WS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/L	10	U				
WS11 4-METHYLPHENOL (P-CRESOL)	UG/L	10	U				
WS12 N-NITROSO-DIPROPYLAMINE	UG/L	10	U				
WS13 HEXACHLOROETHANE	UG/L	10	U				
WS14 NITROBENZENE	UG/L	10	U				
WS15 ISOPHORONE	UG/L	10	U				
WS16 2-NITROPHENOL	UG/L	10	U				
WS17 2,4-DIMETHYLPHENOL	UG/L	10	U				
WS18 BENZOIC ACID	UG/L	50	U				
WS19 BIS(2-CHLOROETHYOXY) METHANE	UG/L	10	U				
WS20 2,4-DICHLOROPHENOL	UG/L	10	U				
WS21 1,2,4-TRICHLOROBENZENE	UG/L	10	U				
WS22 NAPHTHALENE	UG/L	10	U				
WS23 4-CHLOROANILINE	UG/L	10	U				
WS24 HEXACHLOROBUTADIENE	UG/L	10	U				
WS25 4-CHLORO-3-METHYLPHENOL	UG/L	10	U				
WS26 2-METHYLNAPHTHALENE	UG/L	10	U				
WS27 HEXACHLOROCYCLOPENTADIENE	UG/L	10	U				
WS28 2,4,6-TRICHLOROPHENOL	UG/L	10	U				
WS29 2,4,5-TRICHLOROPHENOL	UG/L	25	U				
WS30 2-CHLORONAPHTHALENE	UG/L	10	U				
WS31 2-NITROANILINE (ORTHO NITROANILINE)	UG/L	25	U				
WS32 DIMETHYLPHTHALATE	UG/L	10	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401	401D	402	403
WS33 ACENAPHTHYLENE	UG/L	10	U				
WS34 3-NITROANILINE	UG/L	25	U				
WS35 ACENAPHTHENE	UG/L	10	U				
WS36 2,4-DINITROPHENOL	UG/L	25	U				
WS37 4-NITROPHENOL	UG/L	25	U				
WS38 DIBENZOFURAN	UG/L	10	U				
WS39 2,4-DINITROTOLUENE	UG/L	10	U				
WS40 2,6-DINITROTOLUENE	UG/L	10	U				
WS41 DIETHYLPHTHALATE	UG/L	10	U				
WS42 4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U				
WS43 FLUORENE	UG/L	10	U				
WS44 4-NITROANILINE	UG/L	25	U				
WS45 4,6-DINITRO-2-METHYLPHENOL	UG/L	25	U				
WS46 N-NITROSODIPHENYLAMINE	UG/L	10	U				
WS47 4-BROMOPHENYL PHENYL ETHER	UG/L	10	U				
WS48 HEXACHLOROBENZENE	UG/L	10	U				
WS49 PENTACHLOROPHENOL	UG/L	25	U				
WS50 PHENANTHRENE	UG/L	10	U				
WS51 ANTHRACENE	UG/L	10	U				
WS52 DI-N-BUTYL PHTHALATE	UG/L	10	U				
WS53 FLUORANTHENE	UG/L	10	U				
WS54 PYRENE	UG/L	10	U				
WS55 BUTYL BENZYL PHTHALATE	UG/L	10	U				
WS56 3,3'-DICHLOROBENZIDINE	UG/L	10	U				
WS57 BENZO(A)ANTHRACENE	UG/L	10	U				
WS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U				

COMPOUND	UNITS	304D		401	401D	402	403
WS59 CHRYSENE	UG/L	10	U				
WS60 DI-N-OCTYL PHTHALATE	UG/L	10	U				
WS61 BENZO(B)FLUORANTHENE	UG/L	10	U				
WS62 BENZO(K)FLUORANTHENE	UG/L	10	U				
WS63 BENZO(A)PYRENE	UG/L	10	U				
WS64 INDENO(1,2,3-CD)PYRENE	UG/L	10	U				
WS65 DIBENZO(A,H)ANTHRACENE	UG/L	10	U				
WS66 BENZO(G,H,I)PERYLENE	UG/L	10	U				
WS67 CARBAZOLE	UG/L	10	U				
WT09 CYANIDE, TOTAL	MG/L	0.013	J				
WV03 CHLOROMETHANE	UG/L	10	U				
WV04 BROMOMETHANE	UG/L	10	U				
WV05 VINYL CHLORIDE	UG/L	10	U				
WV06 CHLOROETHANE	UG/L	10	U				
WV07 METHYLENE CHLORIDE	UG/L	10	U				
WV08 1,1-DICHLOROETHENE	UG/L	10	U				
WV09 1,1-DICHLOROETHANE	UG/L	10	U				
WV10 1,2-DICHLOROETHENE, TOTAL	UG/L	10	U				
WV11 CHLOROFORM	UG/L	10	U				
WV12 1,2-DICHLOROETHANE	UG/L	10	U				
WV13 1,1,1-TRICHLOROETHANE	UG/L	10	U				
WV14 CARBON TETRACHLORIDE	UG/L	10	U				
WV15 BROMODICHLOROMETHANE	UG/L	10	U				
WV16 1,2 DICHLOROPROPANE	UG/L	10	U				
WV17 BENZENE	UG/L	10	U				
WV19 TRICHLOROETHENE	UG/L	10	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	304D		401	401D	402	403
WV20 CIS-1,3-DICHLOROPROPENE	UG/L	10	U				
WV21 DIBROMOCHLOROMETHANE	UG/L	10	U				
WV22 1,1,2-TRICHLOROETHANE	UG/L	10	U				
WV24 BROMOFORM	UG/L	10	U				
WV25 TETRACHLOROETHENE	UG/L	10	U				
WV26 TOLUENE	UG/L	10	U				
WV27 1,1,2,2-TETRACHLOROETHANE	UG/L	10	U				
WV28 CHLOROBENZENE	UG/L	10	U				
WV29 ETHYL BENZENE	UG/L	10	U				
WV30 ACETONE	UG/L	10	U				
WV31 CARBON DISULFIDE	UG/L	10	U				
WV32 2-BUTANONE	UG/L	10	U				
WV33 VINYL ACETATE	UG/L	10	U				
WV34 2-HEXANONE	UG/L	10	U				
WV35 4-METHYL-2-PENTANONE	UG/L	10	U				
WV36 STYRENE	UG/L	10	U				
WV37 XYLENES, TOTAL	UG/L	10	U				
WV40 TRANS-1,3-DICHLOROPROPENE	UG/L	10	U				
WV86 HYDROCARBONS, TOTAL PETROLEUM	MG/L	0.5	U				
Z701 SAMPLE NUMBER	NA	304		401	401	402	403
Z702 ACTIVITY CODE	NA	DSX44		DSX44	DSX44	DSX44	DSX44

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	501					
SS01 PHENOL	UG/KG	450000	U				
SS03 BIS(2-CHLOROETHYL) ETHER	UG/KG	450000	U				
SS04 2-CHLOROPHENOL	UG/KG	450000	U				
SS05 1,3-DICHLOROBENZENE	UG/KG	450000	U				
SS06 1,4-DICHLOROBENZENE	UG/KG	450000	U				
SS07 BENZYL ALCOHOL	UG/KG	450000	U				
SS08 1,2-DICHLOROBENZENE	UG/KG	450000	U				
SS09 2-METHYLPHENOL (O-CRESOL)	UG/KG	450000	U				
SS10 BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	450000	U				
SS11 4-METHYLPHENOL (P-CRESOL)	UG/KG	450000	U				
SS12 N-NITROSO-DIPROPYLAMINE	UG/KG	450000	U				
SS13 HEXACHLOROETHANE	UG/KG	450000	U				
SS14 NITROBENZENE	UG/KG	450000	U				
SS15 ISOPHORONE	UG/KG	450000	U				
SS16 2-NITROPHENOL	UG/KG	450000	U				
SS17 2,4-DIMETHYLPHENOL	UG/KG	450000	U				
SS18 BENZOIC ACID	UG/KG	2300000	U				
SS19 BIS(2-CHLOROETHYOXY) METHANE	UG/KG	450000	U				
SS20 2,4-DICHLOROPHENOL	UG/KG	450000	U				
SS21 1,2,4-TRICHLOROBENZENE	UG/KG	450000	U				
SS22 NAPHTHALENE	UG/KG	700000	[redacted]				
SS23 4-CHLOROANILINE	UG/KG	450000	U				
SS24 HEXACHLOROBUTADIENE	UG/KG	450000	U				
SS25 4-CHLORO-3-METHYLPHENOL	UG/KG	450000	U				
SS26 2-METHYLNAPHTHALENE	UG/KG	[redacted]000000	[redacted]				
SS27 HEXACHLOROCYCLOPENTADIENE	UG/KG	450000	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	501					
SS28 2,4,6-TRICHLOROPHENOL	UG/KG	450000	U				
SS29 2,4,5-TRICHLOROPHENOL	UG/KG	2300000	U				
SS30 2-CHLORONAPHTHALENE	UG/KG	450000	U				
SS31 2-NITROANILINE	UG/KG	2300000	U				
SS32 DIMETHYLPHTHALATE	UG/KG	450000	U				
SS33 ACENAPHTHYLENE	UG/KG	450000	U				
SS34 3-NITROANILINE	UG/KG	2300000	U				
SS35 ACENAPHTHENE	UG/KG	620000	[redacted]				
SS36 2,4-DINITROPHENOL	UG/KG	2300000	U				
SS37 4-NITROPHENOL	UG/KG	2300000	U				
SS38 DIBENZOFURAN	UG/KG	450000	U				
SS39 2,4-DINITROTOLUENE	UG/KG	450000	U				
SS40 2,6-DINITROTOLUENE	UG/KG	450000	U				
SS41 DIETHYLPHTHALATE	UG/KG	450000	U				
SS42 4-CHLOROPHENYL PHENYL ETHER	UG/KG	450000	U				
SS43 FLUORENE	UG/KG	[redacted]					
SS44 4-NITROANILINE	UG/KG	2300000	U				
SS45 4,6-DINITRO-2-METHYLPHENOL	UG/KG	2300000	U				
SS46 N-NITROSODIPHENYLAMINE	UG/KG	450000	U				
SS47 4-BROMOPHENYL PHENYL ETHER	UG/KG	450000	U				
SS48 HEXACHLOROBENZENE	UG/KG	450000	U				
SS49 PENTACHLOROPHENOL	UG/KG	2300000	U				
SS50 PHENANTHRENE	UG/KG	[redacted]					
SS51 ANTHRACENE	UG/KG	[redacted]					
SS52 DI-N-BUTYL PHTHALATE	UG/KG	450000	U				
SS53 FLUORANTHENE	UG/KG	[redacted]					

COMPOUND	UNITS	501					
SS54 PYRENE	UG/KG	2800000					
SS55 BUTYL BENZYL PHTHALATE	UG/KG	450000	U				
SS56 3,3'-DICHLOROBENZIDINE	UG/KG	900000	U				
SS57 BENZO(A)ANTHRACENE	UG/KG	1600000					
SS58 BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	450000	U				
SS59 CHRYSENE	UG/KG	2700000					
SS60 DI-N-OCTYL PHTHALATE	UG/KG	450000	U				
SS61 BENZO(B)FLUORANTHENE	UG/KG	450000	U				
SS62 BENZO(K)FLUORANTHENE	UG/KG	450000	U				
SS63 BENZO(A)PYRENE	UG/KG	970000					
SS64 INDENO(1,2,3-CD)PYRENE	UG/KG	450000	U				
SS65 DIBENZO(A,H)ANTHRACENE	UG/KG	450000	U				
SS66 BENZO(G,H,I)PERYLENE	UG/KG	450000	U				
SV03 CHLOROMETHANE	UG/KG	5000	U				
SV04 BROMOMETHANE	UG/KG	5000	U				
SV05 VINYL CHLORIDE	UG/KG	5000	U				
SV06 CHLOROETHANE	UG/KG	5000	U				
SV07 METHYLENE CHLORIDE	UG/KG	5000	U				
SV08 1,1-DICHLOROETHYLENE	UG/KG	2500	U				
SV09 1,1-DICHLOROETHANE	UG/KG	2500	U				
SV10 TRANS-1,2-DICHLOROETHYLENE	UG/KG	2500	U				
SV11 CHLOROFORM	UG/KG	2500	U				
SV12 1,2-DICHLOROETHANE	UG/KG	2500	U				
SV13 1,1,1-TRICHLOROETHANE	UG/KG	2500	U				
SV14 CARBON TETRACHLORIDE	UG/KG	2500	U				
SV15 BROMODICHLOROMETHANE	UG/KG	2500	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 1-DSX44 VALIDATED DATA

COMPOUND	UNITS	501					
SV16 1,2-DICHLOROPROPANE	UG/KG	2500	U				
SV17 BENZENE	UG/KG	21000					
SV18 TRANS-1,3-DICHLOROPROPENE	UG/KG	2500	U				
SV19 TRICHLOROETHYLENE	UG/KG	2500	U				
SV20 CIS-1,3-DICHLOROPROPENE	UG/KG	2500	U				
SV21 DIBROMOCHLOROMETHANE	UG/KG	2500	U				
SV22 1,1,2-TRICHLOROETHANE	UG/KG	2500	U				
SV24 BROMOFORM	UG/KG	2500	U				
SV25 1,1,2,2-TETRACHLOROETHENE	UG/KG	2500	U				
SV26 TOLUENE	UG/KG	84000					
SV27 1,1,2,2-TETRACHLOROETHANE	UG/KG	2500	U				
SV28 CHLOROBENZENE	UG/KG	2500	U				
SV29 ETHYL BENZENE	UG/KG	38000					
SV30 ACETONE	UG/KG	5000	U				
SV31 CARBON DISULFIDE	UG/KG	2500	U				
SV32 2-BUTANONE	UG/KG	5000	U				
SV33 VINYL ACETATE	UG/KG	5000	U				
SV34 2-HEXANONE	UG/KG	5000	U				
SV35 4-METHYL-2-PENTANONE	UG/KG	5000	U				
SV36 STYRENE	UG/KG	2500	U				
SV37 XYLENES, TOTAL	UG/KG	196000					
SV54 HYDROCARBONS, TOTAL PETROLEUM	MG/KG	ATTACHMENT					
Z201 SAMPLE NUMBER	NA	501					
Z202 ACTIVITY CODE	NA	DSX44					

ACTIVITY DSX44 LACLEDE COAL GAS

THE PROJECT LEADER SHOULD CIRCLE ONE - STORET, AIRS, OR ARCHIVE.

CIRCLE ONE: STORET AIRS ARCHIVE

DATA APPROVED BY LABO FOR TRANSMISSION TO PROJECT LEADER ON 06/12/91 09:01:15 BY _____

ANALYSIS REQUEST REPORT

VALIDATED DATA

FOR ACTIVITY: DSX44

S P F D

06/12/91 16:34:32

* FINAL REPORT

FY: 91 ACTIVITY: DSX44 DESCRIPTION: LACLEDE COAL GAS LOCATION: MISSOURI

STATUS: ACTIVE TYPE: SAMPLING - CONTRACT LAB ANALYSIS PROJECT: A34

LABO DUE DATE IS 5/14/91. REPORT DUE DATE IS 5/28/91.

INSPECTION DATE: 3/14/91 ALL SAMPLES RECEIVED DATE: 03/15/91

ALL DATA APPROVED BY LABO DATE: 06/12/91 FINAL REPORT TRANSMITTED DATE: 06/21/91

EXPECTED LABO TURNAROUND TIME IS 60 DAYS EXPECTED REPORT TURNAROUND TIME IS 75 DAYS

ACTUAL LABO TURNAROUND TIME IS 89 DAYS ACTUAL REPORT TURNAROUND TIME IS 99 DAYS

SAMP. NO.	QCC	M	DESCRIPTION	SAMPLE STATUS	# CONT.	CITY	STATE	AIRS/ STORET LOC NO	BEG. DATE	BEG. TIME	END. DATE	END. TIME
001		S	BACKGROUND SAMPLE-CSI-A	1	4	ST. LOUIS	MISSOURI		03/07/91	15:36	/ /	:
002		S	BACKGROUND SAMPLE-CSI-B	1	4	ST. LOUIS	MISSOURI		03/07/91	11:00	/ /	:
003		S	BACKGROUND SAMPLE-CSI-C	1	4	ST. LOUIS	MISSOURI		03/07/91	16:45	/ /	:
004		S	BACKGROUND SAMPLE-CSI-D	1	4	ST. LOUIS	MISSOURI		03/07/91	16:55	/ /	:
005		S	BACKGROUND SAMPLE-CSI-E	1	4	ST. LOUIS	MISSOURI		03/07/91	17:15	/ /	:
006		S	BORING LOCAL.#6-B-06-CS2	1	4	ST. LOUIS	MISSOURI		03/08/91	09:20	/ /	:
007		S	BORING LOCAL.#6-R-06-CS2	1	4	ST. LOUIS	MISSOURI		03/08/91	09:35	/ /	:
008		S	R-06-CS3 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	11:07	/ /	:
009		S	B-14-CS4 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	13:50	/ /	:
010		W	B14-CS4 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	14:20	/ /	:
011		S	B-07-CS6 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/08/91	17:35	/ /	:
012		S	R13-CS7 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/09/91	09:24	/ /	:
013		S	B13-CS7 SAMPLE LOCATION	1	4	ST. LOUIS	MISSOURI		03/09/91	09:45	/ /	:
101		S	BORING LOCATION-01/MOUND STR POWER	1	3	ST. LOUIS	MISSOURI		03/04/91	13:05	/ /	:
102		S	BORING LOCATION 02	1	3	ST. LOUIS	MISSOURI		03/02/91	14:20	/ /	:
103		S	SURFACE SOIL AT EAST CENTRALOF TANK	1	3	ST. LOUIS	MISSOURI		03/04/91	15:30	/ /	:
104		S	BORING LOCATION 05	1	3	ST. LOUIS	MISSOURI		03/04/91	17:25	/ /	:
105		S	BETWEEN TANKS 7-8/BORING 07	1	3	ST. LOUIS	MISSOURI		03/05/91	13:50	/ /	:
106		S	BORING LOCATION-15	1	3	ST. LOUIS	MISSOURI		03/06/91	14:10	/ /	:
107		S	BORING LOCATION -16	1	3	ST. LOUIS	MISSOURI		03/06/91	15:15	/ /	:
108		S	BORING LOCATION-17	1	3	ST. LOUIS	MISSOURI		03/06/91	15:45	/ /	:
109		S	BORING LOCATION-18	1	3	ST. LOUIS	MISSOURI		03/06/91	16:53	/ /	:
110		S	R19-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/14/91	07:45	/ /	:
111		S	R20-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/14/91	07:30	/ /	:
112		S	B21-SAMPLE LOCATION	1	3	ST. LOUIS	MISSOURI		03/13/91	17:30	/ /	:

APPENDIX E

Field Sheets
and
Chain of Custody Records

RAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: 05X44 SAMNO: 001 QCC: _ MEDIA: SOIL PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
OCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: CS1-A DATE 07 TIME FROM REF PT
OCATION: ST. LOUIS MO BEG: 03/01/91 15:36 EAST: ____
ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____
TORET/SAROAD NO: _____ DOWN: 2-3 ft.

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
~~LASS~~	~~ICED~~	SS	SEMIVOLATILES ~~delete~~
LASS	NONE	SV	VOLATILES.
~~LASS~~	~~ICED~~	SM	METALS ~~delete~~
~~LASS~~	NONE	ST09	CYANIDE ~~delete~~
~~LASS~~	~~ICED~~	SM34	MERCURY BY COLD VAP delete

OMMENTS: SEE Boring & Safety Log #2

BACKGROUND

Duplicate

AMPLE COLLECTED BY : PECK/McCALL

AFT

FIELD SHEET
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 002 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CATION: ST LOUIS MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: GS 1 - B DATE DP 07 TIME FROM REF PT
CATION: ST. LOUIS MO BEG: 03/~~01~~/91 11:00 EAST: ___
ASE/BATCH/SMO: ____/_/____ LAB: ___ END: __/__/__ __:__ NORTH: ___
TORET/SAROAD NO: _____ DOWN: 7-11' FT

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	SV	VOLATILES
~~LASS~~	~~ICED~~	SM	METALS
~~LASS~~	~~NONE~~	ST09	CYANIDE
~~LASS~~	~~ICED~~	~~SM34~~	~~MERCURY~~ BY COLD VAP

OMMENTS: SEE ~~BORING~~ DP BORING + SAFETY LOG #2

BACKGROUND

Need Duplicate

AMPLE COLLECTED BY : PELK/McCALL

RAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 003 QCC: _ MEDIA: SOIL PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
OCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: C51-C

	KB DATE	TIME	FROM REF PT
OCATION: ST. LOUIS MO	BEG: 03/01/91	16:45	EAST: ____
ASE/BATCH/SMO: _____/_/_____ LAB: ___	END: __/__/__	__:__	NORTH: ____
TORET/SAROAD NO: _____			DOWN: 1-15'

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	SV	VOLATILES
LASS	ICED	SM	METALS
LASS	NONE	ST09	CYANIDE
LASS	ICED	SM34	MERCURY BY COLD VAP

OMMENTS:

SEE BORING & SAFETY LOG #2

Background

Field Concentration

AMPLE COLLECTED BY : PECK/McCALL

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 004 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: St. LOUIS MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: ~~[illegible]~~ CS1-D

CATION: ST. LOUIS MO

SE/BATCH/SMO: ____/_/_____ LAB: ___

ORET/SAROAD NO: _____

	DATE	TIME	FROM REF PT
BEG:	03/~~01~~/91	16:55	EAST: ____
END:	__/01/__	__:__	NORTH: ____
			DOWN: 17-21 feet

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
~~ASS~~	~~ICED~~	~~SS~~	~~SEMIVOLATILES~~ ~~[illegible]~~
ASS	NONE	SV	VOLATILES
~~ASS~~	~~ICED~~	~~SM~~	~~METALS~~
~~ASS~~	~~NONE~~	~~ST09~~	~~CYANIDE~~ ~~[illegible]~~
~~ASS~~	~~ICED~~	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~

MMENTS: SEE BORING & SAFETY LOG #2

BACKGROUND

Need concentration

MPLE COLLECTED BY : PELK / McCall

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: 05X44 SAMNC: 005 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: CS1-E

CATION: ST. LOUIS MO

SE/BATCH/SMO: _____/_/_____ LAB: ___

ORET/SAROAD NO: _____

DATE TIME FROM REF PT

BEG: 03/01/91 12:15 EAST: ____

END: __/__/__ __:__ NORTH: ____

DOWN: 19.33ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	SV	VOLATILES
~~ASS~~	~~ICED~~	~~SM~~	~~METALS~~
~~ASS~~	~~NONE~~	~~SI09~~	~~CYANIDE~~
~~ASS~~	~~ICED~~	SM34	MERCURY BY COLD VAP

MMENTS: SEE Boring + Safety Log #2

BACKGROUND

Need concentration

MPLE COLLECTED BY : PECK/MaCALL

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 006 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B-06 CS2 DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/~~01~~ 08/91 09:20 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: 3-8 ft.

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME	
~~ASS~~	~~ICED~~	~~SS~~	~~SEMIVOLATILES~~	Dellata
ASS	NONE	SV	VOLATILES	
~~ASS~~	~~ICED~~	~~SM~~	~~METALS~~	[illegible]
~~ASS~~	~~NONE~~	~~ST09~~	~~CYANIDE~~	
~~ASS~~	~~ICED~~	~~SM34~~	~~MERCURY~~	~~BY COLD VAP~~

NO Hg.

MMENTS:

Boring location #6 continues

sample #2

See boring & safety log #2

VIB

Need concentration

MPLE COLLECTED BY : Peck & Michell

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 007 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: R-06-02 DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/~~01~~/91 09:35 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/08/__ __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: 8-13 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME	
~~ASS~~	~~ICED~~	~~SS~~	~~SEMIVOLATILES~~	~~delete~~
ASS	NONE	SV	VOLATILES	
~~ASS~~	~~ICED~~	~~SM~~	~~METALS~~	~~delete~~
~~ASS~~	~~NONE~~	~~ST09~~	~~CYANIDE~~	
~~ASS~~	~~ICED~~	~~SM34~~	~~MERCURY~~	~~BY COLD VAP~~ No Hg.

MMENTS:

Boring location #6 continuous sample #2

See boring & safety log #2

V/B

Med. Con.

AMPLE COLLECTED BY : [signature]

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 008 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B-06-CS3 DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/~~01~~ 08/91 11:07 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: 8-12 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	SV	VOLATILES
ASS	ICED	SM	METALS
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP delete.

MMENTS:

See boring & safety log #2

V/D med. conc

AMPLE COLLECTED BY : Peck / McCall

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 009 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: [illegible] MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B-14 - CS4 FB DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/~~01~~/91 13:50 EAST: ___

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/08/__ __:__ NORTH: ___

ORET/SAROAD NO: _____ DOWN: 4-8 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	SV	VOLATILES
ASS	ICED	SM	METALS
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ delete.

MMENTS:

See boring & safety logbook #2

V/B med. Conc.

AMPLE COLLECTED BY : [illegible]

RAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 010 QCC: _ MEDIA: ~~SOIL~~ water PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

OCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: B14-C54

OCATION: ST. LOUIS MO BEG: 03/~~01~~/91 14:20 EAST: ____

ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/08/__ __:__ NORTH: ____

TORET/SAROAD NO: _____ DOWN: 12-14 ft

DATE TIME FROM REF PT

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	~~M~~GP	NAME
LASS	ICED	~~S~~S	SEMIVOLATILES
LASS	NONE	~~S~~V	VOLATILES
LASS	ICED	SM	METALS
LASS	NONE	~~S~~T09	CYANIDE
LASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ delete.

OMMENTS:

See boring & safety logbook #2

oil & water; medium concentration

~~V/B~~

entire sample - WATR

Med - High conc

AMPLE COLLECTED BY : [illegible]

RAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 011 QCC: _ MEDIA: SOIL PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

OCATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: B-07 - ~~06~~ 08 CS6 DATE TIME FROM REF PT

OCATION: ST. LOUIS MO BEG: 03/~~01~~/91 17:55 EAST: ____

ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____

TORET/SAROAD NO: _____ DOWN: 11-17 ft.

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	SV	VOLATILES
LASS	ICED	SM	METALS
LASS	NONE	ST09	CYANIDE
LASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ deleted

OMMENTS:

See boring & safety logbook #3

V/B Med. Cone

AMPLE COLLECTED BY : [illegible]

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 012 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B13-C57 DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/~~01~~/91 09:24 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/09/__ __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: 5-11 ft.

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	SV	VOLATILES
ASS	ICED	SM	METALS
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ dilute!

MMENTS:

See boring + safety logbook #3

V/B med. Core.

AMPLE COLLECTED BY : Peck / Strouse

RAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 013 QCC: _ MEDIA: SOIL PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

OCATION: [illegible] MO PROJECT NUM: A34 PT: LONGITUDE: ___ __ __

AMPLE DES: B13 - CS 7 RB DATE TIME FROM REF PT

OCATION: ST. LOUIS MO BEG: 03/~~01~~/91 09:45 EAST: ____

ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/09/__ __:__ NORTH: ____

TORET/SAROAD NO: _____ DOWN: 11-12.5 ft

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	SV	VOLATILES
LASS	ICED	SM	METALS
LASS	NONE	ST09	CYANIDE
LASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ delete:

OMMENTS:

See boring + safety logbook #3

V/B Med. Core

AMPLE COLLECTED BY : [illegible] Strobel

RAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 101 QCC: _ MEDIA: SOIL PL: S P F D

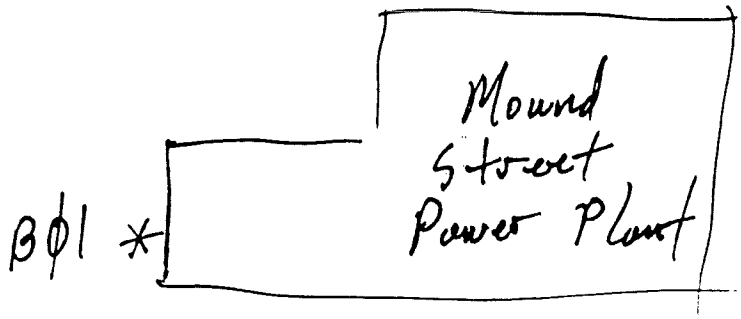
CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CCATION: B01 MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: _____ DATE TIME FROM REF PT
OCATION: ST. LOUIS MO BEG: 03/04/91 13:05 EAST: ____
ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____
TORET/SAROAD NO: _____ OCWN: ____

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SM	METALS
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	ST09	CYANIDE
LASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP delete

OMMENTS: Boring Location 01
South end of old mound street plant
in drive way
0 - 2 ft depth
Split Collected



AMPLE COLLECTED BY : Wes McCall, John Peck

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: 0SX44 SAMNO: 102 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

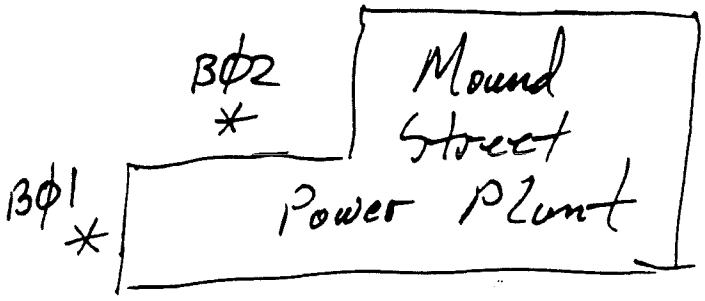
MPLE DES: _____ DATE TIME FROM REF PT
CATION: ST. LOUIS MO BEG: 03/01/91 14:20 EAST: ____
SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____
ORET/SAROAD NO: _____ DOWN: ____

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP delete.

MMENTS: Boring Location Ø2

Corner of old mound street
Power Plant



Split Collected

MPLE COLLECTED BY : Wes McCall, John Peck, Patty Roberts

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 103 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: _____ DATE & TIME FROM REF PT

CATION: ST. LOUIS MO BEG: ~~03/04/91~~ 15:30 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: 3/04/91 __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: ~~___~~ FT

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete

MMENTS:

SURFACE SOIL LOCATED AT THE EAST CENTRAL PART OF THE TANK FARM

- SEE MAP FOR LOCATION

SAMPLE CONSISTS OF 1 ALIQUOT AT 1 FT AND 1 ALIQUOT AT 2 FT

SPLIT SAMPLE WAS COLLECTED

MPLE COLLECTED BY : _____

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: OSX44 SAMNC: 104 ICC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: B05 MO PROJECT NUM: A34 PT: LONGITUDE: ___ __ __

MPLE DES: DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/04/91 17:35 EAST: ____

SE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____

ORET/SAROAD NO: _____ DOWN: 0-2 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete

MMENTS: Between the two tanks at north end of tank farm

Boring Location B05

Split collected.

MPLE COLLECTED BY : Roberts, Peck, Hall

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 105 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: ___ __ __

MPLE DES: BOT
CATION: ST. LOUIS MO
SE/BATCH/SMO: _____/_/_____ LAB: ___
ORET/SAROAD NO: _____

DATE TIME FROM REF PT
BEG: 03/01/91 13:50 EAST: ____
END: 03/01/91 __:__ NORTH: ____
DOWN: 0-2 ft.

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP delete.

MMENTS:

Between tanks 7-8

Use boring & safety log book #1

MPLE COLLECTED BY : [illegible]

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 106 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

CATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B15

CATION: ST. LOUIS MO

SE/BATCH/SMO: ____/_/_____ LAB: ___

ORET/SAROAD NO: _____

	DATE	TIME	FROM REF PT
BEG:	03/~~01~~/91	14:10	EAST: ____
END:	__/06/__	__:__	NORTH: ____
			DOWN: 0-2 ft.

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ ~~BY COLD VAP~~ delete

MMENTS:

see boring + safety logbook #2

South of little tankform near

level wall

AMPLE COLLECTED BY : Peck [illegible]

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 107 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: B16 DATE TIME FROM REF PT.
CATION: ST. LOUIS MO BEG: 03/01/91 15:15 EAST: ____
SE/BATCH/SMO: ____/_/____ LAB: ___ END: __/__/__ __:__ NORTH: ____
ORET/SAROAD NO: _____ DOWN: 0-2 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP deleted.

MMENTS:

20ft south of little transformer
See boring & safety logbook #2

MPLE COLLECTED BY : Rick J McCall

AFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: DSX44 SAMNO: 108 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE GAS REF LATITUDE: __ __ __

CATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: SL7 RB DATE TIME FROM REF PT

CATION: ST. LOUIS MO BEG: 03/01/91 15:45 EAST: ___

SE/BATCH/SMO: ____/_/____ LAB: ___ END: __/__/__ __:__ NORTH: ___

ORET/SAROAD NO: _____ DOWN: 0-2ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MSP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY~~ BY COLD VAP delete

MMENTS:

35' north of little tankfarm

AMPLE COLLECTED BY : Paul McCall

AFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

: 91 ACTNO: 0SX44 SAMNO: 109 QCC: _ MEDIA: SOIL PL: S P F D

TIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
CATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

MPLE DES: 18
CATION: ST. LOUIS MO
SE/BATCH/SMO: _____/_/_____ LAB: ___
ORET/SAROAD NO: _____

	DATE	TIME	FROM REF PT
BEG:	05/01/91	16:52	EAST: ____
END:	05/01/91	__:__	NORTH: ____
			DOWN: 0-2 ft

ALYSIS REQUESTED:

NTAINER	PRESERVATIVE	MGP	NAME
ASS	ICED	SM	METALS
ASS	ICED	SS	SEMIVOLATILES
ASS	NONE	ST09	CYANIDE
ASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete

MMENTS:

160' north of little Tankfarm

see logbook #2

MPLE COLLECTED BY : Rick Linscott

RAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

Y: 91 ACTNO: DSX44 SAMNO: 110 QCC: _ MEDIA: SOIL PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

OCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: R17 DATE TIME FROM REF PT

OCATION: ST. LOUIS MO BEG: 03/~~01~~/91 ~~08:37~~ EAST: ___

ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: 10/~~1~~ 14 07:~~15~~ SH NORTH: ___

TORET/SAROAD NO: _____ DOWN: 0-2 ft.

NALYSIS REQUESTED:

ONTAINER	PRESERVATIVE	MGP	NAME
LASS	ICED	SM	METALS
LASS	ICED	SS	SEMIVOLATILES
LASS	NONE	ST09	CYANIDE
LASS	ICED	SM34	~~MERCURY~~ delete BY COLD VAP

OMMENTS:

8 of ~~[illegible]~~ Mullanphy

130' from railroad track

logbook #2

Brown/Haxes SH

AMPLE COLLECTED BY : ~~[illegible]~~

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 111 QCC: _ MEDIA: SOIL PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: B20 7/8 DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: 03/~~01~~/91 ~~22:25~~ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/~~07~~/__ 07:30 NORTH: ____

STORET/SAROAD NO: _____ 14 59 DOWN: 2-2 ft.

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	SM34	~~MERCURY~~ delete BY COLD VAP

COMMENTS:

S. of Mullinply

180' E. of R.R. track

logbook #2

Brown / Hayes SH

SAMPLE COLLECTED BY : [illegible]

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 112 QCC: _ MEDIA: SOIL PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: B21 DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: 03/~~01~~/91 ~~10~~:30 EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __~~10~~/__ 17:30 NORTH: ____

STORET/SAROAD NO: _____ 13 AH AH DOWN: 0.2 ft

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	SM34	~~MERCURY~~ BY COLD VAP delete

COMMENTS:

82' W. of N 1st Ave

Logbook #2

Bore hole #21

Hayes / Brown SH

SAMPLE COLLECTED BY : [illegible]

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 201 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/05/91 PR __:__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 17:15 NORTH: ____

STORET/SAROAD NO: _____ DOWN: 26

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
4 OZ PLASTIC	FILTER,HNO3	W07	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	~~6 WM54~~	~~MERCURY BY COLD VAP~~ ✓ delete, m

COMMENTS:

GW sample

~~Collected sample at 26 feet.~~ cw

Location = 64 feet south from center of Mullanphy Street and 50 feet East of eastern most RR tracks.

STATIC WATER LEVEL: 24 FT

DEPTH OF WELL: 26 FT.

pH = 7.58

Conductivity

Umhos = 1500

Temp. = 11°C

SAMPLE COLLECTED BY: Roberts, ~~Melia~~ Williams PR

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 202 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/06/91 PR __:__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 10:00 NORTH: ____

STORET/SAROAD NO: _____ DOWN: 33'

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
1 OZ PLASTIC	FILTER,HNO3	W07	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	• ~~WM34~~	~~MERCURY BY COLD VAP~~ delete.

COMMENTS:

Cold sample

Terminal RR Assoc. 147 ft. west of RR track and 78 ft. south of the center of Mullanphy Street.

Depth to static water table = 24'

Depth of well = 33'

pH = 7.81

Temp. = 7°C

Cond. = 2000 umhos

SAMPLE COLLECTED BY : Roberts ~~Hatter~~ Williams (PR)

DRAFT

FIELD SHEET
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 203 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/07/92 __:__ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 14:30 NORTH: ____
STORET/SAROAD NO: _____ DOWN: 47'3"

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
3 VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
½ OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	WM34	~~MERCURY~~ BY COLD VAP delete.

COMMENTS: ARMY CORPS OF ENGINEERS

Engineering Test Well

Location = 147 feet north of the center of Mullanphy Street and 40 feet west of concrete flood level.

Depth of well = 47.3"

Static water level = 27.3"

pH = 6.32

Cond. = 1500 umhos

Temp. = 9°C

SAMPLE COLLECTED BY : Roberts Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 204 OCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ ~~03/07/91~~ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ __:__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 16:45 NORTH: ____

STORET/SAROAD NO: _____ DOWN: ~~48'~~

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
3 VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
½ OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ Kelette

COMMENTS:

ARMY CORPS OF ENGINEERS

Engineering Test well

Location = ~~216 feet north of well~~

~~(Sample #903) was collected from~~

363 feet north of the center of Mullanphy Street and 25 feet west of the concrete flood levee.

Depth of well = 48'

Static water level = 26'

pH = 6.21

Temp. = 9°C.

Cond. = 400 umhos

SAMPLE COLLECTED BY : Roberts / Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 205 QCC: F MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: B13 - St Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: Equip. Rinsate DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO SEG: 03/~~04~~/91 ~~09~~:30 EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____
STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
~~4 OZ PLASTIC~~	~~FILTER, HNO3~~	~~WO7~~	~~IN DISSOLVED METALS~~
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ Hold

COMMENTS: Rinsate of augers and split spoon Samples using clean drillers decon water.

SAMPLE COLLECTED BY : McCall, Peck, Strobel

DRAFT

FIELD SHEET
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 206 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE & TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/04/91~~ __:__ EAST: ____
CASE/BATCH/SMO: ____/_/____ LAB: ___ END: 3/9/91 10:27 NORTH: ____
TORET/SAROAD NO: _____ DOWN: 52 FT

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
_ VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ deleted.

COMMENTS:

COLLECTED FROM ARMY CORPS OF ENGINEERS ENGINEERING TEST WELL

LOCATION: 20 FT. WEST OF CONCRETE LEVEE WALL AND ~ 2118 FT N. OF THE CENTER OF MULLANPHY ST.

DEPTH OF WELL: 52 FT
STATIC WATER LEVEL: 29 FT.

- pH = 6.14.
- COND. = 1600 umhos/cm
- TEMP. = 11°C.

[illegible]

SAMPLE COLLECTED BY: ROBERTS & WILLIAMS

3/9/91

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

206D

FY: 91 ACTNO: DSX44 SAMNO: ~~207~~ 2K QCC: _ MEDIA: WATER PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

AMPLE DES: _____
OCATION: ST. LOUIS MO
CASE/BATCH/SMO: ____1_1_____ LAB: ___
TORET/SAROAD NO: _____

DATE TIME FROM REF PT
BEG: ~~03101191~~ 3/9/91 __:__ EAST: ____
END: 3/9/91 10:22 NORTH: ____
DOWN: 52 FT

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS
UBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	WM34	MERCURY ~~BY COLD VAP~~ delete.

COMMENTS:

COLLECTED FROM ARMY CORPS OF ENGINERS ENGINEERING TEST WELL

LOCATION: 20 FT. WEST OF CONCRETE LEVEE WALL AND ~ 218 FT NORTH OF THE CENTER OF MULLANPHY ST.

DEPTH OF WELL: 52 FT
STATIC WATER LEVEL = 29 FT.
pH = 6.14
COND. = 1600 umhos
TEMP. = 11°C

SAMPLE COLLECTED BY : ROBERTS & WILLIAMS

Chris Wells
3/9/91

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 207 QCC: E MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ PR :__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: 03/09/91 :__ NORTH: ____

STORET/SAROAD NO: _____ 12:18 PR DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
1 OZ PLASTIC	FILTER,HNO3	W07	IH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY~~ BY COLD VAP delete PR
30oz glass	ICED	WV86	Total Petro. Hydrocarbons

COMMENTS:

Field Blank

SAMPLE COLLECTED BY : Williams/Roberts

RAFT

FIELD SHEET
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV., 25 FUNSTON RD. KANSAS CITY, KS 66115

~~208PR~~ 208PR

FY: 91 ACTNO: DSX44 SAMNO: ~~207~~ 208PR QCC: S MEDIA: WATER PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
OCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

03/08/91 RE

AMPLE DES: _____ DATE TIME FROM REF PT
OCATION: ST. LOUIS MO BEG: ~~03/01/91~~ __:__ EAST: ____
CASE/BATCH/SMO: ____/_/____ LAB: ___ END: __/__/__ 11:00 NORTH: ____
TORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	WV	VOLATILES
UBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS
JBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY~~ ~~BY COLD VAP~~ Delete.

COMMENTS:

Geoprobe Pipe Rinsate Sample
Poured through pipe screen and
probe pipe.

COLLECTED BY APEX OIL OFFICE

pH = 7.00
Temp = 4°C.
Cond. = 16 umhos

SAMPLE COLLECTED BY : Roberts, Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: ~~207~~ 209 QC: E MEDIA: WATER PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: ___ __ __

AMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/04/91~~ RC __ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: ~~03/09/91~~ __:__ NORTH: ____
TORET/SAROAD NO: _____ 18:30 DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	*WV	VOLATILES
~~1UBI~~	~~5 ML HNO3~~	~~WM~~	~~METALS~~
~~GLASS~~	~~ICED~~	~~WS~~	~~SEMIVOLATILES~~
~~1 OZ PLASTIC~~	~~FILTER, HNO3~~	WO7	IH DISSOLVED METALS
~~1UBI~~	~~NAOH~~	~~WI09~~	~~CYANIDE, TOTAL~~
1UBI	5 ML HNO3	WM34	MERCURY ~~BY COLD VAP~~

PR

COMMENTS:

Trip Blank

SAMPLE COLLECTED BY : Williams / Roberts

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: 301 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ ~~03/04/91~~ 03/06/91 PR
LOCATION: ST. LOUIS MO DATE TIME FROM REF PT
CASE/BATCH/SMO: ____/_/____ LAB: ___ BEG: ~~03/04/91~~ __:__ EAST: ____
STORET/SAROAD NO: _____ END: __/__/__ ~~14:45~~ NORTH: ____
DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
4 OZ PLASTIC	FILTER, HNO3	WO7	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY ST COLD VAP~~ ✓ delete pr
~~2 40 ML VOA VLS ICED~~		WV86	HYDROCARBONS, TOTAL PETROL ✓

8oz 9/95 PR

COMMENTS:

SW sample

Abandoned Pump House, Collected at the SE corner of pump house

pH = 8.15

Temp. = 7°C

Cond. = 440 umhos

SAMPLE COLLECTED BY : Roberts / Williams

RAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: R1 ACTNO: 05Y44 SAMNO: ~~303~~ 303D CC: _ MEDIA: WATER PL: S P F D

CTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
OCATION: _____ ID PROJECT NUM: 434 PT: LONGITUDE: __ __ __

AMPLE DES: _____ DATE TIME FROM REF PT
OCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/26/91 __:__ EAST: ____
ASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 14:45 NORTH: ____
TORET/SAROAD NO: _____ DOWN: ____

NALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
LASS	ICED	WS	SEMIVOLATILES ✓
OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
UBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ ✓ deleted
~~40 ML VOA VLS~~ 80 oz g/less	ICED (RE)	WV86	HYDROCARBONS, TOTAL PETROL ✓

OMMENTS:

Duplicate sample of #301

AMPLE COLLECTED BY : Roberts Williams

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 302 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/06/91 PR __:__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 17:15 NORTH: ____

STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
OZ PLASTIC	FILTER,HNO3	W07	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ deleted
~~40 ML VOA VLS~~	~~ICED~~	WV86	HYDROCARBONS, TOTAL PETROL ✓
80 oz glass	PR		

COMMENTS:

SW sample

Collected about 170ft upstream of NE corner of the abandoned pump house.

pH = 7.87

Temp. = 6° C

Cond. = 450 umhos

SAMPLE COLLECTED BY : Roberts Williams

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 303 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/09/91 __:__ EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 14:00 NORTH: ____

STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES
CUBI	5 ML HNO3	WM	METALS
GLASS	ICED	WS	SEMIVOLATILES
1 OZ PLASTIC	FILTER,HNO3	W07	IH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ delete
~~40 ML VOA VLS~~	~~ICED~~	WV86	HYDROCARBONS, TOTAL PETROL
80 oz glass			

COMMENTS:

SW SAMPLE / Miss. River

Collected 330 feet south (downstream) of the southeast corner of the abandoned pump house

pH = 7.27

Temp. = 6°C

Cond. = 360 nmHOS

SAMPLE COLLECTED BY : Roberts / Brown

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: 304 QCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO ~~BEG: 93/01/91 __:__~~ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: 2/7/91 8:55 NORTH: ____
STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
4 OZ PLASTIC	FILTER, HNO3	W07	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ delete. m
~~2 40 ML VOA VLS ICED~~		WV86	HYDROCARBONS, TOTAL PETROL ✓

80oz g/GSS

COMMENTS:

SURFACE WATER SAMPLE FROM THE ILLINOIS AMERICAN DRINKING WATER INTAKE IN E. ST. LOUIS.

, pH : 7.05 ,
, CONDUCTIVITY 592 µMHOS ,
, TEMP. : 3°C ,

SAMPLE COLLECTED BY : _____

RAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 0SX44 SAMNO: ~~335~~ 342 OCC: _ MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: _____ MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____
LOCATION: ST. LOUIS MO
CASE/BATCH/SMO: _____/_/_____ LAB: ___
STORET/SAROAD NO: _____

DATE TIME FROM REF PT
~~BEG: 03/01/91~~ __:__ EAST: ____
END: 3/01/91 13:55 NORTH: ____
DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES ✓
CUBI	5 ML HNO3	WM	METALS ✓
GLASS	ICED	WS	SEMIVOLATILES ✓
1 OZ PLASTIC	FILTER, HNO3	WO7	IH DISSOLVED METALS ✓
CUBI	NAOH	WT09	CYANIDE, TOTAL ✓
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ ✓ delete pr
~~40 ML VOA VLS~~	~~ICED~~	WV86	HYDROCARBONS, TOTAL PETROL ✓

800z glass

COMMENTS:

DUPLICATE SURFACEWATER SAMPLE FROM THE ILLINOIS AMERICAN DRINKING WATER INTAKE IN E. ST. LOUIS

SAMPLE COLLECTED BY : _____

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: 401 OCC: _ MEDIA: SOIL PL: S P E D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: 434 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/06/91 (RR) __:__ EAST: ____
CASE/BATCH/SMO: ____/_/____ LAB: ___ END: __/__/__ 13:30 NORTH: ____
TORET/SAROAD NO: _____ DOWN: 0-6 "

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	NONE	SV	VOLATILES
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete
GLASS	ICED	SV54	HYDROCARBONS, TOTAL PETROL

COMMENTS:

SEDIMENT SAMPLE / Grab
Collected about 150 ft downstream from the SE corner of the abandoned pump house.

SAMPLE COLLECTED BY : Roberts Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: ~~404~~ 401D QCC: _ MEDIA: SOIL PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: ___ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/04/91 __:__ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ ~~15:30~~ NORTH: ____
STORET/SAROAD NO: _____ DOWN: 0-6"

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	NONE	SV	VOLATILES
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete
GLASS	ICED	SV54	HYDROCARBONS, TOTAL PETROL

COMMENTS:

Duplicate of #401

SAMPLE COLLECTED BY : Roberts/Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: 402 ICC: _ MEDIA: SOIL PL: S P F O

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ 03/06/91 (RE) __:__ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 12:35 NORTH: ____
STORET/SAROAD NO: _____ DOWN: 0-6 "

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	NONE	SV	VOLATILES
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	~~SM34~~	~~MERCURY BY COLD VAP~~ delete
GLASS	ICED	SV54	HYDROCARBONS, TOTAL PETROL

COMMENTS:

SEDIMENT SAMPLE / CRAB

Collected about 60 feet south of SW sample # 302.

SAMPLE COLLECTED BY : Brown / Williams

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: 05X44 SAMNO: 403 OCC: _ MEDIA: SOIL PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __
LOCATION: St Louis ID PROJECT NUM: 434 PT: LONGITUDE: __ __ __

SAMPLE DES: _____ 03/07/91(PR) DATE TIME FROM REF PT
LOCATION: ST. LOUIS MO BEG: ~~03/01/91~~ __:__ EAST: ____
CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ 14:15 NORTH: ____
STORET/SAROAD NO: _____ DOWN: 0-6"

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	NONE	SV	VOLATILES
GLASS	ICED	SM	METALS
GLASS	ICED	SS	SEMIVOLATILES
GLASS	NONE	ST09	CYANIDE
GLASS	ICED	~~SM34~~	~~MERCURY BY COLD VAR~~ delete.
GLASS	ICED	SV54	HYDROCARBONS, TOTAL PETROL

COMMENTS:

SEDIMENT SAMPLE / Crab / Miss. River

(Collected 330 feet south (downstream) of the southeast corner of the abandoned pump house.

SAMPLE COLLECTED BY : Roberts Brown

Solid units therefore sediment for media ds

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 501 QCC: _ MEDIA: ~~WATER~~ KS PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: __ __ __

LOCATION: St. Louis MO PROJECT NUM: A34 PT: LONGITUDE: __ __ __

SAMPLE DES: 80,000 gal. tank #80-1 DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: 03/~~04~~ 04/91 9:15 EAST: ____

CASE/BATCH/SMO: _____/_/_____ LAB: ___ END: __/__/__ __:__ NORTH: ____

STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
VOA VIALS	ICED	WV	VOLATILES
~~GLASS~~ 2-ran VOA Vials	ICED	WS	SEMIVOLATILES
2 40 ML VOA VLS	ICED	~~WV86~~ SV54	HYDROCARBONS, TOTAL PETROL

COMMENTS:

Sample collected out of side valve of an 80,000 gal. tank #80-1. It is located on the S.W. corner of the tank farm

High Concentration sample - Oil Sample

SAMPLE COLLECTED BY : Keith A. Brown

DRAFT FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 91 ACTNO: DSX44 SAMNO: 200 OCC: P MEDIA: WATER PL: S P F D

ACTIVITY DES: LACLEDE COAL GAS REF LATITUDE: ____

LOCATION: _____ MO PROJECT NUM: 634 PT: LONGITUDE: ____

SAMPLE DES: LACLEDE COAL GAS SITE PF SAMPLE DATE TIME FROM REF PT

LOCATION: ST. LOUIS MO BEG: 03/08/91 __:__ EAST: ____

CASE/BATCH/SMU: ____/__/____ LAB: ____ END: __/__/____ __:__ NORTH: ____

STORET/SAROAD NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2 VOA VIALS	ICED	WV	VOLATILES
GLASS	ICED	WS	SEMIVOLATILES
CUBI	5 ML HNO3	WM	METALS
4 OZ PLASTIC	FILTER,HNO3	W07	TH DISSOLVED METALS
CUBI	NAOH	WT09	CYANIDE, TOTAL
CUBI	5 ML HNO3	~~WM34~~	~~MERCURY BY COLD VAP~~ delete.

COMMENTS:

SAMPLE COLLECTED BY _____

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION	SHEET
Keith Brown	Lockdale Coal Gas Site	05-06 (DAY) 01 (MONTH) 03 (YEAR) 91	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: 1-liter CUBITAINER	1-liter BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
DSX44301	3	1			1	✓					EMCO 579SA, 24
DSX44302	3	1			1	✓					"
DSX44301	3	2			1	✓					"
DSX44301D	3	2			1	✓					"
DSX44302	3	2			1	✓					"
DSX44304	3	2			1	✓					"
DSX44304D	3	2			1	✓					"
	21	12			7						

DESCRIPTION OF SHIPMENT

33 PIECE(S) CONSISTING OF Ø BOX(ES)

2 ICE CHEST(S), OTHER

MODE OF SHIPMENT

___ COMMERCIAL CARRIER: ___

___ COURIER

X SAMPLER CONVEYED (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
Keith A. Brown [X] SEALED [ ] UNSEALED	3/7	1120	William Oberle [X] SEALED [ ] UNSEALED	Transport to EPA Lab KCKS
William Oberle [X] SEALED [ ] UNSEALED	3/8/91	0921	Scott Hayes [X] SEALED [ ] UNSEALED	Transport to EPA R. VII Lab
Scott Hayes [X] SEALED [ ] UNSEALED	3/8/91	1005	Barry Evans [X] SEALED [ ] UNSEALED	Read @ EPA Lab

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION	SHEET
TRINA A. BROWN	LACLEDE COAL GAS	14 DAY / 3 MONTH / 91 YEAR	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	NUMBERS OF CONTAINERS: SUBITAINER	[illegible]	[illegible]	[illegible]	VIALS EA SET	SAMPLED MEDIA: water	Soil	Sediment	dust	other	RECEIVING LABORATORY REMARKS OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
0544-110		2					✓				
111		2					✓				
112		2					✓				

DESCRIPTION OF SHIPMENT

6 PIECE(S) CONSISTING OF _____

_____ ICE CHEST S/ OTHER _____

MODE OF SHIPMENT

_____ COMMERCIAL CARRIER _____

_____ COURIER

X SAMPLER CONVEYED

_____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
Trina A Brown	3/14	12:45	[illegible] 3/14/91	Courier
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	
RELINQUISHED BY			RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	
RELINQUISHED BY			RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	

7-EPA-9262(Revised [illegible])

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Kelly M. Brown	Laclede Coal Gas	09 / 03 / 01	1 of 2

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
05x44=203	3	1			1	✓					
-204	3	1			1	✓					
-205FMS	3	1			1	✓					
-207F	3	2			1	✓					
-208FMS	3	1			1	✓					
-209F					1	✓					
-206	6	2			2	✓					QC Extra VOA lumed NA
-206D	3	1			1	✓					
-303	3	2			1	✓					
001					1		✓				
002					1		✓				
003					1		✓				
004					1		✓				
005					1		✓				
006			2		1		✓				
007			2		1		✓				
008			2		1		✓				
009			2		1		✓				
010			2		1		✓				Sample changed to water see RC
011			2		1		✓				
012			2		1		✓				
013			2		1		✓				
501					3					✓	
total	26	11	16		26						

DESCRIPTION OF SHIPMENT

14 PIECE(S) CONSISTING OF 1 BOX(ES)

4 ICE CHEST(S). OTHER _____

MODE OF SHIPMENT

_____ COMMERCIAL CARRIER _____

_____ COURIER

X SAMPLER CONVEYED _____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[illegible]	[illegible]	[illegible]	[illegible] 9/11/01	[illegible]
☒ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION	SHEET
Keith H Brown	Laurel Coal Gas	5-[illegible] DAY 05 MONTH 91 YEAR	2 of 2

CONTENTS OF SHIPMENT

SAMPLE NUMBER	SUBTAIN-F	[illegible]	[illegible]	[illegible]	[illegible]	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
DSX44-101		2'					✓				
102		2'					✓				
103		2'					✓				
104		2'					✓				
105		2'					✓				
106		2'					✓				
107		2'					✓				
108		2'					✓				
109		2'					✓				
401		3'			2'			✓			
401D		3'			2'			✓			
402		3'			2'			✓			
✓ 403		3'			2'			✓			
total		30			8						

DESCRIPTION OF SHIPMENT

[illegible] PIECE(S) CONSISTING 2

[illegible] ICE CHEST(S) OTHER

MODE OF SHIPMENT

[illegible] COMMERCIAL CARRIER

[illegible] COURIER

X SAMPLER CONVEYED

(SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[illegible]	[illegible]	[illegible]	[illegible] 3/11/91	[illegible]
X SEALED	UNSEALED		X SEALED	UNSEALED
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
SEALED	UNSEALED		SEALED	UNSEALED
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
SEALED	UNSEALED		SEALED	UNSEALED

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION	SHEET
Keith A. Brown	LACLEDE COAL GAS	1 DAY 3 MONTH 91 YEAR	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	CUBITAINER	[illegible]			VOA SET (VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
DS144-001		2					✓				
-002		2					✓				
-003		2					✓				
-004		2					✓				
-005		2					✓				

DESCRIPTION OF SHIPMENT

10 PIECE(S) CONSISTING OF 1

____ ICE CHEST(S), OTHER ____

MODE OF SHIPMENT

____ COMMERCIAL CARRIER ____

____ COURIER

1 SAMPLER CONVEYED

____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
Keith A. Brown	3/15/91	[illegible]	[illegible] 3/15/91	[illegible]
☒ SEALED UNSEALED ☐			SEALED UNSEALED ☐	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED UNSEALED ☐			SEALED UNSEALED ☐	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
☐ SEALED UNSEALED ☐			SEALED UNSEALED ☐	

7-EPA-9262(Revised 5/85)

APPENDIX F

MDNR WELL LOGS

Reported to GEOLOGICAL SURVEY AND WATER RECOURCES

STATE OF MISSOURI
DIVISION

RELEASED

LOG NO. D 25548	OWNER Laclede Gas Co.
COUNTY St. Louis	FARM Missouri Hills — WELL NO. 2-3
T 47 — R 76	DRILLER
500' N-SL 350' W-EL	DATE Spud 15 March 68 Comp: 19-3-68
	ELEV. 438 K.B. 435.5 G.L. — PROD. Plugged w/20 sx T.D. to 220 - + 43 sx from surface to plug.
	LOGGED BY J. Wells

REMARKS 18' of 6 5/8" surface csg. pulled when plugged.

INDEX SHEET NO.

Air Rotary tools

Log & all data released from confidential 8-1-73 OGC Rule 7-4(a) & (g) Issued gen'l

No spls returned below 223'

Top picked from GR log

T.D. 433'

ST LOUIS

SALEM

WHARSAW

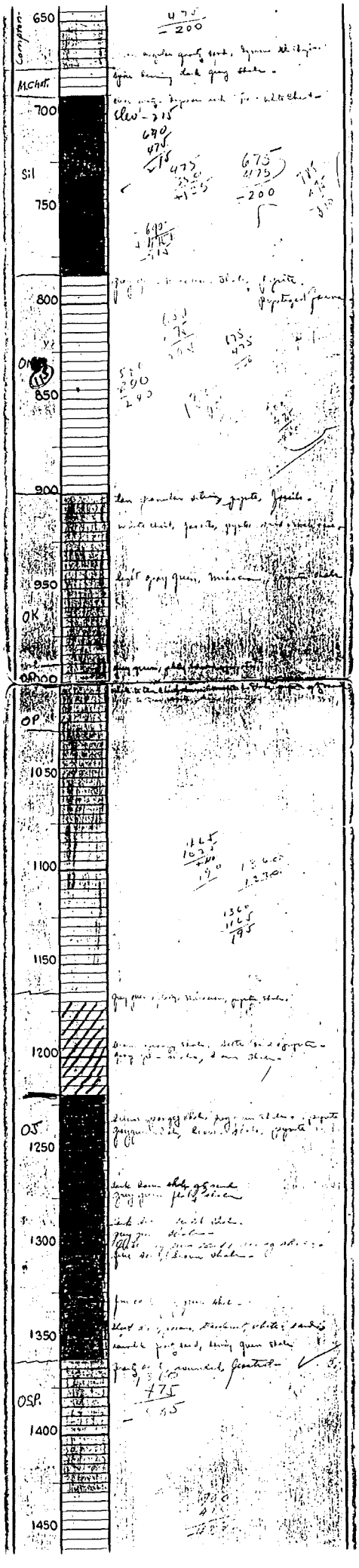
MO SURVEY NO 1874	OWNER Schorr - Kolksch neider
COUNTY St. Louis	FARM — WELL NO 1
T 45 — R 7E	DRILLER Sewell - contr.
	DATE 1915
	ELEVATION 475 — PRODUCTION 100 G.P.M.
	SAMPLES STUDIED C.D. Gleason

REMARKS 3700 N. 2600 W. of Natural Bridge & Parnell. Log from Sewell. Plugged & Abandoned. Selphon-Saline from St. Peter. Miss Con. Revised 9-22-38

0 — 50 — 100 — 150 — 200 — 250 — 300 — 350 — 400 — 450 — 500 — 550 — 600 — 650

47.5
37.5

67.5
47.5
-200


650
M.Chatt.
700
Sil
750
800
OM
850
900
950
OK
1000
OP
1050
1100
1150
1200
OS
1250
1300
1350
OSP.
1400
1450

APPENDIX G

ON-SITE DRILLING AND SAMPLING LOGS
MARCH 4 THROUGH 9, 1991

FT1307 FM00579SA

ecology and environment, inc.
OVERLAND PARK, KANSAS

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: BØ1
Screen Size & Type: N/A
Boring/Well No.: BØ1 (1-12)
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV Solid Stem Auger
Date: March 4, 1991
Driller: Keith Bunselmeyer
Start Time: 13:05 Completion Time: 14:00
Geologist: Wesley McCall
Total Depth of Hole: 18 Ft Groundwater Depth: ~ 6 Ft
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel and Sand	HNU = NAB*
	BØ1-A				Black - grey, clay with sand and gravel	
	BØ1-B				Black loamy soil with gravel + sparse clay balls	NAB
					Black loamy soil with gravel and brown clay balls	NAB
	BØ1-C				Fine gravel and sand in black grey clay	NAB
					medium gravel and brick fragments	NAB Tar-like odor
					Black grey clay sparse angular gravel and brick fragments	Coal-tar like odor, oily sheen NAB
					- Refusal @ ~ 18 ft	

* HNU - photo ionizer for Volatile organic [illegible]

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: BØ2
Boring/Well No.: BØ2 (1-14)
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV Solid Stem Auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: N/A
Boring Diameter: 5 inch ~~4"~~
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 4, 1991
Start Time: 14:25 Completion Time: 14:55
Total Depth of Hole: 21 ft Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth ft.	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
2.0					Black loamy soil, gravel, wood chips, coal cinders	—
5.0					Medium Brown clay	—
7.0					Greenish Brown clay	Coal tar odor HNu = 3ppm
12					Grey clay with sparse sand and gravel	HNu = 3ppm
17					Dark grey clay with sparse gravel	HNu = 20 ppm
21					Dark grey clay with brick fragments	HNu = 60 ppm down bore hole
					↑ Refusal at 21 ft	

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FT1307 FM00579SA

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B#3
Screen Size & Type: N/A
Boring/Well No.: B#3
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV Solid Stem Auger
Date: March 4, 1991
Driller: Keith Bunselmeyer
Start Time: 15:50 Completion Time: 16:00
Geologist: Wesley McCall
Total Depth of Hole: 19 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel and grey black soil	
2.0					Black clay loam soil with coal cinders and wood chips	Heavy tar-like odor HNU = 2.5 ppm.
3.0					Green plastic clay with minor silt	HNU = 2 ppm
13					Green plastic clay	HNU = 2 ppm
15					Wood fragments	
16					Black oily, tarry ooze with coal cinders	HNU = 2 ppm
18					Gray Black Clay	
19					Refusal at 19'	

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FT1307 FM00579SA

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: 304
Screen Size & Type: N/A
Boring/Well No.: 5
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV Solid stem auger
Date: March 4, 1991
Driller: Keith Bunselmeyer
Start Time: 1645 Completion Time: 1756
Geologist: Wesley McCall
Total Depth of Hole: 19 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel and river sandy soil	
3.0					Gravel, brick fragments gray sand	
5.0					Gravel and brick fragments in gray sand	
15					Gravel with brick and wood fragments	
19					Refusal at 19 ft	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B#5
Screen Size & Type: NA
Boring/Well No.: B#5
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, solid stem auger
Date: March 4, 1991
Driller: Keith Bunselmeyer
Start Time: 17:25 Completion Time: 18:00
Geologist: Wesley McCall
Total Depth of Hole: 26 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Sand and gravel with brown sandy soil matrix	
2.0					gray black clay	slight coal-tar odor
8.0					gray black clay	HNU = 0.4 ppm
13.0					greenish gray clay, plastic	HNU = 0.4 ppm
18.0					same as above	HNU = 10 ppm
23.0					same as above	
26.0					→ Refusal at 26 ft bedrock = limestone	HNU = 1 ppm down open auger hole

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B#6
Boring/Well No.: B#6
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: N/A
Boring Diameter: 5 inch
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 5, 1991
Start Time: 13:25 Completion Time: 03:55
Total Depth of Hole: 18 Groundwater Depth: —
Completion Depth: 10 Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					gravel and grey sandy soil	
					black tarry clay soil with gravel	HNu > 5ppm
					black tarry ooze oily sheen, brown clay balls	HNu = 1ppm
					as above with some gravel	HNu = 8ppm
					Augers broke between 2nd and 3rd auger, unable to retrieve.	

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FT1307 FM00579SA

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B06B
Screen Size & Type: NA
Boring/Well No.: B06B
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, solid stem auger
Date: March 5, 1991
Driller: Keith Bunselmeyer
Start Time: 11:25 Completion Time: 12:24
Geologist: Wesley McCall
Total Depth of Hole: 33 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Ft. Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel, sand, brick fragments	
3.0					Green grey clay	coal tar odor
5.0					Green grey clay with coal and brick fragments	HNU = 10ppm
10.0					as above	HNU = 10ppm
15.0					Greenish grey clay, plastic, with fragments of coal-coke	HNU = 10ppm
25.0					Greenish grey clay	
30.0					Brownish green clay	(continued)
33.0						

FT1307 FM00579SA

DRILLING & SAMPLING LOG

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CONTINUATION SHEET

Project Name & Number: Laclede Coal Gas

Date: March 5, 1991

Site Location: St. Louis, Missouri

Boring Well Location: B & B

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Compact greenish brown clay with trace of fine sand - silt	
					Brown clay saturated with black tarry oils	HNU = 2 ppm
					Refusal at 35 Ft Bedrock ?	

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FT1307 FM00579SA

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: BG7
Screen Size & Type: NA
Boring/Well No.: BG7
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV solid stem auger
Date: March 5, 1991
Driller: Keith Bunselmeyer
Start Time: 14:15 Completion Time: 15:10
Geologist: Wesley McCall
Total Depth of Hole: 29 ft Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel and brick fragments in dk gray sandy soil	HNU = NAB
					Black ooze, coal-coke fragments, wood fibers, greenish gray clay balls	HNU = 14 ppm
					Black ooze with coke, slag and wood fragments, sparse gray-green clay balls	HNU = 10 ppm
					Black ooze with coke + slag fragments	HNU = 7 ppm
					Soft, plastic green clay	
					Green clay with sparse gravel	
					Green gray clay with increasing limestone fragments	
					Refusal at 29 ft on Limestone bedrock	

FT1307 FM00579SA

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quanity: NA
Site Location: St. Louis, Missouri
Boring Diameter: Sinch
Boring Well Location: B Ø 8
Screen Size & Type: NA
Boring/Well No.: B Ø 8
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV Solid stem auger
Date: March 5, 1991
Driller: Keith Bunselmeyer
Start Time: 15:20 Completion Time: 16:00
Geologist: Wesley McCall
Total Depth of Hole: — Grounawater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Abort Location. Shallow refusal at several points. Brick + Concrete foundation.	

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FT1307 FM00579SA

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B09
Boring/Well No.: B09
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: N/A
Boring Diameter: 5 inch
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 5, 1991
Start Time: 16:08 Completion Time: 16:55
Total Depth of Hole: — Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Abort Location, Shallow refusal at several points, Concrete foundation.	

FT1307 FM00579SA

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OVERLAND PARK, KANSAS

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quanity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B1
Screen Size & Type: NA
Boring/Well No.: B1
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, solid stem augers
Date: March 5, 1991
Driller: Keith Bunselmeyer
Start Time: 1105 Completion Time: 1735
Geologist: Wesley McCall
Total Depth of Hole: ____ Groundwater Depth: ____
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: ____ Surface Elevation: ____

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Abort Location, shallow refusal at several points. Concrete Foundation.	

FT1307 FM00579SA

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B11
Screen Size & Type: N/A
Boring/Well No.: B11
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV Solid stem auger
Date: March 6, 1991
Driller: Keith Bunselmeyer
Start Time: 08:10 Completion Time: 08:35
Geologist: Wesley McCall
Total Depth of Hole: 15 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel and sand, medium brown clay soil	
					medium brown clay	
					medium brown clay with sparse brick fragments	
					medium brown clay soil brick fragments	
					gray black clay, wet	
					Refusal at ~15 ft	HNU = 85 ppm down open boring

FT1307 FM00579SA

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OVERLAND PARK, KANSAS

DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B12
Screen Size & Type: NA
Boring/Well No.: B12
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N H
Drilling Equipment: CME 550 ATV, solid stem auger
Date: March 6, 1991
Driller: Keith Bunselmeyer
Start Time: 09:05 Completion Time: 09:35
Geologist: Wesley McCall
Total Depth of Hole: 11 Ft Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
1					Gravel and sand	
3					Brown clay loam	
5					Greenish gray clay	HNU = NAB
8					plastic greenish grey clay, damp, oily sheen	
11					Greenish grey clay with tarry ooze	coal tar odor
					Refusal at 11 ft	HNU > 50 ppm down open bore hole.

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B13
Boring/Well No.: B13
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 6, 1991
Start Time: 09:45 Completion Time:
Total Depth of Hole: 12 Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
1					Gravel and Sand	
					Poor recovery — wet black ooze with abundant brick fragments	
5					black wet ooze, brick fragments Poor Recovery	
10					Grey Black clay, brick fragments, black ooze	
12					Refusal at 12 ft	Raining, no HNU readings.

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quanity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B14
Screen Size & Type: NA
Boring/Well No.: B14
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, solid stem augers
Date: March 6, 1991
Driller: Keith Bunselmeyer
Start Time: 10:35 Completion Time: 11:25
Geologist: Wesley McCall
Total Depth of Hole: 26.21 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
1					Gravel and sandy soil	
					Very little recovery. Black oil on auger with traces of soil, gravel and brick fragments.	
8					Very little recovery over entire interval, Black oil on augers. Sparse clay and brick fragments.	HNU = 40 ppm Subsurface rubble may be stripping augers.
6					↑ Refusal at [illegible]	Screening sample of oil collected at ~3 ft depth in 8 oz bottle.

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B15
Boring/Well No.: B15
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 6, 1991
Start Time: 14:05 Completion Time: 14:50
Total Depth of Hole: 31 ft Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
1					Gravel, brown clay loam soil	
3					Greenish brown clay with black tarry material	
5					Black tar, saturated soil - plastic	
10					Black tar saturated sand, some greenish grey clay balls	
15					Black tar saturated sand, brick fragments, oily areas	HNU >20 ppm
20					Black tarry sawdust(?)	
23					Grey black clay	
25					Black, wet, wood divers	
27					Green green clay with brick fragments.	wet
31						

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B16
Boring/Well No.: B16
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 6, 1991
Start Time: 1505 Completion Time: 1534
Total Depth of Hole: ~~X~~ — Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Repeated refusal at ~3 ft depth on foundation. Abort Location	HNU ~ 150 ppm down 3 ft hole

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B17
Boring/Well No.: B17
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, Solid Stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 6, 1991
Start Time: 15:38 Completion Time: 16:40
Total Depth of Hole: 33'+/ Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Black sandy loam soil with sub rounded pebbles	
					Black loamy soil with coal + cinders	
					Grey black clay, sparse brick fragments and coal cinders	
5					Sandy grey black clay with sparse brick fragments	HNU = NAR
					Sandy greenish black clay	
13					Brownish clay with abundant angular gravel	
15					Grey black clay with coal cinders	
20					Sandy green black clay with sparse angular pebbles	HNU = 4 ppm Minotax = 0 ppm
25					Sandy green black clay proportion of amount of pebbles increases with depth	HNU = 35 ppm
33						

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B13
Boring/Well No.: B13
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid Stem Auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: N/A
Boring Diameter: 5 inch
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 6, 1991
Start Time: 1650 Completion Time: 1745
Total Depth of Hole: 33 ft Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Brown sandy soil with sparse gravel	
					Black sandy clay, sparse angular gravel	HNU = 110 ppm
					Black clay, coarse sand and sparse angular gravel	
					Wet grey black clay with medium sand	HNU = 500 ppm
					Grey black clay with coarse to medium sand	HNU = 200 ppm
					Greenish black clay	HNU = 130 ppm
					Greenish black clay (wet)	HNU = NAB

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B19
Screen Size & Type: N/A
Boring/Well No.: B19
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV, solid stem auger
Date: March 7, 1991
Driller: Keith Bunselmeyer
Start Time: 08:20 Completion Time: 09:13
Geologist: Wesley McCall
Total Depth of Hole: 30 ft Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					brown sandy loam soil with gravel	
					Black sludge of coal cinders, slag, and sparse brick fragments	HNU = 1 ppm
					Black sandy clay with limestone gravel and coal cinders, slag	
					Dk black sand?, abundant coal cinders and brick fragments	HNU - NAB

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 5 inch
Boring Well Location: B 2¢
Screen Size & Type: NA
Boring/Well No.: B 2¢
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, solid stem auger
Date: March 7, 1991
Driller: Keith Bunselmeyer
Start Time: 09:19 Completion Time: 10:20
Geologist: Wesley McCall
Total Depth of Hole: 30Ft Grounawater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
4					Coal waste. Sandy coal cinders and clay, some brick fragments and gravel	HNU = NA B
15					as above with wood fragments + fibers	
17					as above ; Wet	
28					Sandy grey black clay	
30						

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B21
Boring/Well No.: B21
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 7, 1991
Start Time: 10:30 Completion Time: ~~11:45~~ 11:10
Total Depth of Hole: _____ Groundwater Depth: _____
Completion Depth: _____ Surface Elevation: _____

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Shallow refusal (<3Ft) at several points. Limestone bedrock. About Location	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B22
Boring/Well No.: B22
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quanity: N/A
Boring Diameter: 5 inch
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 7, 1991
Start Time: 1119 Completion Time: 1125
Total Depth of Hole: 2 Grounawater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Bedrock refusal (~2 ft) at several points. Limestone bedrock. About Location.	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B23
Boring/Well No.: B23
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, Solid Stem Auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: N/A
Boring Diameter: 5 inch
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 7, 1991
Start Time: 11:20 Completion Time: 15
Total Depth of Hole: 4 Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Brown loam soil w/ gravels	
					Red brown sandy clay loam with gravel	
					Weathered bedrock, red-brown	
					Refusal at ~4Ft. Limestone bedrock	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B24
Boring/Well No.: B24
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, solid stem auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 5 inch
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 7, 1991
Start Time: 1330 Completion Time: 1405
Total Depth of Hole: 23 ft Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
					Gravel, brown sandy soil	
					Grayish green clay with sparse coal-coke fragments	
					Grayish green clay, damp, plastic	HNU = NAB
					same as above, traces of coal tar	coal tar odor HNU = NAB
					Sandy green clay stay trace of coal-coke fragments	
					Sandy black tarry material with coal-coke fragments	slight coal tar odor
					Refusal at 23ft	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: B24
Boring/Well No.: CSE
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, Hollow stem Auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quanity: N/A
Boring Diameter: 3.75 ID
Screen Size & Type: N/A
Screened Interval: N/A
Well Diameter: N/A
Date: March 17, 94-11
Start Time: 1410 Completion Time: 1730
Total Depth of Hole: 23 Ft Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks
1					Sand and Gravel	
	SS*				Green brown sandy clay with gravel + sparse coal fragments	
3						
	SS				No Recovery	N/A Recovery
5						
	SS				Brown + black mottled clay sparse coal + gravel fragments	
7					Brown Clay	
7.5	SS				Grey black clay with coal cinders	
9						
	SS				Black mottled green clay	~20% Recovery
11						
					Greenish grey clay with black mottling (Manganese)	~40% Recovery
	SS					~95% Recovery
						" "
						~30% Recovery
14						
	SS				Compact green clay, silty layer : no black mottling	~95% Recovery
21						
	SS				Black mottled green clay with fine sand	~40% Recovery
23						
					↑ Refusal @ ~23 Ft fine grained crystalline limestone = bedrock	

* SS = Split Spoon

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 4.25 inch ID
Boring Well Location: BG6
Screen Size & Type: N/A
Boring/Well No.: CS2
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV, hollow stem auger
Date: March 4, 1991
Driller: Keith Bunselmeyer
Start Time: 09:01 Completion Time: 10:12
Geologist: Wesley McCall
Total Depth of Hole: 14 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks (% Recovery)
	—				Gravel, rock, rubble, bricks in soil	No sample
	CS				Black sandy sludge with oily sheen, some gravel fragments	(~20%) HNU = NAD
	CS				Green compact clay sparse areas of tar contamination	(~95%)
	CS				Green compact clay with black manganese mottling	(~95%)
					Halt boring advancement	HNU = 22 ppm down open core hole

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 4.25 inch ID
Boring Well Location: B/6
Screen Size & Type: NA
Boring/Well No.: CS3
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV, Hollow stem auger
Date: March 8, 1991
Driller: Keith Bunselmeyer
Start Time: 10:15 Completion Time: 11:30
Geologist: Wesley McCall
Total Depth of Hole: 14 ft Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks (% Recovery)
	—				Gravel, rock in black soil, tarry zones	No sample
	CS				Green black sandy clay with rock and brick fragments	(45%) Brick in nose of sampler
	SS				Green compact clay with zones of tar contamination	HNU = 3ppm
					as above	see photo #20 roll #1
					Black tarry clay	HNU = 17 ppm
					Green Compact Clay	No contamination observed
					14 ft drilling advancement	

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Site Location: St. Louis, Missouri
Boring Well Location: 314
Boring/Well No.: 554
Drilling Contractor: John Mathes & Assoc.
Drilling Equipment: CME 550 ATV, Hollow Stem Auger
Driller: Keith Bunselmeyer
Geologist: Wesley McCall
Driller's Helper(s): Jim Barker, Jeff Crank

Well Casing Size, Type, Quantity: NA
Boring Diameter: 4.25 inch I.D.
Screen Size & Type: NA
Screened Interval: NA
Well Diameter: NA
Date: March 5, 1991
Start Time: 12:40 Completion Time: 14:35
Total Depth of Hole: 14 Groundwater Depth: —
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks (% Recovery)
—	—				Gravel, rubble, sandy soil	No sample
—	SS				Black fairy sandy clay soil brick & wood fragments	(~25%)
—	SS				Sand, gravel & brick fragments saturated with greenish black oil	(~10%)
—	SS					(~25%) HNU ≈ 9 ppm
—	SS				Augers coated with oil	No recovery
—					Brick fragments, gravel + sand coated with oil	(~5%)
—					Brick and concrete fragments in sand, saturated with oil	(~10%)
—					Refusal at 14 ft.	HNU ≈ 13 ppm Down open bore hole. Sample of oil and water collected from split spoon.

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quanity: N/A
Site Location: St. Louis, Missouri
Boring Diameter: 4.25 inch I.D.
Boring Well Location: ~~###~~ B&7
Screen Size & Type: N/A
Boring/Well No.: CS5
Screened Interval: N/A
Drilling Contractor: John Mathes & Assoc.
Well Diameter: N/A
Drilling Equipment: CME 550 ATV, Hollow stem augers
Date: March 5, 1991
Driller: Keith Bunselmeyer
Start Time: ~~12:00~~ 15:10 am
Completion Time: ~~14:30~~ am
Geologist: Wesley McCall
Total Depth of Hole: 14 ft
Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: —
Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks (% Recovery)
	—				Gravel and brick fragments in black soil	No Sample
	SS				Dark green compact clay with black tarry mottling	(75%) HNU = NAB
	SS				Dark green sandy clay brick fragments	(~20%)
	SS				Green black clay, brick and limestone fragments, lens of coarse sand and pebbles	(~50%) HNU ≈ 200 ppm

Refusal of split spoon at 9 ft.

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DRILLING & SAMPLING LC

Project Name & Number: Laclede Coal Gas
Well Casing Size, Type, Quantity: NA
Site Location: St. Louis, Missouri
Boring Diameter: 4.25 inch ID
Boring Well Location: B07
Screen Size & Type: NA
Boring/Well No.: CS6
Screened Interval: NA
Drilling Contractor: John Mathes & Assoc.
Well Diameter: NA
Drilling Equipment: CME 550 ATV
Date: March 8, 1991
Driller: Keith Bunselmeyer
Start Time: 16:50 Completion Time: 17:45
Geologist: Wesley McCall
Total Depth of Hole: 17 Groundwater Depth: —
Driller's Helper(s): Jim Barker, Jeff Crank
Completion Depth: — Surface Elevation: —

Depth	Sample	N-Value Number of blows/6"	Graphic Log	Completion Date	Description	Remarks (% Recovery)
	NS					No Sample: Bore hole adjacent to CS5
	SS				Coarse sand and gravel green clay bottom 6 inches	
	SS				Alternating layers of sand + gravel and green clay	oil saturated (40%)
	SS				Coarse sand, medium rounded gravel	(10%)
	SS				Wood fibers, black tarry sands green compact clay last 2 inches	(10%)
					Halt advancement of boring	

SUPERFUND SECTION (SF)
FILE ADDITION/REVISION/DELETION FORM

1. _____ Add New File
_____ Delete Existing File
__X__ *Revise Existing File

2. __X__ Site-specific Site Code _____
_____ Non-site-specific

3. File Name: Mound St. FMGP

4. Other Identifier: Mound St. PCB site, Laclede Coal Gas Site, Mound Street, Mound St. Power Plant, Mound St. Power Station, Laclede Station A.

5. Address: Mulfanphy, Mound & 1st Sts.
City: St. Louis
State: Mo

6. _____ Legal (LAVENDER) _____ Registry (RED)
__X__ Technical (BROWN) _____ General (YELLOW)
_____ Confidential (ORANGE) _____ Dioxin (DIOX)

7. Comments: Same site has been identified under several names, and investigated under several names

* If this is a file revision, please indicate what information is to be revised:

revising into one name

Requestor: Tim Lacy Date: 10/24/96

Section Chief: _____ Date: _____

I:\SPF\FORMS\FM-FILECRE
3/20/92

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Falls, 1993

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Mound Street PCB's CERCLIS #: MO000009367

AKA: _____ SSID: _____

ADDRESS: 100 Mound Street

CITY: St. Louis STATE: MO ZIP CODE: 63102

SITE REFERENCE POINT: Center of former Union Electric Property.

USGS QUAD MAP NAME: Granite City, IL TOWNSHIP: 45 (N)/S RANGE: 7 (E)/W

SCALE: 1:24,000 MAP DATE: 1954 SECTION: ____ 1/4 ____ 1/4 ____ 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: 5th Principal

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 90 ° 07 ' 30 " LATITUDE: 38 ° 37 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 90 ° 10 ' 00 " LATITUDE: 38 ° 37 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 195

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 64 . 42 "

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 1 ' 4 . 42 "

D) ADD TO STARTING LATITUDE: 38 ° 37 ' 30 . 00 " + 1 ' 4 . 42 =

SITE LATITUDE: 38 ° 38 ' 34 . 00 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 173

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 57 . 15 "

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 0 ' 57 . 15 "

D) ADD TO STARTING LONGITUDE: 90 ° 10 ' 00 . 00 " + 0 ' 57 . 15 =

SITE LONGITUDE: 90 ° 10 ' 57 . 15 "

INVESTIGATOR: Don Falls DATE: 12/13/93

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
GEHM, 1993a

THE GEHM Corporation
1417 Bingham Road
Post Office Box 65
Boonville, MO 65233

816-882-3485
816-882-5766 (Fax)

RECEIVED
SEP 16 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

September 15, 1993

Ms. Kris Davidson, Environmental Specialist
Missouri Department of Natural Resources
Hazardous Waste Program - Superfund Section
P.O. Box 176
Jefferson City, Missouri 65102

RE: Activities Report for Spill Report # 07143 - KB -1331

Dear Ms. Davidson,

We are submitting the enclosed report on behalf of Terminal Railroad Association (TRRA) of St. Louis. The report documents efforts taken by TRRA in response to requests made by the St. Louis Fire Department regarding the discovery of an abandoned tank at First & Mound Streets, St. Louis, Missouri.

Should you have any questions regarding this report or require additional information, please call me at (816) 882-3485.

Sincerely,

Daryl R. Bowles, CHMM
Director,
Environmental Field Services

cc: Mr Bob Ripper
Terminal Railroad Association of St. Louis
700 North Second Street
St. Louis, Missouri 63102

ACTIVITIES REPORT
TRRA of St. Louis
First & Mound Streets Site
MDNR Spill Report
 # 07143 - KB - 1331

RECEIVED
SEP 16 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

The GEHM Corporation
1417 Bingham Rd.
P.O. Box 65
Boonville, MO 65233

THE GEHM Corporation

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ACTIVITIES REPORT
TRRA of St. Louis
First & Mound Streets Site
MDNR SPILL REPORT # 07143 - KB -1331

1.0 PROJECT SYNOPSIS

This is a report of activities and findings resulting from the discovery of oils seeping into a pump station operated by Metropolitan Sewer District (MSD) in St. Louis, Missouri. On July 14, 1993, MSD reported this situation to the MDNR. MSD analytical information revealed PCB levels of less than 50 ppm in the oils seeping into the pump station. Additionally, a sample was obtained from waste oil contained in an underground storage tank present in the area, and owned by Terminal Railroad Association of St. Louis (TRRA). The St. Louis Fire Department (SLFD) notified TRRA on July 28, 1993 and requested the contents of the tank be removed. TRRA was unaware of the existence of the tank prior to notification by the SLFD.

In response to the situation, TRRA initiated and completed the following tasks:

- **Contents of the tank were removed** on August 4, 1993. The tank was completely cleaned and freed of all liquids. The material was containerized on-site in 55 gallon drums for characterization and disposal.

- An **Infrared Thermographic Survey was conducted** of the area in an attempt to characterize leak plumes or trails.

- **Three borings** were advanced in the immediate area to determine subsurface soil conditions. Two soil samples were obtained from the site and submitted to a qualified laboratory for chemical analysis.

This report documents the response efforts and findings of the investigatory activities.

2.0 DESCRIPTION OF SURROUNDING PROPERTIES

The property is bordered by gravel roads on the north, east, and south sides. To the west is a gravel covered area containing truck scales and operated by Apex Oil Co. Across the road (Mound Street), and to the south is an empty lot formerly occupied by Union Electric Company of Missouri. To the east are several sets of railroad tracks immediately adjacent to the flood wall. To the north (across Brooklyn Street), is a facility operated by Continental Cement Company (apparently used for cement loading/unloading). The MSD Pump Station is situated adjacent to the flood wall and approximately 400-500 ft. north-east of the tank location. Southwest of the property (across Mound street) is a bulk petroleum storage/distribution facility. This facility is characterized by several large

(>500,000 gallon capacity) above ground storage tank systems.

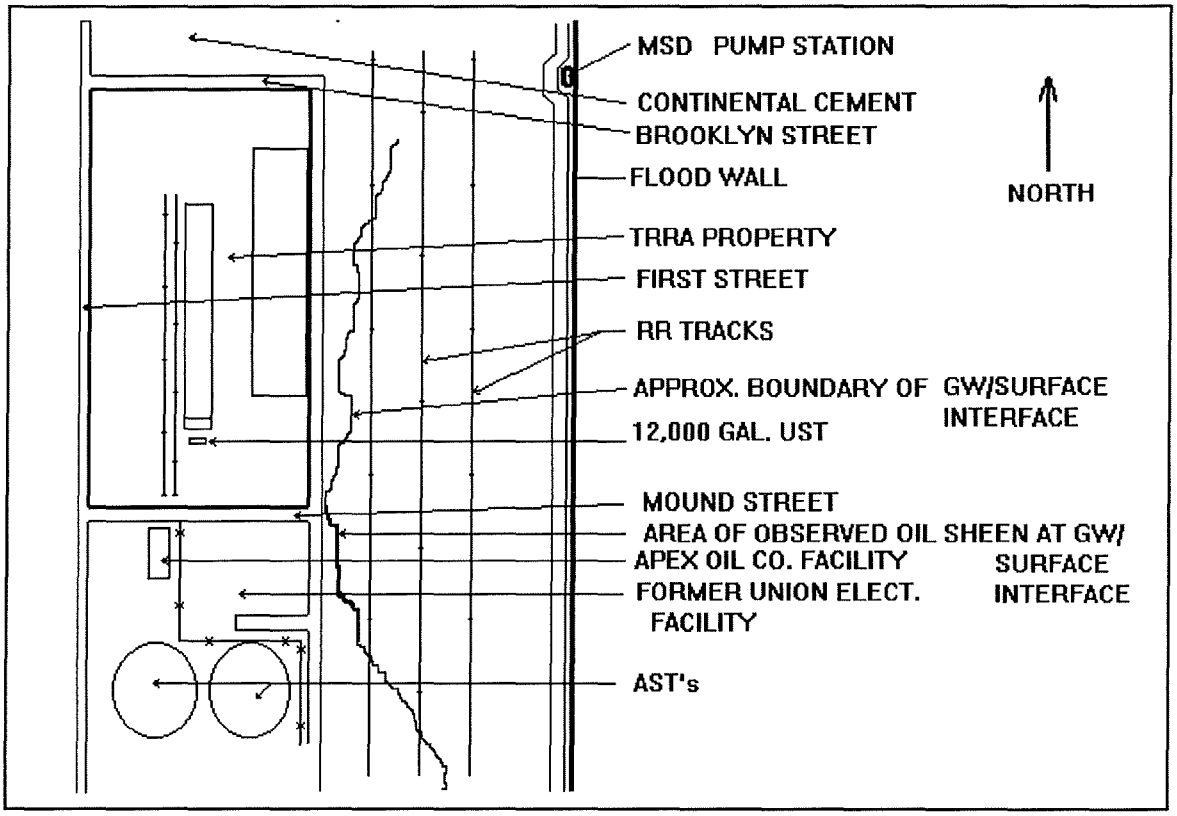


FIGURE 1: AREA SKETCH SHOWING PROPERTY AND SURROUNDING PROPERTIES. (APPROX. SCALE: 1"=180')

Numerous combined sewer, water and other utilities exist (some abandoned) throughout the area which were not completely defined for this report. Utilities which were obvious from site observations and from conversations with MSD personnel included a sewer line adjacent to the TRRA property along Mound Street, and a main line extending west from the pump station. Several underground utility lines run parallel to the railroad tracks and flood wall in a north - south direction. A TRRA property drawing identified a vitrified pipe drain traversing the site from approximately the tank location to the southeast corner of the property (copy provided in attachments). No attempts were made intrusively to locate and verify the existence of this pipe, however, IR/T did not provide a signature typical of an underground conduit acting as a migratory pathway.

A slight gradient (approx. 1:20) typifies the immediate area from west to east.

Groundwater was encountered on the site at a depth of 8 to 8.5 feet from surface. However, site activities were conducted one day following the crest of the Mississippi River on August 1, 1993. Evidence of extreme hydrostatic pressure in the area was observed by water shooting approximately 10 feet high from a Corps of Engineers piezometer located adjacent to the flood wall (approximately 400 feet from the UST), and by a groundwater/surface interface along the area between the eastern most road and the railroad tracks (see Figure 1). Observations of this interface revealed an apparent petroleum sheen present in many areas where the groundwater was seeping from the

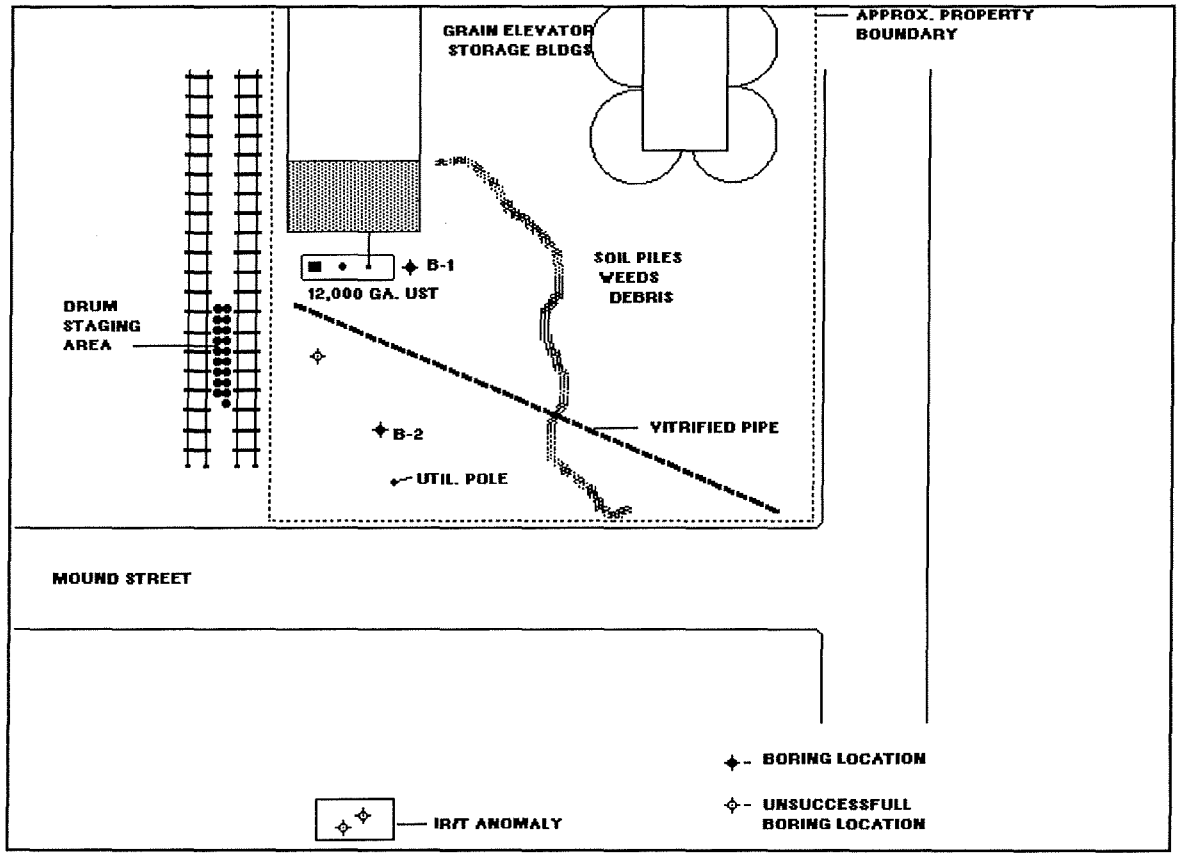


FIGURE 2: SITE SKETCH DEPICTING PROMINENT FEATURES. (APPROX. SCALE: 1"=200')

interface. A sheen was observed in an area extending from a line approximately even with the south side of the TRRA property, south to a line approximately even with the south side of the former Union Electric property.

3.0 SITE DESCRIPTION

The parcel of property identified as TRRA property and where the UST exists, measures approximately 150 ft. by 340 ft. The property is generally situated in a north-south direction between the ends of Mound and Brooklyn Streets, St. Louis County, St. Louis, Missouri. Two structures are on the property which appear to be abandoned grain elevator and storage/handling structures constructed of reinforced concrete. The larger of the two structures measures approximately 40 ft. by 160 ft. and is situated along the east side of the property. The smaller structure measures approximately 20 ft. by 170 ft., is situated along the west side of the property with the UST located at the south end. A railroad siding runs adjacent to this smaller structure as well.

4.0 SITE ACTIVITIES

The purpose of the site activities was twofold. First was in response to the requests of the SLFD assuming the tank as the most likely source of the contaminants entering the MSD pump station, and secondly, to assess the most likely migratory pathway of the contaminants for the purpose of determining the most effective abatement measures.

4.1 Tank Contents Removal.

On August 4, 1993, field personnel were mobilized to the site to conduct removal of the tank contents and cleaning of the tank. This procedure was accomplished by Environmental Operations, St. Louis, Missouri. A vacuum truck was used to pump material from the tank then placed in 55 gallon drums, staged on site. The tank was entered, following Confined Space Entry Procedures to remove and clean the remaining product and debris. Samples of the waste were obtained and submitted to American Interplex Corporation for analyses and summarized in the following table.

TANK WASTE ANALYSIS SUMMARY			
PARAMETER	UNIT	RESULT	METHOD
IGNITABILITY	°F	Non-ignitable below 212	EPA 1010
TOTAL HALIDES	mg/Kg	880	EPA 9020
PCB	mg/Kg	<10	EPA 600/4-81/045
HEAT CONTENT	BTU/lb	9480	ASTM D240
TCLP:			EPA 1311 (FEDERAL REGISTER/VOL. 57, NO. 227/NOVEMBER 24, 1992), 3010A, 6010A, 7470.
SILVER	mg/l	<.007	
ARSENIC	mg/l	<.02	
BARIUM	mg/l	2.1	
CADMIUM	mg/l	.019	
CHROMIUM	mg/l	.0096	
MERCURY	mg/l	<.01	
LEAD	mg/l	<.1	
SELENIUM	mg/l	<.02	

Note: Analysis parameters were selected for the purpose of determining disposal options.

Sixteen drums (approximately 880 gallons) of sludge/liquid, and one drum containing solid debris were generated. The waste was dual phased consisting of 60% ethylene glycol and 40% waste oils (based on appearance).

The tank system was constructed of steel and riveted with the top of the tank at ground surface. An eighteen inch diameter manway centered the tank with a two inch line extending from the tank, above grade, through the wall of the nearby structure. Tank dimensions were 10.5' dia., and 18.5' in length providing a capacity of 12,000 gallons. Tank depth was at 10.5 feet from surface.

4.2 Infrared Thermographic Survey (IR/T).

An Infrared Thermographic Survey was conducted in the immediate area on August 17, 1993 by EnTech Engineering, Inc. Infrared Thermography (IR/T) was selected to be performed at this site due to its ability to provide on-site, real time data. IR/T measures the heat energy emitted from the earths surface stored during daylight hours. Areas of dissimilar chemical or physical make-up (such as petroleum contaminated soils versus non-petroleum contaminated soils) emits stored heat energy at different rates. IR/T is used to identify potential contaminated areas in relation to a known source such as an Underground Storage Tank, Pipeline, etc.

The results of the IR/T investigation for this site did not portray evidence of a leak

plume, trail or other leak signature which would suggest a release capable of migrating from the UST to any point off-site.

The investigation did, however, indicate an anomaly on the former Union Electric Company property south of the TRRA property (see Figure 2). An area measuring approximately 10' x 10' was identified. IR/T cannot identify the cause of an anomaly without either an intrusive investigation or knowledge of a potential source of an anomaly. At the request and permission of Inspector Charles Gay (SLFD), this area was investigated and described in section 4.3.

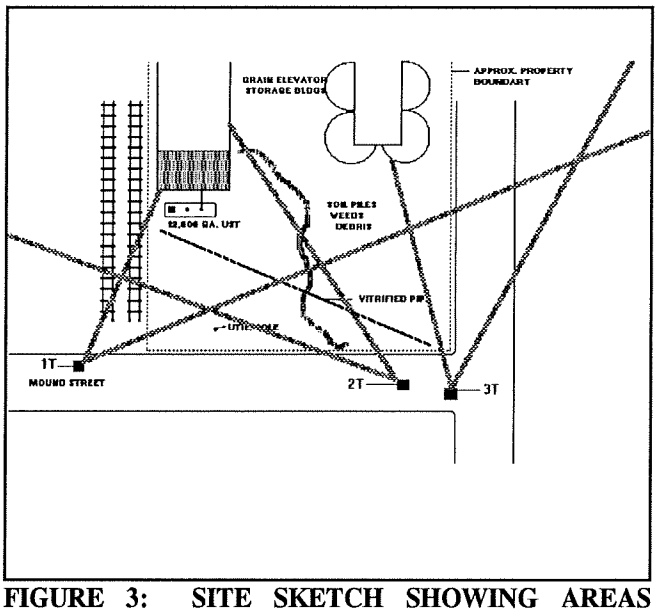
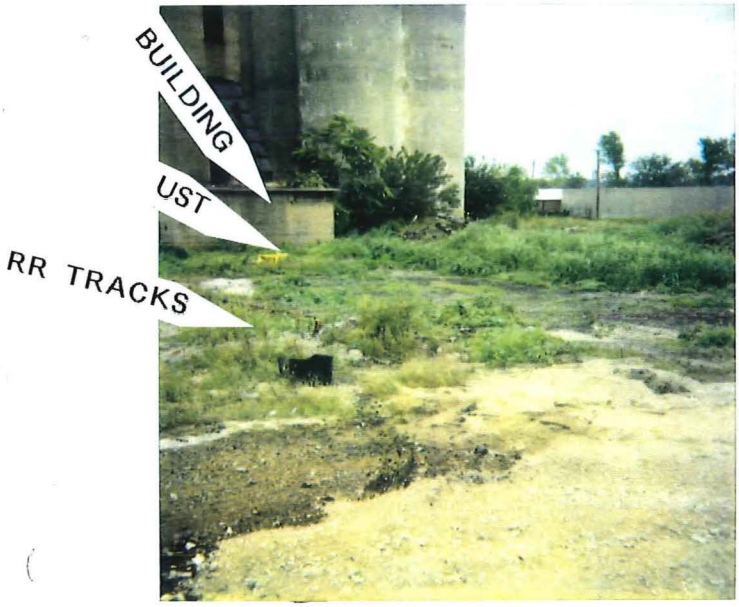
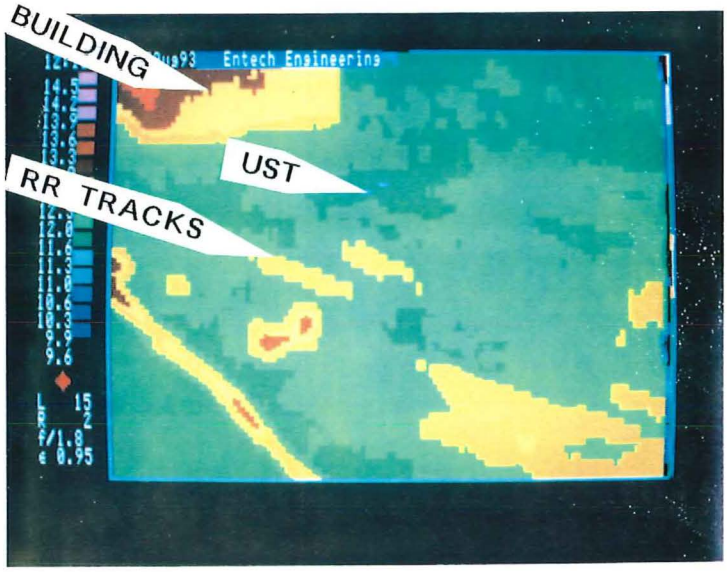


FIGURE 3: SITE SKETCH SHOWING AREAS DEPICTED ON IR/T THERMOGRAMS.

From the IR/T data generated, three views were selected for presentation in this report. These views are depicted on the following site sketch and the thermograms are presented on the following pages. The data was gathered between 11:00 p.m and midnight from a lift truck at approximately 30'. The corresponding photographs are provided for the purpose of reference.

EnTech Engineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270





VISUAL IMAGE NUMBER: 1V **THERMOGRAM IMAGE NUMBER:** 1T

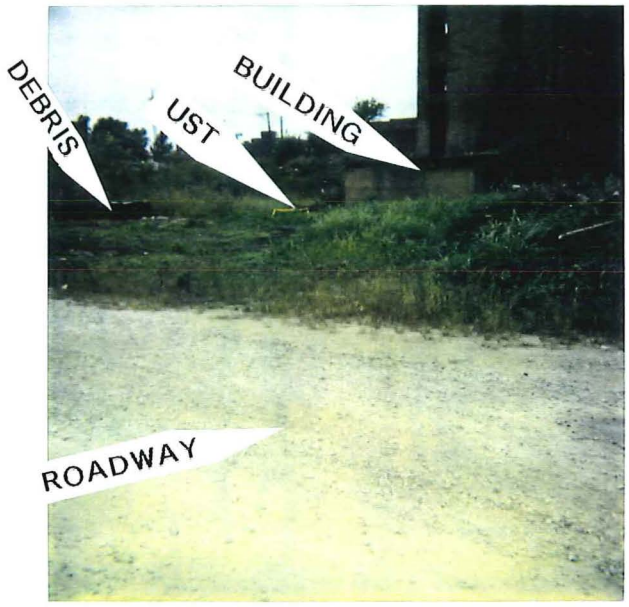
LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

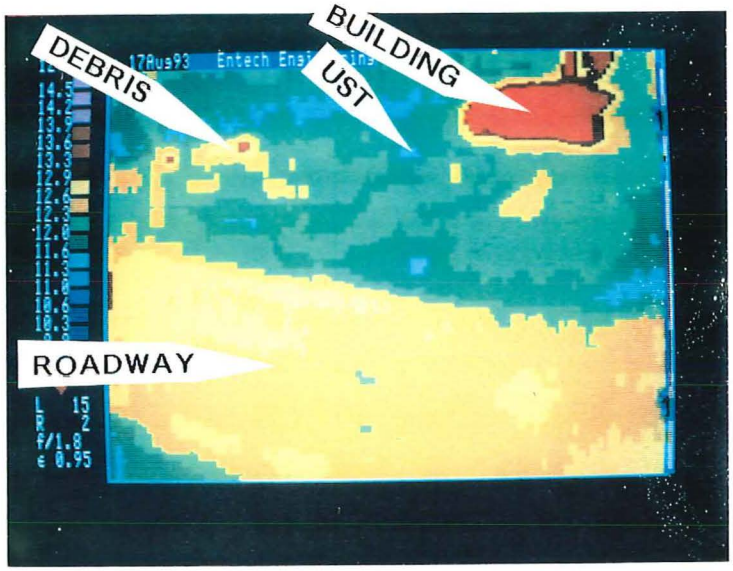
ITEM: Example data image

LOCATION: Refer to drawing item #1

INVESTIGATION DATE: 8/17/93

EnTech Engineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270





VISUAL IMAGE NUMBER: 2V **THERMOGRAM IMAGE NUMBER:** 2T

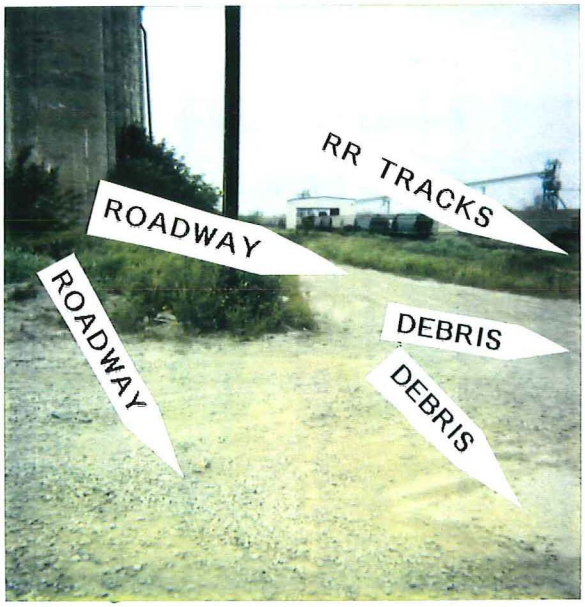
LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

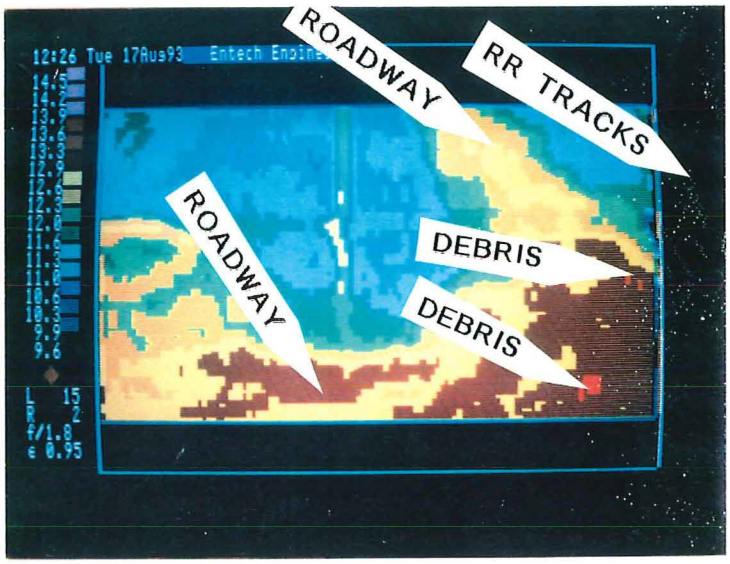
ITEM: Example data image

LOCATION: Refer to drawing item #2

INVESTIGATION DATE: 8/17/93

EnTech Engineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270





VISUAL IMAGE NUMBER: 3V **THERMOGRAM IMAGE NUMBER:** 3T

LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

ITEM: Example data image

LOCATION: Refer to drawing item #3

INVESTIGATION DATE: 8/17/93

4.3 Drilling/Sampling.

On August 4, 1993, a drilling crew was mobilized to the site and a total of five boring attempts were made. Three attempts were unsuccessful with auger refusal at five feet. One unsuccessful attempt was made on site approximately 30 feet south of the west end of the tank. Solid debris was encountered to a depth of 5 feet and the attempt was abandoned. At the request and permission of Inspector Charles Gay (SLFD), two other attempts were made in the area of the IR/T anomaly discovered within the former Union Electric Property. Both attempts were abandoned at a depth of 5 feet encountering solid rock debris.

The two successful attempts were located at the east (down gradient) end of the tank location, and approximately 37.5 feet south of the tank location. One sample was obtained from each of these borings and submitted to a qualified laboratory per analysis presented in the following table

SAMPLE RESULTS SUMMARY TABLE
(in ppm)

I.D	LOCATION	TPH	PCB	BENZENE	TOLUENE	E. BENZENE	XYLENES
01	10 FT. DEPTH	67	<0.05	<0.002	<0.002	<0.002	<0.002
02	8 FT. DEPTH	23	<0.05	<0.002	<0.002	<0.002	<0.002

5.0 SUMMARY/DISCUSSION

Analysis of the tank contents reveal a mixture of Ethylene Glycol (Antifreeze) and Waste Oil and should be disposed of in accordance with State and Federal Regulations.

The tank is scheduled for removal the first of October, 1993. Removal will be in accordance with MDNR UST Closure Guidance.

Results of site activities suggest the tank as the source of the oil seepage into the pump station unlikely for the following reasons:

- The pump station is located topographically upgradient from the UST.
- Soil sample results are not indicative of a release sufficient to supply free product from the UST to the pump station.

- IR/T failed to reveal anomalies on or around the site indicative of a leak plume, trail or signature.

- Water was not present in the tank. (Given the depth to groundwater 8.5', and depth to the tank bottom, 10.5', and the extreme amount of hydrostatic pressure in the area.)

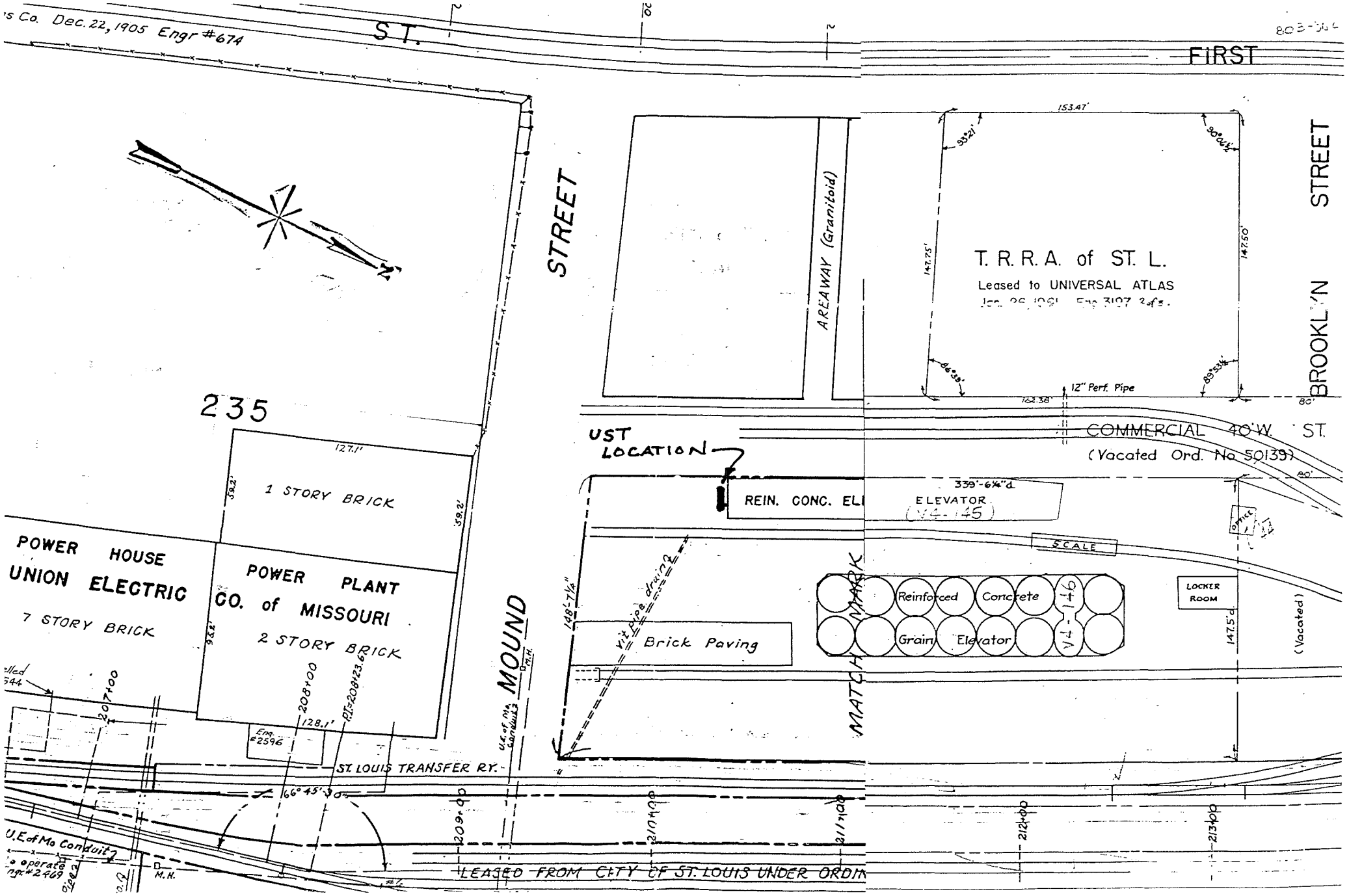
Additionally, the presence of the sheen at the groundwater/surface interface suggests a problem much more widespread than that of a single source. It is likely, the rising groundwater from the effects of the flooding in the immediate area had a direct affect on the sudden presence of the oil in the pump station.

Report Distribution List:

1. Ms. Kris Davidson, Environmental Specialist
   Missouri Department of Natural Resources
   Hazardous Waste Program - Superfund Section
   P.O. Box 176
   Jefferson City, Missouri 65102

2. Mr. Charles Gay, Fire Inspector
   St. Louis Fire Department
   Fire Prevention Bureau
   1421 N. Jefferson
   St. Louis, Missouri 63106

3. Mr Bob Ripper
   Terminal Railroad Association of St. Louis
   700 North Second Street
   St. Louis, Missouri 63102



's Co. Dec. 22, 1905 Engr #674
ST.
FIRST
STREET
235
1 STORY BRICK
POWER HOUSE
UNION ELECTRIC
7 STORY BRICK
POWER PLANT
CO. of MISSOURI
2 STORY BRICK
Eng. #2596
ST. LOUIS TRANSFER RY.
U.E. of Mo Conduit
MOUND
AREAWAY (Granitoid)
T. R. R. A. of ST. L.
Leased to UNIVERSAL ATLAS
12" Perf. Pipe
BROOKLYN STREET
COMMERCIAL 40' W. ST.
(Vacated Ord. No 50139)
UST LOCATION
REIN. CONC. EL
ELEVATOR
SCALE
Reinforced Concrete
Grain Elevator
V4-146
LOCKER ROOM
Brick Paving
MATCH MARK
(Vacated)
LEASED FROM CITY OF ST. LOUIS UNDER ORDIN

GHEM CORPORATION
RAIL ROAD - ST. LOUIS

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Soils W/Const. Debris and Red Brick Debris to 10'		
5			
	Groundwater 8.5'		
		SS 10'	
10	Terminate Boring 10'		
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT 8.5' FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.
2649 Postalozzi St. Louis MO 63118

DATE: 3/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .01

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Soil w/Const. Debris to 3'		
	Refusal 3'		
5			
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Postalozzi St. Louis MO 63118

DATE: 8/5/93	PROJECT NO.: 5780			
DRILLER: GB	LOGGER: GB	AUGER: SF		
SURFACE ELEVATION:		HOLLOW STEM:		

Boring No. .02

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Clay to 8'		
5		SS x 2@8'	
	Terminate Boring 8'		
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT 8.5' FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Postalozzi St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .03

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Clay w/Const. Debris to 8'		
5		SS 8'	
	Terminate Boring 8'		
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Postalozzi St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER:

SURFACE ELEVATION: | HOLLOW STEM: H.S

Boring No. .04

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Brown Clay w/Rock Debris To 3'		
	Refusal 3'		
5			
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Pestalozzi St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .05

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Brown Clay w/Const. Debris to 5'		
5	Refusal 5'		
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Pestalozzi St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .06

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 16, 1993

ATTN: Mr. Daryl Bowles

Control No. 3520

Sample Description: Two (2) soil received on 8/9/93
Re: Terminal Rr Assoc. of St. Louis Mound & First Streets
(Site) St. Louis, MO Project No. 0116
P.O. No. 080-693 116

Result:

Parameter	Unit	01 8-4-93 0930	02 8-4-93 0945
Total Petroleum Hydrocarbons	mg/Kg	67	23
PCB	mg/Kg	<0.05	<0.05
Benzene	mg/Kg	<0.002	<0.002
Toluene	mg/Kg	<0.002	<0.002
Ethylbenzene	mg/Kg	<0.002	<0.002
m- & p-Xylenes	mg/Kg	<0.002	<0.002
o-Xylenes	mg/Kg	<0.002	<0.002

Method: Modified EPA 418.1, EPA 3550, 8080, 5030, 8020

Remark: Results are presented on an as-received basis.

Enclosure: Chain of custody

AMERICAN INTERPLEX CORPORATION

MWM/tj

By Michael W. McNerlin
Michael W. McNerlin
Laboratory Director

AIC CN 3520

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

THE GEHM Corporation

Submitted by: (Name/Telephone/Date)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
THE GEHM CORPORATION 1417 BINGHAM RD., P.O. BOX 65 BOONVILLE, MO 65233-0065 DARYL BOWLES 816-882-3485	AMERICAN INTERPLEX CORP. 8600 KANIS RD. LITTLE ROCK, AR. 72204-2322	TERMINAL RR ASSOC. OF ST. LOUIS MOUND & FIRST STREETS (SITE) ST. LOUIS, MO. BOB RIPPER 314-539-4712

Project No.:	Applicable Regulatory No.:	P.O. #: (For Lab)	Samplers Signature:
0116	07143-KB-1331	080-693 116	Daryl K. Bowles

	Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST: BTEX (8020)	TPH (418.1)	TPH MO.MOD (418.1)	OA-1 (IOWA)	OA-2 (IOWA)	TOG (413.1)	PCB CONT. (8080)	OTHER	OTHER	OTHER
(1)	01	SOIL	ICE	8-4-93	0930	X		X				X			
(2)	02	SOIL	ICE	8-4-93	0945	X		X				X			

COMMENTS/SPECIAL INSTRUCTIONS:
- NORMAL TURN AROUND
- PLEASE FAX RESULTS TO: DARYL BOWLES 816-882-5766

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Daryl K. Bowles	8-6-93	1100	Nathan Sivia	08-07-93	0915
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 20, 1993

ATTN: Mr. Daryl Bowles

Control No. 3586

Sample Description: One (1) glycol/oil collected by Environmental Operations received on 8/12/93
Re: Gehm Corp 0111

Result:

Parameter	Unit	5780	Regulatory Level
Ignitability	°F	Non-Ignitable below 212	-
Toxicity Characteristic Leaching Procedure			
Solids	%	100	-
Silver	mg/l	<0.007	5.0
Arsenic	mg/l	<0.2	5.0
Barium	mg/l	2.1	100.0
Cadmium	mg/l	0.019	1.0
Chromium	mg/l	0.0096	5.0
Mercury	mg/l	<0.01	0.2
Lead	mg/l	<0.1	5.0
Selenium	mg/l	<0.2	1.0

Method: EPA 1010, EPA 1311 (Federal Register/Vol. 57, No. 227/November 24, 1992), 3010A, 6010A, 7470

Enclosure: Chain of custody

AMERICAN INTERPLEX CORPORATION

SL/tm

By Steven Lovell
Steven Lovell
Technical Director

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 20, 1993

ATTN: Mr. Daryl Bowles

Control No. 3521

Sample Description: One (1) oil/glycol received on 8/9/93
P.O. No. 050593 DB

Result:

Parameter	Unit	TANK WASTE 8-04-93 1000
Total Halides	mg/Kg	880
PCB	mg/kg	<10
Heat Content	BTU/lb	9480

Method: EPA 9020, 600/4-81/045, ASTM D240

Remark: As requested analysis for Toxicity Characteristic Leaching Procedure and Flash Point was performed on additional sample referenced American Interplex Corporation Control No. 3586. Analysis performed on oil layer only.

Enclosure: Chain of Custody

AMERICAN INTERPLEX CORPORATION

SL/tm

By Steven Lovell
Steven Lovell
Technical Director

AIC CN 3521

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

THE GEHM Corporation

Submitted by: (Name/Telephone)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
DARYL R. BOWLES, CHMM THE GEHM CORPORATION P.O. BOX 65 BOONVILLE, MO 65233 (816) 882-3485	American Interplex Corporation 8600 Kanis Rd. Little Rock, AR 72204-2322	Terminal Railroad Association of St. Louis First & Mound Streets St. Louis, MO Mr. Bob Ripper (314) 539-5196

Project No.: 0116	Applicable Regulatory No.: 07143-KB-1331	P.O. #: (For Lab) 050593 DB	Samplers Signature: Daryl R. Bowles

Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST												
					BTEX (8020)	TPH (418.1)	TPH MO.MOD (418.1)	OA-1 (IOWA)	BTU VALUE	pH	TOX (CHLORINE)	FLASH POINT (CC)	PCB CONTENT (8080)	TCLP METALS*	OTHER	OTHER	OTHER
TANK WASTE	SLUDGE	N/A	08-04-93	1000					X		X	X	X	X			

COMMENTS/SPECIAL INSTRUCTIONS:
* METALS INCLUDED ARE: ARSENIC, BARIUM, CADMIUM, CHROMIUM, LEAD, MERCURY, SELINIUM, SILVER.

PLEASE FAX RESULTS TO: 816-882-5766

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Daryl R. Bowles	8-6-93	1100	Martha Sirois	08-07-93	0915
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

American Interplex 8600 Kanis Rd. Little Rock AR 72204 (501) 224-5060

[redacted]

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

COMPANY Environmental Operations CONTACT Michael Lechner PROJECT NO. 5780

ADDRESS 2649 Pestalozzi DATE 8-11-93 P.O. NO.

CITY/STATE/ZIP St Louis MO 63118 DUE DATE

PHONE (314) 771-8442 FAX ( )

Page 1 of 1

AICC N 3580

SPECIAL INSTRUCTIONS: ATTN: Krista

Reference: Gehm Corp. Loc. # 0111

SAMPLE IDENTIFICATION

ITEM	LAB NO.	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	ANALYSES REQUESTED: TCLP Metals	ANALYSES REQUESTED: Flash Point	COMMENTS
1	(1)	70% Glycol/30% waste oil	8-11-93		Glass 32oz	X	X	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER
				[signature]	8/11/93	1300	

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
GEHM, 1993

THE GEHM Corporation
1417 Bingham Road
Post Office Box 65
Boonville, MO 65233

816-882-3485
816-882-5766 (Fax)

RECEIVED
OCT 28 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

October 26, 1993

Ms. Kris Davidson, Environmental Specialist
Missouri Department of Natural Resources
Hazardous Waste Program - Superfund Section
P.O. Box 176
Jefferson City, Missouri 65102

RE: UST Removal Closure Report

Dear Ms. Davidson,

We are submitting the enclosed report on behalf of Terminal Railroad Association (TRRA) of St. Louis. The report contains soil sample analysis results as requested by TRRA. I hope you find this information useful in your investigation of the area.

Should you have any questions regarding this report or require additional information, please call me at (816) 882-3485.

Sincerely,

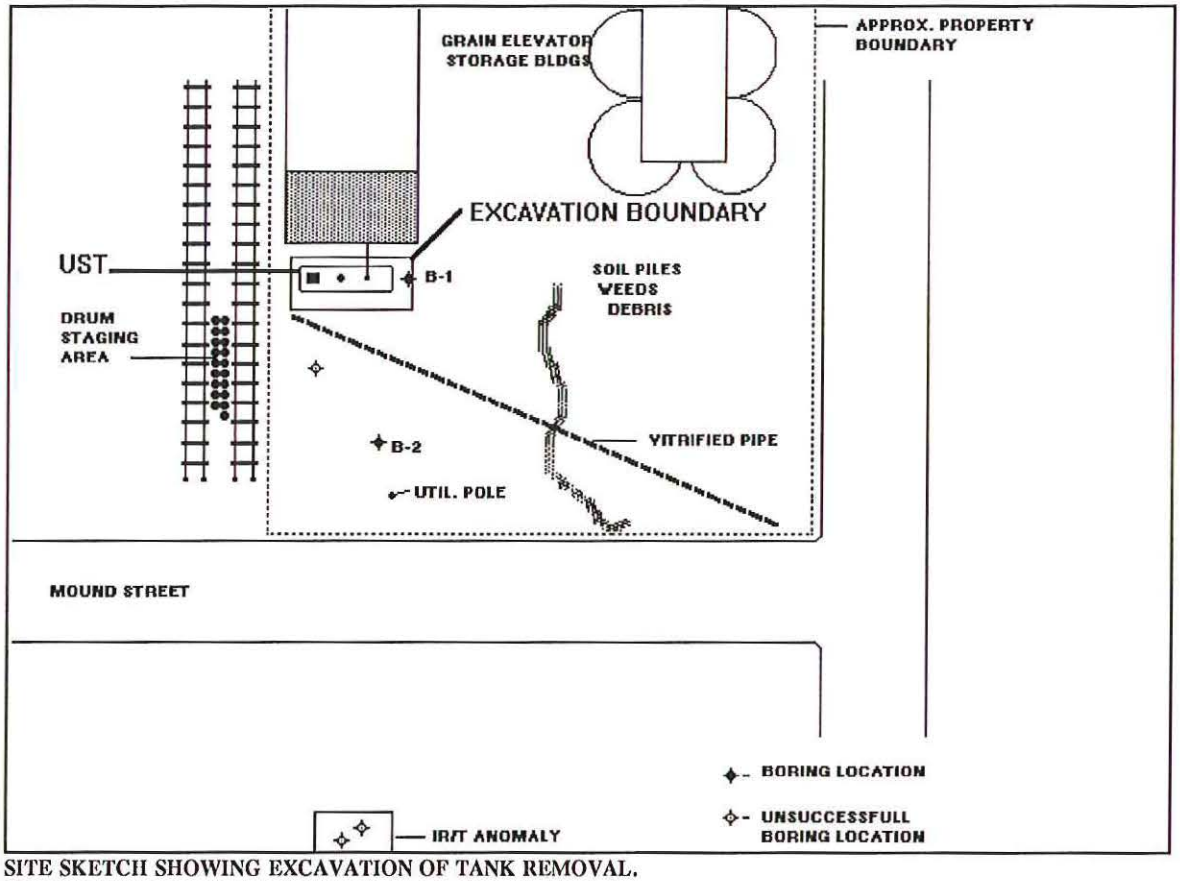
Daryl R. Bowles, CHMM
Director,
Environmental Field Services

cc: Mr Bob Ripper
Terminal Railroad Association of St. Louis
700 North Second Street
St. Louis, Missouri 63102

UST CLOSURE REPORT
for
Terminal Railroad Association

OWNER/FACILITY INFORMATION:

Facility Name:	NONE	UT# N/A		
Address	First & Mound Streets			
County St. Louis		**City**	St. Louis, MO	**Zip Code** 63102
Telephone/Contact	(314) 539-4712	Mr. Bob Ripper		
Date of Tank Removal	October 11, 1993			



SITE SKETCH SHOWING EXCAVATION OF TANK REMOVAL.

PROJECT SYNOPSIS

This underground storage tank removal project is a result of the discovery of oils seeping into a pump station operated by Metropolitan Sewer District (MSD) in St. Louis, Missouri. On July 14, 1993, MSD reported this situation to the MDNR. MSD analytical information revealed PCB levels of less than 50 ppm in the oils seeping into the pump station. Additionally, a sample was obtained from waste oil contained in an underground storage tank present in the area, and owned by Terminal Railroad Association of St. Louis (TRRA). The St. Louis Fire Department (SLFD) notified TRRA on July 28, 1993 and requested the contents of the tank be removed. TRRA was unaware of the existence of the tank prior to notification by the SLFD.

In response to the situation, TRRA initiated and completed the following tasks:

- **Contents of the tank were removed** on August 4, 1993. The tank was completely cleaned and freed of all liquids. The material was containerized on-site in 55 gallon drums for characterization and disposal.

- An **Infrared Thermographic Survey was conducted** of the area in an attempt to characterize leak plumes or trails.

- **Three borings** were advanced in the immediate area to determine subsurface soil conditions. Two soil samples were obtained from the site and submitted to a qualified laboratory for chemical analysis.

The results of these efforts are documented in an ACTIVITIES REPORT dated Setember 1, 1993 which documents the response efforts and findings of the investigatory activities.

This UST had no record of registration with the Missouri Department of Natural Resources. TRRA indicated no knowlege of the existence of the tank prior to notification by the SLFD. The UST removal project included removal of the soil overburden, removal of the tank, obtaining samples of the soils below the tank, on the down gradient wall and of the soil pile, disposal of the tank as scrap metal, and backfilling the excavation.

1.0 SAMPLE RESULTS

Soil sampling for this UST removal project included sampling below the tank and the down gradient wall. Additionally, one composite sample of excavated soil was obtained.

SAMPLE RESULTS SUMMARY TABLE (in ppm)							
I.D	LOCATION	TPH	BENZENE	TOLUENE	E. BENZENE	XYLENES	PCB's
PIT	FROM BELOW TANK, 2 COMPOSITE POINTS AT EACH END, OF NATIVE SOIL, 12FT. DEPTH	<5	<0.002	<0.002	<0.002	<0.004	<.05
DGW	FROM DOWN GRADIENT WALL (EAST WALL), 10.5 FT. DEPTH	< 5	<0.002	<0.002	<0.002	<0.004	<.05
SP	FROM FOUR COMPOSITE POINTS OF THE EXCAVATED SOILS	66	<0.002	0.002	0.002	0.004	<.05

2.0 LOCATION OF LINES AND UTILITIES

Underground lines or utilities were not discovered in the immediate area during excavation activities. However, an area drawing supplied by TRRA denotes a vitrified pipe extending across the site. (See Sketch Section 5.0)

3.0 FORMER LOCATIONS OF TANK(S)

One 10,000 gallon tank was located at the south end of the eastern most building on the property. The tank overburden consisted of grass and soil. The product line extended north from the tank approximately 10 feet and entered the building through a concrete wall at ground elevation.

4.0 DEPTH & SIZE OF TANK

Tank capacity was 10,000 gallons. Dimensions were 10.5 ft. diameter by 18.5 ft long. The top of the tank was exposed at grade elevation.

5.0 EXCAVATION BOUNDARIES

The excavation was limited to that necessary for tank removal. This excavation extended approximately 4 feet beyond the outer limits of the tank to a depth of 12 feet. Final dimensions of the tank pit excavation was 16 ft wide, 25 feet long and 12 feet deep.

6.0 ABOVE GROUND TANKS & PIPING

There were no above ground tank systems at this site.

7.0 DISTANCE TO WELLS, STREAMS, AND LAKES.

There were no private drinking water wells, or lakes within .5 miles of the tank location. The site is adjacent to the Mississippi River approximately 1,000 feet to the east.

8.0 SOILS DESCRIPTION

Soils encountererd was black junk fill with cinders to a depth of 12 feet. Below, native soils consisted of typical river sands/silts.

9.0 PHOTOGRAPHS

PHOTO #1: NORTH EAST VIEW SHOWING TANK AT BEGINNING OF EXCAVATION.

PHOTO #2: BOTTOM AND END OF TANK AFTER REMOVAL.

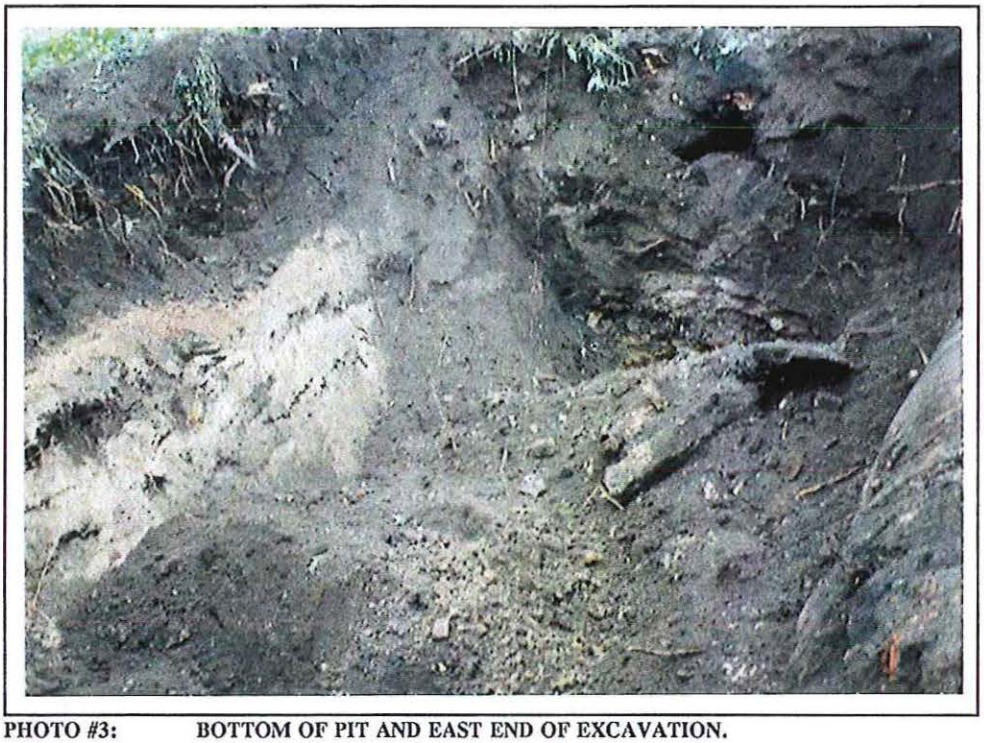


PHOTO #3: BOTTOM OF PIT AND EAST END OF EXCAVATION.

PHOTO #4: SITE CONDITION AT COMPLETION.

11.0 DESCRIPTION OF RESIDUAL CONTAMINATION

Based on odor and appearance, no contaminated media was observed during tank removal operations.

12.0 AMOUNT OF EXCAVATED SOILS

Approximately 30 cubic yards of soil was removed in efforts to remove the tank and affected soils.

13.0 SLUDGE IN TANKS

The tank had previously been emptied of all contents and cleaned. Fifteen drums of Waste Oil/ethylene glycol sludge/liquid was generated for disposal.

15.0 DISPOSAL OF TANK CONTENTS

Tank contents is currently awaiting acceptance for disposal by a licensed and permitted disposal company.

16.0 DISPOSAL OF TANK(S)

The tank was transported to, and disposed of through scrap metal recycling at Grossman Iron & Steel Company, St. Louis, MO.

17.0 FORMER CONTENTS OF TANK(S)

TRRA indicated the tank originally was used to store Fuel Oil.

18.0 DEPTH OF GROUNDWATER

After tank removal, a small amount of water was present in the tank pit area estimated at < 50 gallons. This water was absorbed into the loose soils in the pit during subsequent excavation activities. No other water accumulated or was encountered.

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

October 19, 1993

ATTN: Mr. Daryl Bowles

Control No. 4528

Sample Description: Three (3) soil received on 10/13/93
Re: Terminal Railroad Assn. 0119
P.O. No. 101-293 0119

Result:

Parameter	Unit	Pit 10-11-93 1020	DGW 10-11-93 1022	SP 10-11-93 1025
Total Recoverable Petroleum Hydrocarbons	mg/Kg	<5	<5	66
PCB	mg/Kg	<0.05	<0.05	<0.05
Benzene	mg/Kg	<0.002	<0.002	<0.002
Toluene	mg/Kg	<0.002	<0.002	<0.002
Ethylbenzene	mg/Kg	<0.002	<0.002	<0.002
m- & p-Xylenes	mg/Kg	<0.002	<0.002	<0.002
o-Xylene	mg/Kg	<0.002	<0.002	<0.002

Method: Modified EPA 418.1, EPA 3550, 8080, 5030A, 8020

Remark: Results are presented on an as-received basis.

Enclosure: Chain of Custody

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

MWM/tj

AIC CN 4528

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

THE GEHM Corporation

Submitted by: (Name/Telephone/Date)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
THE GEHM CORPORATION 1417 BINGHAM RD, P.O. BOX 65 BOONVILLE, MO 65233 DAZYL BOWLES 816-882-3485	AMERICAN INTERPLEX CORP. 8600 KANIS RD. LITTLE ROCK, AR 72204 501-224-5060	TERMINAL RAILROAD ASSN. FIRST & MOUND STREETS ST. LOUIS, MO BOB ROPPER 314-539-4712

Project No.:	Applicable Regulatory No.:	P.O. #: (For Lab)	Samplers Signature:
0119	N/A	101-293 0119	Daryl K. Bowles

AIC #	Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST: BTEX (8020)	TPH (418.1)	TPH MO.MOD. (418.1)	OA-1 (OWA)	OA-2 (OWA)	TOG (413.1)	PCB CONT. (8080)	OTHER	OTHER	OTHER
1	PIT	SOIL	ICE	10-11-93	1020	X		X				X			
2	DGW	SOIL	ICE	10-11-93	1022	X		X				X			
3	SP	SOIL	ICE	10-11-93	1025	X		X				X			

COMMENTS/SPECIAL INSTRUCTIONS:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Daryl K. Bowles	10-12-93	1000			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
			Shane Holmes	10/13/93	1030

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Huff & Angel, 1992

Bulletin 71
(MCC Research Report 92-03)

RAINFALL FREQUENCY ATLAS OF THE MIDWEST

by Floyd A. Huff and James R. Angel

Midwestern Climate Center
Climate Analysis Center
National Weather Service
National Oceanic and Atmospheric Administration

and

Illinois State Water Survey
A Division of the Illinois Department of Energy and Natural Resources

1992

Bulletin 71
(MCC Research Report 92-03)

RAINFALL FREQUENCY ATLAS OF THE MIDWEST

by Floyd A. Huff and James R. Angel

Title: Rainfall Frequency Atlas of the Midwest.

Abstract: This report presents the results and methodology of an intense study of rainfall frequency relationships throughout the Midwest (Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin). Using primarily 275 long-term daily reporting stations from the National Weather Service (NWS) cooperative network supplemented by 134 daily reporting stations with shatter records, rainfall amounts have been determined for recurrence intervals from 2 months to 100 years and for durations of 5 minutes to 10 days. The results are presented as maps and as climate division averages in tabular form. Several special raingage networks were used to develop relationships between amounts for 24 hours and less. This report also examines the time distributions of heavy rainfall over time, and other storm characteristics such as storm orientation and movement. The assumption of spatially independent observations between stations is also discussed.

Reference: Huff, Floyd A., and James R. Angel. Rainfall Frequency Atlas of the Midwest. Illinois State Water Survey, Champaign, Bulletin 71, 1992.

Indexing Terms: Climatology, heavy rainfall, hydroclimatology, hydrometeorology, Midwest, extreme value distributions, climate change.

The Midwestern Climate Center (MCC) is funded by a grant from the Climate Analysis Center, National Weather Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDC, 2012

Final Report

Missouri Commercial Fish Harvest

2000-2012

Missouri Department of Conservation

Prepared by: Sara Tripp, Dave Herzog, Susan Reinagel and Joe McMullen

EXECUTIVE SUMMARY

- This report contains a summary of Missouri's commercial fishery data for 2000 - 2012 and a synthesis of the harvest trends for the last 68 years (1945-2012).
- From 2000-2012, the number of commercial permits issued and the number of licensed commercial fishers that reported harvest has generally declined for both resident and non-resident fishers.
- The majority of the commercial harvest reported was caught by relatively few fishers each year and the top 25 fishers each year accounted for 70 to 83% of the annual harvest from 2000 to 2012.
- From 2000-2012, commercial harvest peaked at 914,721 pounds in 2001, and has on average declined since that year, with a low of 244,491pounds of fish harvested in 2010.
- During the thirteen year period from 2000 to 2012, over 50% of the total pounds harvested were taken from the Mississippi River, except for 2006 where 51% of the pounds harvested came from the Missouri River.
- Combined across all rivers, buffalofishes, catfishes, common carp, and Asian carp average 86% of the total harvest from 2000-2012 and account for the largest groups of fish that are harvested commercially in Missouri.
- Over the last thirteen years, the harvest of Asian carp has increased to 15% of the total harvest in 2012, making them the third most harvested fish group.
- Since the Similarity of Appearance provision of the Endangered Species Act was enacted in 2010, we have not observed a shift in harvest effort from the open rivers portions to the pooled portion of the Mississippi River.

ABSTRACT

In Missouri, rivers open to commercial fishing include the Missouri River, Mississippi River and the portion of the St. Francis River that forms a common boundary between Arkansas and Missouri. Data obtained from the reports of commercial fishers have been compiled and analyzed since 1945 to provide harvest trend information to help the Missouri Department of Conservation (MDC) monitor, evaluate, and better understand the rivers' commercial fisheries. Commercial fishers return monthly reports indicating river fished, pounds harvested by species, and the type and quantity of gear used. The total annual harvest is calculated within species groups, individual species and individual rivers. The total number of commercial fishers who purchased gear licenses have decreased overall from 2000-2012. The top four groups of fish harvested from 2000 -2012 were buffalofishes, catfishes, common carp, and Asian carp. Buffalofishes were the most numerous species group caught and comprised 22 to 45% of the total annual harvest from 2000-2012. The three catfish species (flathead, blue, and channel) were also commonly harvested and accounted for 17 to 41% of the total annual harvest from 2000-2012. While, harvest of common carp has fallen from 113,436 pounds (19% of the total annual harvest) in 2000 down to only 14,528 pounds (4% of the total annual harvest) in 2011; annual harvest of Asian carp (typically bighead, silver, and grass) has increased from 8% in 2000 to 15% of the total annual harvest in 2012. The total annual harvest of shovelnose sturgeon was highest in 2001 at 77,811 pounds and lowest in 2012 with 159 pounds harvested. Shovelnose sturgeon harvest has drastically declined potentially because of the Similarity of Appearance (SOA) provision of the Endangered Species Act which closed commercial harvest of shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). During this time period, paddlefish annual harvest was highest in 2002 at

21,427 pounds and lowest in 2012 with 1,590 pounds. The commitment that is made by commercial fishers and MDC to reporting on and maintaining the commercial fishing program continues to provide interaction between each group and provide relevant information about research and management of our commercial fishery resources.

INTRODUCTION

Seines, gill nets, trammel nets, hoop nets, and trot lines may be commercially fished in the Missouri River, the Mississippi River and the portion of the St. Francis River that forms a common boundary between the states of Arkansas and Missouri subject to certain restrictions (Wildlife Code of Missouri). A commercial fisher must purchase a permit (resident or non-resident) and license each gear that is fished. In order to harvest roe bearing species (shovelnose sturgeon, paddlefish, or bowfin) a resident or non-resident roe fish commercial harvest permit has been required since July of 2009.

Since 1945, data have been compiled and analyzed to provide harvest trend information to help us monitor, evaluate, and better understand each river's commercial fishery. This report contains commercial fishery data for 2000-2012, and a discussion of harvest trends for the last 68 years (1945-2012).

METHODS

Commercial fishers are required to report their daily harvest monthly, indicating river fished, pounds harvested by species, and type and quantity of gear used. When harvest is mentioned in this report, we are referring to the harvest that is reported to the Missouri Department of Conservation, fully understanding that there may be harvest occurring that may not be reported. Data from the reports are entered into spreadsheets for summarization and analysis. The number of fishers, amount and type of gear used (seine, trammel net, gill net, hoop net, and trotline) and percent of total harvest by the top 25 fishers are quantified each year. Annual catch was summarized by species for the Mississippi, Missouri, and St. Francis Rivers.

Information for some fish species was collected by species groups rather than individual species. These species groups represent the following species in this report.

- Buffalofishes: bigmouth buffalo, smallmouth buffalo, black buffalo
- Catfishes: flathead catfish, channel catfish, blue catfish
- Suckers: blue sucker, shorthead redhorse, river redhorse, golden redhorse, black redhorse, spotted sucker
- Carpsuckers: river carpsucker, quillback, highfin carpsucker
- Gars: longnose gar, shortnose gar, spotted gar
- Bullheads: black bullhead, yellow bullhead
- Asian Carp: bighead, silver, and black carp
- Softshell Turtles: midland smooth softshell, eastern spiny softshell

FINDINGS

Numbers of Fishers

From 2000-2012, the number of commercial permits issued has generally declined, with a high of 356 commercial permits issued in 2000 to a low of 216 in 2011 (Figure 1; Table 1). The number of licensed commercial fishers that harvested fish has also declined from a high of 250 in 2002 to a low of 126 in 2011 (Figure 1; Table 1). The number of non-resident commercial fishers that have been issued a commercial fishing permit, as well as the number of licensed non-resident commercial fishers that have harvested fish, has also declined over the thirteen year period (Table 1).

Gear Used

In 2000 and 2001, hoop nets were the most commonly used gear in all three commercially fished rivers. In 2002, there was a shift from hoop nets to trammel nets on the Missouri and Mississippi rivers (Table 2-14) except during the floods in 2010 when hoop nets were again more frequently used. During this time on the Mississippi river, gill nets and trotlines were more frequently used. On the St. Francis River from 2002 – 2012, hoop nets and trotlines were the most frequently used commercial fishing gear.

Harvest

The majority of the commercial harvest was caught by relatively few fishers each year (6-13 fishers harvested 50% of the annual total) and the top 25 fishers each year accounted for 70 to 83% of the annual harvest from 2000 to 2012 (Figure 2-14). From 2000-2012, commercial harvest peaked at 914,721 pounds in 2001, and has on average declined since then, reaching a low of 244,491pounds of fish harvested in 2010 (Figure 15). However, within the last two years (2011-2012) harvest has increased slightly (Table 15-27, Figure 15). The average total harvest for this thirteen year period was 505,639 pounds. During the thirteen year period from 2000 to 2012, with the exception of 2006, over 50% of the total pounds harvested were taken from the Mississippi River (Table 15-27, Figure 16). Less than 1% of the total pounds harvested were taken from the St. Francis River annually.

Across all rivers, buffalofishes, catfishes, common carp, and Asian carp account for the largest groups of fish that are harvested commercially in Missouri (Figure 17). Combined, these four groups average 86% of the total harvest from 2000-2012. Buffalofishes consistently rank at the top for the greatest percent of total harvest each year with only one exception in 2010. Over the thirteen year period buffalofishes averaged 38% of the total harvest. Catfishes as a group

averaged 26% of the total harvest when the St. Francis and Mississippi Rivers were combined during 2000-2012. Despite catfish harvest being prohibited on the Missouri River since 1992 a small amount of commercial harvest is still reported (Protection Division was contacted in each case). Common Carp have fallen in the ranking from the third most harvested fish with 19% of the total harvest in 2000 to the fourth most harvested fish in 2012 at 4% of the total harvest. Asian carp (bighead and silver carp) harvest has only been reported since 1992, but over the last thirteen years the harvest of Asian carp has increased to 15% of the total harvest in 2012, taking over third place on the list (Figure 17).

Shovelnose sturgeon, paddlefish, and bowfin are all targeted for the caviar market; however bowfin harvest is minimal and accounts for less than 1% of the total harvest each year. From 2000-2012, a total of 258,949 pounds of shovelnose sturgeon were commercially harvested from Missouri waters. Sturgeon harvest peaked in 2001, at 77,811 pounds and was lowest in 2012 with only 159 pounds being reported (Figure 18). This drastic decline coincides with the SOA provision of the Endangered Species Act which closed commercial fishing for shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). Before SOA, the open river portion of the Mississippi River accounted for 88% of the shovelnose sturgeon pounds harvested from 2000 through 2009. Since SOA was instated in 2010, we have not observed a shift in harvest effort from the open rivers portions to the pooled portion of the Mississippi River (above Lock and Dam 26) (Figure 18). Paddlefish harvest reached a high in 2002 at 21,427 pounds and was lowest in 2012 at 1,590 pounds (Figure 19). The supply and demand of the caviar industry may have an impact on roe fish species harvest. Record high flooding events in 2010 and a record low drought in 2011may also be influencing this trend.

TRENDS IN THE COMMERCIAL FISHERY PROGRAM DATA, 1945-2012

Numbers of commercial fishers

The number of fishers purchasing commercial permits has fluctuated annually over the 68 years when harvest was required to be reported. Overall, there was a general decline in total number of purchased commercial fishing permits from 1948 until 1969, after this time period the number of permits issued increased until 1982 with a peak of 1,801 permits purchased. Numbers declined sharply in the 1980's, and since 1993, the number of commercial fishers has remained below 400, reaching an all-time low in 2011 at 216 commercial fishing permits purchased (Figure 20 and 21). Traditionally, more commercial fishers have fished the Missouri River than the Mississippi and St. Francis Rivers (Figure 21). After 1990, the decline in numbers of commercial fishers was more pronounced relative to the declines observed on the Mississippi River. The reasons for decline in purchase of commercial permits are not specifically known; however, several factors potentially contribute to these yearly fluctuations. For instance, increases in fees, health advisories on fish consumption, removal of certain species (i.e., paddlefish and catfish from the Missouri River and shovelnose sturgeon from the Missouri River and the open portion of the Mississippi River) from the allowable commercial harvest list, fluctuating river conditions, implementation of special permits for roe harvester and roe dealer, and demand for fish and roe can all affect the number of permits sold each year.

Total Harvest

The first year of recorded commercial harvest was in 1945.There was a general decline in commercial harvest from 1945 through 1966, when an all-time low was reached with 235,116 pounds being harvested (Figure 22). After 1967, the method of estimating commercial harvest was changed from yearly reporting to recommended monthly reporting, which resulted in an

increase in harvest and likely more accurate estimation of harvest (Figure 22). In addition, the reported harvest again increased after 1975, due to another change in the reporting method which required monthly reports to be submitted (Robinson 1977). Harvest peaked in 1990 at an all-time high of 1,936,996 pounds. Since 1990 harvest has fluctuated yearly peaking again in 2001 at 914, 721 pounds and then declining to 244,419 pounds in 2010. Harvest has slightly increased in the last two years with 336,614 pounds being harvested in 2012.

Proportion of total harvest by river fluctuated during the 68 year period (Figure 22), but in 60 of the 68 years of reported harvest (1945 – 2012) over 50% of the yearly harvest was taken from the Mississippi River. Historically, 57% (55 year average) of the harvest came from the Mississippi River, 41% from the Missouri River, and 2% from the St. Francis River. Since 1999, the proportion of harvest that occurs on the Mississippi River has increased to 66% (13 year average) of the total harvest. In the past 6 years, nearly 76% of the total reported harvest has occurred in the Mississippi River. Missouri River harvest has continued to decline with only 33% of the total harvest in the past 13 years. St. Francis River harvest continues to remain low and comprised only 1% of the total harvest since 1999 (Figure 22).

The reasons for fluctuation in the total pounds harvested throughout the years are not specifically known; however, many of the same factors that potentially contribute to inconsistent license sales also could affect the yearly variations in harvest. For instance, in the Missouri Commercial Fish Harvest Report 1999, Robinson mentions that changes in reporting requirements, river levels and clarity, health advisories on fish consumption, removal of certain species from the commercial fish list in specific areas, and demand can all affect the amount of pounds harvested each year.

Harvest of Selected Species

Twelve species or groups of fish have consistently contributed to the yearly commercial harvest over the last 68 years. Since reporting began in 1945, a few species have been added to the list of commercially harvested fishes. In 1975, grass carp were first reported as being harvested and have remained a staple species in the harvest. Asian carp harvest began in 1992 and has been increasing since that time. Over the 68 years of reported harvest, three groups of fish (common carp, buffalofishes, and catfishes) have comprised the majority of the total harvest; however in recent years Asian carp have become one of the top three harvested groups, moving common carp down to the fourth harvested species group. Shovelnose sturgeon and paddlefish have consistently supported a limited fishery and are highly valued because the roe is processed to make caviar.

Common carp historically dominated the total harvest from 1945 to 1980. During this 35 year time period, common carp comprised the greatest percent of harvested fish in all but two years and averaged 43% of the total harvest. Since 1980, Common carp have only accounted for 17% (33 year average) of the total harvest (Figure 23). Annual pounds of common carp harvested have varied considerably, ranging from 558,945 pounds in 1945 to 14,528 pounds in 2011 (Figure 24). Predominately common carp were harvested from the Missouri River; however in 1965-1981 and 1983 through 1985, more Common carp were harvested in the Mississippi River than in the Missouri River (Figure 24). Before 1980, common carp harvest averaged 275,000 pounds (35 year average), but since the invasion of Asian carp in 1992, common carp harvest declined to an average of only 82,000 pounds. Asian carp have since increased in the total percentage of pounds harvested each year to nearly 18% of the harvest in 2008 and 16% in 2012 (Figure 23) becoming the third most harvested fish

group. The most pounds of Asian carp were harvested in 2002, with 103,217 pounds being harvested; which was 12% of the total harvest. During the flood of 2010, Asian carp harvest was at the lowest level since 1992 with only 9,268 pounds harvested (4% of the total harvest); however by 2012 Asian carp harvest had rebounded to 52,064 pounds and 16% of the total harvest (Figure 25). The majority of Asian carp were initially harvested from the Missouri River, but since 2007 Asian carp harvest has increased in the Mississippi River and surpassed the Missouri River harvest. Asian carp are seldom harvested from the St. Francis River (Figure 25). When we consider the three groups of invasive carps; common (referred to as carp in historic harvest), grass, and Asian carp (bighead and silver carp), they have collectively made up on average 27% (21 year average since Asian carp have been harvested) of the total harvest. In the 20 years in which all three invasive carp groups have been harvested, they have comprised as much as 40% of the total pounds harvested (Figure 23). The presence of invasive carps in the top three harvested groups is concerning given the limited information regarding how these invasive species effect native fishes.

Buffalofishes were the second most harvested fish from 1945 through 1993 except for four years (1978, 1980, 1981, 1982) in which they were the top harvested fish in Missouri. Since 1994, buffalofishes have been the most harvested commercial fish group except for 2010 when they were the second most harvested fish group; second to catfishes. Percent contribution of buffalofishes to the total harvest has in general increased from 16% in 1948 to 45% in 2003 (Figure 26). Annual pounds of buffalofishes harvested fluctuate yearly. However there was a general decrease in pounds harvested from 203,266 pounds in 1945 to 146,774 pounds in 1967. Since 1967, harvest has continued to increase for several years with harvest peaking in 1969 at 304,222 pounds, 339,540 pounds in 1978, and reached an all-time high in 1990 at 534,785

pounds (Figure 27). After 1990, pounds harvested have decreased with a few peaks in harvest in 1996 and 2002, reaching a low of only 83,631 pounds harvested in 2010. The past two years, harvest has increased again with 135,049 pounds harvested in 2012 (Figure 27). In the 68 years of reported commercial harvest, the majority of buffalofishes have been harvested in the Mississippi River except for 11 years in which more were harvested in the Missouri River (Figure 27). They are the most harvested species in the St. Francis River with 234,375 pounds being harvested over the 68 year period; however the pounds harvested account for only 1% of the harvest yearly.

Catfishes have historically been considered a group of three commercially harvested species (channel, flathead, and blue catfish). Over the last 68 years, catfishes have accounted for on average 20% of the total pounds harvested each year. From 1945 through 1983, catfishes were the third most harvested group. However, during a ten year period from 1984 to 1993, catfishes became the most harvested group of commercially harvested fishes comprising an average of 30% of the total harvest (Figure 28). After 1993 and for the next 20 years, catfishes dropped down to the second most harvested commercial fish group; except for 2010 when catfishes were again the most harvested group accounting for 41% of the total harvest that year (Figure 28). The combined harvest of the three species of catfishes declined from 164,303 pounds in 1945 to 96,256 pounds in 1967 (Figure 29). From 1968 until 1992, when harvest of catfishes was closed on the Missouri River, the harvest of the catfishes increased and peaked in 1990 at 598,049 pounds. Yearly catfishes harvest declined with one small peak in 2001 at 197,814 pounds (Figure 29). There was concern that the closure of catfishes harvest on the Missouri River might result in increased fishing pressure and harvest of catfishes from the Mississippi River; however this does not appear to have happened. The average pounds of

catfishes harvested in the Mississippi River during the twenty year period prior to the Missouri River closure was 131,653 pounds while the average pounds harvested in the twenty years after the closure declined to 125,565.

Relative to other commercial species or groups, the commercial harvest of shovelnose sturgeon over the 68 years has been minimal. On average, commercial harvest of shovelnose sturgeon has accounted for less than 2% of the total pounds harvested each year. During this time, reported harvest of shovelnose sturgeon remained fairly consistent with an average of 10,901 pounds taken yearly. However there were a few increases in harvest: in 1987 there were 26,089 pounds harvested; in 1989 there were 29,537 pounds harvested, and in 2001 a record high was reached, with 77,811 pounds of shovelnose sturgeon harvest reported (Figure 30). Since this time, harvest has declined. In 2012, only 159 pounds were reported as harvested (Figure 30). One reason for the decline in harvest after 2010 is the SOA provision of the Endangered Species Act which closed commercial fishing for shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). Typically the Mississippi River has accounted for 60% of the shovelnose sturgeon harvest; however during the periods1981 through 1987, 1991, and 2005 through 2010 the Missouri River comprised the majority of the shovelnose sturgeon harvest (Figure 30).

Paddlefish have sustained a relatively small fishery which has accounted for an average of 2% (9,021 pounds) of the total pounds harvested each year from 1945 to 2012. Paddlefish harvest remained steady from 1945 through 1962. After the mid 1960's, there was a general increase in harvest which peaked in 1989 at 57,180 pounds (Figure 31). After the record high harvest in 1989, reported harvest declined to a low of 2,324 pounds in 1997. Harvest increased slightly peaking again in 2002 at 21,427 pounds reported and has continued to decline since

reaching a record low of 1,590 pounds in 2012 (Figure 31). In the 45 years leading to the closure of paddlefish harvest on the Missouri River in 1990, the majority of paddlefish harvest occurred on the Mississippi River (Figure 31). However after the closure, the harvest that was occurring on the Missouri River did not appear to shift to the Mississippi River. In the 20 years prior to paddlefish harvest closure on the Missouri river, the average yearly harvest on the Mississippi River was 11,698 pounds and in the 21 years after the closure 9,235 pounds were harvested on average annually.

RECOMMENDATIONS

The commercial fishery program recommends to:

- Continue to collect, compile, and analyze monthly reports to monitor and track trends in harvest.
- Communicate with surrounding states to promote and encourage cohesive management strategies along the commercially harvested waters.
- Monitor catfishes and paddlefish populations in both the Missouri and Mississippi rivers to evaluate the population changes resulting from the ban of commercial harvest of catfishes and paddlefish from the Missouri River.
- Monitor harvest trends in the Mississippi River to determine if harvest that once occurred in the open river portion of the Mississippi River (below Lock and Dam 26) and the Missouri River shifts to the pooled portion of the Mississippi River (above Lock and Dam 26).
- Continue monitoring the shovelnose sturgeon population in all reaches of the Mississippi River and the Missouri River to further our understanding of the impacts of SOA.

- Monitor the harvest trends for the four invasive carp species separately (common carp, grass carp, silver carp, and bighead carp). Determine if the increased biomass of invasive carps has an effect on our native species. Enhance reporting of fish species that are important to agency needs (e.g. alligator gar) or are expected to influence the commercial fishery resources (e.g. black carp).
- Continue to interact with commercial fishers by supporting periodic meetings, newsletters, and relevant information about research and management of our commercial fishery resources.

LITERATURE CITED

Robinson, J. W. 1977. Collection of Commercial Fisheries Harvest Data in Missouri for 1975. Missouri Department of Conservation, National Marine Fisheries Service Project 2-291-R-1, Study A, Progress Report. 15 pp.

Robinson, J. W. 2001. Missouri's Commercial Fishing Harvest, 1999. Missouri Department of Conservation, Non Federal Aid Project, Final Report. 39 pp.

Wildlife Code of Missouri. . Rules of the Conservation Commission issued March 1, 2013. 218 pp.

Table 1. Number of commercial fishing permits issued (resident and non-resident) in each fiscal year and the number of licensed commercial fishermen (resident and non-resident) that harvested pounds of fish and contributed to the total pounds harvested in each year.

	Permits Issued			Fishermen that Harvested Pounds of Fish		
Permit Year	Total	Resident	Non-Resident	Total	Resident	Non-Resident
2000	356	347	9	239	232	7
2001	343	333	10	237	231	6
2002	351	345	6	250	245	5
2003	331	326	5	199	195	4
2004	296	291	5	194	190	4
2005	313	306	7	175	170	5
2006	313	302	11	186	178	8
2007	298	289	9	171	166	5
2008	310	298	12	146	142	4
2009	304	292	12	168	163	5
2010	318	311	7	136	133	3
2011	216	213	3	126	126	0
2012	246	239	7	143	139	4

Table 2. Amount of gear used on Missouri's commercial rivers in 2000.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Seine Use	1			1
Days of Trammel Net Use	638	776	19	1433
Days of Gill Net Use	30	747		777
Days of Hoop Net Use	16431	43915	2964	63310
Days of Trotline Use	16	4552	24	4592
Total	17116	49990	3007	70113

Table 3. Amount of gear used on Missouri's commercial rivers in 2001.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Seine Use	203	5		208
Days of Trammel Net Use	613	1248	14	1875
Days of Gill Net Use	28	1494		1522
Days of Hoop Net Use	16366	30676	6816	53858
Days of Trotline Use	31	5121		5152
Total	17241	38544	6830	62615

Table 4. Amount of gear used on Missouri's commercial rivers in 2002. In June of 2002 the method of reporting effort was changed on the commercial fishing reports. The top table reflects the number of days each gear was fished from January to June. The bottom table reflects the amount of gear fished from June to December.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Trammel Net Use	449	458	2	909
Days of Gill Net Use	774	145		919
Days of Hoop Net Use	14662	7719	6041	28422
Days of Trotline Use	1378	10	4	1392
Total	17263	8332	6047	31642

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine		285		285
Yards of Trammel Net	20467	20475		40942
Yards of Gill Net	468	33900		34368
Number of Hoop Nets	3587	8059	1446	13092
Number of Hooks	1659	57390		59049
Total	26181	120109	1446	147736

Table 5. Amount of gear used on Missouri's commercial rivers in 2003.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	300			300
Yards of Trammel Net	42598	34665	140	77403
Yards of Gill Net	1418	80010	14	81442
Number of Hoop Nets	5600	9826	3344	18770
Number of Hooks	871	55379	545	56795
Total	50787	179880	4043	234710

Table 6. Amount of gear used on Missouri's commercial rivers in 2004.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	300			300
Yards of Trammel Net	39016	36720	70	75806
Yards of Gill Net	1980	108544		110524
Number of Hoop Nets	7028	12148	1872	21048
Number of Hooks	621	60381	184	61186
Total	48945	217793	2126	268864

Table 7. Amount of gear used on Missouri's commercial rivers in 2005.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	400	800		1200
Yards of Trammel Net	24131	27080		51211
Yards of Gill Net	5272	110776		116048
Number of Hoop Nets	7424	11573	2173	21170
Number of Hooks	12	58694	40	58746
Total	37239	208923	2213	248375

Table 8. Amount of gear used on Missouri's commercial rivers in 2006.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	29234	21765		50999
Yards of Gill Net	1335	59667		61002
Number of Hoop Nets	8093	11018	1385	20496
Number of Hooks	6	52572	150	52728
Total	38668	145022	1535	185225

Table 9. Amount of gear used on Missouri's commercial rivers in 2007.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	13640	8485		22125
Yards of Gill Net	3015	121232		124247
Number of Hoop Nets	7731	10490	155	18376
Number of Hooks	352	39332		39684
Total	24738	179539	155	204432

Table 10. Amount of gear used on Missouri's commercial rivers in 2008.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	8065	7235		15300
Yards of Gill Net	933	50152		51085
Number of Hoop Nets	6870	7152	374	14396
Number of Hooks		68217		68217
Total	15868	132756	374	148998

Table 11. Amount of gear used on Missouri's commercial rivers in 2009.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	9984	5200	600	15784
Yards of Gill Net	114	15372		15486
Number of Hoop Nets	6523	8944	325	15792
Number of Hooks	60	39873		39933
Total	16681	69389	925	86995

Table 12. Amount of gear used on Missouri's commercial rivers in 2010.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	3709	13890	300	17899
Yards of Gill Net	460	23512		23972
Number of Hoop Nets	6969	6732	386	14087
Number of Hooks		55488	800	56288
Total	11138	99622	1486	112246

Table 13. Amount of gear used on Missouri's commercial rivers in 2011.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	4246	4245	500	8991
Yards of Gill Net	300	35005		35305
Number of Hoop Nets	2217	8671	410	11298
Number of Hooks		46455	1000	47455
Total	6763	94376	1910	103049

Table 14. Amount of gear used on Missouri's commercial rivers in 2012.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine			200	200
Yards of Trammel Net	13165	6400	3	19568
Yards of Gill Net	2330	29560		31890
Number of Hoop Nets		7405	494	10409
Number of Hooks		43627	950	44577
Total	15495	86992	1647	106644

Table 15. Total harvest of fish from Missouri's commercial rivers in 2000.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	67927	45113	396	113436
Buffalofishes	114062	110362	1423	225847
Flathead catfish	1775	58013	759	60547
Channel catfish	1140	54178	1281	56599
Blue catfish	918	78787	205	79910
Freshwater drum	5293	15467	184	20944
Bullheads		538	4	542
Carpsuckers	8533	10923		19456
Shovelnose sturgeon	5855	20744		26599
Paddlefish	243	13656		13899
Suckers	1241	825	148	2214
Gars	846	1622	648	3116
American eel		96		96
Bowfin		72	20	92
Grasscarp	19288	6988		26276
Asian carp	34806	9942		44748
Total	261927	427326	5068	694321

Table 16. Total harvest of fish from Missouri's commercial rivers in 2001.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	70933	59514	437	130884
Buffalofishes	141647	137122	3966	282735
Flathead catfish	73	58907	656	59636
Channel catfish	124	46693	1411	48228
Blue catfish	723	89158	69	89950
Freshwater drum	9861	31940	393	42194
Bullheads		936	1	937
Carpsuckers	9807	15787		25594
Shovelnose sturgeon	12595	65216		77811
Paddlefish	490	19632		20122
Suckers	161	647	541	1349
Gars	1919	2095	173	4187
American eel		182		182
Bowfin		285	36	321
Grass carp	27181	15300		42481
Asian carp	41972	46138		88110
Total	317486	589552	7683	914721

Table 17. Total harvest of fish from Missouri's commercial rivers in 2002.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	55109	50785	115	106009
Buffalofishes	157754	177643	2014	337411
Flathead catfish	410	65565	1562	67537
Channel catfish	397	36336	2190	38923
Blue catfish	952	71445	23	72420
Freshwater drum	5698	21358	134	27190
Bullheads	21	401		422
Carpsuckers	9782	17509		27291
Shovelnose sturgeon	5301	38075		43376
Paddlefish	389	21038		21427
Suckers	1167	1375	12	2554
Gars	2413	1307		3720
American eel	117	30		147
Bowfin	50	555		605
Grass carp	23455	15960		39415
Asian carp	60385	42832		103217
Total	323400	562214	6050	891664

Table 18. Total harvest of fish from Missouri's commercial rivers in 2003.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	42098	24691	53	66842
Buffalofishes	154370	118413	1875	274658
Flathead catfish		42179	2962	45141
Channel catfish		16078	2998	19076
Blue catfish		36664	31	36695
Freshwater drum	4191	9718	92	14001
Bullheads		342		342
Carpsuckers	11521	6842	20	18383
Shovelnose sturgeon	6856	17273		24129
Paddlefish	1	15396		15397
Suckers	795	146	70	1011
Gars	2409	72	18	2499
American eel		24		24
Bowfin	169		5	174
Grass carp	17393	7500		24893
Asian carp	39877	20609		60486
Total	279680	315947	8124	603751

Table 19. Total harvest of fish from Missouri's commercial rivers in 2004.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	39074	27918	10	67002
Buffalofishes	131111	160199	1588	292898
Flathead catfish	32	50882	2208	53122
Channel catfish		23713	2078	25791
Blue catfish	130	47769	66	47965
Freshwater drum	2946	7967	40	10953
Bullhead		202	62	264
Carpsuckers	9186	5208		14394
Shovelnose sturgeon	6171	24538		30709
Paddlefish	529	16269		16798
Suckers	87	301	60	448
Gars	1386	62		1448
American eel		12		12
Bowfin		485		485
Grasscarp	13837	8161		21998
Asian carp	48067	25195		73262
Total	252556	398881	6112	657549

Table 20. Total harvest of fish from Missouri's commercial rivers in 2005.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	27463	19716	25	47204
Buffalofishes	83888	129795	3499	217182
Flathead catfish	177	33388	1766	35331
Channel catfish	52	23029	2606	25687
Blue catfish	26	43679	210	43915
Freshwater drum	2177	6522	189	8888
Bullheads		804		804
Carpsuckers	9492	3950		13442
Shovelnose sturgeon	6939	3452		10391
Paddlefish	1023	9853		10876
Suckers	236	16		252
Gars	625	123		748
American eel	600	30		630
Bowfin		112		112
Grass carp	7043	5663		12706
Asian carp	32606	23093		55699
Total	172347	303225	8295	483867

Table 21. Total harvest of fish from Missouri's commercial rivers in 2006.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	22362	16575	20	38957
Buffalofishes	101525	58297	750	160572
Flathead catfish	39	43649	837	44525
Channel catfish		17627	1054	18681
Blue catfish		28443	139	28582
Freshwater drum	1609	6792	5	8406
Bullheads		700	5	705
Carpsuckers	9909	2014		11923
Shovelnose sturgeon	7709	2016		9724
Paddlefish		8977		8977
Suckers	1223	17		1240
Gars	2328	74		2402
American eel	10			10
Bowfin				
Grass carp	15321	4503		19824
Asian carp	42927	6656		49583
Total	204962	196340	2810	404111

Table 22. Total harvest of fish from Missouri's commercial rivers in 2007.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	18020	17634		35654
Buffalofishes	45387	93462	274	139123
Flathead catfish	442	50381	160	50983
Channel catfish	6	13094	236	13336
Blue catfish	552	32729	6	33287
Freshwater drum	2252	5456	26	7734
Bullheads		313		313
Carpsuckers	5600	1724		7324
Shovelnose sturgeon	5914	2258		8172
Paddlefish	450	11029		11479
Suckers	59	28		87
Gars	1510	315		1825
American eel	81			81
Bowfin		1953		1953
Grass carp	8328	5466		13794
Asian carp	14133	42019		56152
Total	102734	277860	702	381297

Table 23. Total harvest of fish from Missouri's commercial rivers in 2008.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	11626	17702	41	29369
Buffalofishes	36029	91949	1136	129114
Flathead catfish		36966	570	37536
Channel catfish		13290	583	13873
Blue catfish	100	50073	32	50205
Freshwater drum	997	4363	86	5446
Bullheads		5857		5857
Carpsuckers	2394	2591		4985
Shovelnose sturgeon	11627	356		11983
Paddlefish		7997		7997
Suckers	129	69		198
Gars	168	60		228
American eel				
Bowfin	38	1336		1374
Grass carp	3458	11730		15188
Asian carp	7363	60997		68360
Total	73929	305335	2447	381711

Table 24. Total harvest of fish from Missouri's commercial rivers in 2009.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	10445	9419	89	19953
Buffalofishes	37797	54639	1820	94256
Flathead catfish	20	48740	822	49582
Channel catfish	25	18270	534	18828
Blue catfish	162	22525	53	22740
Freshwater drum	1211	3081	42	4334
Bullheads		542	4	546
Carpsuckers	1538	219		1757
Shovelnose sturgeon	6476	583		7059
Paddlefish		8683		8683
Suckers	78	43	16	137
Gars	308	413	6	727
American eel	38	0		38
Bowfin		242		242
Grass carp	2606	1892		4498
Asian carp	8797	7704		16501
Total	69501	176993	3385	249879

Table 25. Total harvest of fish from Missouri's commercial rivers in 2010.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	6533	14827	585	21945
Buffalofishes	21836	60114	1681	83631
Flathead catfish		35062	1321	36383
Channel catfish	4	13569	1107	14680
Blue catfish	62	49641	143	49846
Freshwater drum	473	2722	53	3248
Bullheads		5408		5408
Carpsuckers	333	268		601
Shovelnose sturgeon	7372	944		8316
Paddlefish		2907		2907
Suckers	20	85	12	117
Gars	12	175	82	269
American eel				
Bowfin		438		438
Grass carp	1479	5771	112	7362
Asian carp	2437	6831		9268
Total	40561	198762	5096	244419

Table 26. Total harvest of fish from Missouri's commercial rivers in 2011.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	6088	8151	289	14528
Buffalofishes	36823	91659	3052	131533
Flathead catfish	50	33687	1131	34868
Channel catfish		21106	1381	22487
Blue catfish		47548	442	47990
Freshwater drum	1308	3774	439	5521
Bullheads		692		692
Carpsuckers	789	98		887
Shovelnose sturgeon		521		521
Paddlefish		6738		6738
Suckers	24	82		106
Gars	507	550		1057
American eel				
Bowfin		625		625
Grass carp	3713	12246		15959
Asian carp	10585	35309		45894
Total	59887	262785	6734	329406

Table 27. Total harvest of fish from Missouri's commercial rivers in 2012.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	15421	8220	14	23655
Buffalofishes	60630	72386	2034	135049
Flathead catfish	82	36424	936	37442
Channel catfish	26	21534	2189	23749
Blue catfish	2259	42519	268	45046
Freshwater drum	993	3947	23	4963
Bullheads		55	54	109
Carpsukcers	1467	244		1711
Shovelnose sturgeon		159		159
Paddlefish		1590		1590
Suckers	38	13		51
Gars	86	12		98
American eel				
Bowfin				
Grass carp	4976	5953		10929
Asian carp	9823	42241	0	52064
Total	95801	235297	5517	336614

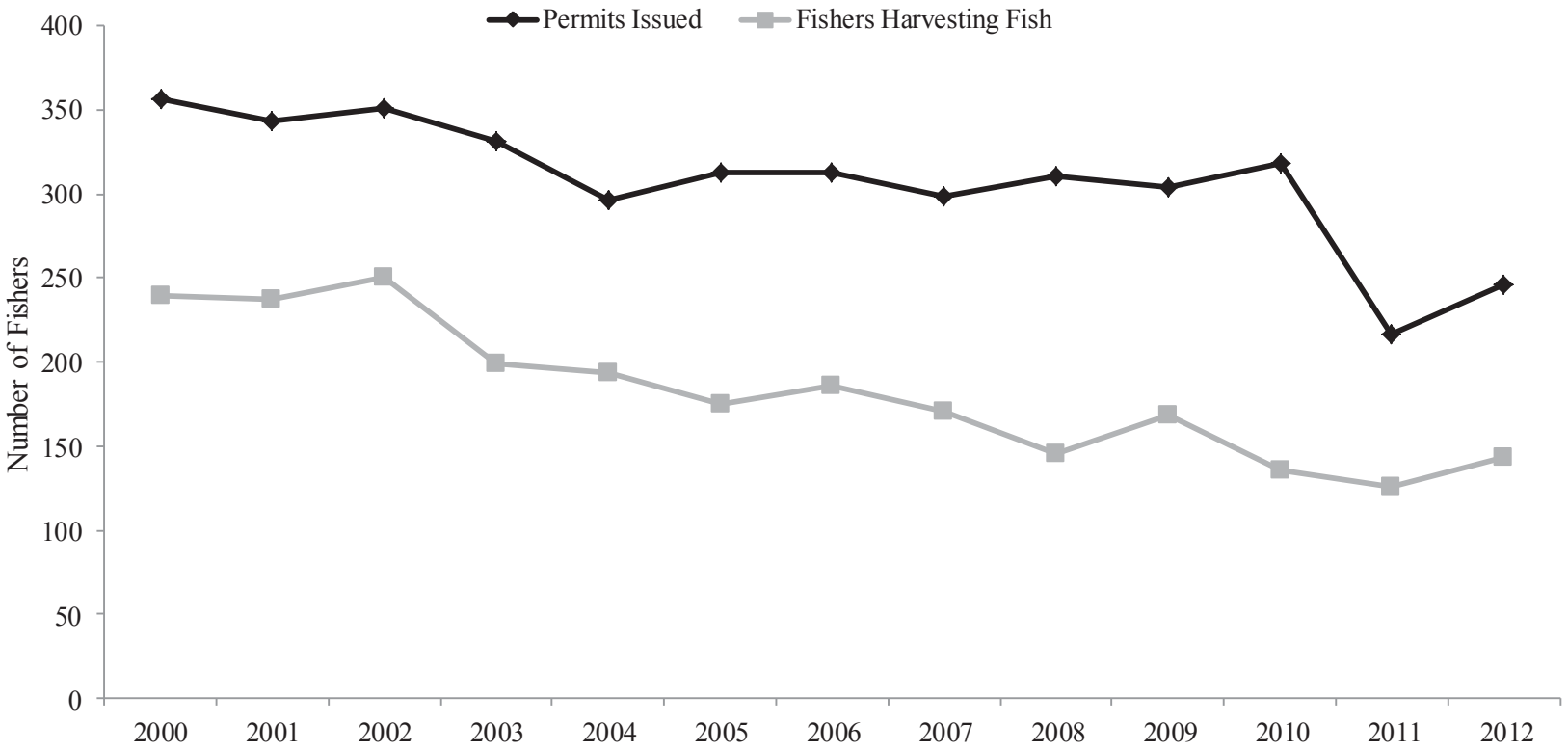


Figure 1. Total number of commercial fishing permits issued and the number of fishers harvesting fish from 2000-2012.

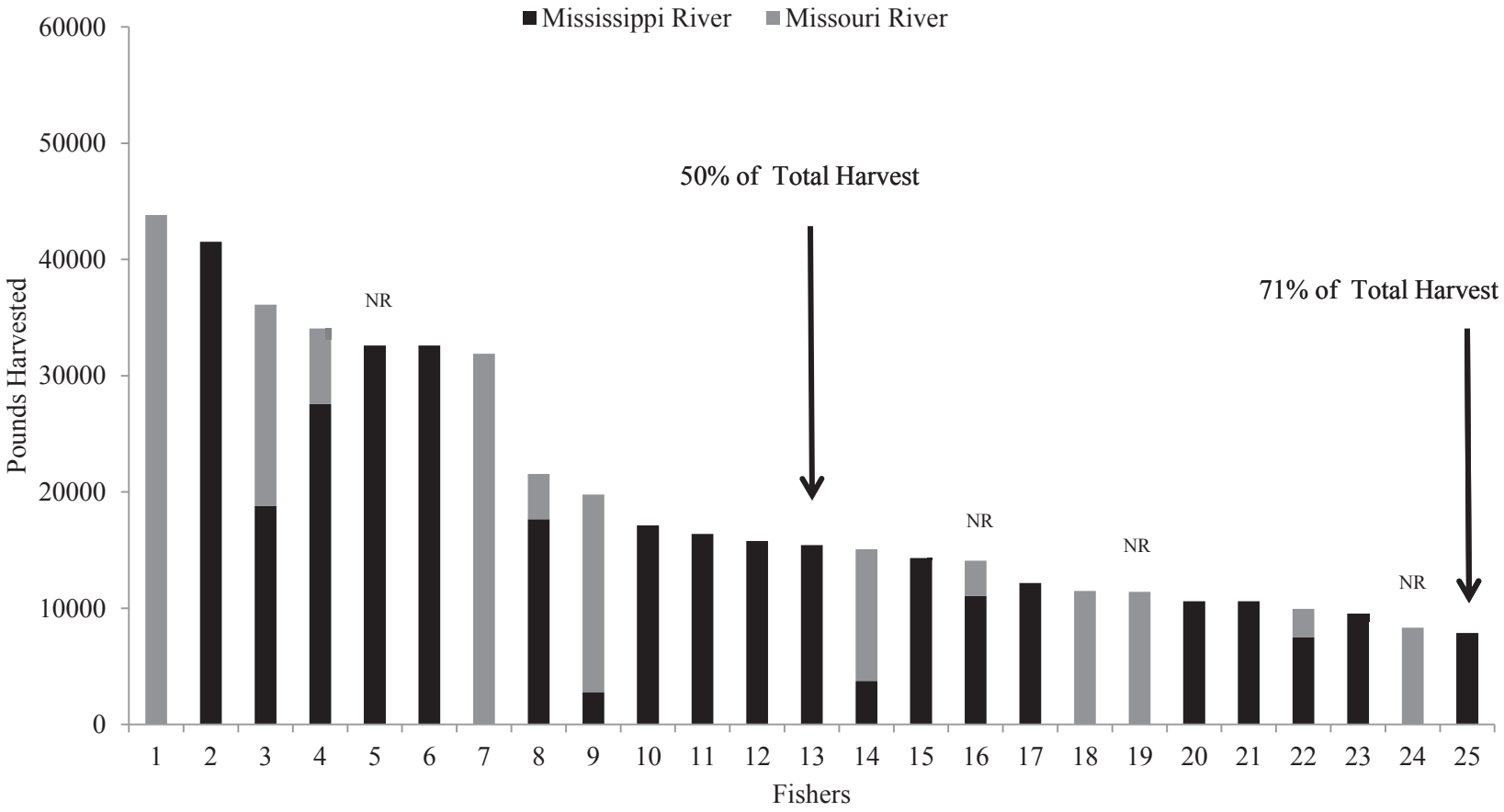


Figure 2. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2000, NR represents those commercial fishers that were non-residents.

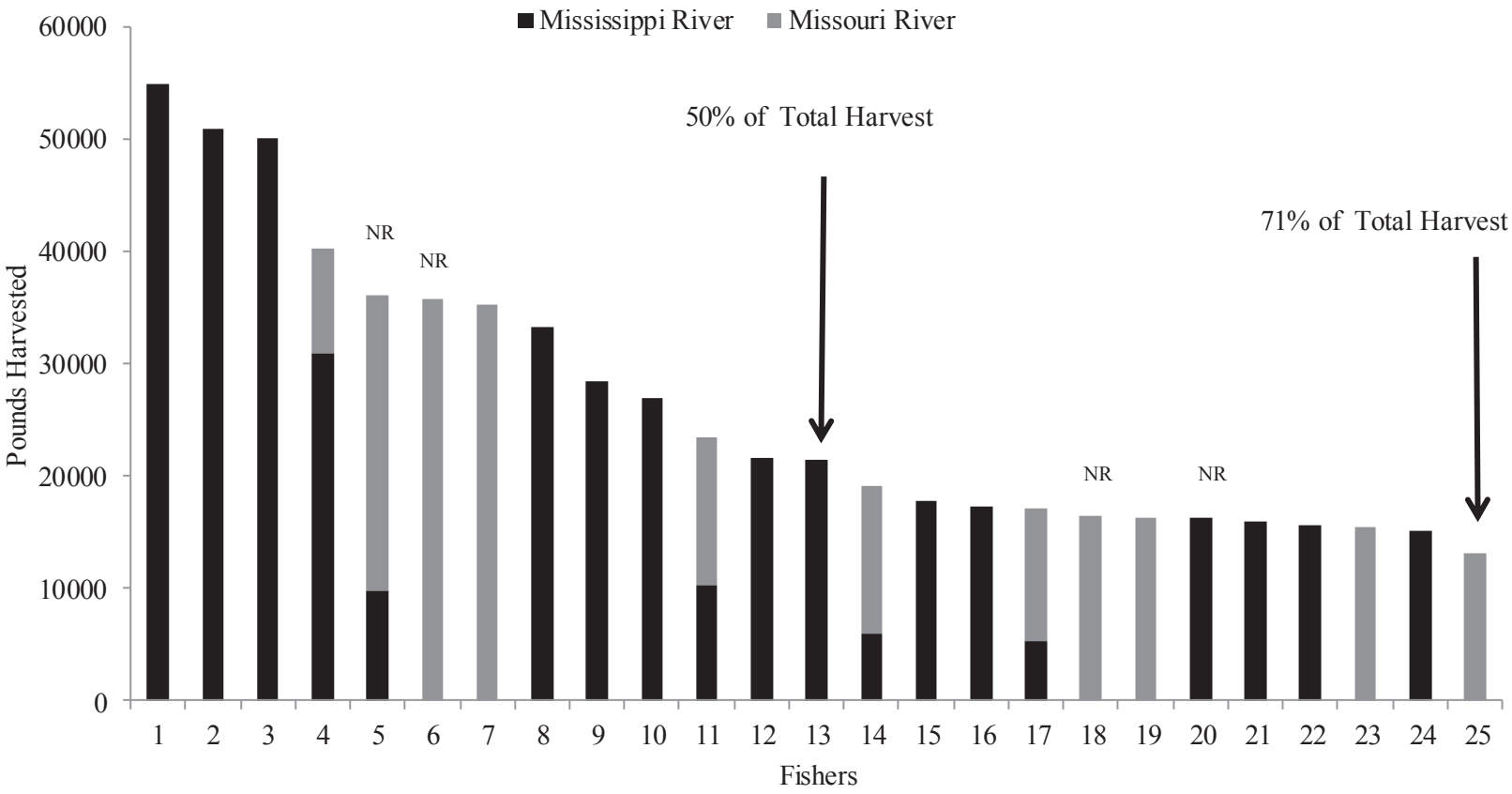


Figure 3. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2001, NR represents those commercial fishers that were non-residents.

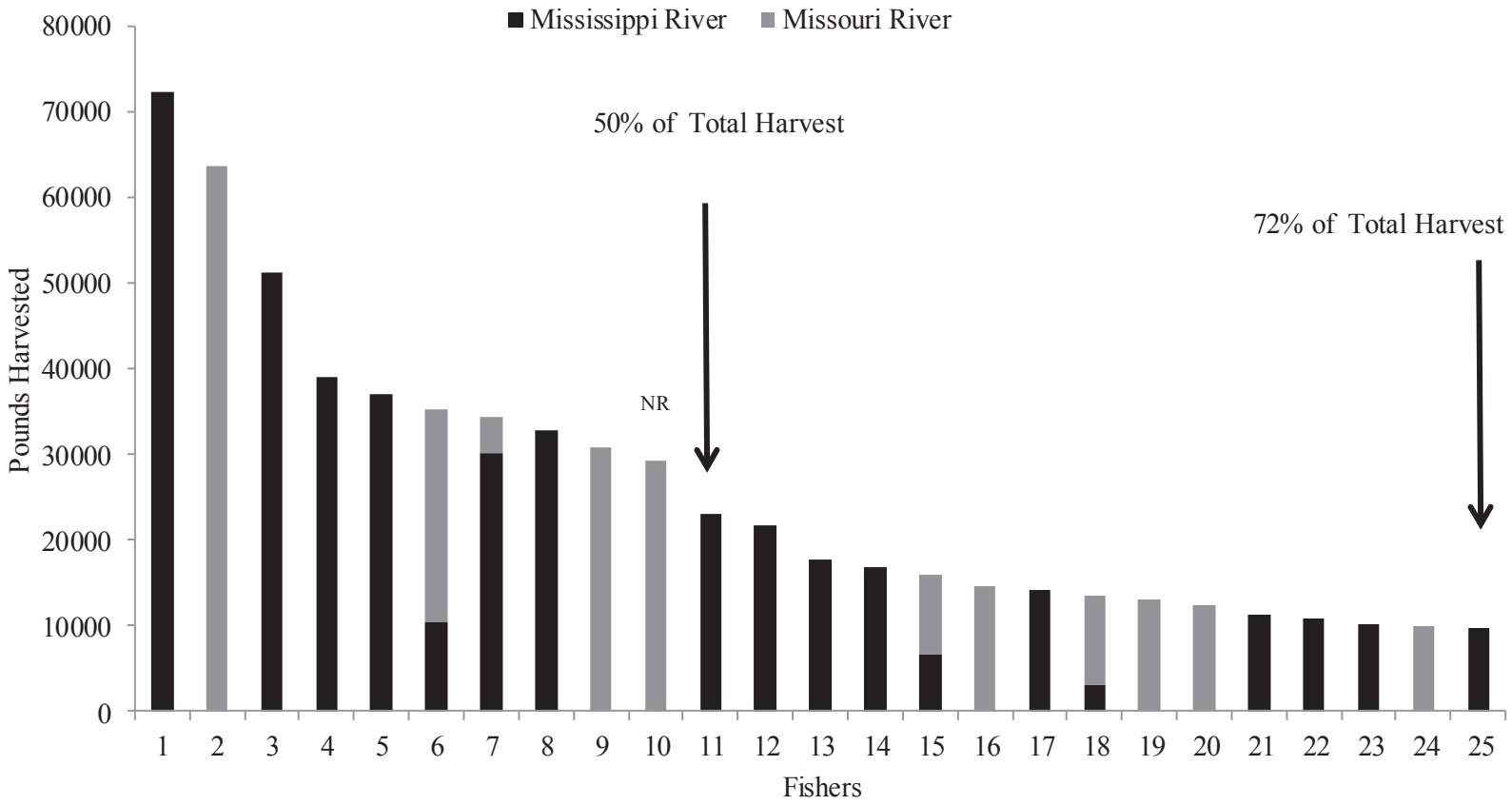


Figure 4. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2002, NR represents those commercial fishers that were non-residents.

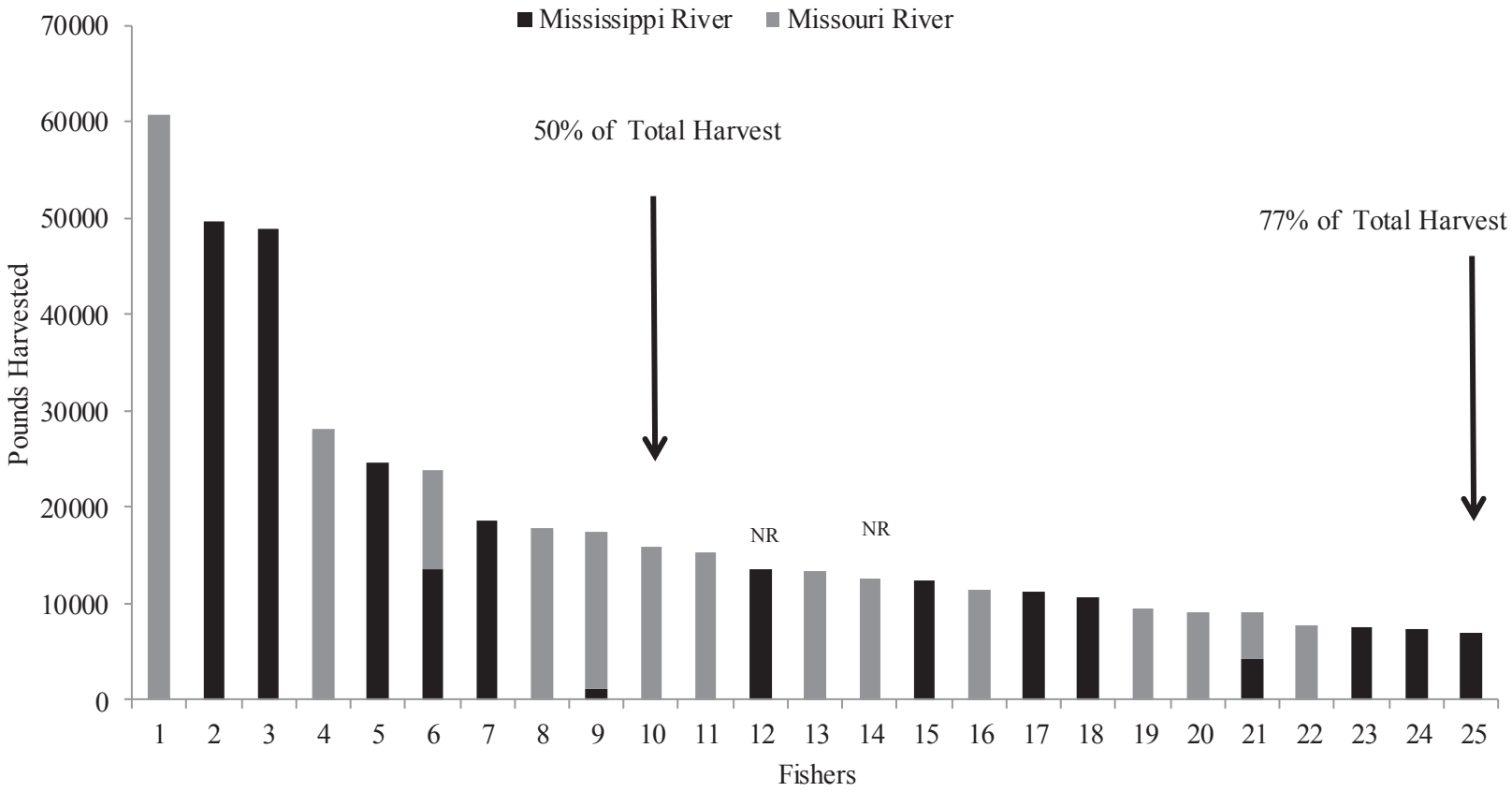


Figure 5. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2003, NR represents those commercial fishers that were non-residents.

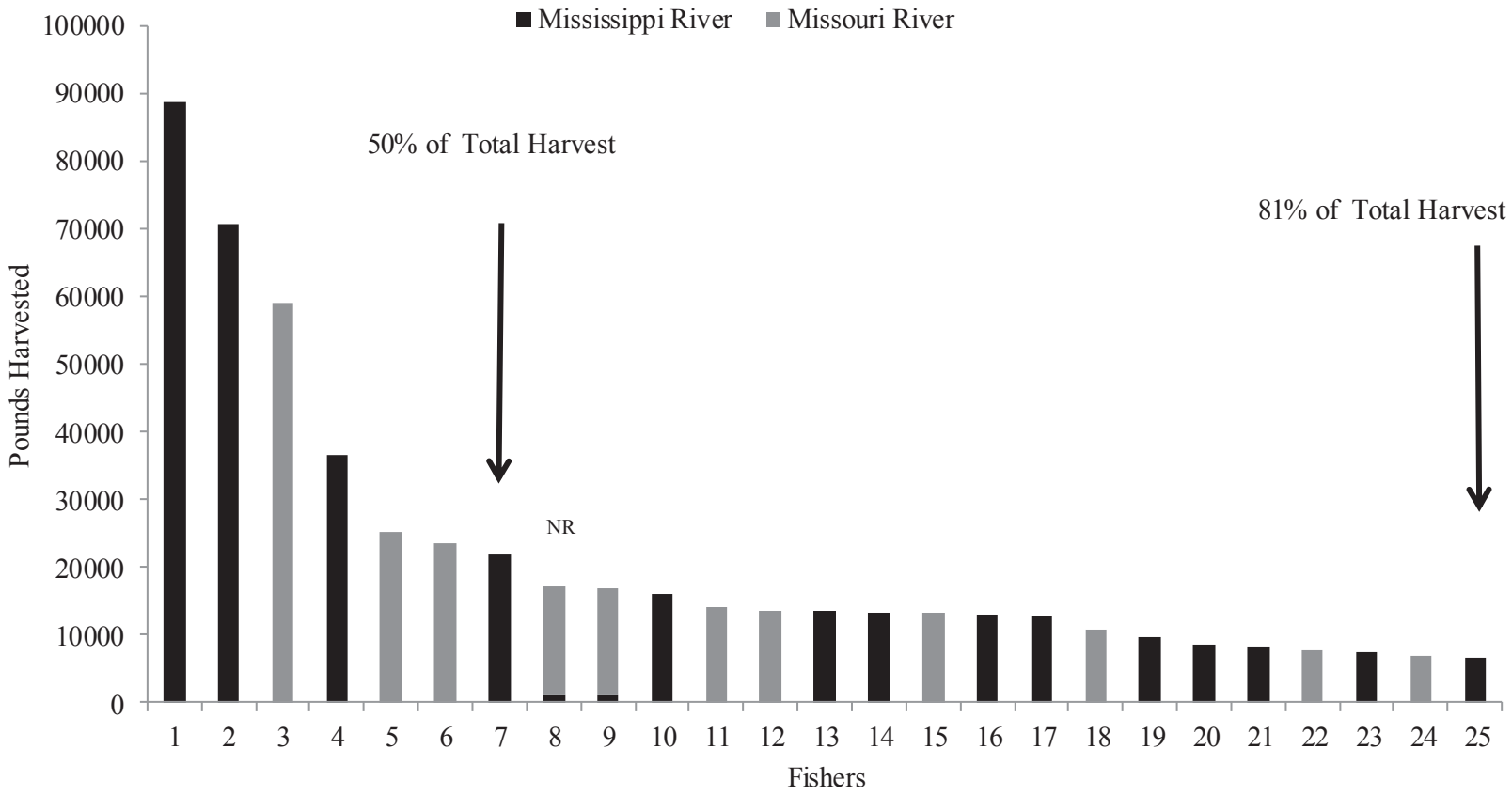


Figure 6. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2004, NR represents those commercial fishers that were non-residents.

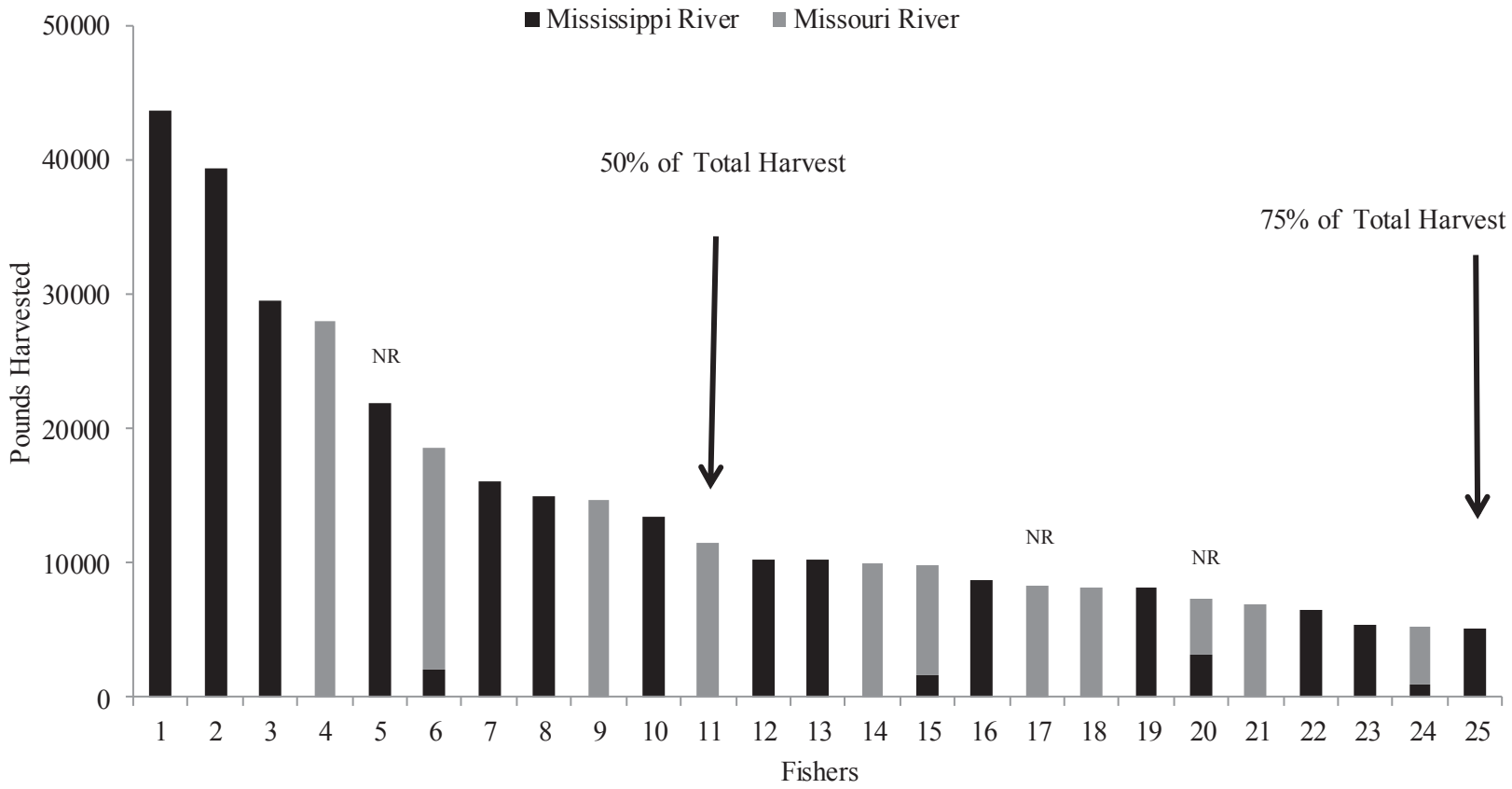


Figure 7. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2005, NR represents those commercial fishers that were non-residents.

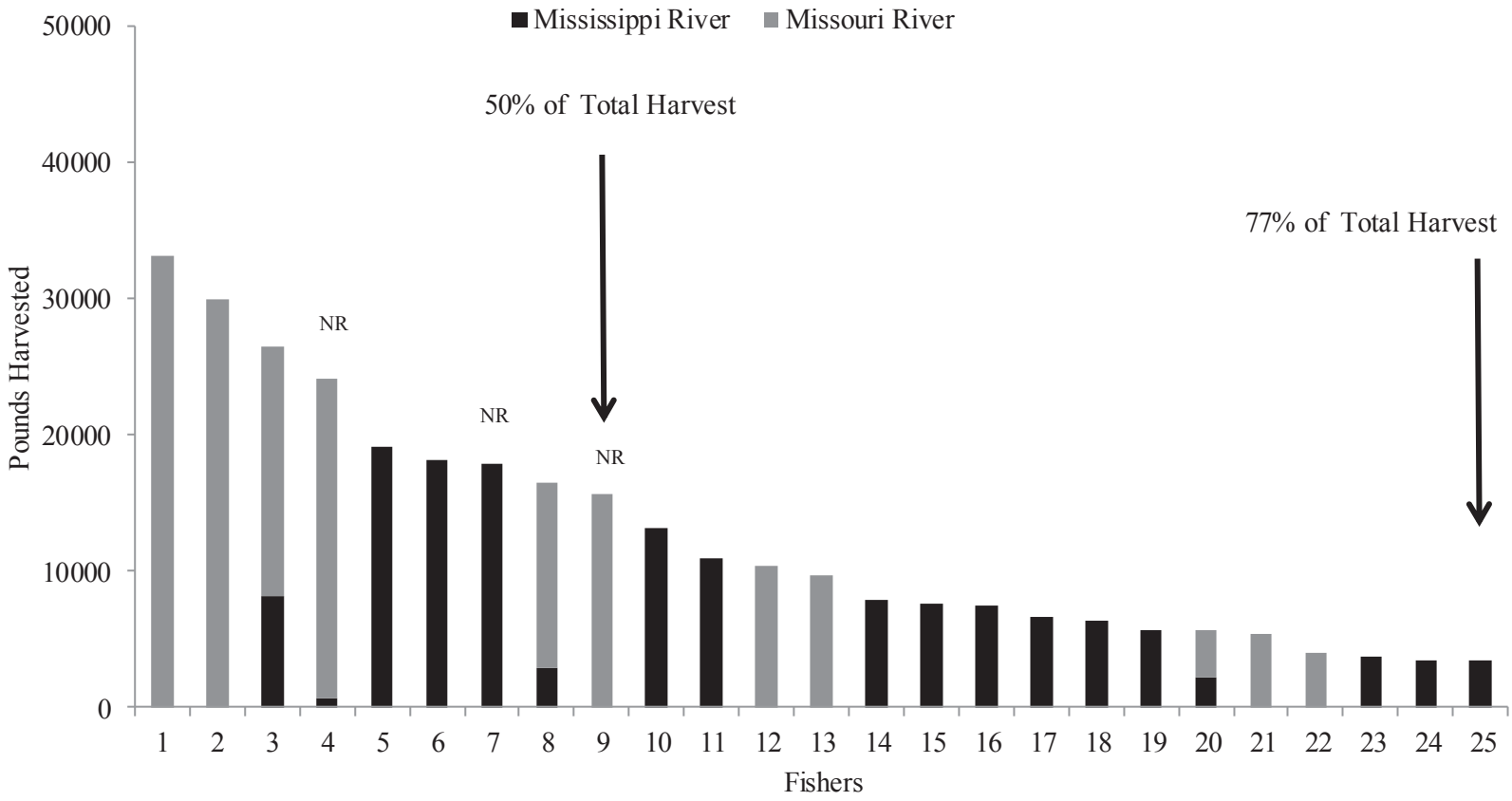


Figure 8. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2006, NR represents those commercial fishers that were non-residents.

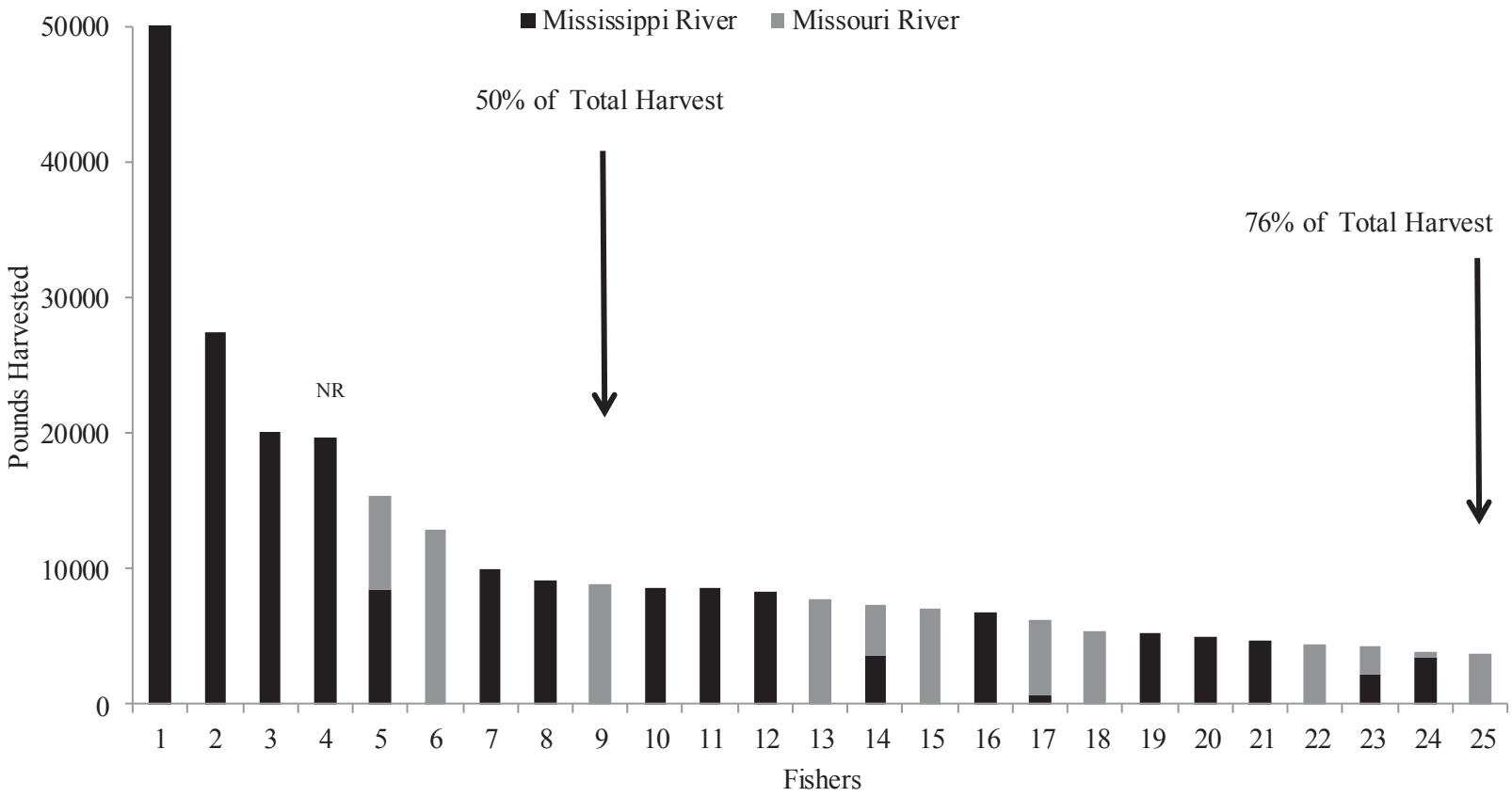


Figure 9. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2007, NR represents those commercial fishers that were non-residents.

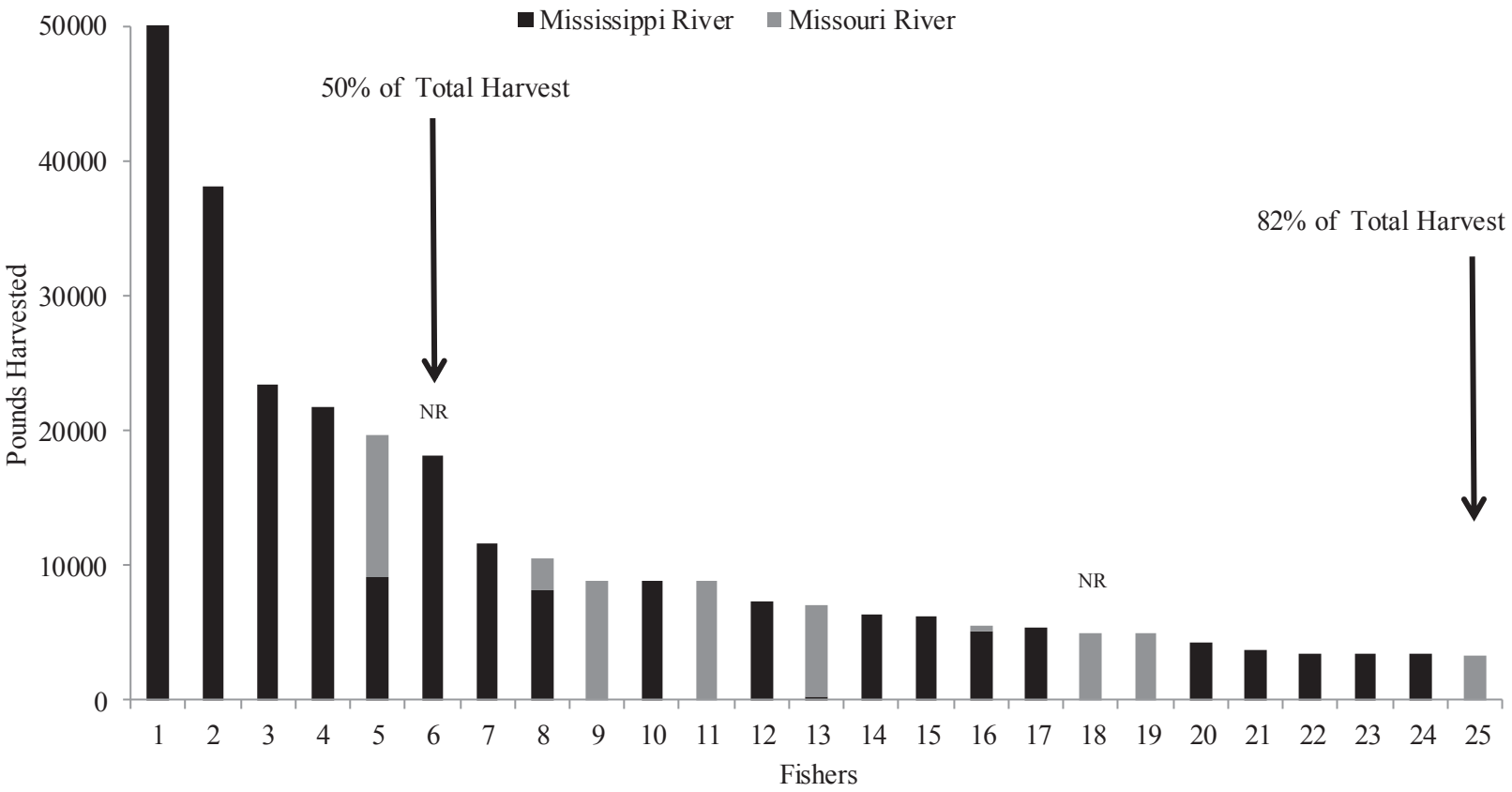


Figure 10. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2008, NR represents those commercial fishers that were non-residents.

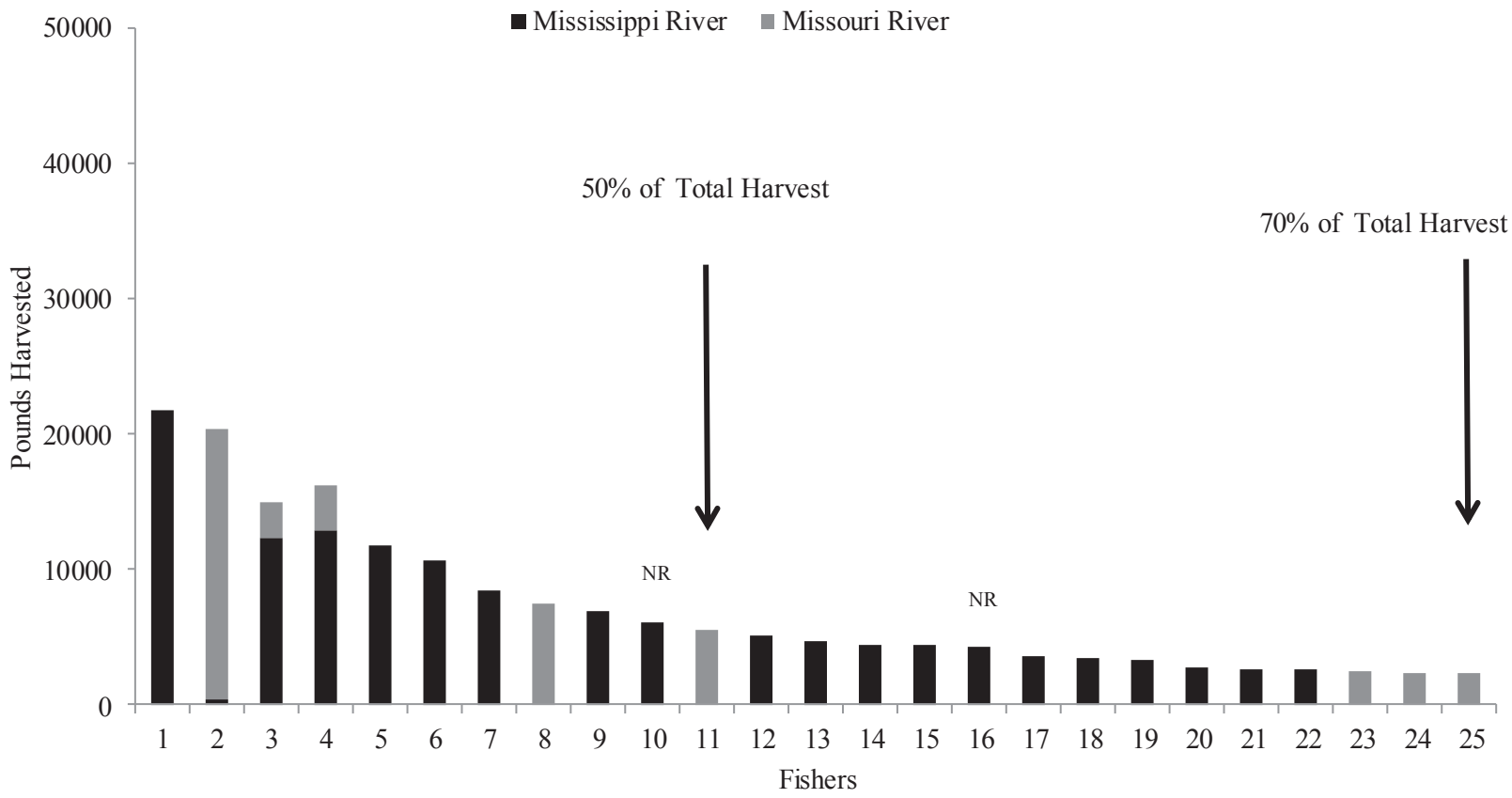


Figure 11. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2009, NR represents those commercial fishers that were non-residents.

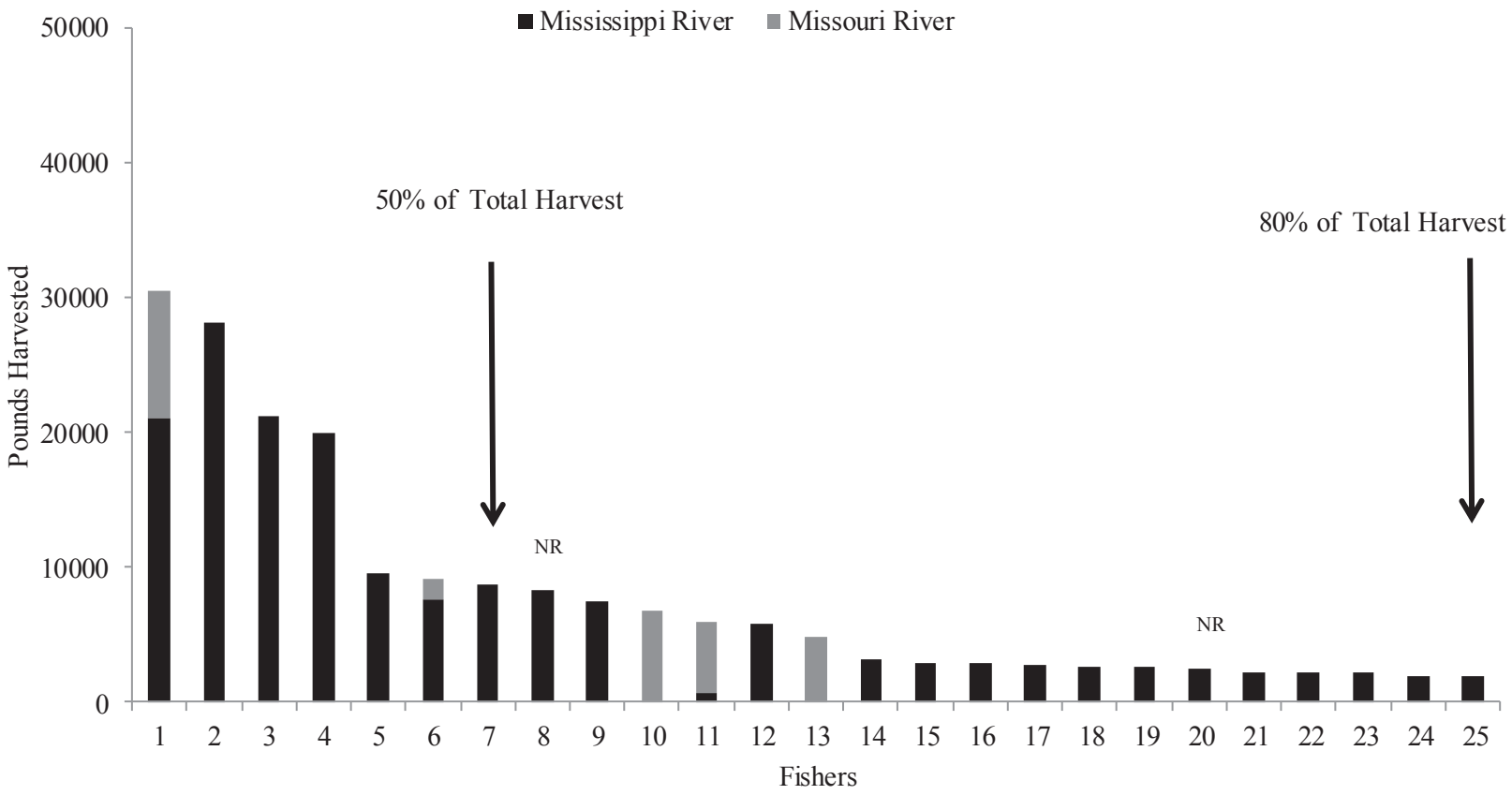


Figure 12. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2010, NR represents those commercial fishers that were non-residents.

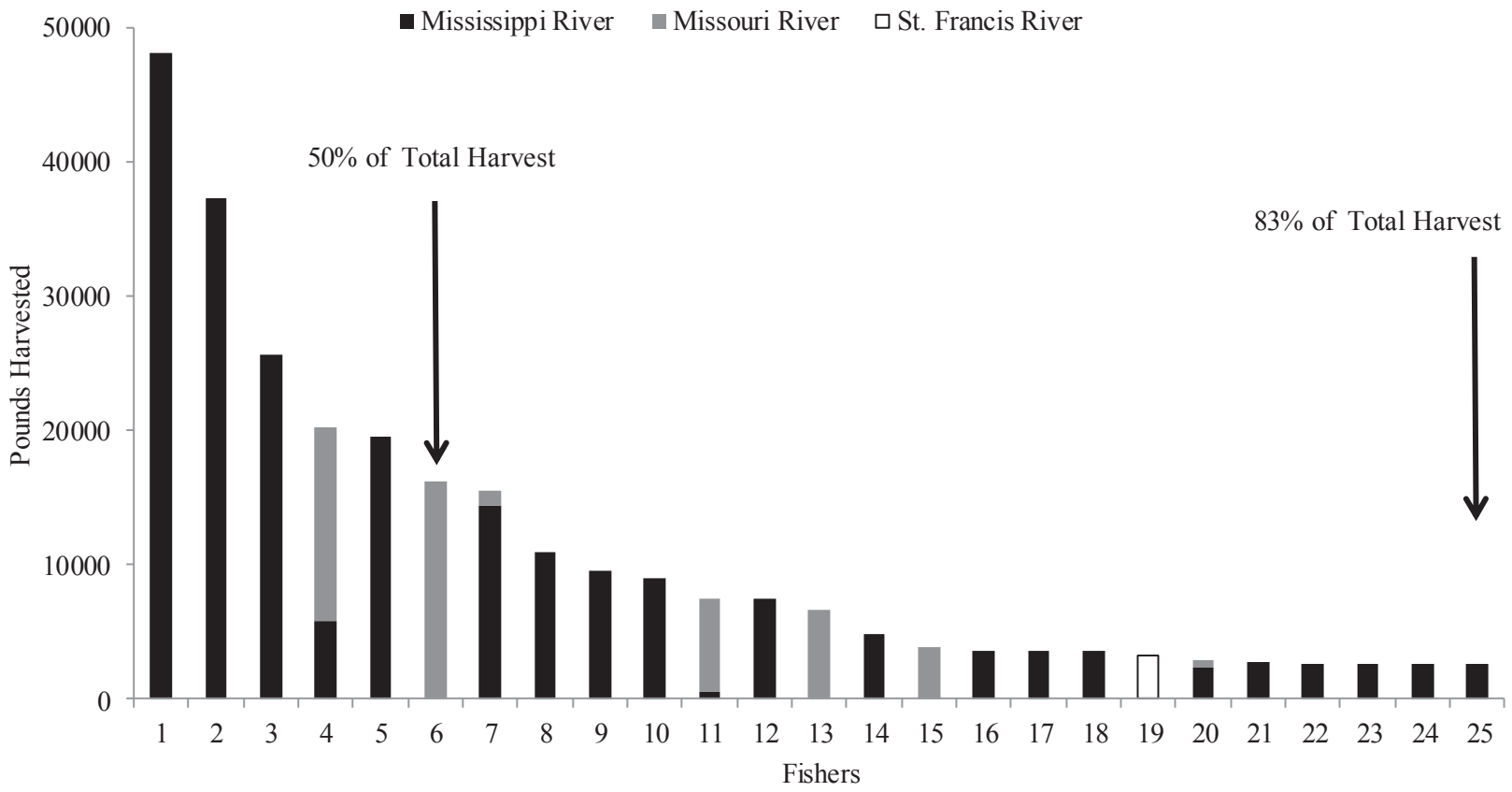


Figure 13. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2011, NR represents those commercial fishers that were non-residents.

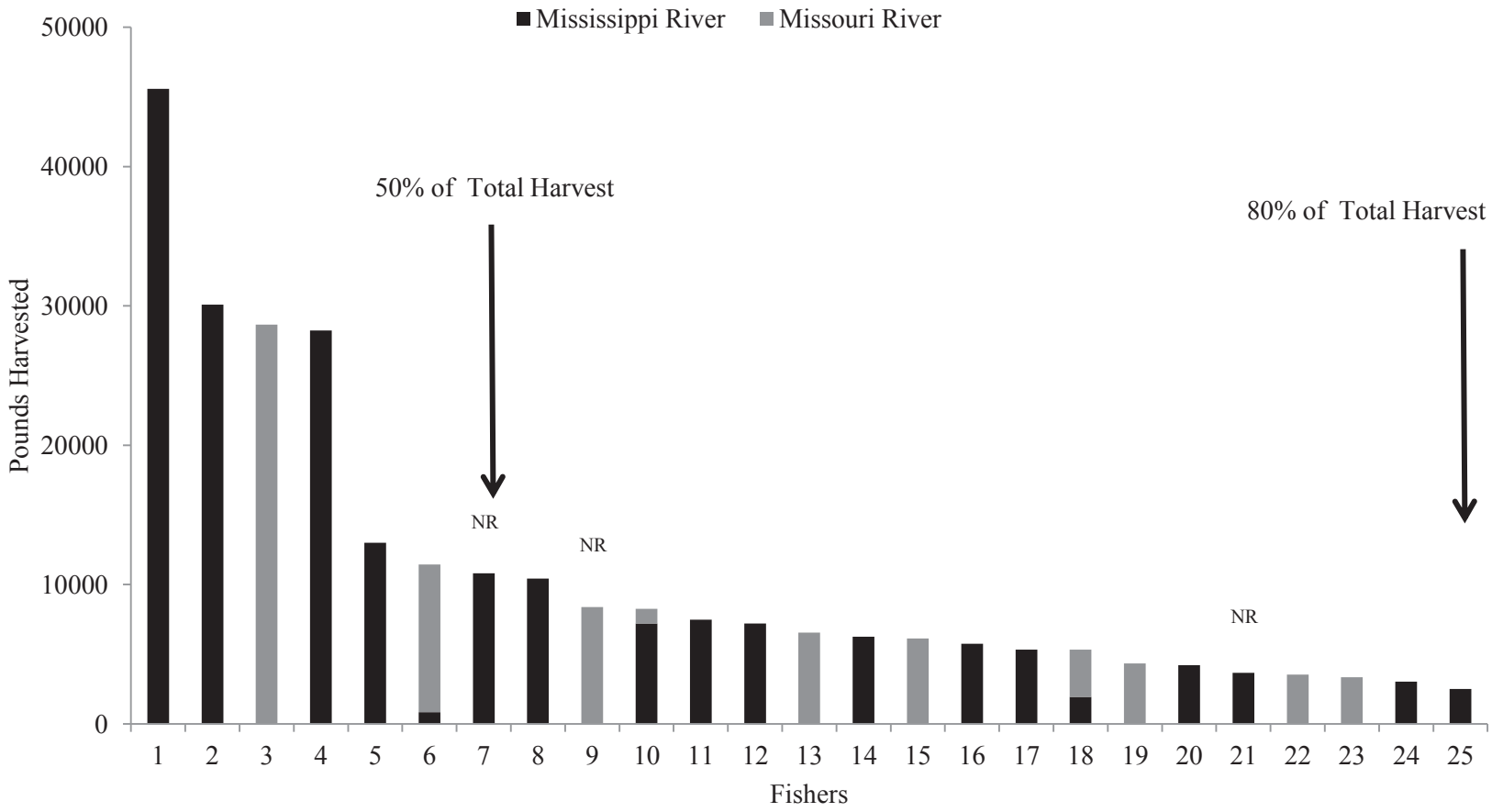


Figure 14. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2012, NR represents those commercial fishers that were non-residents.

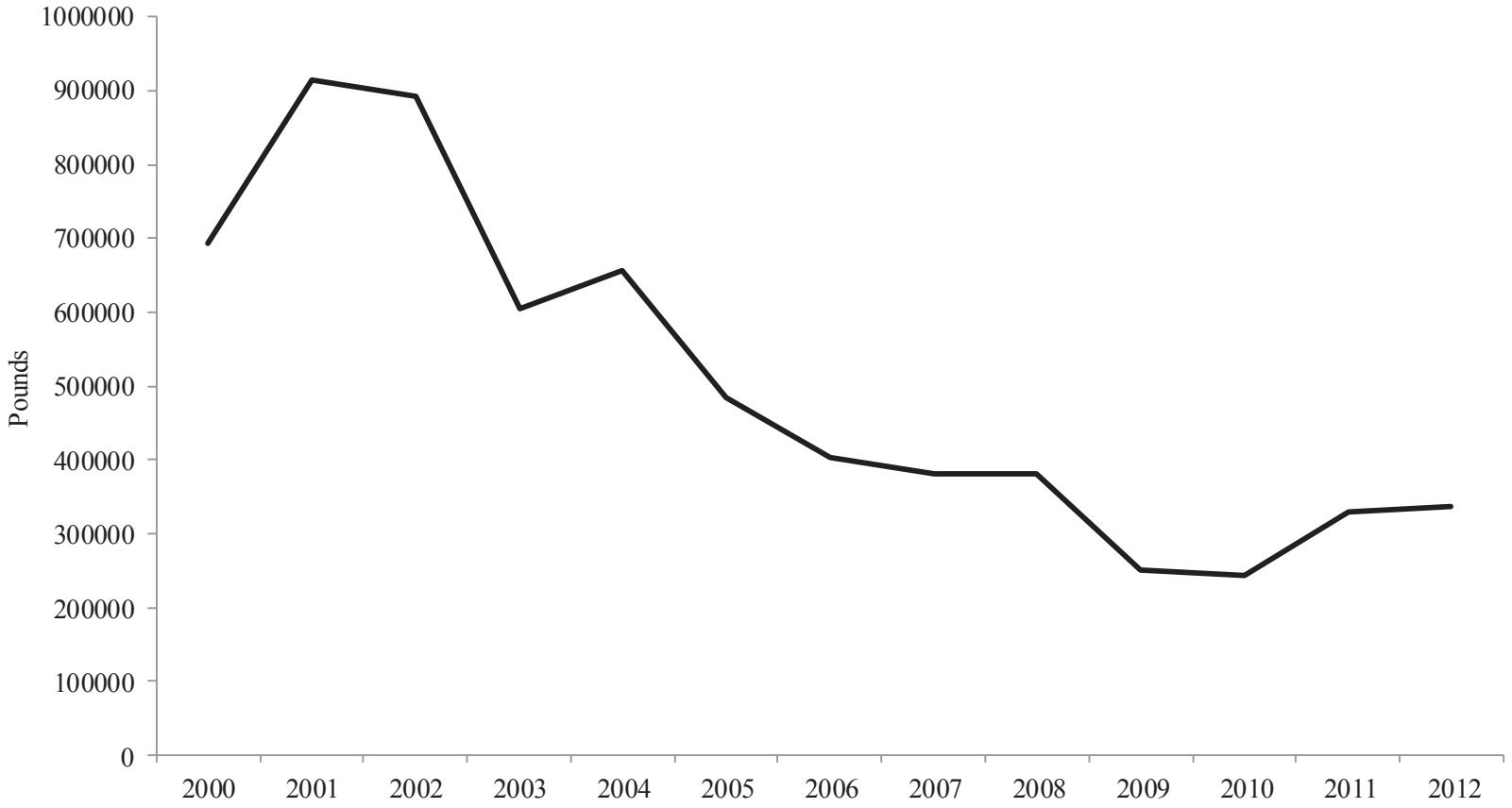


Figure 15. Total pounds harvested by commercial fishers for the three commercial waters in Missouri from 2000-2012.

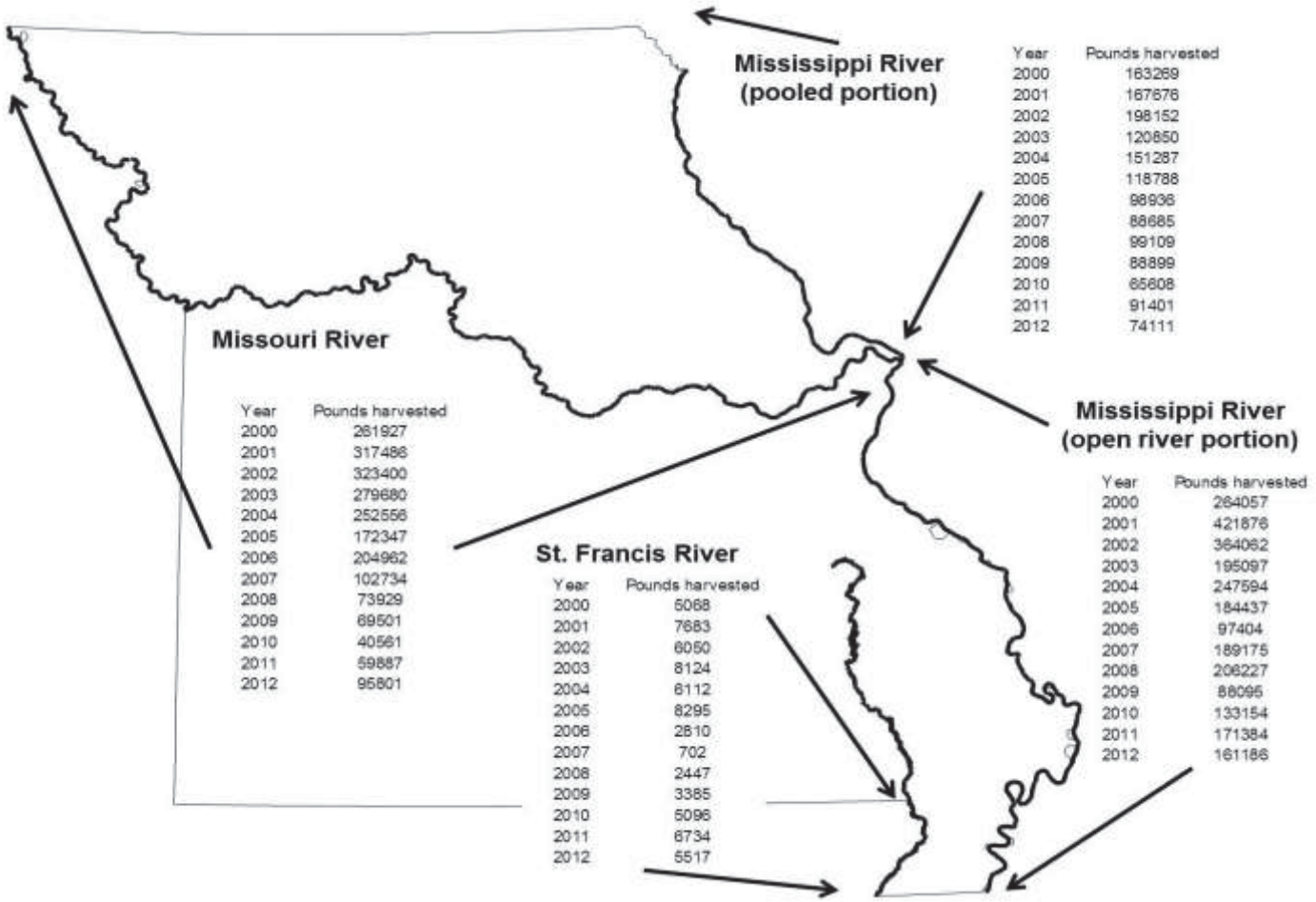


Figure 16. Harvest of commercial fishes in pounds by portion of river fished and year. For the harvest that occurred in the Mississippi River, we broke harvest down into two categories the open river portion (below Lock and Dam 26) and the pooled portion (above Lock and Dam 26).

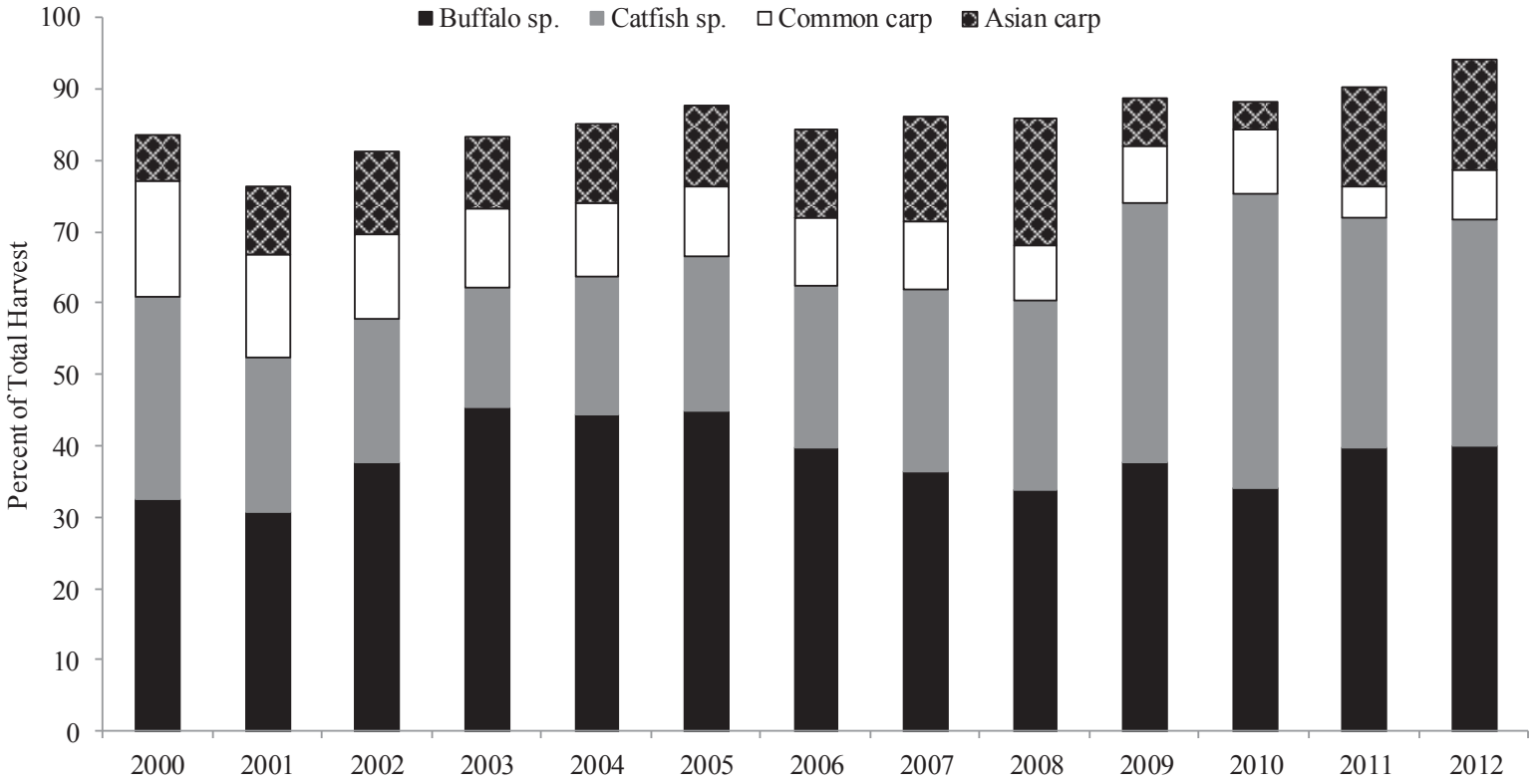


Figure 17. Percent of total harvest for the four groups of fish that consistently account for the majority of the pounds harvested.

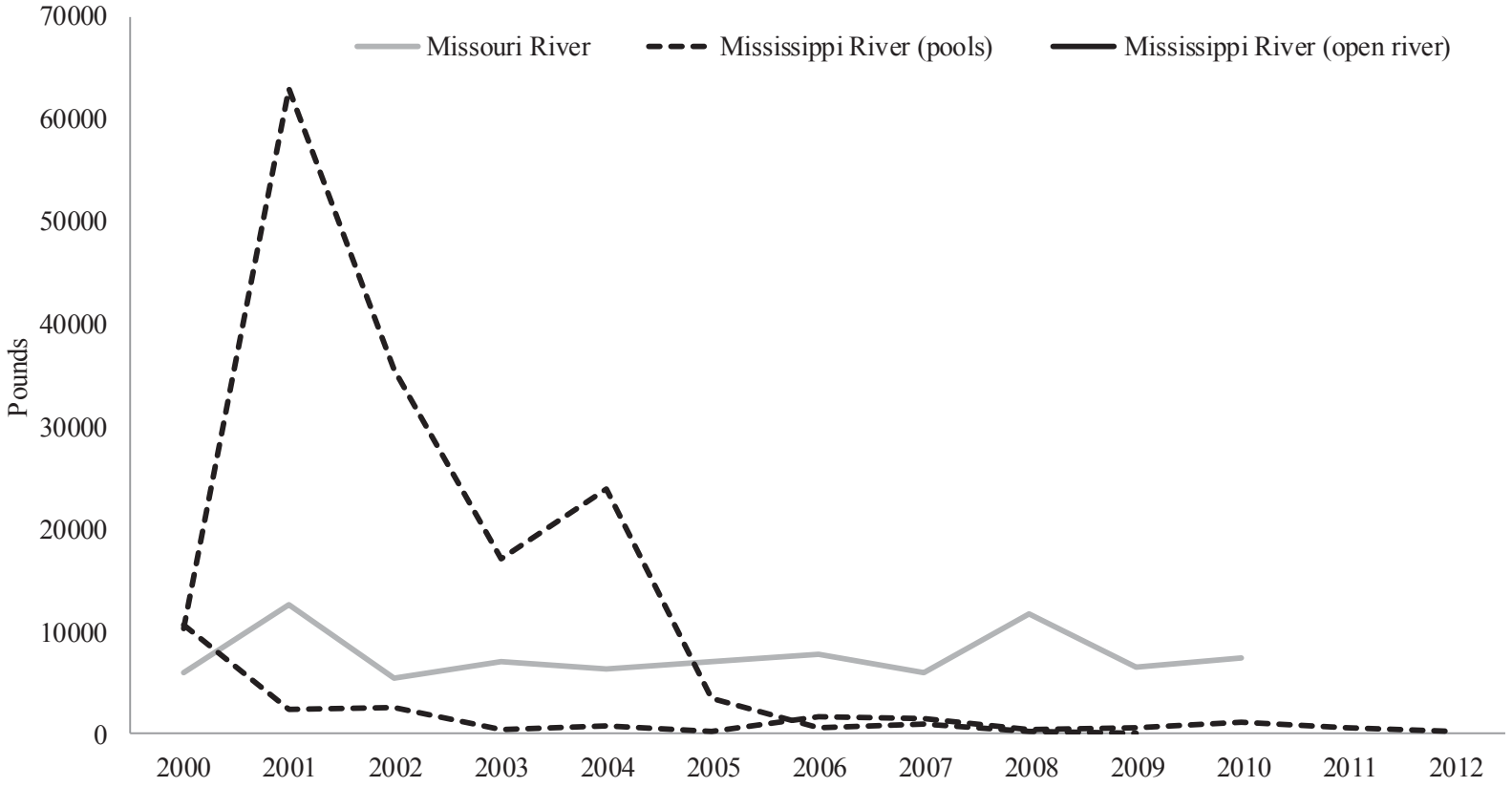


Figure 18. Pounds of sturgeon harvested from Missouri's commercial waters from 2000-2012. Note harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

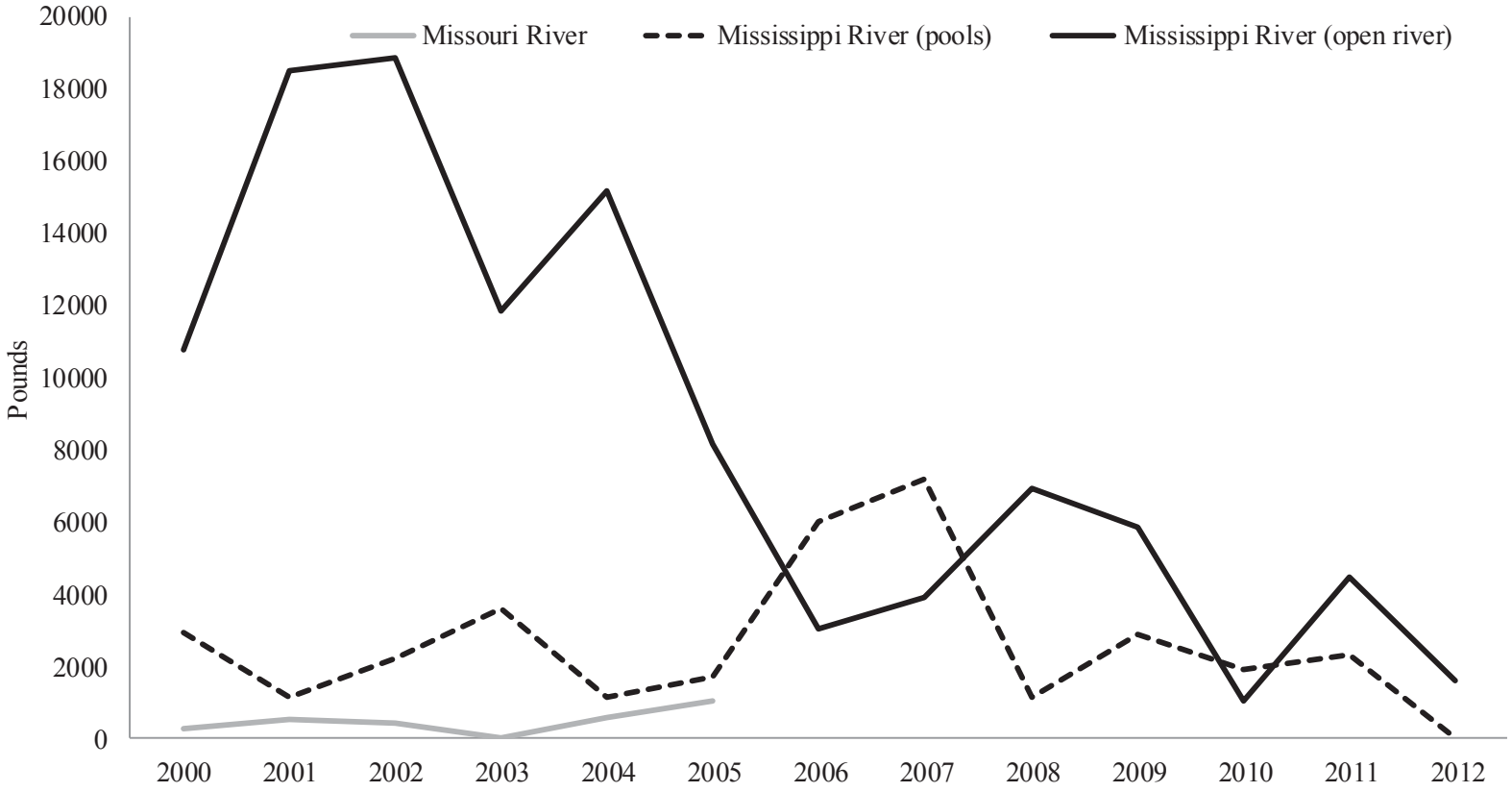


Figure 19. Pounds of paddlefish harvested from Missouri's commercial waters from 2000-2012. Note harvest of paddlefish was closed in 1990 on the Missouri River.

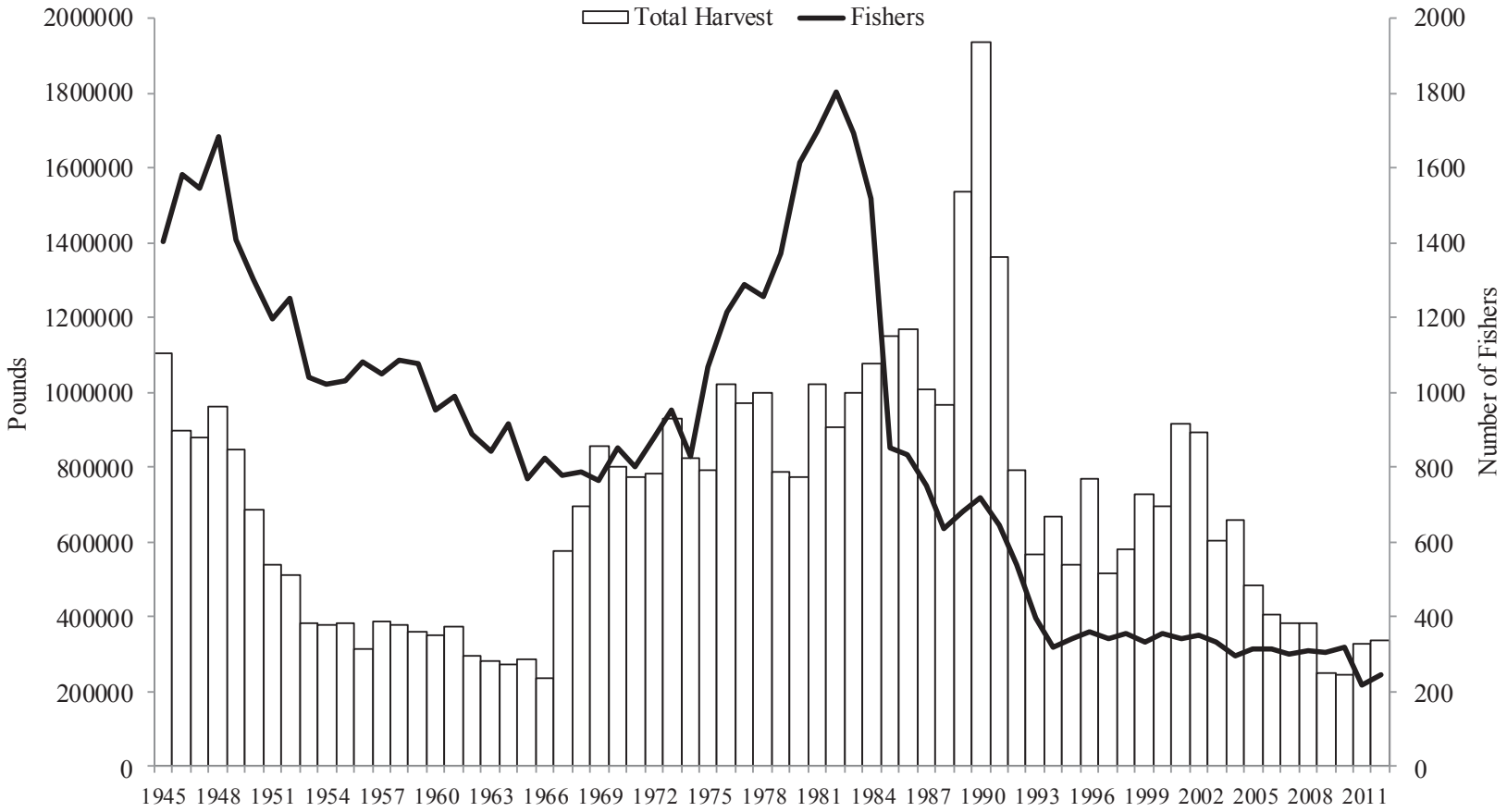


Figure 20. Number of commercial fishers and their harvest from the Missouri, Mississippi, and St. Francis rivers combined from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

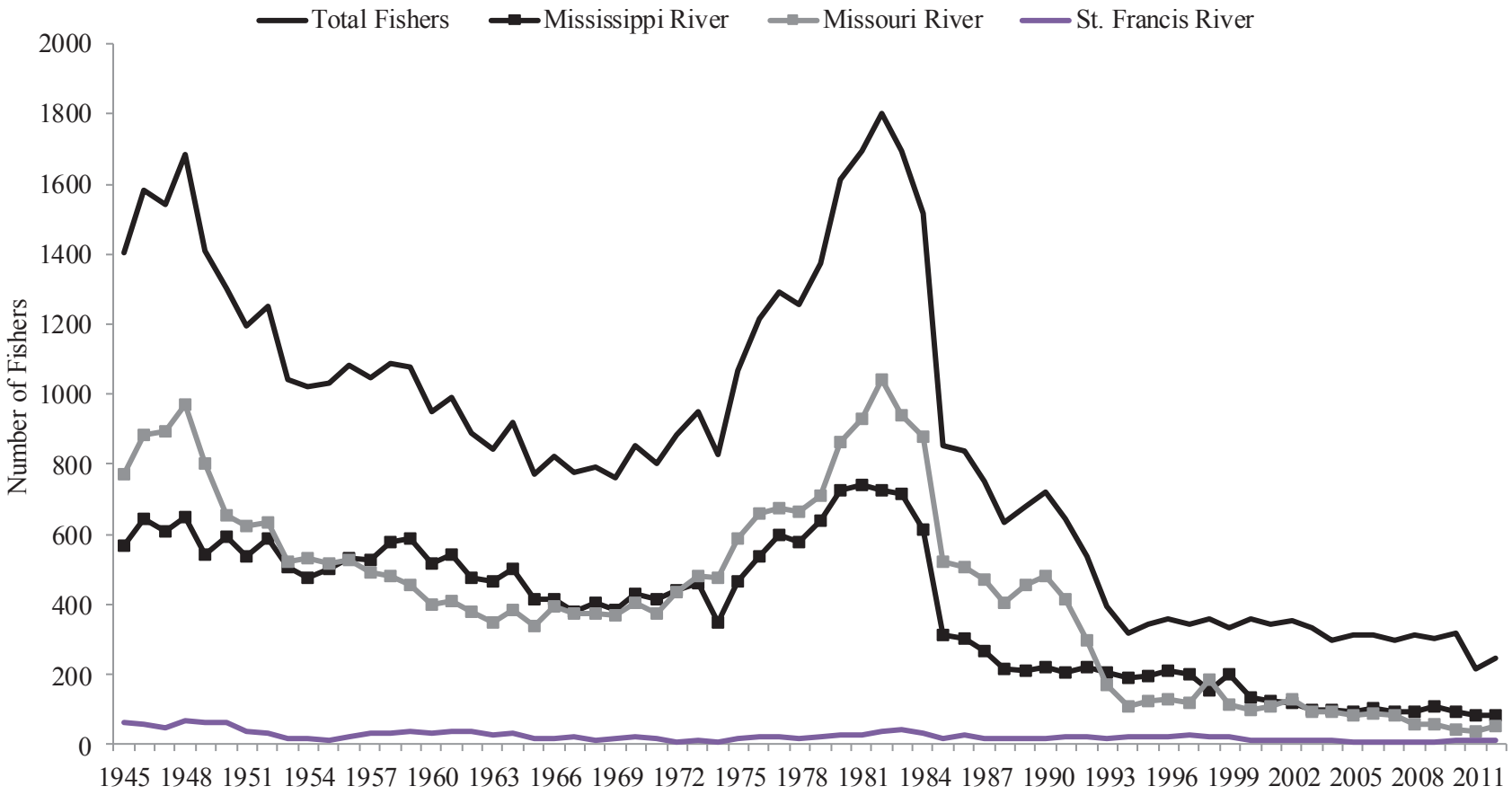


Figure 21. Number of total commercial fishers and the number of fishers from the Missouri, Mississippi, and St. Francis rivers from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

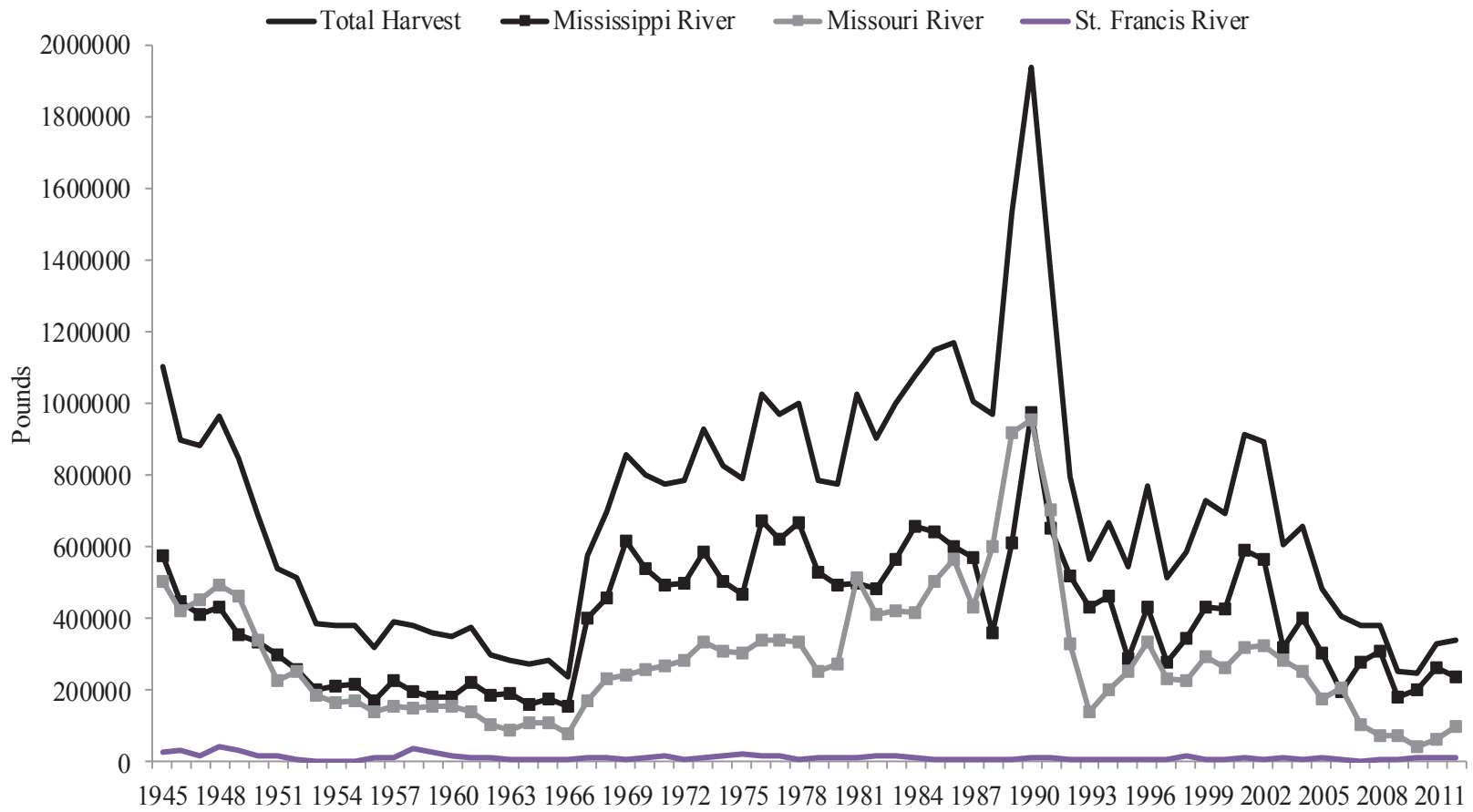


Figure 22. Commercial harvest, combined and individual, from the Missouri, Mississippi, and St. Francis rivers from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

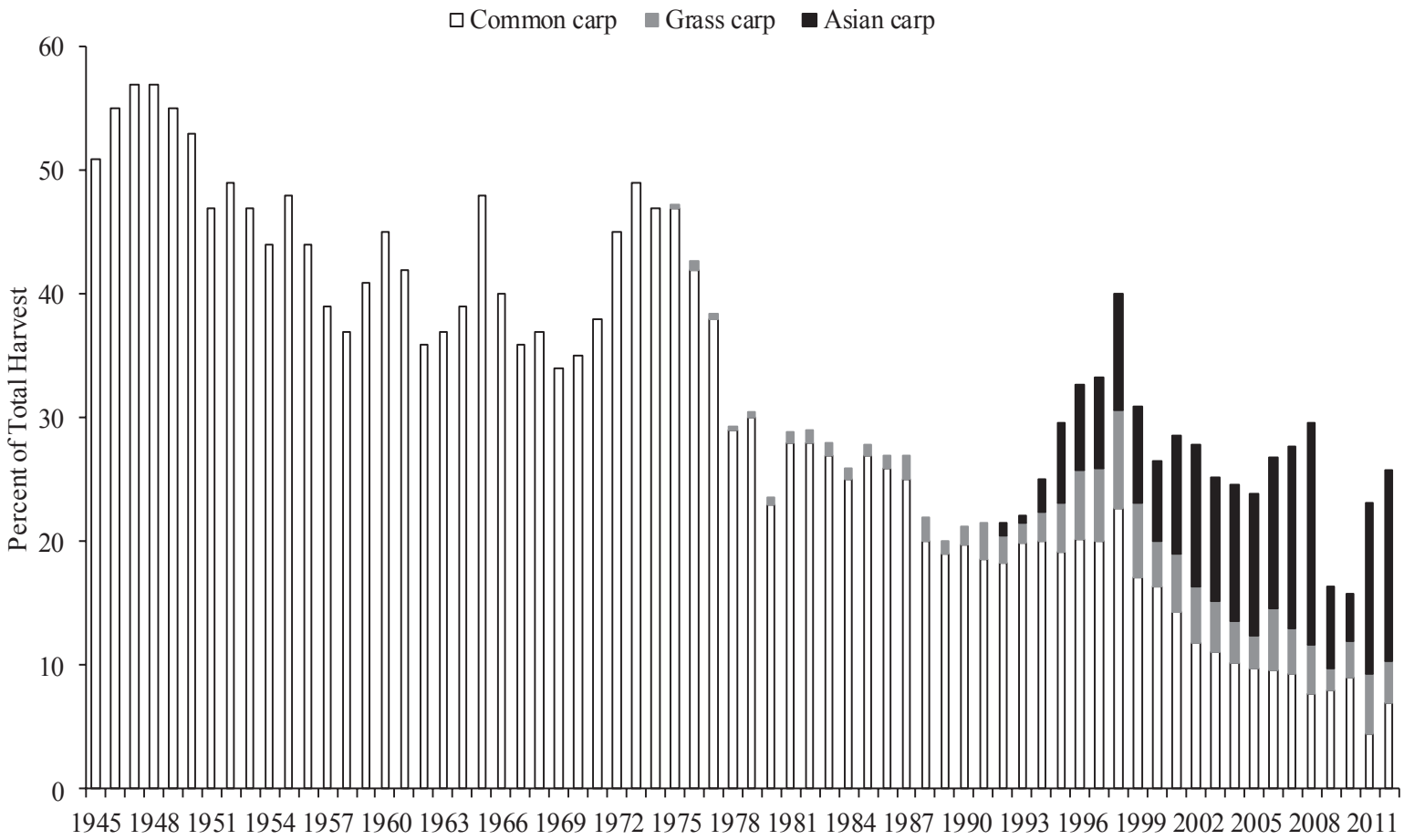


Figure 23. Percent of total harvested pounds of three groups of invasive carp harvested from Missouri's commercial waters from 1945 to 2012.

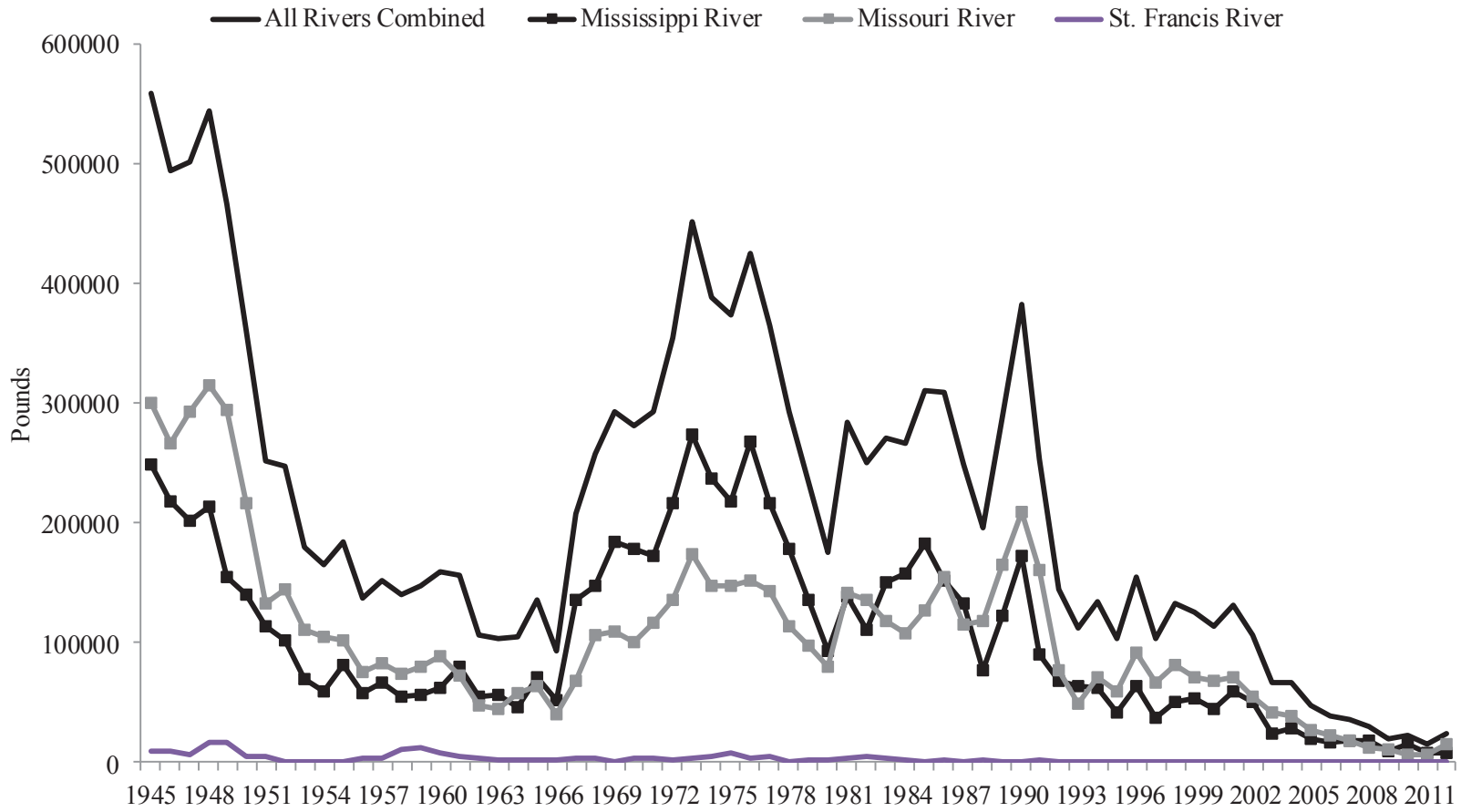


Figure 24. Pounds of common carp harvested from Missouri's commercial waters from 1945-2012.

Figure 25. Pounds of Asian carp harvested from Missouri's commercial waters from 1945-2012.

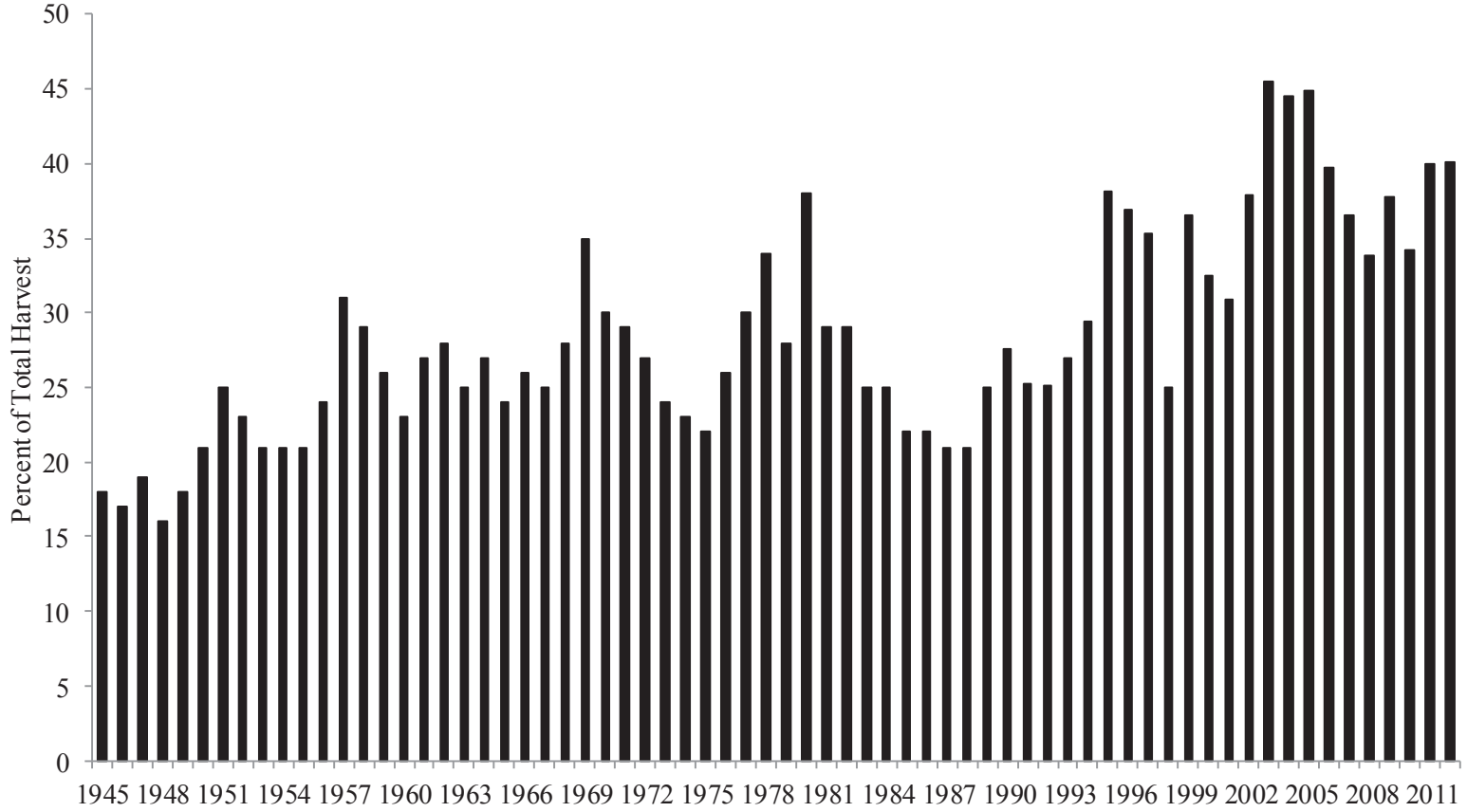


Figure 26. Percent of total harvested pounds of buffalofishes harvested from Missouri's commercial waters from 1945 to 2012.

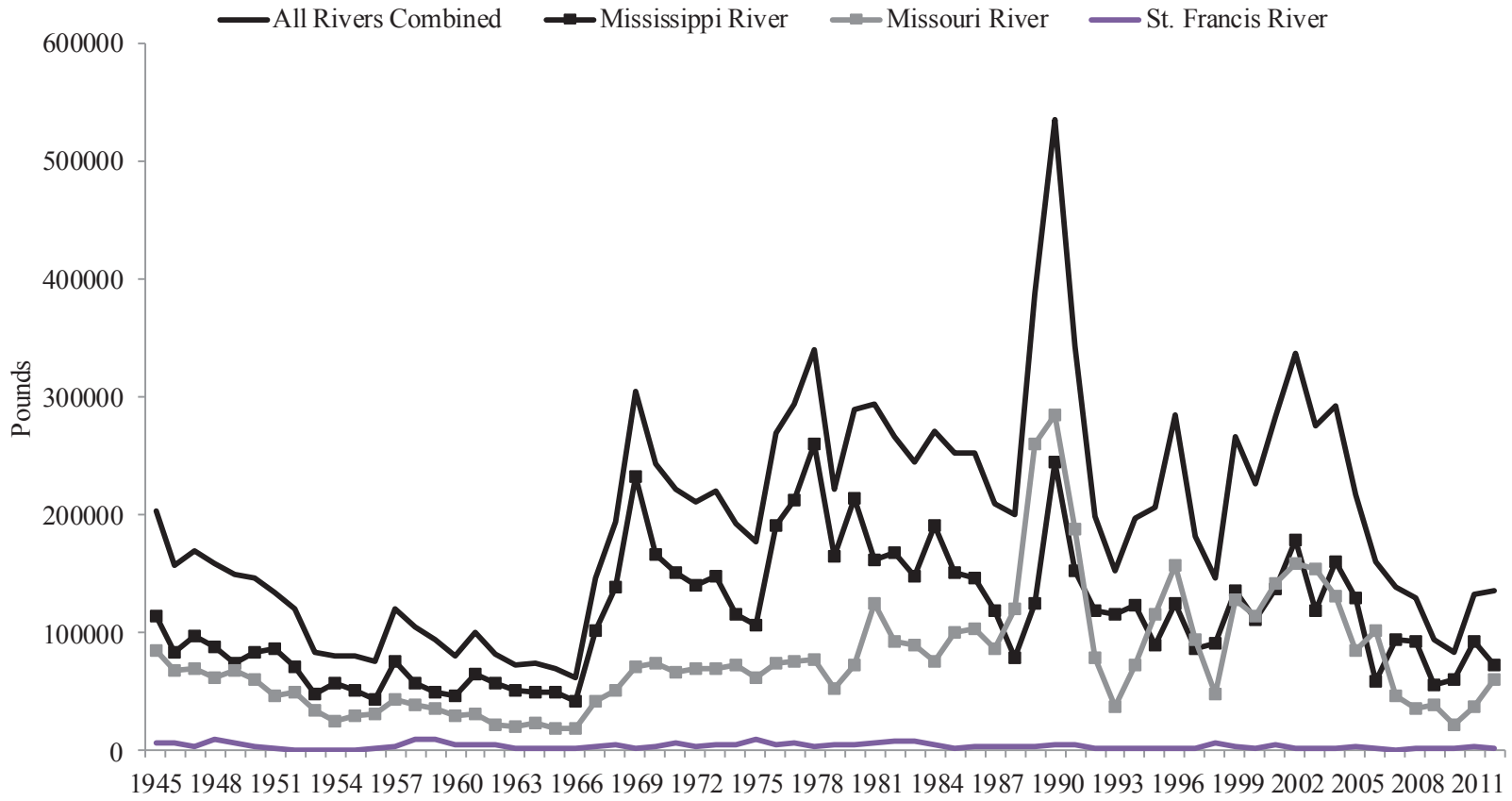


Figure 27. Pounds of buffalofishes harvested from Missouri's commercial waters from 1945-2012.

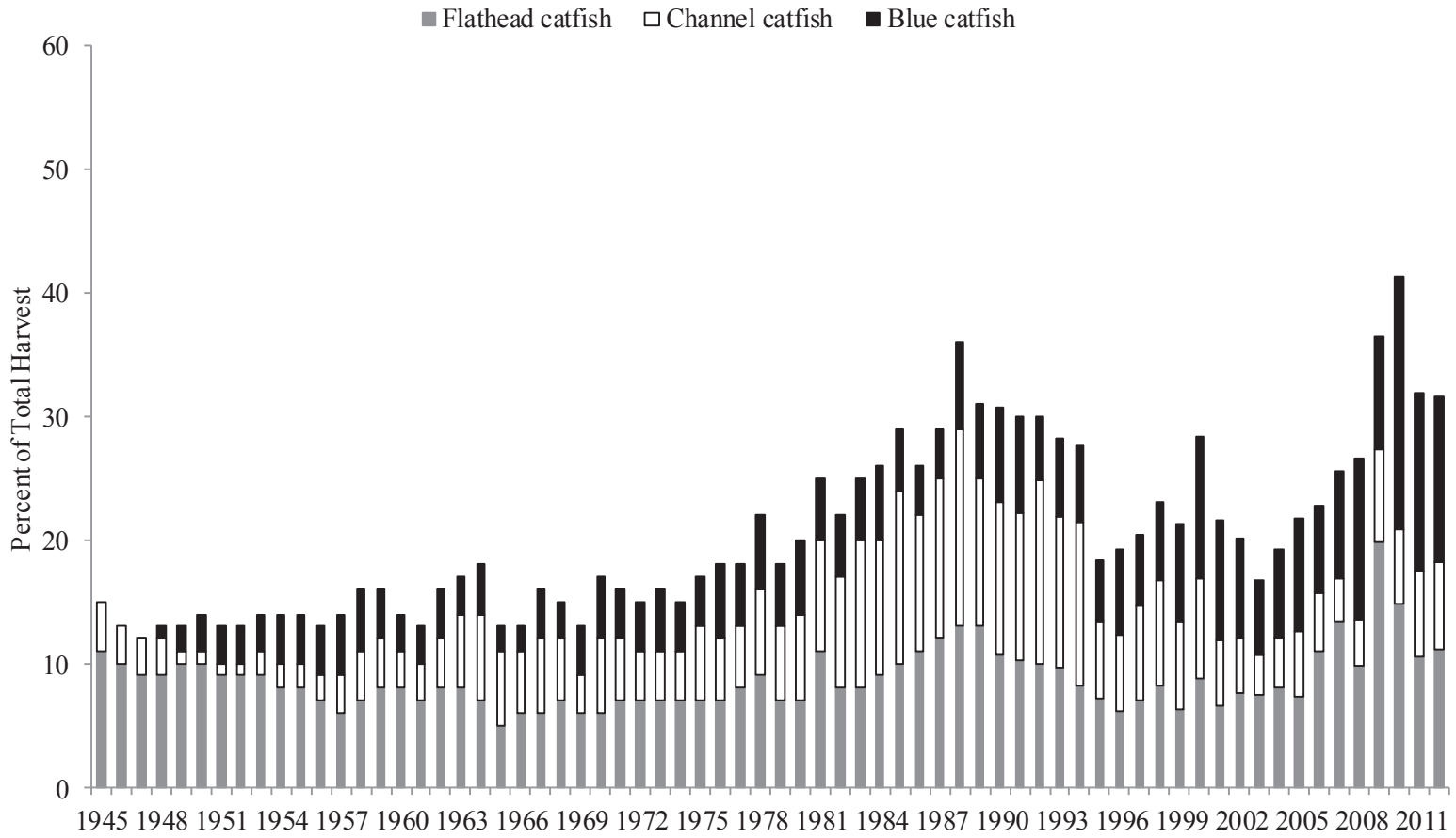


Figure 28. Percent of total harvested pounds of three catfish species harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of catfish was closed on the Missouri River in 1992.

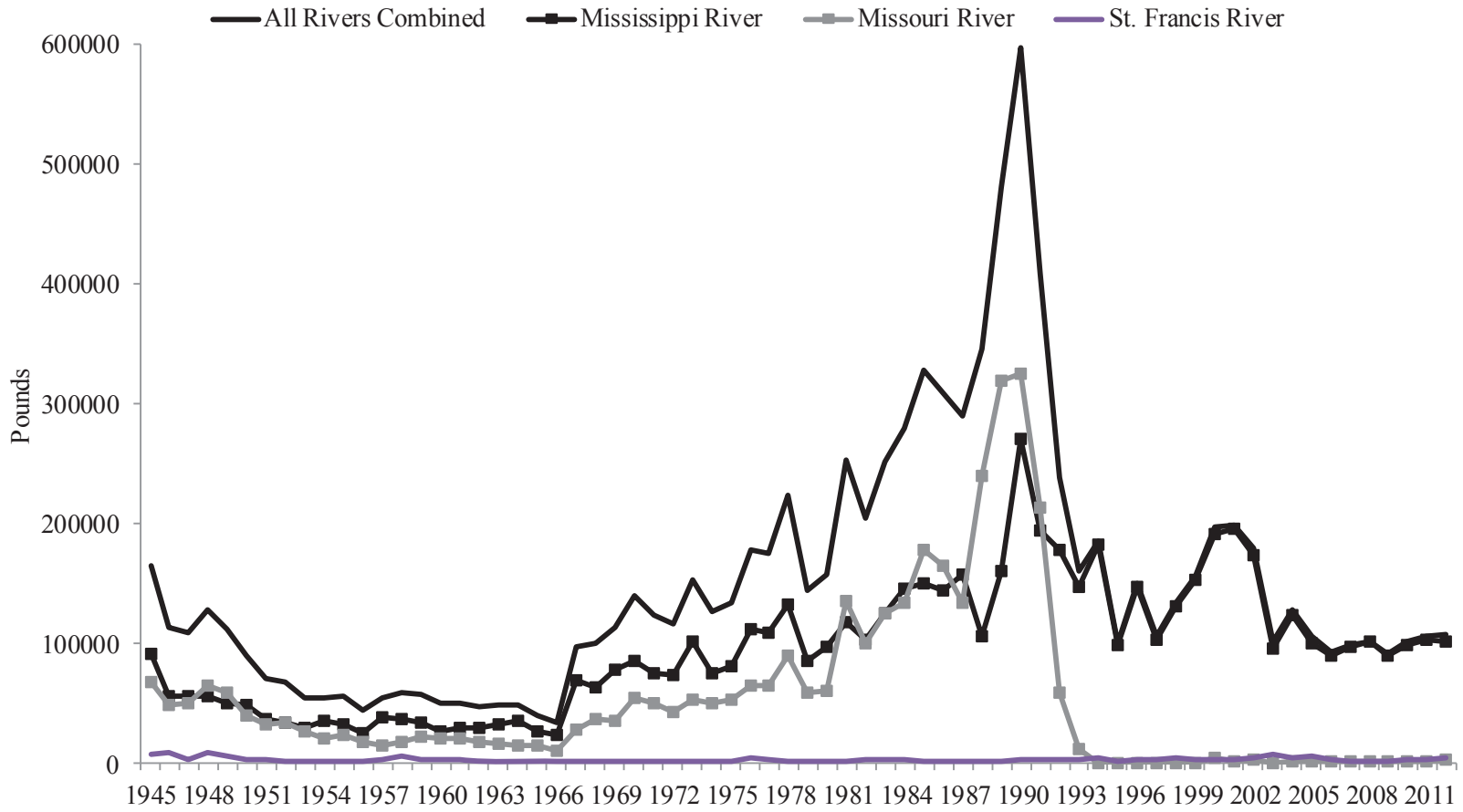


Figure 29. Pounds of catfishes harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of catfish was closed on the Missouri River in 1992. Reported catfish harvest after 1992 on the Missouri River could either be illegal harvest or recreational harvest reported on the commercial report.

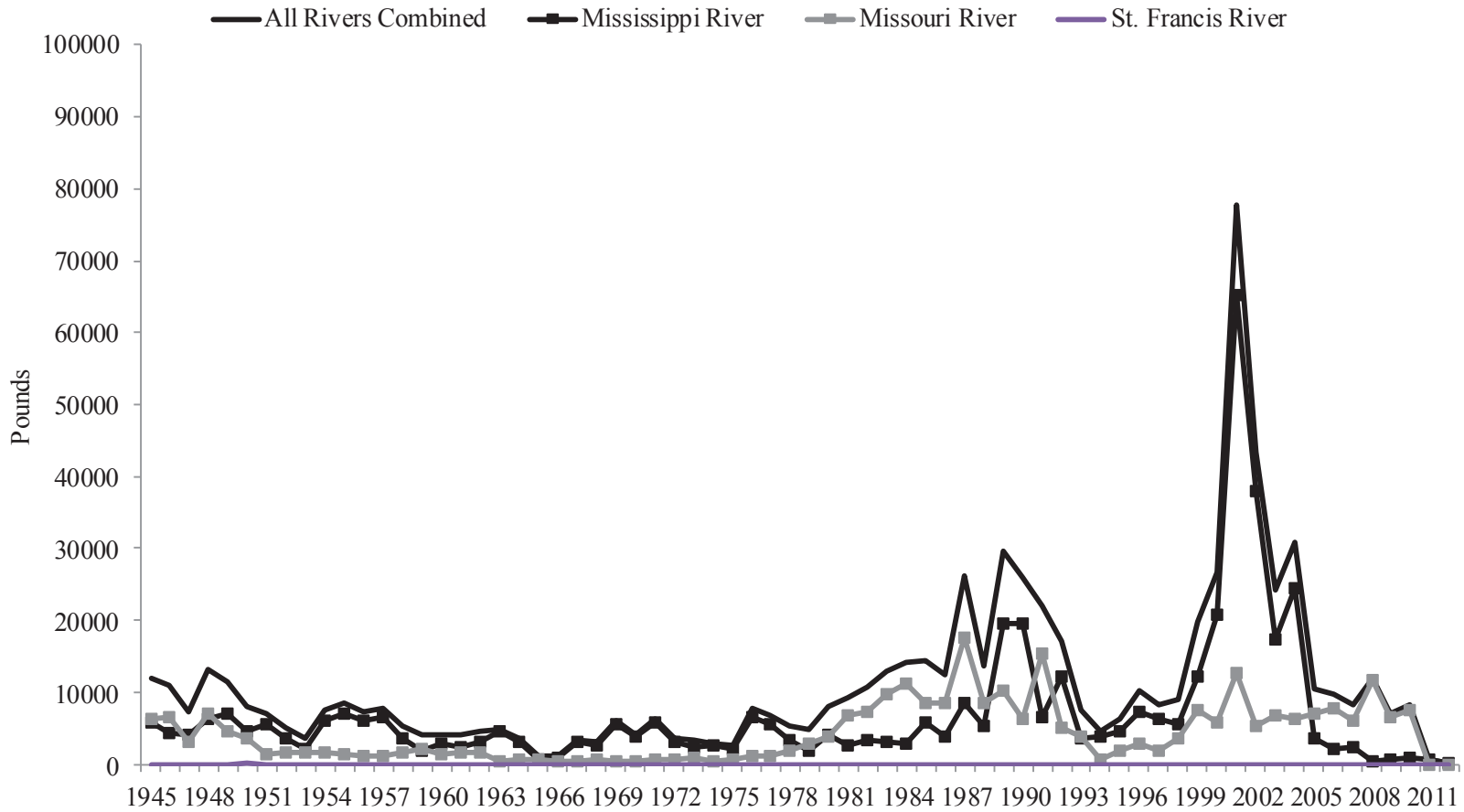


Figure 30. Pounds of sturgeon harvested from Missouri's commercial waters from 1945-2012. Note harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

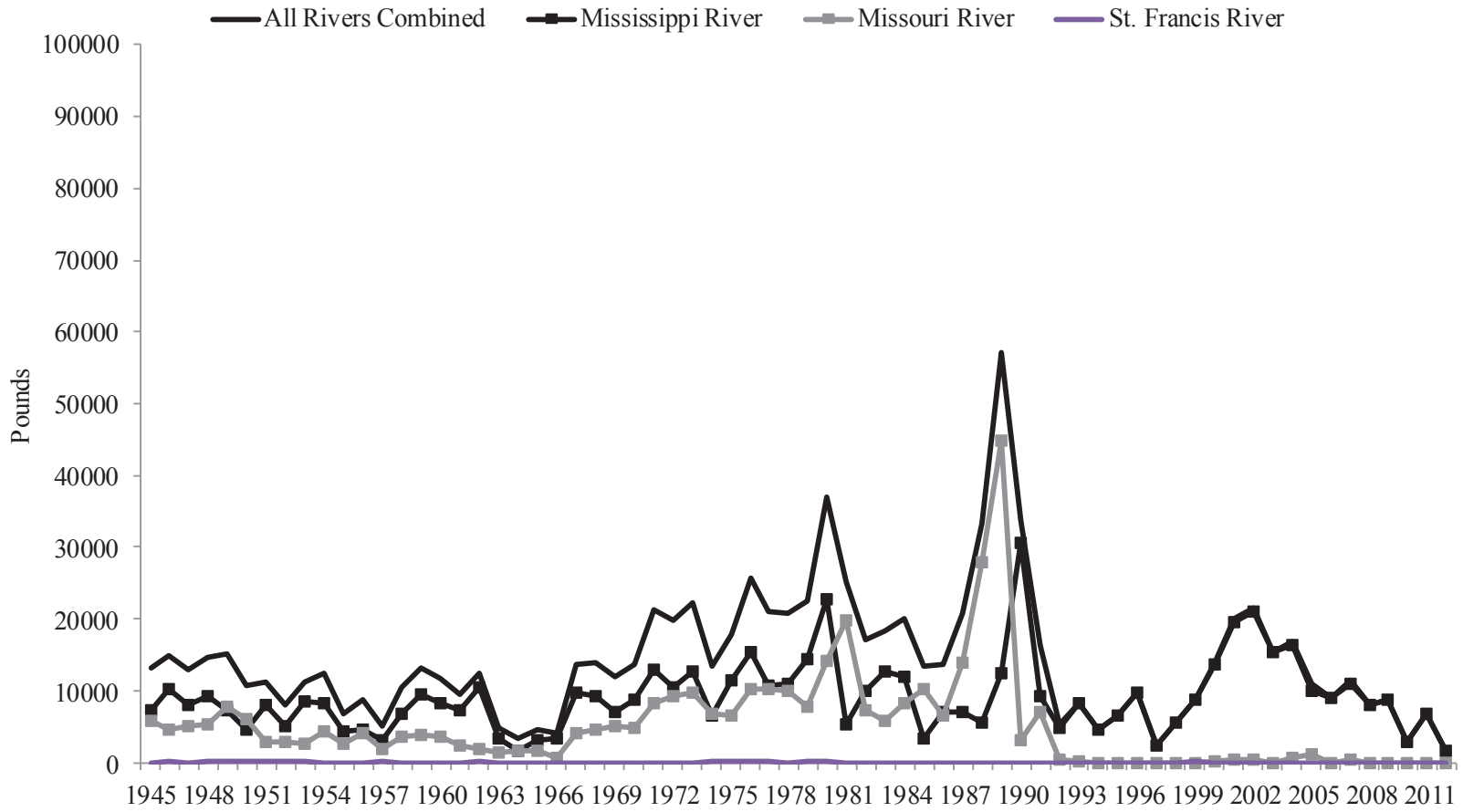


Figure 31. Pounds of paddlefish harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River.

FILE: Mound Street PCB's

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 1993

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MEMORANDUM

DATE: November 22, 1993

TO: Mound Street PCB Site

FROM: Don Falls, Environmental Specialist
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Mound Street PCB Site Reconnaissance

On November 11, 1993, I traveled to the Mound Street PCB site to conduct a site reconnaissance and meet with Mr. Daryl Bowles and Mr. David Gehm of the GEHM Corporation. The site is located at Mound and Brooklyn Streets, on the Riverfront, in downtown St Louis. I arrived at the site at 8:35 a.m. and first made a vehicle reconnaissance of the area within 1/4 mile of the site. The weather was clear and sunny with a temperature of approximately 55 degrees.

At 9:00 a.m., I met with Mr. Bowles and Mr. Gehm at the old terminal building. They were at the site to oversee the removal of waste oil that had been temporarily stored on-site from an earlier underground storage tank removal. I first asked Mr. Bowles if he could show me where the Metropolitan Sewer District pump station was located. He directed me to the pump station located at the end of Brooklyn Street, approximately 400 feet from the old terminal building. The pump station is located next to the flood wall and is surrounded by a security fence. I noted that five 55-gallon drums marked as waste oil and PCBs (Polychlorinated Biphenyl) were stored against the pump station south wall.

I then asked Mr. Bowles if he would show me exactly where the boring attempts were made that he had referred to in his activities report. We walked across Mound Street to an area immediately east of the old terminal building. This area appeared as an anomaly on the IR/T (Infrared Thermograph) survey completed in August 1993 by Entech Engineering as part of GEHM Inc.'s investigation of the site. Mr. Bowles explained that the drilling attempts were unsuccessful due to solid rock, cinder block, and other debris being encountered at a depth of about five feet. Mr. Bowles informed me that a long-time employee of Apex Fuel Company claims that Union Electric Company once used a building at this particular site to store transformers. The

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basement of this building was said to be full of waste oil when the building was demolished several years ago. Mr. Bowles indicated that the foundation or basement of this demolished building might explain the IR/T anomaly.

I asked Mr. Gehm about the capabilities of the IR/T and if it could image at depths of several feet. He said that he thought that the IR/T could image areas of dissimilar makeup to a depth of about 20 feet. Mr. Bowles added that buried objects as small as five-gallon buckets have been identified with the instrument. Mr. Gehm said that the IR/T images are taken using a lift bucket and are taken at a height of about 30 feet above the ground.

At 10:15 a.m., Mr. Gehm and Mr. Bowles said that they had to leave to finish with the removal of the waste oil. I thanked them for their assistance and told them that I would stay in touch with them. After taking more photographs of the area, I then left the site at approximately 11:00 a.m.

DF:so

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 1994a

PRELIMINARY ASSESSMENT

MOUND STREET PCB'S

CITY OF ST. LOUIS, MISSOURI

March 21, 1994

Missouri Department of Natural Resources

Hazardous Waste Program

Prepared By	Reviewed By	Approved By
Don Falls	James L. Kavanaugh	Edwin Knight
Don Falls Environmental Specialist	James L. Kavanaugh Chief, Site Evaluation Unit	Edwin Knight Chief Superfund Section

DATE: 3/21/94

PREPARED BY: Don Falls
Missouri Department of Natural Resources

SITE: Mound Street PCB

EPA ID NO.: MO0000093682

1. INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources, through a cooperative agreement with the U.S. Environmental Protection Agency, conducted a Preliminary Assessment (PA) at the Mound Street PCB site. The purpose of this investigation was to collect information concerning conditions at the site sufficient to assess the threat posed to human health and the environment, and to determine the need for additional investigation under CERCLA/SARA or other action. The scope of this investigation included review of available file information, a comprehensive source survey, a comprehensive target survey, and an on-site reconnaissance (11/11/93).

2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

2.1 Location

The Mound St. PCB site is located in the City of St. Louis, Missouri, near the intersection of First and Mound streets on the extreme eastern side of the city (Figure 1). The geographic coordinates are 38° 38'34" N latitude and 90° 10' 57" W longitude (Reference 3 and 4).

The City of St. Louis is characterized by a temperate climate. Summers are warm and humid with daily temperatures reaching 77° or higher. The winter months are generally cold with daily temperatures of 23° to 43°F. Net annual precipitation for the area is 36.5 inches (Reference 5, pages 1 ,13 ,43).

The two-year, 24-hour rainfall for the area is approximately 3.5 inches (Reference 12).

2.2 Site Description

The Mound Street PCB site covers approximately 1.4 acres of a 3 acre tract. The site is in an industrial setting, near the west bank of the Mississippi River, in St. Louis. The property is surrounded by concrete and gravel surfaced roads and an open gravel covered lot. Immediately north of the site, across Mound St., is property owned by the Terminal Railroad Association (TRRA). A set of large concrete grain elevators, which appear to be abandoned, occupy this property. Continental Cement Company operates a facility, north of Brooklyn Street, for cement loading and unloading (Figure 1). To the southwest is a bulk petroleum storage and distribution facility operated by Petroleum Fuels & Terminal Company (P F & T), a subsidiary of Apex Oil Company. This tank farm is distinguished by five large (>50,000 gallon capacity) above ground storage tanks. Immediately to the east there are several sets of railroad tracks and a railroad siding which run parallel to the adjacent flood wall. Directly west of the site is a gravel paved lot, with a truck scale, used by Apex Oil Company for staging and weighing of their trucks (Reference 11 page 1).

Past owners of the site include Union Electric Company of St. Louis, Mound Street Corporation, AZCON and Tenlis Company. McKinley Iron Inc. is the current owner of the site property. (Reference 6).

2.3 Operational History and Waste Characteristics

The Laclede Gas and Light Company operated a large coal gasification facility in the area of the Mound St. site from the late 1880's until 1945. This Manufactured Gas Plant (MGP) produced gas through coal carbonization, using a retort process, whereby coal was heated and the resulting gas was run through a condenser and a scrubber before it reached a gas holder. Wastes were produced in the scrubber and condenser during this process. It is estimated that over 930 million gallons of coal tar waste were produced at the Laclede Coal Gas facility during its period of operation. Most of these coal tar waste were probably sold to coal tar refineries for further processing. However, it was also common practice for MGPs in the early 1900's to bury as much as 24% of their waste coal tars on-site in unlined pits or trenches. There could be up to 223 million gallons of coal tar waste buried on or near the site. (Reference 7, Pages 3-1 through 3-3, 4-4).

Union Electric Company purchased the property in 1945 from the Laclede Gas Light Company, and operated the Mound St. power plant at the site until 1973 (Reference 7, Page 3-1). The property changed ownership several times from 1973 until October 1985 when it was sold to the

Mound St. Corporation. The Mound St. Corporation leased the building to an individual who used the building to house his electric motor stripping operations (Reference 8, page 2-5). In March, 1991 the old Mound Street Power Plant was demolished after an oil fire occurred in the basement of the building. In 1993 the site property was transferred to its current owner, McKinley Iron Incorporated. (Reference 6).

The Mound St. power plant was originally investigated as a potentially contaminated site in April, 1987 when personnel from the St. Louis City Division of Health collected six oil samples from the basement of the building. This sampling occurred after allegations that hydraulic fluids from old electrical transformers were stored in the building, and after a spill of oil in 1986 from the adjoining petroleum tank farm, whereby oil entered the basement of the building. All six of the oil samples collected were analyzed for PCBs, and no PCB contamination was detected (Reference 7, Page 3-3). It also should be noted that from 1976 to 1987 the United States Coast Guard has investigated three separate oil slicks on the Mississippi River where oil problems in the basement of the former power plant was the suspected source of the oil spills to the river (Reference 8, page 2-13).

During September, 1987 the U.S. Environmental Protection Agency (EPA) sponsored a Preliminary Assessment (PA) of the Laclede Coal Gas Site (EPA ID # MOD981715980) conducted by Ecology and Environment Inc. (E&E). The scope of the preliminary assessment included the Mound St. Power Plant. Oil samples were collected from the Mound St. power plant, and two manholes in front of the building, with none of the samples showing PCB contamination (Reference 7, Page 3-3).

In 1990, due to the presence of oily waste at the former Laclede Coal Gas property, and because of the proximity of a drinking water intake, located directly across the Mississippi River from the Laclede Coal Gas site, the EPA requested a Screening Site Inspection (SSI) at the site. During a November 20, 1990 site reconnaissance personnel from E&E reported observing seepage from the foundation and piping system of an abandoned pump house that was formerly owned by the Mound St. power plant. The pipes that originated from the power plant had been plugged with concrete, but seepage was still leaching through the concrete. Because this pump house is located on the east side of the flood wall, this leachate was observed to be seeping directly into the Mississippi River (Reference 7, Page 3-3).

The Mississippi River stage at the time of the SSI reconnaissance was recorded at a maximum stage of 2.77 feet, which is well below the average stage of 11.30 feet (Reference 25).

E&E completed the SSI Report for the Laclede Coal Gas property in October 1991. There is reference made in this SSI report of a plan to include collecting a sample of oil from the basement of the former Mound St. power plant during sampling at the adjoining former coal gas site. However, the power plant was in the process of being razed at the time of the investigation, so no samples could be collected (Reference 19, Page 4). The SSI report does not indicate whether or not the oil waste was removed from the building prior to demolition. The Mound St. Power Plant was not included in the site inspection study area.

The analytical results obtained from the SSI performed by E&E identified cyanides, BTEX compounds, and PAHs as the major on- site contaminants. Previous oil sampling from the basement of the former Mound St. Power Plant did not however detect the presence of PCBs (Reference 7, page 3-3).

On July 9, 1993, personnel from the St. Louis Metropolitan Sewer District (MSD) discovered oil seeping into their Brooklyn St. pump station from the storm sewer (Reference 9). The Brooklyn St. pump station is located approximately 300 feet northeast of the Mound Street site along the flood levee wall. MSD reported the discovery of the waste oil to the Missouri Department of Natural Resources (MDNR) on July 14, and also notified the St. Louis City Fire Department (SLFD) of the situation.

Analytical results from the samples of oil collected by MSD at the pump station, and nearby manholes, indicated that the waste oil contained PCBs in concentrations ranging from 11.7 to 47 ppm (Reference 10). The City of St. Louis contracted with REACT Environmental Engineers to collect and remove the oil from the wet well of the pump station. REACT pumped the oil from the surface of the wet well and containerized it in five 55 gallon barrels. These barrels were then staged within the confines of the security fence of the pump station. This waste oil was later analyzed by Tipton Environmental Technologies, and was then transported to their Treatment Storage and Disposal Facility (TSDF) in Tipton, MO (Reference 27).

During the investigation to determine the source of the oil, the presence of a Underground Storage Tank (UST) was discovered on the property owned by TRRA. A sample of the UST contents analyzed on July 15, 1993 at the MSD laboratory identified PCBs in the tank oil at a concentration of 39 ppm. Furthermore, the tank oil sample and the sample taken from the wet well of the Brooklyn Street Station both exhibited similar, although not identical, peaks during infrared spectra analysis (Reference 10).

The SLFD notified TRRA of the existence of the UST on July 28, 1993, and asked that the tank and its contents be removed. In response to this request, TRRA contracted with GHEM Corporation to perform a removal of the UST and its contents and to further investigate the area in an attempt to identify any leak plumes or trails.

GHEM Corporation personnel conducted preliminary site activities on August 2, 1993 one day following the crest of the Mississippi River, during the record flood of 1993. Records on file at the United States Geological Survey (USGS) Office of Water Resources indicate a river stage of 49.43 feet on August 2. This river stage would be 2.57 feet below the top of the flood wall, and was over 38 feet above the annual mean river stage of 11.30 feet (Reference 25).

At the time of their investigation, personnel from GHEM Corporation reported evidence of extreme hydrostatic pressure in the area by water shooting approximately 10 feet high from a Corp of Engineers piezometer located adjacent to the flood wall. This extreme hydraulic pressure was also evidenced by a groundwater/surface interface in the area, where groundwater was observed seeping from the interface. This interface reportedly extended from a line approximately even with the south side of the TRRA property, and south to a line approximately even with the south side of the former Union Electric property. Observations of this interface revealed an apparent petroleum sheen in many places along its length (Reference 11, Page 3).

GHEM Corporation performed a removal of the tank contents on August 4, 1993 and collected a sample of the oil for analysis. It was reported that the waste oil appeared to be a mixture of ethylene glycol and waste oils. Laboratory analysis of this tank oil did not show the presence of PCBs above the detection limit of 10 ppm (Reference 11).

In an effort to identify any subsurface leak plumes or trails, an Infrared Thermographic (IR/T) Survey was conducted in the area along with three drill borings to determine subsurface conditions. The results of the IR/T survey and borings did not identify any evidence of a leak plume or trail in the area of the UST but, did however indicate an anomaly on the former Union Electric property. The area of the IR/T anomaly was reported to be approximately a 10'X 10' area located on the site of the former Mound St. Power Plant. An attempt was made to determine the source of this anomaly by advancing a auger at two locations within the area identified by the IR/T survey. Both of the attempts were unsuccessful due to auger refusal at a depth five feet (References 11, page 7).

The current investigation on the Mound Street PCB site began in July of 1993, with the MSD report of PCB's in a nearby storm sewer. Most of the preliminary assessment research was

completed prior to locating the PA and SSI for the Laclede Coal Gas Site. Since these reports did not address the potential for ground water to surface water contamination, the decision was made to produce this report. While the PA included the power plant location, the scope of the SSI did not. Site conditions have changed due to the flood and building demolition. Migration to surface water has been suspected (oil slicks on the river) and documented (storm sewer contamination).

3. GROUNDWATER PATHWAY

3.1 Hydrogeologic Setting

The following information for section 3.1 is taken from a report prepared by the Missouri Division of Geology and Land Survey (Reference 12).

The site is located on a narrow strip of alluvium between an area of limestone bedrock and the Mississippi River. The groundwater within the alluvium will move generally in the direction of the river, that is to the east or southeast, and it will eventually discharge to the river. During unusually high river stages, the groundwater may temporarily flow away from the river. Since no confining layer is known to exist between the alluvial aquifer and the bedrock of Mississippian limestone, the groundwater target distance should extend for a four mile radius from the site.

The shallowest material at the site is fill material. Its thickness is unknown, but is estimated at 15 to 18 feet.

The alluvium consists of a mixture of stratified sediments deposited by the river. Based on findings at a nearby site, the alluvium is made up of clay, and silty clay in the top 10 to 30 feet, but becomes generally coarser with depth, becoming silty sand and sand. Lenses of gravel can be found. The total thickness of the alluvium is estimated at approximately 80 feet. The alluvial aquifer can be expected to yield large quantities of fresh water. The depth to water will be approximately 20 feet. The bedrock is Mississippian aged limestone.

The Mississippian System in this area is made up of a sequence of limestone, cherty limestone, and sandy or shaley limestones. This system includes, in descending order; the Ste. Genevieve Limestone, St. Louis Limestone, Salem Formation, Warsaw Formation, Burlington-Keokuk Limestone, and the Fern Glen Formation. The Salem and Warsaw formations are generally

shaley limestones and do contain shale beds in the St. Louis area. However, the thickness and position of shale horizons varies within this area. The shallowest reliable aquitard in the area is the Maquoketa Shale at the top of the Ordovician System. The Mississippian aquifer might yield small quantities of fresh water in the target area, but very little data is available. Any groundwater below the Maquoketa is expected to be mineralized.

Drilling at a nearby site encountered no confining material between the alluvium and the bedrock.

The alluvial aquifer is bounded by the limits of its deposition within the target area. Bedrock faulting in the area does not completely transect the Mississippian aquifer. No aquifer discontinuity exists within the target area.

The depth to groundwater at the site is approximately 20 feet. The alluvial sediments at this depth may not be good aquifer material, however, the depth at which the material is saturated should be considered the aquifer.

Sinkholes and caves can be found in the Mississippian bedrock within the target area. the karst aquifer probably does not directly underlie the site, however, and it is not likely to be affected by contaminant migration from the site. If the site is actually on the bedrock residual area, any water that percolates down into it should move toward the alluvial aquifer since groundwater movement is typically toward the river (Reference 24).

3.2 Groundwater Targets

The population of the City of St. Louis relies on the municipal water supplies drawn from the Mississippi, Missouri and Meramec Rivers. The cities in western Illinois likewise draw their water form the Mississippi River. There are no known drinking water wells located within a four mile distance of the site (References 12; 22).

3.3 Groundwater Conclusions

Reference is made in the 1991 SSI Final Report prepared for the Laclede Coal Gas Site that three Polycyclic Aromatic Hydrocarbons (PAH's) and benzene and cyanide were detected in a downgradient well sample at the site. It is also possible that PCB contaminated oil may have infiltrated the shallow aquifer in the area of the Mound St. Power Plant. However, since there are no known drinking water wells utilized within a four mile distance of the site, a threat from the groundwater pathway would appear very unlikely.

4. SURFACE WATER PATHWAY

4.1 Hydrologic Setting

The site is located approximately 300 feet from the west bank of the Mississippi River. All runoff from the site is prevented from reaching the Mississippi River directly by the flood levee wall. Because there are no drainage channels or streams in the immediate area surrounding the site, surface water must drain downgradient by overland flow and is diverted into a storm sewer system that is connected to the sanitary sewer system. The sanitary wastewater is pumped upstream for approximately two miles to the Bissell Point Treatment Plant. The treated water from the plant is then discharged into the Mississippi River . The surface water pathway target distance limit would include the Mississippi River to a point downstream in south St. Louis County at Section 24, Township 43 N, Range 6 E.

The drainage area for the site is less than 50 acres. The two-year, 24-hour rainfall for the area is approximately 3.5 inches (Reference 12). During high water events, hydraulic pressures reportedly force groundwater to the surface at the site (Reference 11, page 3).

The area of the site is subject to adverse impacts from flooding. The site is protected by a high concrete levee wall built to withstand a 500 year flood (Reference 12). During the height of the record flood of 1993 the site did not experience any flooding from overland flow.

4.2 Surface Water Targets

There are no drinking water intakes located within 15 river miles downstream of the site on the Missouri side of the river. However, the Illinois American Water Company has two drinking water intakes on the Illinois side of the river; one at Choteau Island ten miles north of the site, and one located approximately 1/4 mile downstream from the Mound St. site in the SE 1/4 of the SW 1/4 of section 11, T.2 N., R.10 W. at East St. Louis, Illinois (Reference 13).

The Illinois American Water Company provides drinking water from these intakes for several communities in western Illinois. The combined service population for the water company is approximately 300,000. The intake at East St. Louis reportedly provides 60% of the total supply (Reference 13). Two raw water samples were collected at this intake during Ecology and Environment's investigation of the Laclede Coal Gas Site. These water samples indicate total chromium at 12-14 ppb; lead at 15-18 ppb; and zinc at 46-54 ppb. These samples were obtained

during extremely low water conditions. A background surface water sample was not collected so that no comparison to background can be made for these metals (Reference 7, pages 7-5, 7-6).

The Mississippi River would be considered a primary target because of the observed release of oil to the river. The Mississippi River is listed for the protection of "Warm Water Aquatic Life and Human Health-Fish Consumption," "Livestock & Wildlife Watering","Drinking Water Supply", "Irrigation", "Boating & Canoeing", and "Industrial" uses (Reference 14, page 76). The Mississippi River would also be considered a primary fishery due to commercial and sport fishing along the river (Reference 29).

The Pallid Sturgeon (*Scaphiryhnchus albus*), a fish known to range widely in the Mississippi River, is state listed Endangered. The Sicklefin Chub (*Macrohybopsis meeki*), also inhabits the Mississippi River and is a federal candidate for listing as a Threatened or Endangered species and is state listed Rare. Both of these species may be adversely affected by discharges of hazardous substances to the river (Reference 15).

Within 15 river miles of the site on the Illinois side of the Mississippi river there are approximately 0.7 miles of palustrine wetlands frontage. These wetlands would only serve as secondary targets due to their distance from the site. There is no known wetland frontage, within the target distance limit, on the Missouri side of the river (Reference 28).

4.3 Surface Water Conclusions

A release of PCB contaminated oil to the Mississippi River from the site appears likely. Since the contaminated oil first appeared in the MSD pump station from the area storm sewer there is a strong possibility that some of the fugitive oil escaped to the river. (Reference 9). Furthermore, there is a strong potential for groundwater to surface water release due to the proximity of the site to the river and the because of the shallow alluvial aquifer. There is some suggestion that the oils found in the basement of the power plant were hydraulically affected by the river, as evidenced by the fluctuations of the oil level in the basement with the level of the river (Reference 8, page 5-1).

The Mississippi River should be considered a primary target as it is state protected for agricultural, industrial, and recreational purposes and is used as a fishery and as a source of drinking water (Reference 14, page 76).

The Illinois American Water Company Metro East water intake is located less than one mile downstream from the Mound St. PCB site on the Illinois side of the Mississippi River. This intake serves an apportioned population of 180,000 persons. Previous samples taken at the intake were nondetect for PCB's, but the river level was extremely low (2½ feet). Future samples should be taken during high water conditions (30+ feet) or when oil slicks appear from the site. The Illinois wetland frontage would likewise be considered a secondary target since the possibility of site contaminants reaching these wetlands appears slight.

5. SOIL EXPOSURE AND AIR PATHWAYS

5.1 Physical Conditions

The Mound St. PCB site is located in an industrial setting, surrounded by gravel covered lots and a railroad siding. The area of the site is built up with fill material to elevate it above the normal flood level. This fill material is approximately 12 feet in depth and consist of demolition waste with cinders, broken brick and cobble size stones (Reference 23, page 4). Beneath the fill material lies stratified native alluvial soils deposited by the river. The soil survey for the City of St. Louis describes the soil unit at the site as urban land, bottom land, covered with fill material, with 0 to 3 percent slope. This soil unit typically will have 85% of the surface covered by asphalt, concrete, buildings or other impervious material (Reference 17, pages 18 and 19).

There are no fences restricting access to the Mound St. site. However, the site is located in an industrial area which ostensively is not frequented by the public. The MSD Brooklyn St. pump station, in which the PCB contaminated oil was first discovered, is surrounded by a 7 foot high security fence. Likewise, the P F & T Company petroleum storage facility is enclosed by a 8 foot high woven wire fence.

5.2 Soil and Air Targets

There are no residents on site. The nearest residence is over 1/4 mile from the site reference point. The nearest school is over 1/2 mile from the site. Information on the number of employees that work at the area businesses is sketchy, but Apex Oil Company and TRRA workers are in the vicinity of the site daily. However, theses workers would not normally be on the former Mound St. power plant property since the site is located on a vacant lot, outside their normal work areas.

MSD employees that work periodically inside the confined space of the Brooklyn St. pump station might possibly be exposed to PCBs, if the contaminated oils continue to appear in the wet well at the station. The presence of an oil sheen on groundwater seeping to the surface during the flood would suggest the possibility of continued surface contamination from the previous oil spill in the area.

The total population within a 1-mile radius, on the Missouri side of the Mississippi River, is approximately 3,755 people (Reference 16). The total population within a four mile radius of the site, including Illinois, is 207,102 persons (Reference 7, page 5-1).

The Jefferson National Expansion Memorial- Gateway Arch is located approximately one mile south of the site. This park, operated by the National Park Service, encompasses 90 acres of property and has an annual attendance of approximately 2.7 million (Reference 26). No other sensitive terrestrial environments are known within a 4-mile radius of the site (Reference 18).

5.3 Soil Exposure and Air Pathway Conclusions

Analytical data from the 1991 SSI Report of the Laclede Coal Gas Site identified cyanide, PAHs and BTEX compounds in the soil samples collected at a 0-2 foot depth. Cyanide in particular was found throughout the seven acre property, including the site of the former Mound St. Power Plant.

Although possible, the potential for exposure through the soil pathway, is probably low. The area of the site is covered by concrete and gravel. Workers would not typically be expected to come in contact with contaminated soil unless they were involved in excavation at the site. The oily waste discovered in the MSD pump station was reportedly coming from the storm sewer and would not pose a threat through the soil pathway. The oily sheen noted on the groundwater seeping to the surface described in the GHEM activities report would suggest the possibility of surface contamination. However, it is likely that the groundwater was only forced out to the surface due to the high hydraulic pressure exerted during the record flood, and is not a typical occurrence.

Because the PCB contaminated oil was found seeping into the MSD pump station from the storm sewer, the possibility of exposure to PCBs through the air pathway appears slight. However there is a potential for some exposure to airborne cyanide, BTEX compounds, and PAHs in the area of the Mound St. PCB Site due to previous documented contamination from coal tar waste and oil spilled at the adjoining property formerly known as the Laclede Coal Gas Site.

6. SUMMARY AND CONCLUSIONS

The Mound St. PCB site is located in an industrial area, along the west bank of the Mississippi River in downtown St. Louis, Missouri. The property on which the Mound St. PCB Site is located was once owned by Laclede Coal Gas Company. Laclede Coal Gas operated a Manufactured Gas Plant (MFP) at the site from the late 1800's until 1945 when it was sold to Union Electric Company.

Union Electric operated the Mound St. Power Plant on the site until 1973. The power plant remained vacant for several years after its closing in 1973. In 1986 there was a reported oil spill from the nearby Apex Oil Company storage facility. This spill was said to have covered the entire site, and some of the spilled oil apparently entered the basement of the vacant power plant. In March, 1991 the Mound St. Plant was demolished after an oil fire had occurred in the building. It is unclear whether any of the waste oil remained in the building at the time of demolition. However, the presence of the IR/T anomaly, discovered in the area of the former Mound St. power plant basement, implies that some of the waste oil may be buried there.
The site was originally investigated due to the observed oily waste releases to the Mississippi River and allegations that Union Electric Company once stored electrical transformer fluid in the basement of the former Mound St. Power Plant. However, previous oil sampling did not detect the presence of PCBs at the power plant.

An EPA sponsored SSI was completed on the former Laclede Coal Gas Site in October 1991. Thirteen subsurface soil, twelve surface soil, six surface water, six ground water, four sediment, and one oil samples were collected during SSI sampling and analyzed for volatiles, semi-volatiles, metals, and cyanides. The SSI identified cyanide, BTEX compounds and PAHs as the major on-site contaminants. A oil sample from the former Mound St. Power Plant was scheduled to be collected during the SSI investigation but the building was in the process of being razed so none was collected.

In July, 1993 the MSD discovered PCB contaminated oil seeping into the wet well of their Brooklyn St. pump station. MSD analysis of this waste oil indicated PCBs at less than 50 ppm. This event occurred during the record flood of 1993 when the area was apparently under extreme hydraulic pressure from the nearby river. A nearby UST was discovered during investigation of the site by MSD and the tank was found to contain waste oil with 39 ppm PCBs. A later analysis of the tank contents by a independent laboratory gave the PCB levels at less than 10 ppm. The tank and its contents were subsequently removed. The reason for the discrepancy between MSD's results and those of the independent laboratory are unclear. However, the

possibility of the UST oil being the source of the fugitive oil found in the MSD pump station should be investigated further.

A release of PCB contaminated oil to the Mississippi River is strongly suspected. The Mississippi River is a primary surface water target because it is classified as a fishery and is habitat for rare and endangered fish species. The Illinois Metro East water intake is located almost directly across the Mississippi River from the Mound St. Site. This intake serves an apportioned population of 180,000 people. This population may be considered as secondary targets because no significant contamination was found in surface water samples, including a sample taken at the intake (Reference 19, table 5). However, samples were not taken during high water conditions nor when oil slicks appeared on the river.

Analytical results confirm contamination of the shallow groundwater in the area by cyanide and PAH compounds from the former MGP (Reference 19). In addition, there is a strong possibility that PCBs mixed with petroleum have also infiltrated the shallow aquifer, but this aquifer is not used for drinking.

Soils in the area of the site are known to be contaminated with cyanide and PAHs compounds. However, due to the gravel cover at the site, it appears that exposure to contaminated soil would only occur if workers at the site disturb the soil. The probability of documenting a release to the air at the site is low. The volatilization of cyanide and PAH compounds could possibly pose a moderate threat to workers near the site, particularly workers at the Apex Oil Company terminal where the highest levels of these contaminants were found. Workers that perform periodic maintenance at the MSD pump station may have some exposure to PCBs in the confined space of the station, but only if the contaminated oils continue to appear in the wet well or storm sewer.

There are approximately 0.7 mile of wetland frontage within 15 river miles of the site on the Illinois side of the river. These wetlands would only be considered secondary targets due to their distance from the site and the volume of the river.

The Jefferson National Expansion Memorial - Gateway Arch, a national monument, is the only terrestrial sensitive environment located within a four mile distance from the site. This monument is located approximately one mile south of the Mound St. site, and is not expected to be adversely affected by the site.

REFERENCES

1. RESERVED

2. RESERVED

3. U.S. Geological Survey, 7.5-minute topographic quadrangle maps of Missouri and Illinois : Cahokia, Illinois-Missouri 1954, Photorevised 1974; Clayton, Missouri 1954, Photorevised 1974; French Village, Illinois 1954, Photorevised 1982; Granite City, Missouri-Illinois 1954, Photorevised 1974; Monks Mound, Illinois 1954, photorevised 1993; Webster Groves, Missouri-Illinois 1954, Photorevised 1974.

4. Latitude/Longitude Calculation Worksheet, 12/13/93. From U.S. Environmental Protection Agency Guidance for Performing Preliminary Assessments under CERCLA, 9/91

5. U.S. Department of Commerce, The Climatic Atlas of the United States, 1983. Pages 1,13, and 43.

6. Wallen, Al. Environmental Investigator, Hazardous Waste Program Superfund Section Investigative Report, Enforcement Sensitive, Dated January 20, 1994.

7. Ecology and Environment, Inc. Final Report, Screening Site Inspection Laclede Coal Gas, St. Louis, Missouri, October 29, 1991, EPA ID # MOD 981715980

8. Preliminary Assessment, Mound Street Power Plant, St. Louis, Missouri. Prepared by: Ecology & Environment for Region VII EPA Dated June 23, 1988

9. Falls, Don. Hazardous Waste Program, Division of Environmental Quality, Missouri Department of Natural Resources, Phone Log of conversations with Howard Edmond of Metropolitan Sewer District, St. Louis, MO, and Robert Jackson and Anne Olberding of U.S. EPA Region VII, Kansas City, MO 12/13/93.

10. Metropolitan Sewer District, Environmental Compliance Laboratory Instrumentation Analysis Results, lab numbers 270,434,886,887 and 888.

11. The GHEM Corporation, Activities Report, TRRA of St. Louis, First & Mound Streets Site, St. Louis, MO September 1, 1993.

12. Starbuck, Edith. Missouri Department of Natural Resources, Division of Land Survey, PA/SI Report for the Mound Street Site, St Louis City, 12/29/93

13. Falls, Don. Hazardous Waste Program, Missouri Department of Natural Resources, Phone Log of conversations with Edith Starbuck, Division of Geology and Land Survey, Missouri Department of Natural Resources and Richard Reed with the Illinois American Water Company, Granite City, Illinois 12/29/93.

14. Missouri Department of Natural Resources, Missouri Water Quality Standards, 10 CSR 20-7.031. Pages 1 and 76

15. Dichneite, Dan. Missouri Department of Conservation, letter dated 7/22/92.

16. Department of Natural Resources Work Map, Census Block Populations, Downtown St. Louis, MO, Map dated 2/21/92

17. U.S. Department of Agriculture, Soil Conservation Service
Soil Survey of St Louis County and St. Louis City, Missouri.
Issued April, 1982.

18. Brabender, Jerry. U.S. Fish and Wildlife Service, letters
dated 6/14/93.

19. Ecology and Environment, Inc. Trip Report for Screening Site Inspection of the Laclede Coal Gas site, Granite City Township, St. Louis City, MO, May 21, 1991.

20. Falls, Don. MDNR, HWP Memorandum to Mound St. Site File, Mound St. PCB Site Reconnaissance, 11/22/93.

21. Missouri Department of Natural Resources, Census of Missouri
Public Water Systems 1991. Pages 1 and 46

22. Cobb, Richard. Illinois Environmental Protection Agency, letter to Ed Knight, Missouri Department of Natural Resources, dated 3/24/92

23. The GHEM Corporation, UST Closure Report for Terminal Railroad Association, October 26, 1993

24. Starbuck, Edith. Geologist, DGLS. Memorandum to Don Falls, Superfund Section, HWP. Existence of karst near the Mound Street Site Dated 1/5/94.

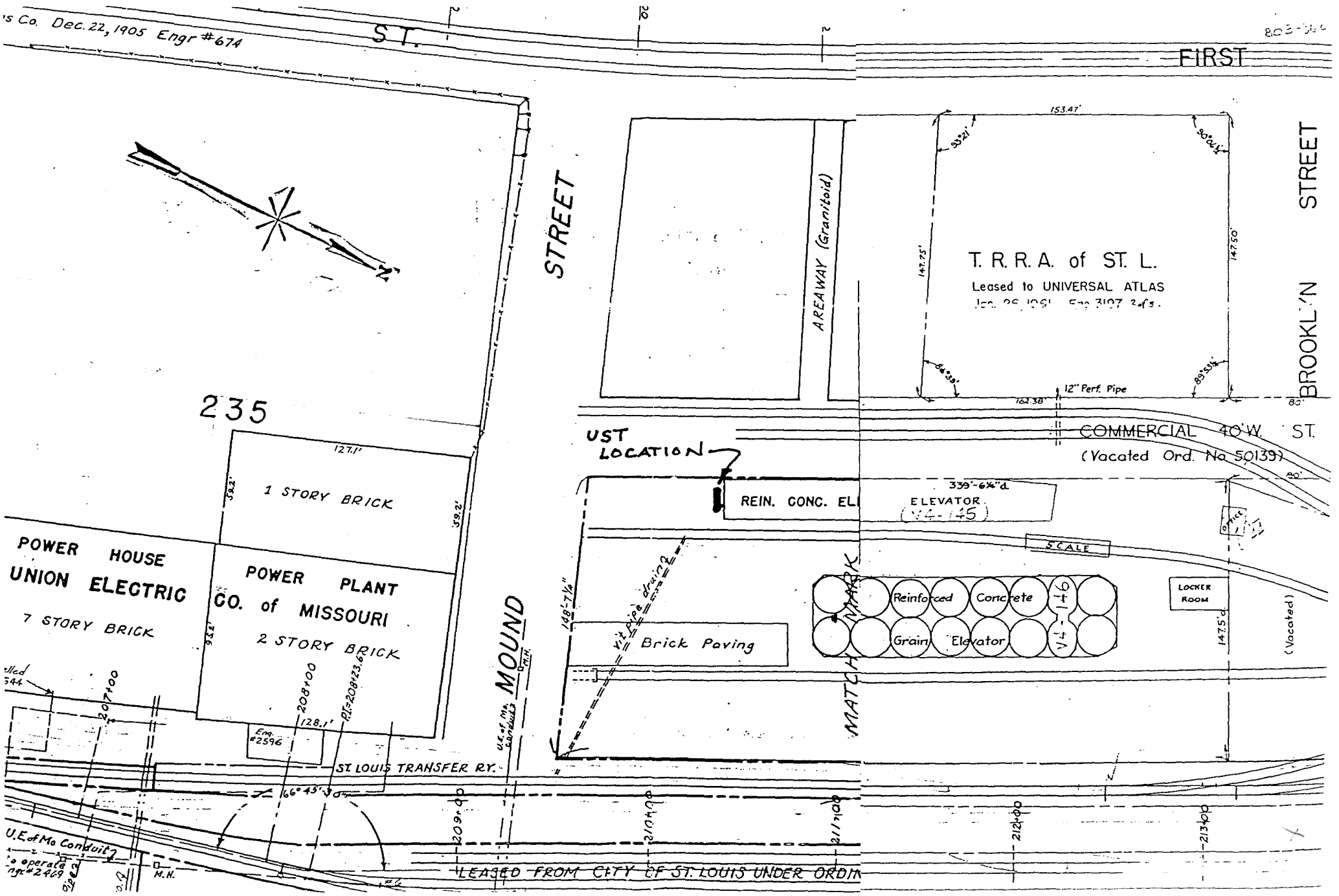
25. Falls, Don. Missouri Department of Natural Resources, Hazardous Waste Program, Phone Log of conversation with George Gray of the Office of Water Resources, U.S. Geologic Survey, St Louis, MO 3/11/94.

26. Falls, Don. Missouri Department of Natural Resources, Hazardous Waste Program, phone Log of conversation with Louise Barra, public affairs officer, Jefferson National Expansion Memorial- Gateway Arch. 3/15/94.

27. Falls, Don. Missouri Department of Natural Resources, Hazardous Waste Program, Phone Log of conversation with Rich Schnur, REACT Environmental Engineers. 3/15/94.

28. U.S. Department of the Interior, Fish and Wildlife Service, National Wetland Inventory Map: Cahokia, Illinois-Missouri 1988; Granite City, Missouri-Illinois 1988

29. Falls, Don. Missouri Department of Natural Resources, Hazardous Waste Program, Phone Log of conversation with Jack Robinson, Missouri Department of Conservation, 3/15/94.



's Co. Dec. 22, 1905 Engr #674
ST.
FIRST
STREET
235
1 STORY BRICK
POWER HOUSE
UNION ELECTRIC
7 STORY BRICK
POWER PLANT
CO. of MISSOURI
2 STORY BRICK
MOUND
AREAWAY (Granitoid)
T. R. R. A. of ST. L.
Leased to UNIVERSAL ATLAS
12" Perf. Pipe
BROOKLYN STREET
COMMERCIAL 40'W. ST.
(Vacated Ord. No 50139)
UST LOCATION
REIN. CONC. EL
ELEVATOR
SCALE
Reinforced Concrete
Grain Elevator
LOCKER ROOM
Brick Paving
MATCH MARK
ST. LOUIS TRANSFER RY.
U.E. of Mo Conduit
LEASED FROM CITY OF ST. LOUIS UNDER ORDIN

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 1994b

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MEMORANDUM

DATE: January 5, 1994

TO: Don Falls, Environmental Specialist, HWP, DEQ

FROM: Edith Starbuck, Geologist, DGLS

SUBJECT: Existence of karst near the Mound Street Site

Sinkholes and caves can be found in the Mississippian bedrock within the target area. The sinkholes are represented as closed depressions on the Granite City topographic map. Also, the existence of karst features is discussed in the DGLS publication, "Engineering Geology of St. Louis County, Missouri". The karst aquifer probably does not directly underlie the site, however, and it is not likely to be affected by contaminant migration from the site. If the site is actually on the bedrock residual area, any water that percolates down into it should move toward the alluvial aquifer since groundwater movement is toward the river.

Please let me know if you have any further questions about the site geology (314)368-2136.

ES:kb

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'94 JAN 7 AM 11 06
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

RECYCLED PAPER

MOUND STREET SITE STRATIGRAPHY				
	Stratigraphic Unit	Composition	Thickness (ft.)	Remarks
Quaternary System	Alluvium	Clay, silt, sand, gravel	80	High yield aquifer
Mississippian System	Ste. Genevieve Formation	Silty to sandy limestone	470 - 530	Yields small to moderate quantities of water
	St. Louis Limestone			
	Salem Formation			
	Burlington-Keokuk Limestone	Cherty limestone	240	
	Fern Glen Formation	Red limestone and shale	100	
	Chouteau Group	Limestone, shale and siltstone	0 - 122	
Devonion System	Sulphur Springs Group	Sandstone and limestone	0 - 60	
	Grassy Creek Shale	Carbonaceous Shale	0 - 50	
Silurian System		Cherty limestone	0 - 200	
Ordovician System	Maquoketa Shale	Silty, limey, or dolomitic shale	150	Confining layer

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MISSOURI DEPARTMENT OF
NATURAL RESOURCES

- - - - - - - - - - - - - - - - Header Data - - - - - - - - - - - - - - - -

Log # 019835
Owner:NORTHWESTERN COOPERAGE CO
Alias:
St:MO Cnty:ST. LOUIS
SE SE NE TRS: S02 T45N R07E
Lat.:38,40,23.648N
Long.:90,11,25.660W
Quad:38090C6

Type well:Private Well
Type log: S
Driller:HAVERSTICK WELL CO Date: /
Driller License No:
Confidential:N Release Dt. /
Logger:C.E. ROBERTSON Date:08/1961

Elev.: 420 Elev.S Yield: 260 SWL:(a) H20 @:
T.D.: 80 base: DrDwn: 31 SWL:(b)

Bedrock at: 75 Samples saved:N Int. cored: 0 to 0
Top Fm.:HOLOCENE ALLUVIUM
Bot Fm.:MISSISSIPPIAN SYSTEM
Problems:
Remarks:

- - - - - - - - - - - - - - Construction Data - - - - - - - - - - - -

Log #:019835 Date Completed: /

CASING: Dpth: 59 Diam: 8.00 I/O:O Sz. Hole: 0.00 Sz. Below: 0.00
0 0.00
0 0.00
0 0.00

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Formations Top:HOLOCENE ALLUVIUM
Bot:MISSISSIPPIAN SYSTEM
Other data sources:
Remarks:

- - - - - - - - - - - - - - Stratigraphy Data - - - - - - - - - - - -

Log #:019835

Top	Base	Name	--Lith-- Pr	Sc	Mn	Minerals--- Pri	Oc	Sec	Oc	Mnr	Oc
0	75	HOLOCENE ALLUVIUM	CL	SD	GR		0		0		0
75	80	MISSISSIPPIAN SYSTEM	LS	SD			0		0		0

Printed on 12/30/93 at 10:45:40.

Header Data

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Type well:Noncommunity Public Well
Type log: D
Driller: Date: /
Driller License No: Confidential:N Release Dt. /
Logger: Date: /

Elev.: 420 Elev.S Yield: 150 SWL:(a) H20 @:
T.D.: 2200 base: DrDwn: 000 SWL:(b)

Bedrock at: 0 Samples saved:N Int. cored: 0 to 0
Top Fm.:
Bot Fm.:
Problems:
Remarks:

Construction Data

Log #:001655 Date Completed:09/1951

CASING: Dpth: 80 Diam:160.0 I/O:O Sz. Hole: 0.00 Sz. Below: 0.00
0 0.00
0 0.00
0 0.00

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Top:
Formations Bot:
Other data sources:
Remarks:

Stratigraphy Data

Log #:001655

Top	Base	Name	--Lith-- Pr Sc Mn	Pri	Oc	Sec	Oc	Mnr	Oc
0	230	ST LOUIS LIMESTONE	LS SH		0		0		0
230	350	SALEM FORMATION	LS CH		0		0		0
350	380	UNKNOWN	SH		0		0		0
380	460	WARSAW FORMATION	LS SH		0		0		0
460	630	KEOKUK-BURLINGTON LS. UNDIFF	LS SH		0		0		0
630	720	FERN GLEN FORMATION	LS SH CH		0		0		0
720	760	KINDERHOOK SHALE	SH		0		0		0
760	880	SILURIAN SYSTEM	LS		0		0		0
880	1040	MAQUOKETA SHALE	SH LS		0		0		0
1040	1180	KIMMSWICK LIMESTONE	LS		0		0		0
1180	1240	DECORAH GROUP	LS CH		0		0		0
1240	1370	PLATTIN LIMESTONE	LS		0		0		0
1370	1502	JOACHIM DOLOMITE	SH LS		0		0		0
1502	1640	ST. PETER-EVERTON FMS. UNDIFF	SS		0		0		0
1640	2200	CAMBRIAN SYSTEM	SS LS		0		0		0

Printed on 12/30/93 at 10:49:09.

- - - - - - - - - - - - - - - H e a d e r D a t a - - - - - - - - - - - - - - -

Log # 003616
Owner:CUPPLES COMPANY
Alias:
St:MO Cnty:ST. LOUIS
SE NE NW TRS: S02 T45N R07E
Lat.:
Long.:
Quad:UNKNOWN
Type well:Private Well
Type log: S
Driller:WISE Date:05/1936
Driller License No:
Confidential:N Release Dt. /
Logger:GROHSKOPF Date: /

Elev.: 421 Elev.S Yield: 15 SWL:(a) H20 @:
T.D.: 885 base: DrDwn: 0 SWL:(b)

Bedrock at: 0 Samples saved:N Int. cored: 0 to 0
Top Fm.:ST LOUIS LIMESTONE
Bot Fm.:SILURIAN SYSTEM
Problems:
Remarks:

- - - - - - - - - - - - S t r a t i g r a p h y D a t a - - - - - - - - - - -

Log #:003616

Top	Base	Name	--Lith-- Pr	Sc	Mn	Pri	Oc	Sec	Oc	Mnr	Oc
0	210	ST LOUIS LIMESTONE	LS	SH			0		0		0
210	325	SALEM FORMATION	LS	CH	SH		0		0		0
325	435	WARSAW FORMATION	SH	LS	CH		0		0		0
435	595	KEOKUK-BURLINGTON LS. UNDIFF	CH	LS			0		0		0
595	700	FERN GLEN FORMATION	CH	LS	SH		0		0		0
700	735	CHOUTEAU GROUP	LS	CH			0		0		0
735	755	CHATTANOOGA SHALE	SH				0		0		0
755	885	SILURIAN SYSTEM	LS	SD	DL		0		0		0

Printed on 12/30/93 at 10:47:17.

Header Data

Log # 002748
Owner:FISHER CHEMICAL CO
St:MO Cnty:ST. LOUIS
NW SE SE TRS: S02 T45N R07E
Alias:
Lat.:
Type well:Private Well
Long.:
Type log: S
Quad:UNKNOWN
Driller:WISE Date:08/1933
Driller License No:
Confidential:N Release Dt. /
Logger:GLEASON Date: /

Elev.: 430 Elev.S Yield: 30 SWL:(a) H20 @:
T.D.: 210 base: DrDwn: 150 SWL:(b)

Bedrock at: 45 Samples saved:N Int. cored: 0 to 0
Top Fm.:ST LOUIS LIMESTONE
Bot Fm.:ST LOUIS LIMESTONE
Problems:
Remarks:

Construction Data

Log #:002748 Date Completed:08/1933

	Dpth:	Diam:	I/O:	Sz. Hole:	Sz. Below:
CASING:	30	8.00	O	0.00	8.00
	0	0.00			
	0	0.00			
	0	0.00			

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Formations Top:ST LOUIS LIMESTONE
Bot:ST LOUIS LIMESTONE
Other data sources:
Remarks:

Stratigraphy Data

Log #:002748

Top	Base	Name	--Lith-- Pr	Sc	Mn	Minerals--- Pri	Oc	Sec	Oc	Mnr	Oc
45	210	ST LOUIS LIMESTONE	LS	CH			0		0		0

Printed on 12/30/93 at 10:46:32.

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2006

Missouri Department of Natural Resources

MEMORANDUM OF UNDERSTANDING
Missouri Department of Natural Resources and the City of St. Louis

USE OF LOCAL GROUNDWATER ORDINANCE AS ENVIRONMENTAL INSTITUTIONAL CONTROL WHEN USING MISSOURI'S RISK-BASED CORRECTIVE ACTION PROCESS ON CONTAMINATED SITES

I. PURPOSE AND INTENT

A. This Memorandum of Understanding ("MOU") between the City of St. Louis and the Missouri Department of Natural Resources (DNR) is entered into for the purpose of encouraging restoration, reuse and redevelopment of sites in the City of St. Louis and to satisfy the requirements of the Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance for the use of a groundwater ordinance as an environmental institutional control. The Missouri DNR has reviewed Ordinance 66777 of the City of St. Louis (Attachment A) and determined that the ordinance prohibits the installation and use of potable water supply wells by public and private entities. The ordinance provides that the unit of local government may enter into an MOU with the Missouri DNR to allow the use of the ordinance as an institutional control.

B. The intent of this Memorandum of Understanding is to specify the roles and responsibilities that must be undertaken by the unit of local government and the Missouri DNR and to specifically satisfy the requirements for MOUs as set forth in Section 11 of the MRBCA Technical Guidance.

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

In order to 1) ensure the long-term integrity of the groundwater ordinance as an institutional control that prohibits the current and future use of groundwater as potable water (thereby eliminating the drinking water pathway) and 2) ensure that the risk to human health and the environment from any contamination left in place in reliance on the groundwater ordinance is effectively managed, the City of St. Louis hereby assumes the following responsibilities:

A. The City will notify the Missouri DNR of any proposed changes to Ordinance 66777 or requests for variance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request;

B. Together with the Missouri DNR, the City will maintain a list of all sites within the geographical boundaries of the city, that have received Letters of Completion from the Missouri DNR under the MRBCA process, provided the City has received copies of said letters from the Missouri DNR. Copies of Letters of Completion should be forwarded to the executive Director, St. Louis Development Corporation, 1015 Locust Street, St. Louis, MO 63101.

C. The City will enforce the ordinance and notify DNR when the ordinance is violated; and

D. The City will allow the Missouri DNR access to information necessary to monitor adherence to the terms of this MOU or to the ordinance.

III. SUPPORTING DOCUMENTATION

The following documentation is required in Section 11 of the Departmental MRBCA Technical Guidance and is attached to this MOU:

A. Attachment A: A copy of the Ordinance 66777 certified by the Register is the current, controlling law and provides authorization for the City to enter into this Memorandum of Understanding;

B. Attachment B: Identification of the legal boundaries within which the ordinance is applicable (certification by city clerk or other official that the ordinance is applicable everywhere within the corporate limits; if ordinance is not applicable throughout the entire city or village, legal description, map, and GPS coordinates of area showing sufficient detail to determine where ordinance is applicable).

This MOU shall be revisited as appropriate to ensure it functions as intended. This MOU may be changed or terminated upon approval of both parties at any time.

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: City of St. Louis

Francis G. Slay DATE: October 20, 2006

Francis G. Slay, Mayor

Darlene Green, Comptroller DATE: 10-25-06

Darlene Green, Comptroller

Attest: Parrie L. May

Parrie L. May, City Register

Approved as to form only:

54354

City Counselor

FOR: Missouri Department of Natural Resources

BY: Doyle Childers DATE: 9-5-06

Doyle Childers, Director

(Name and title of signatory)

ATTACHMENT A

COMMITTEE SUBSTITUTE
BOARD BILL NO. 190 INTRODUCED BY ALDERMAN ALFRED WESSELS

AN ORDINANCE PERTAINING TO GROUNDWATER; PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY, PROHIBITING THE DIGGING AND INSTALLATION OF POTABLE WATER SUPPLY WELLS; CONTAINING DEFINITIONS, AUTHORIZING THE MAYOR ON BEHALF OF THE CITY TO ENTER INTO MEMORANDUM OF UNDERSTANDING WITH THE MISSOURI DEPARTMENT OF NATURAL RESOURCES FOR TRACKING AND REPORTING REMEDIATED SITES AND CONTAINING A PENALTY AND AN EMERGENCY CLAUSE.

WHEREAS, due to limited quantity and low quality, there are areas of ~~shallow~~ groundwater beneath the City of St. Louis that at this time are not valuable as potable water sources, and therefor are not used for potable water; and

WHEREAS, many commercial and industrial properties in the City of St. Louis are underlain with groundwater unusable for potable purposes due to contamination by anthropogenic sources; and

WHEREAS, at this time, it is often technologically impossible and financially unfeasible to restore groundwater to drinking water standards; and

WHEREAS, the City of St. Louis does not use groundwater as a source for public drinking water; and

WHEREAS, state law, regulation and policy allows for state-evaluated, risk-based corrective action process for groundwater that is directed toward protection of human health and the environment balanced with the economic welfare of the citizens of the state; and

WHEREAS, where public drinking water is available, the potable use of groundwater in designated areas should be prohibited to protect public health and welfare when the quality of the groundwater presents an actual or potential threat to human health; and

WHEREAS, the City of St. Louis desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that may be affected by such chemical constituents

BE IT ORDAINED BY THE CITY OF ST. LOUIS AS FOLLOWS:

SECTION ONE. For the purposes of this ordinance the following definitions shall apply:

1. Person shall include any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, political subdivision, or any other legal entity, or their legal representatives, agents or assigns.

2. Potable water means any water used or intended to be used for human or domestic consumption, including, but not limited to use for drinking, bathing, swimming, washing dishes, or preparing food.

SECTION TWO. Notwithstanding the provisions of any other ordinance, no person shall use or attempt to use groundwater as a potable water supply.

SECTION THREE. No person shall drill or install wells to be used for a potable water supply.

SECTION FOUR.. Any active or inactive potable water wells found to exist subsequent to the enactment of this ordinance shall be reported to the Missouri Department of Natural Resources (MoDNR).

SECTION FIVE. The Mayor of the City of St. Louis, or his designee, is hereby authorized and directed to enter into a Memorandum of Understanding with MoDNR for tracking remediated sites, notifying MoDNR of changes to this ordinance, and taking certain precautions regarding potable water supply wells, if any are found subsequent to the enactment of this ordinance.

SECTION SIX. Any person convicted of violating this ordinance shall be fined not more than five hundred dollars or imprisoned up to ninety days or by both fine and imprisonment and shall be required to close the well(s) according to state standards under the Missouri Well Construction Rules (10 CSR 23) or other applicable state or federal laws or regulations.

SECTION SEVEN. This being an ordinance for the preservation of public peace, health and safety, it is hereby declared to be an emergency measure within the meaning of Sections 19 and 20 of Article IV of the Charter of the City of St. Louis and therefore this ordinance shall become effective immediately upon its passage and approval by the Mayor.

66777

Clerk, Board of Aldermen

President, Board of Aldermen

Approved ☑

Disapproved ☐

Date August 1, 2005

Mayor

Truly Engrossed and Enrolled

Chairman

STATE OF MISSOURI } SS
CITY OF ST. LOUIS } I, the undersigned Register of said City do hereby certify the foregoing to be a true copy of

Ordenance 66777
Board Bill # 190
Comm Sub.

the original of which is on file in this office.

Witness my hand and the seal of the City of St. Louis this 23 day of March 2006

Parrie L. May

REGISTER

ATTACHMENT B

LAW DEPARTMENT
PATRICIA A. HAGEMAN
CITY COUNSELOR
314 CITY HALL
1200 MARKET STREET
SAINT LOUIS, MISSOURI 63103
(314) 622-3361
Facsimile (314) 622-4956

FRANCIS G. SLAY
MAYOR

DEPUTY CITY COUNSELOR
STEPHEN J. KOVAC

- ASSOCIATES
JOSEPH R. NIEMANN
FRANCIS M. OATES
JAMES R. HARTUNG
DAVID E. MILLER
KATHLEEN G. TANNER
DONALD G. DYLEWSKI
LESLYE E. MITCHELL-YANCEY
ROBERT L. LYNG
MARIBETH MCMAHON
MARK LAWSON
NANCY R. KISTLER
JUDITH A. RONZIO
MARIO A. PANDOLFO, JR.
CARL W. YATES III
WILLIAM T. ZORN
THOMAS R. MCDONNELL
MATTHEW M. MOAK
SUSAN L. PHELPS-SMITH
CRAIG K. HIGGINS

- ASSISTANTS
PATRICIA L. WENDLING
JACQUELINE D. HARRIS
PAUL R. DIEKHOFF
SCOTT L. HARPER
ALAN R. SCHMIDT
THOMAS J. GOEDDEL
DANIEL J. EMERSON
PETER MOSÁNYI II
BARBARA E. BIRKICHT
THOMAS S. GLEDITSCH
RAYMOND B. FLOJO
BELINDA SPAETH
JOSEPH A. MONTECILLO
DREW A. HEFFNER
ERIKA ZAZA

May 19, 2006

To Whom It May Concern:

RE: Groundwater / Ordinance 66777

The City of St. Louis Ordinance 66777, related to groundwater, is applicable everywhere in the corporate limits of the City of St. Louis as shown and described on the map and legal description, attached to this letter.

Sincerely,

Stephen J. Kovac
Deputy City Counselor

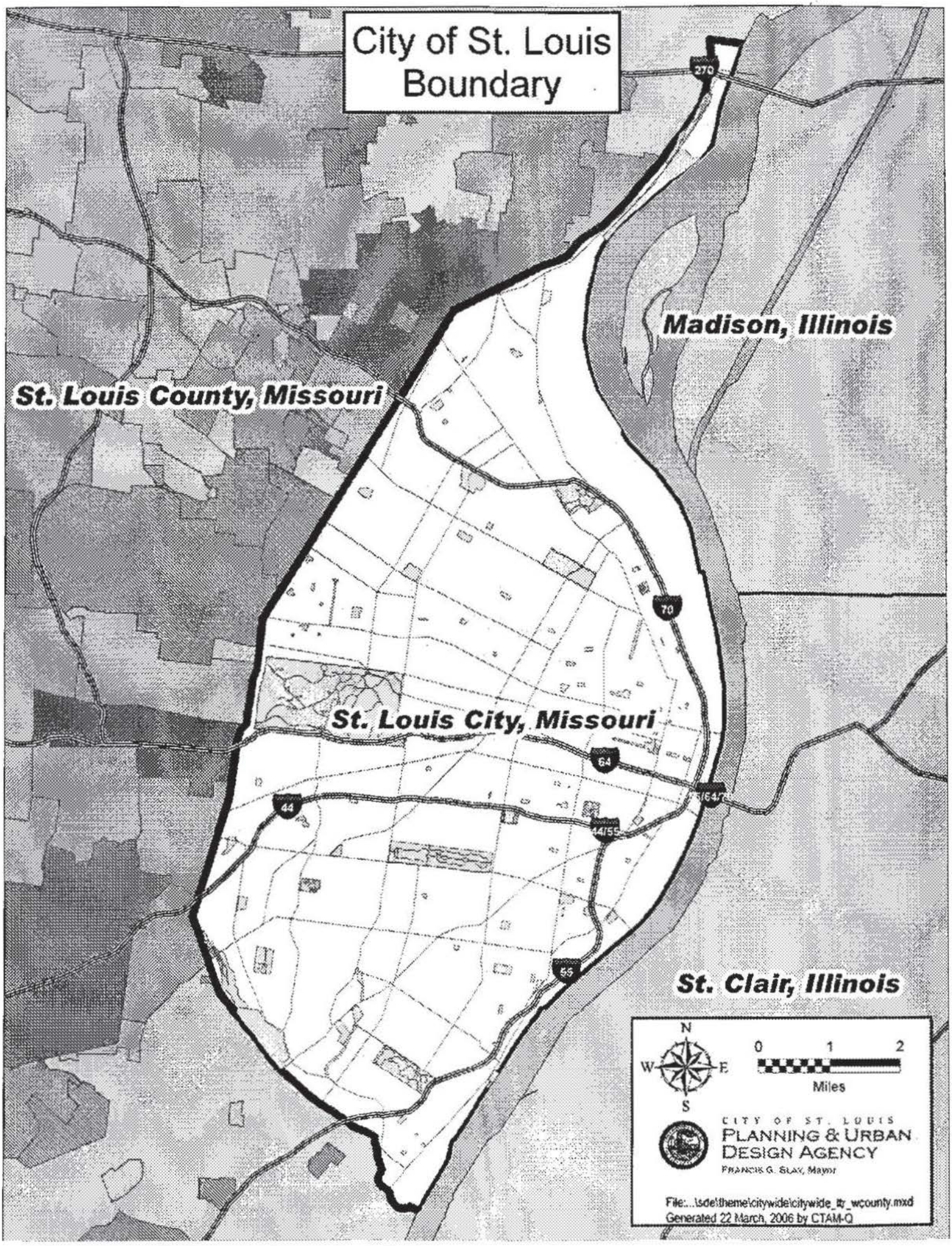
SJK

Legal Description of the City of St. Louis
Charter of the City of St. Louis, Scheme, Section 1

Section 1 Boundaries of the City of St. Louis; territory of St. Louis County.

The boundaries of the City of St. Louis are hereby enlarged, settled and established as follows:

The corporate limits of the City of St. Louis shall comprise all that district of country situated in the County of St. Louis and State of Missouri, to-wit: Beginning at a point in the middle of the main channel of the Mississippi River and running thence westwardly at right angles to said channel to a point on the west bank of said river two hundred feet south of the center of the mouth of the River des Peres; thence westwardly and parallel to the center of the River des Peres and two hundred feet south thereof to the eastern line of the Lemay Ferry Road; thence westwardly to a point in the west line of said Lemay Ferry Road at its intersection with the center of the Weber Road; thence westwardly along the center of the Weber Road to its intersection of the east line of lot one (1) of the Carondelet commons south of the River des Peres; thence westwardly to the southeast corner of Rudolph Overman's or northeast corner of B. H. Haar's land; thence westwardly to said Haar's northwest corner; thence northwestwardly to a point in the center of the Gravois Road six hundred (600) feet southwardly from the center of the bridge across the River des Peres; thence northwestwardly to the southeast comer of lot thirty-one (31) of the subdivision of the Mackenzie tract in United States survey one thousand, nine hundred, and fifty-three (1,953); thence northwestwardly in continuance of said last-mentioned line to the southern line of lot twenty-one (21) of the subdivision of the said Mackenzie tract; thence northwestwardly to a point in the southern line of United States survey two thousand and thirty-five, twenty-six (26) chains eastward from the southwest corner of said survey; thence northwardly to a point in the north line of the subdivision of East Laclede six hundred (600) feet west of the McCausland Road; thence northwardly and parallel with the center of the McCausland Road to a point on the Clayton Road six hundred (600) feet west of its intersection with the McCausland road; thence northwardly and parallel with the Skinker Road and six hundred (600) feet west thereof to its intersection with the old Bonhomme Road; thence northeastwardly to the intersection of the center line of McLaran Avenue and Mead Street; thence in a northeastwardly direction to a point in the Bellefontaine Road six hundred (600) feet north of its intersection with the Columbia Bottom Road; thence northwardly and parallel with center line of the Columbia Bottom Road to the northern boundary line of the United States survey number one hundred and fourteen (114); thence eastwardly along said line to the center of the main channel of the Mississippi River; thence with the meanderings of said channel southwardly to the point of beginning; and the residue of what now constitutes the County of St. Louis shall hereafter be called St. Louis County.


City of St. Louis Boundary
Madison, Illinois
St. Louis County, Missouri
St. Louis City, Missouri
St. Clair, Illinois
270
70
64
44
44/55
55
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1
2
Miles
CITY OF ST. LOUIS
PLANNING & URBAN DESIGN AGENCY
FRANCIS G. SLAY, Mayor
File:...\sde\theme\citywide\citywide_tp_wcounty.mxd
Generated 22 March, 2006 by CTAM-Q

RECEIVED
CITY REGISTER

2006 NOV 7 AM 9 52

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2013

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

www.dnr.mo.gov

MEMORANDUM

DATE: October 18, 2013

TO: Mound Street PCB's Technical File and Laclede Coal Gas Technical File

FROM: Hillary Wakefield, Project Manager HBW
Hazardous Waste Program, Superfund Section, Site Assessment Unit

SUBJECT: Site Visit to Mound Street PCB's & Laclede Coal Gas Sites

On September 26, 2013, Superfund staff from the Missouri Department of Natural Resources (DNR) conducted a site visit to two sites: Mound Street PCB's and Laclede Coal Gas in the city of St. Louis near the Mississippi River.

DNR personnel, Chinwe Ndubuka and Hillary Wakefield of the Site Assessment Unit arrived at the intersection of Mullanphy and North 1st Streets at 11:15 a.m. Staff observed and took several pictures of the Center Point Terminal Company petroleum storage facility that is located at this intersection. Center Point Terminal Company is operated by Petroleum Fuel & Terminal Company. Signs restricting access onto the facility were located in several different places on the fencing that encompasses the above ground petroleum tanks. This location, where the 5 larger tanks sit, on the west side of Commercial Street, is the location of the Mound Street PCB's and Laclede Coal Gas sites. The Mound Street PCB's site is located more to the northeast corner of the Center Point Terminal's property, by the intersection of Mound and Commercial Streets.

Staff then drove east past the floodwall and along the Great Rivers Greenway Riverfront Trail to an old brick and windowless building. The Riverfront Trail is an eleven mile trail that follows the Mississippi River and is used by bicyclists, in-line skaters, and hikers. The old brick building was identified as the Mullanphy Pump House, built circa 1900. This Pump House is currently used for passersby as a viewing place to observe the construction of the Stan Musial I-70 Bridge and/or to view the river. There was no sign of the Metropolitan Sewer District (MSD) Pump Station estimated to be located north of the Mullanphy Pump House under the new bridge. In 1993, the St. Louis MSD reported to DNR a concern about oils seeping into the MSD Brooklyn Street Pump Station. During this site visit, it was suspected that the Brooklyn Street Pump Station might have been removed in order for the bridge construction to occur.

The area where the Mound Street Power Plant (Mound Street PCB's site) once sat was identified and now is currently vacant, a grass covered area with no buildings occupying it. This was

located to the west of Commercial Street, just north of one of the tanks and outside the fencing. Nothing resembling oil/coal tar stains were noticed on the grass covered area. Vegetation seemed typical and not stressed from any kind of contaminant in this type of industrial setting. A GPS reading was collected at this location, along with several pictures.

While observing the location where the Mound Street Power Plant once sat, it was noted that Mound Street really was not operating as a thorough street anymore (like some aerial maps currently show). Workers at the petroleum facility seem to use the missing section of Mound Street as a private road.

The bridge construction group has set up several temporary office buildings and an area for workers to park just north of Mound Street. The buildings and parking area was observed just south of the bridge, right under the bridge, and just a little south of the Continental Cement Company's active facility. Located to the west and northwest of the Mound Street PCB's/Laclede Coal Gas sites was a large State Correctional Facility with a chain linked fence and no trespassing signs surrounding their property.

The Project Manager noted the location of the former homeless encampment, once known as "Hopeville" and noted the southeast intersection of Mullanphy and Commerical Streets was indeed nonexistent and seemed to be unoccupied for quite a long time.

The DNR personnel left the area at 1145. The pictures taken and the GPS point collected from this site visit will be used in the photographs and maps appendices in the Mound Street PCB's Site Reassessment (SR) and Laclede Coal Gas SR.

HW

attachment

Mound Street PCBs site
& Laclede Coal Gas site
Site Visit

Thursday
September
26, 2013
Pg. 1 of 4

approx. 78°F Clear, sunny
no- light breeze
Hillary Wakefield, SAIC Proj. Mgr.
Chinwe Ndubuka, SAIC Proj. Mgr.
-Arrived @ Mullanphy & Commercial streets at 11:15am. Staff observed & took pictures of the Center Point Terminal Companys petroleum storage facility, currently in operation. Petroleum facility's access was restricted with fencing & signs found around the petroleum tanks.
Staff then drove down towards the Mississippi River along the Greenway Riverfront Trail (used for bikers & hikers). The Mullanphy Pump House (built circa 1900) was still in place & currently being used a a viewing place to observe the new Stan Musial I-70 Bridge be constructed. There was no sign of the Brooklyn Street Pump House

→

located north of the Mullanphy pump house. The construction of the bridge is taking place right over Brooklyn Street, so maybe the pump house was removed in order for the bridge construction to take place?

Staff then drove up Commercial Street in between train tracks & the Petroleum Storage Facility. The area where the Mound Street Power Plant once sat was observed. A GPS reading was collected, along w/ several pictures. The area where the Power Plant was, was vacant, no building & had a grassy cover. No stains from oil/coal tar were noticed. Vegetation seemed okay & not stressed from any kind of contaminants.

Staff drove up Commercial Street to "Brooklyn Street" (under bridge). It should be noted that Mound Street really wasn't a thorough street and used mostly for

workers at the petroleum facility. Driving under the bridge, it was observed that the construction group (for the bridge) had set up several temporary offices & an area for workers to park. These buildings & park area was observed just south of the bridge. Right under the bridge & just a little north, Continental Cement Company had an active facility.

To the west & northwest of the Mound Street PCB/Laclede Coal Gas site was a large State Correctional facility with a chain linked fence & no tresspassing signs surrounding the property.

On the way off the site, it was noted the homeless encampment to the southeast of Mullanphy & Commercial Streets was no longer and seemed to be unoccupied for quite a long time.

Staff left @ 11:45a Map →

Mound Street PCBs & Laclede Coal Gas

Site Sketch

From: Michael.Jackson@amwater.com
To: Wakefield, Hillary
Subject: RE: drinking water intakes on the MI River near St. Louis
Date: Tuesday, April 22, 2014 11:42:08 AM

This is what our internal affairs folks said we can offer.

What we say, in the Metro East, including Granite City, is we serve 73,000 metered customers (250,000 population)

Thank You,
Michael R. Jackson
Director, Production
Illinois American Water - Central Region
618 239 3238 Office
618 830 1771 Cell
michael.jackson@amwater.com

PRIVATE & CONFIDENTIAL:
This email and any attachments are for the sole use of the original intended addressee. If you have received this email in error, please immediately delete this message from your system and notify us at 618 239 3238

WARNING: Although reasonable precautions have been taken to ensure that no viruses are present in this email, It is the responsibility of the recipient to ensure that it is virus free and that there is no loss or damage arising in any way from the receipt and or use of this email.

From: "Wakefield, Hillary" <hillary.wakefield@dnr.mo.gov>
To: "'michael.jackson@amwater.com'" <michael.jackson@amwater.com>,
Cc: "Wakefield, Hillary" <hillary.wakefield@dnr.mo.gov>
Date: 04/21/2014 09:07 AM
Subject: RE: drinking water intakes on the MI River near St. Louis

Hi Mike. Were you able to gather any information for me to put in my report? I have been out of the office for an emergency surgery and recovery the past two weeks and had not seen an email from you and was making sure I didn't miss it.

Thanks very much!

Hillary L. Wakefield
Environmental Project Manager
Missouri Deparment of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, Missouri 65102-0176

Phone 573.751.2475
Fax 573.751.7869

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit dnr.mo.gov.

From: Wakefield, Hillary
Sent: Friday, March 28, 2014 1:57 PM
To: 'michael.jackson@amwater.com'
Cc: hillary4nature@hotmail.com
Subject: FW: drinking water intakes on the MI River near St. Louis

Thank you Mike.

Hillary L. Wakefield
Environmental Project Manager
Missouri Deparment of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, Missouri 65102-0176
Phone 573.751.2475
Fax 573.751.7869

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit dnr.mo.gov.

From: Wakefield, Hillary
Sent: Wednesday, March 26, 2014 4:42 PM
To: 'infoil@amwater.com'
Cc: Wakefield, Hillary
Subject: drinking water intakes on the MI River near St. Louis

To whom it may concern,

I am conducting an environmental report on a hazardous waste site that located several hundred feet from the Mississippi River in downtown St. Louis, Missouri (North 1st Street and Mullanphy, St. Louis, MO). Reading over several past reports on this site of concern, I read there are two water intake locations off the Mississippi River near this site. One is at Chouteau Island, which would be approximately 10 miles upstream from the site and the second intake is in Section 11 (SE ¼ of the SW ¼ of Section 11, T2N, R10W) in East St. Louis, Illinois. The intake data was retrieved back in the early 1990s and I would like to confirm if these two intakes are still operating. If so, could you tell me what size populations these intakes serve, please?

Thank you so kindly for your help!

Hillary L. Wakefield
Environmental Project Manager
Missouri Deparment of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, Missouri 65102-0176
Phone 573.751.2475

Fax 573.751.7869

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit dnr.mo.gov.

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2014b

STATE OF MISSOURI
MISSOURI DEPARTMENT OF NATURAL RESOURCES

POINT LOCATIONAL DATA COLLECTION SHEET

This sheet is used to record required point locational data. To record line, area, or vertical data, please complete the Supplemental Locational Data Collection Sheet.

1. FACILITY INFORMATION

1A. FACILITY ID (for official use only)

1B. PERMIT NUMBER OR OTHER IDENTIFIER
EPA ID # MOD981715980

1C. FACILITY OR SITE NAME
Laclede Coal Gas

1D. LOCATION (PHYSICAL/SITE) ADDRESS
Mullanphy & N. 1st Streets

2. DATA RECORDED FOR

(1) APCP	(2) ESP	(3) HWP	(4) LRP	(5) SWMP	(6) PDWB	(7) SWCP
(8) WPCB	(9) EAO	(10) EC	(11) SHPO	(12) Parks	(13) GSRAD	(14) Land Survey

2A. SECTION/UNIT
Superfund Section / Site Assessment Unit

3. LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR, ZONE 15 NORTH, METERS)

UTM Easting 745198.18 UTM Northing 4280861.75

4. HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		Interpolation	
Static Mode	G1	Source Map Scale: 1:24,000 1:100,000 Other _____	
Dynamic Mode (Kinematic)	G2	Topographic Map or DRG	I1
Differential Post Processing	G3	Aerial Photograph or DOQQ	I2
Precise Positioning Service	G4	Satellite Imagery	I3
Signal Averaging	G5	Interpolation Other	IO
Real Time Differential Processing	G6		

5. HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality		Interpolation Data Quality
FOM	± _____ Meters	± _____ Feet or ± _____ Meters
EPE	± _____ Feet or ± _____ Meters	
PDOP		

6. HORIZONTAL REFERENCE DATUM

All GPS readings must be referenced to NAD 83 | Interpolation Datum: NAD 83 or NAD 27

7. MANUFACTURER OF GPS RECEIVER

CMT	GARMIN	LOWRANCE	TRIMBLE	OTHER

7A. MODEL OF GPS RECEIVER
NA

8. COORDINATE DATA SOURCE

Description	Code	Description	Code	Description	Code	Description	Code
SERO	D2	PDWB	N2	GSRAD	P2	Dun & Bradstreet	DB
SWRO	D3	SWCP	N3	LSP	P3	EPA Headquarters	HQ
KCRO	D4	SWMP	N4	Kansas City Local Agency	L1	EPA, Region 7	R7
NERO	D5	EAO/TAP	N5	Springfield Local Agency	L2	Private Sector	PV
SLRO	D6	WPCB	N6	St. Louis City Local Agency	L3	Regulated Entity	RE
APCP	D7	DEQ Admin.	N7	St. Louis County Local Agency	L4	Tribe	TR
ESP	D8	SHPO	N8	MoDNR	M1		
HWP	D9	EC	N9	Contractor	CR		
LRP	N1	DSP	P1	Citizen	CT		

9. DATA COLLECTOR AND DATE			
YOUR NAME (PLEASE PRINT) Hillary Wakefield		DATE COLLECTED April 28, 2014	
10. REFERENCE POINT (Mark the feature where the locational data was collected. If needed, use box 11, Location Comments to provide enough information so someone could return to the collection site feature.)			
Reference Point	Code	Reference Point	Code
Indoor Air	AI	Outfall Pipe	OP
Air Monitoring Station	AM	Pile	PL
Air Release/Stack	AS	Pumping Station	PS
Air Vent	AV	Radioactive Source	RA
Ambient Air	AO	Road	RD
Building	BL	Railroad	RR
Bridge	BR	Soil Boring Sampling	SB
Buried Waste/Waste Pit Area	BW	Species of Conservation Concern	SC
Cave Entrance	CE	Sediment Sampling	SD
Center of Facility or Site	CF	Southeast Corner of the Facility or Site	SE
Center of Operations	CO	Soil Gas	SG
Containers	CT	Stratigraphic Test Hole – Oil & Gas	SH
Drums	DM	Surface Impoundment	SI
Described by Site Name	DS	Seep Area	SP
Exploratory Hole (Mineral Prospect)	EH	Spring	SR
Entry Point (Water enters distribution system)	EP	Soil Sampling	SS
Ecological Research Plot	ER	Surface Water Sampling	ST
Equipment Point of Use	EU	Southwest Corner of the Facility or Site	SW
Foundation Test Hole	FH	Tank	TK
Groundwater Sampling	GS	Water Treatment Plant	TP
Institutional Control	IC	Transfer Station	TS
Impacted Groundwater	IG	Abandoned Well	WA
Intersection (Road, Pipe, Street, Etc.)	IN	Coal Bed Methane Well	WB
Raw Water Intake Structure	IP	Industrial High Capacity Well	WC
Impacted/Contaminated Soil/Spill	IS	Dry Oil or Gas Well	WD
Infectious Waste	IW	Return Well	WE
Land Survey Corners	LC	Monitoring Well	WG
Loading Facility or Dock	LD	Heat Pump Well	WH
Landfill	LF	Irrigation Well	WI
Lagoon or Pond	LS	Drinking Water Well	WK
Main Office/Admin Building	MA	Gas Monitoring Well	WM
Main Access/Entrance/Gate	MG	Natural Gas Well	WN
Missouri Land Survey Monument	MM	Petroleum Well	WP
Material Recovery Facility	MR	Reconstruction Well	WR
Northeast Corner of the Facility or Site	NE	Class II Injection Well	WS
Northwest Corner of the Facility or Site	NW	Class V Injection Well	WT
Outcrop	OC	Vertical Well	WV
Descriptive Comments (use Location Comments below) and code as DC			

11. LOCATION COMMENTS (If needed, further describe the feature represented by the Reference Point.)

Center of operations point was placed on ArcMap map in the middle of the boundary of the site

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2014c

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

www.dnr.mo.gov

MEMORANDUM

DATE: October 14, 2014

TO: Laclede Coal Gas Technical File & Mound Street PCB's Technical File

FROM: Hillary Wakefield, Project Manager
Hazardous Waste Program, Superfund Section, Site Assessment Unit

SUBJECT: Laclede Coal Gas and Mound Street PCB's Site Visit and meeting with USEPA and Tetra Tech

On October 14, 2014, Superfund (SPF) staff from the Missouri Department of Natural Resources (DNR) met with US Environmental Protection Agency (USEPA) and Tetra Tech for a Site Visit of the Laclede Coal Gas and Mound Street PCB's sites. Individuals present were: Hillary Wakefield, DNR SPF Section Project Manager for the Site Assessment Unit; Heath Smith, USEPA Region 7 On-Scene Coordinator; and Keith Brown, Tetra Tech Senior Environmental Scientist.

The meeting between the two agencies (DNR & USEPA) included USEPA's contractor Tetra Tech. USEPA has hired Tetra Tech to conduct an assessment of the Laclede Coal Gas site. The interested parties met early in the morning, the temperature was in the 50s and it was cloudy and misting rain. After introductions were made, the three looked through several maps and discussed the past sampling events. Keith Brown was the project manager and author of the 1991 Ecology and Environment's Screening Site Inspection and explained and found the approximate locations of the past samples that were collected during that investigation.

The three went and talked to staff at the office of the Apex Oil Petroleum Fuel and Terminal (Apex Oil PFT). The Apex Oil PFT is a current operating facility in the location of the Laclede Coal Gas and Mound Street PCB's sites. The Manager, Tim Bishop was not present and another employee was present and answered many of the questions the parties had for him. Heath Smith filled in the present employee and updated him with the status of the upcoming assessment USEPA has planned. The employee was very cooperative and said he would inform Mr. Bishop and to let them know if there were any more questions or anything else was needed. After visiting with the employee in the Apex Oil PFT office, Ms. Wakefield, Mr. Smith, and Mr. Brown drove around the Apex Oil PFT facility and the properties around the facility observing potential sampling locations and possible locations where past manufactured gas operations occurred.

Ms. Wakefield, Mr. Smith, and Mr. Brown then drove down by the Riverfront Trail next to the Mississippi River. The Mullanphy Pump House had been severely vandalized since Ms. Wakefield's site visit in September 2013. Spray paint was observed all over the pump house and signs nearby. Concrete fixtures nearby were severely broken or had spray paint all over them.

Memo to Laclede Coal Gas Technical File & Mound Street PCB's Technical File
Laclede Coal Gas and Mound Street PCB's Site Visit and meeting with USEPA and Tetra Tech

Mr. Smith and Mr. Brown climbed down the rip rap to the edge of the river and noticed the oil sheens that "bubbled" up near the south side of the pump house. These sheens were observed to spread out to rather large areas before finally dispersing. The oil sheens were rather continuous and there seemed to be no long pauses between the oil dispersing in the water. Both Mr. Smith and Mr. Brown threw in rocks and pushed around with large sticks to see if the oily material was being triggered by something. Mr. Smith and Mr. Brown took pictures and recorded the oil coming up.

The site visit and meeting was concluded around noon. Upon concluding, Mr. Brown mentioned he would be in contact with Ms. Wakefield and Mr. Smith regarding the upcoming assessment.

HW:js

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2014d

REQUEST FOR FEDERAL ACTION

The **Missouri Department of Natural Resources** (Requesting Agency) requests, pursuant to Section 128(b)(1)(B)(i) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9608(b)(1)(B)(i), the assistance of the United States Environmental Protection Agency, Region 7 (EPA) in the evaluation of site conditions and/or the performance of a response action, for the following site:
Laclede Coal Gas (EPA ID#: MOD981715980)

Mullanphy & N. 1st Streets (In CERCLIS, the street address for Laclede Coal Gas is "Mound St & Broadway" which is incorrect (see attached map) and needs to be changed. The CERCLIS address is located 1 block northwest of the actual site.
Street Address

Apex Oil Petroleum Fuel and Terminal is currently operating and located at this site location
Property Description

St. Louis
City

City of St. Louis
County

Missouri
State

By making this request, the Requesting Agency recognizes that the EPA, or any other entity acting on behalf of the EPA, may use its authorities under CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, or any other federal statute, regulation or response program, to respond to and recover costs incurred in response to releases or threats of releases of hazardous substances, pollutants and/or contaminants at or from the site. By making this request, the Requesting Agency waives notice as otherwise required by Section 128(b)(1)(D) of CERCLA, 42 U.S.C. § 9628(b)(1)(D). The signatory of this request is authorized to make this request on behalf of the Requesting Agency.

Date **April 24, 2014**

Dennis Stum
Name

Superfund Section Chief
Title

Missouri Department of Natural Resources
Requesting Agency

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MDNR, 2015

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE RECORD

FILE: Laclede Coal Gas and Mound Street PCB's

DATE: March 30, 2015

TELEPHONE:
Incoming ()
Outgoing (X)

SUBJECT: Access to sample the property in late spring 2015

PERSONS INVOLVED:	REPRESENTING:
Hillary Wakefield	MDNR, HWP, Superfund
John Young	MDOC, Superintendent of St. Louis Community Release Center

SUMMARY OF CONVERSATION:
Ms. Wakefield contacted the St. Louis Community Release Center, located across N. 1st Street and to the west of the Laclede Coal Gas & Mound Street PCB's sites, regarding several questions for the Site Reassessment report. USEPA also requested a need to gain access to this site for their upcoming sampling event in June. Mr. John Young, Superintendent for the center was very helpful with answering the questions regarding how many persons the facility housed. The center houses up to 550 inmates and there are 135 full time employees at the center that work in three different shifts. Mr. Young estimated that anywhere from 5-15 visitors per day. Ms. Wakefield also discussed the upcoming sampling event and addressed the need for USEPA to gain access to the Center's property. Mr. Young was happy to help and said he would forward the information up the chain as soon as he received the email with all the information from Ms. Wakefield.

ACTION TAKEN:
Ms. Wakefield emailed Mr. Young with a summary of the upcoming sampling event and a USEPA Consent to Access for Environmental Investigation/Response form.

Hillary Wakefield
Environmental Specialist

March 30, 2015
Date of Signature

No. F00407814

STATE OF MISSOURI

Rebecca McDowell Cook
Secretary of State

CORPORATION DIVISION
AMENDED CERTIFICATE OF AUTHORITY
OF A FOREIGN CORPORATION

WHEREAS,

CENTER POINT TERMINAL COMPANY

FORMERLY,

DUNRAINE U.S. CORPORATION

INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE AND NOW IN EXISTENCE AND IN GOOD STANDING IN SAID STATE, AND QUALIFIED TO TRANSACT BUSINESS IN MISSOURI HAS DELIVERED TO ME, DULY AUTHENTICATED EVIDENCE OF AN AMENDMENT TO ITS ARTICLES OF INCORPORATION AS PROVIDED BY LAW, AND HAS, IN ALL RESPECTS, COMPLIED WITH THE REQUIREMENTS OF THE THE GENERAL AND BUSINESS CORPORATION LAW OF MISSOURI, GOVERNING AMENDMENTS TO THE ARTICLES OF INCORPORATION OF FOREIGN CORPORATIONS, AND IN ACCORDANCE THEREWITH ISSUE THIS CERTIFICATE OF AMENDMENT.

IN TESTIMONY WHEREOF, I HAVE SET MY HAND AND IMPRINTED THE GREAT SEAL OF THE STATE OF MISSOURI, ON THIS, THE 17TH DAY OF JUNE, 1996.

Rebecca McDowell Cook

Secretary of State

$25.00

S.O.S. #30

State of Missouri

Judith K. Moriarty, Secretary of State

P.O. Box 778, Jefferson City, Mo. 65102

Corporation Division

FILED
AND AMENDED CERTIFICATE OF AUTHORITY ISSUED
JUN 17 1996
Rebecca McDowell Cook
SECRETARY OF STATE

Application for an Amended Certificate of Authority for a Foreign Corporation

(Submit in duplicate with filing fee of $20.00)

The below corporation, relating to amending its certificate of authority of Foreign Corporation, does hereby state:

(1) Its name is: Dunraine U.S. Corporation

and is incorporated in the State of: Delaware; and it was qualified

in the State of Missouri on February 24, 1995.
(month/day/year)

(2) By appropriate corporate action on: May 15, 1996, the corporation:
(month/day/year)

(1) Changed its corporate name to: Center Point Terminal Company

Name it will use in Missouri if new name not available: N/A

(2) Changed its period of duration to: N/A

(3) Changed the state or country of its incorporation to: N/A

(3) There is attached hereto a Certificate of the Secretary of State of the State of Delaware relating to the amendment(s), set forth in item 2 above and showing that the Corporation is in existence and in good standing in said State.

(4) The effective date of this document is the date it is filed by the Secretary of State of Missouri, unless you indicate a future date, as follows: N/A
(Date may not be more than 90 days after the filing date in this office)

In affirmation thereon, the facts stated above are true.

Steven G. Twele, Vice President 5-15-96

(Authorized signature of officer or chairman of the board) (Title) (Date of signature)

Attached is a current certificate attesting to the change, duly authenticated by the secretary of state or other official having custody of corporate records in the state or country of incorporation.

Corp. #48 (1-93)

State of Delaware

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THAT THE SAID "DUNRAINE U.S. CORPORATION", FILED A CERTIFICATE OF AMENDMENT, CHANGING ITS NAME TO "CENTER POINT TERMINAL COMPANY", THE TWENTY-FIRST DAY OF MAY, A.D. 1996, AT 4 O'CLOCK P.M.

AND I DO HEREBY FURTHER CERTIFY THAT THE AFORESAID CORPORATION IS DULY INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL CORPORATE EXISTENCE NOT HAVING BEEN CANCELLED OR DISSOLVED SO FAR AS THE RECORDS OF THIS OFFICE SHOW AND IS DULY AUTHORIZED TO TRANSACT BUSINESS.

Edward J. Freel, Secretary of State

AUTHENTICATION: 7979358

DATE: 06-10-96

2238066 8320

960167956

TABLE H-STREAM CLASSIFICATIONS AND USE DESIGNATIONS

WATER BODY	CLASS	MILES	FROM	TO	COUNTY	COUNTY 2	IRR	LWW	AQL	CLF	CDF	WBC	SCR	DWS	IND
Mississippi R.	P	6.3	N Riverfront Park	Missouri R.	St. Louis City	St. Charles	x	x	x			B	x	x	x
Mississippi R.	P	28.3	Meramec R.	N Riverfront Park	St. Louis	St. Louis City	x	x	x				x	x	x
Mississippi R.	P	125.1	State Line	Ohio R.	Pemiscot	Mississippi	x	x	x			B	x	x	x
Mississippi R.	P	94.4	Cuivre R.	Lock and Dam 21	St. Charles	Marion		x	x			A	x	x	x
Mississippi R.	P	44.1	Missouri R.	Cuivre R.	St. Charles			x	x			A	x	x	x
Mississippi R.	P	44.6	Kaskaskia R.	Meramec R.	Ste. Genevieve	St. Louis	x	x	x			B	x	x	x
Mississippi R.	P	120.1	Ohio R.	Kaskaskia R.	Mississippi	Ste. Genevieve	x	x	x			B	x	x	x
Mississippi R.	P	37.5	Lock & Dam 21	Des Moines R.	Marion	Clark		x	x			A	x	x	x
Missouri R.	P	104.5	Mouth	Gasconade R.	St. Louis	Gasconade	x	x	x			B	x	x	x
Missouri R.	P	129.0	Chariton R.	Kansas R.	Chariton	Jackson	x	x	x			B	x	x	x
Missouri R.	P	135.0	Gasconade R.	Chariton R.	Gasconade	Chariton	x	x	x			B	x	x	x
Missouri R.	P	184.5	Kansas R.	State Line	Jackson	Atchison	x	x	x			B	x	x	x
Mistaken Cr.	P	6.5	Mouth	20,42N,7W	Osage			x	x			B			
Mistaken Cr.	C	1.5	20,42N,7W	30,42N,7W	Osage			x	x			B			
Moccasin Cr.	C	2.6	Mouth	26,63N,33W	Gentry			x	x			B			
Modoc Cr.	C	3.3	Mouth	25,46N,6W	Montgomery			x	x			B	x		
Monegaw Cr.	P	4.8	Mouth	21,38N,27W	St. Clair			x	x			A	x		
Monegaw Cr.	C	18.4	21,38N,27W	4,39N,28W	St. Clair			x	x			B	x		
Moniteau Cr.	P	25.7	Mouth	5,50N,14W	Howard			x	x			B	x		
Moniteau Cr.	C	14.4	5,50N,14W	16,52N,14W	Howard	Randolph		x	x			B			
Moniteau Cr.	C	16.1	16,46N,15W	21,46N,17W	Moniteau	Cooper		x	x			B	x		
Moniteau Cr.	P	19.6	Mouth	16,46N,15W	Cole	Moniteau		x	x			B	x		
Montgomery Br.	C	6.5	15,38N,23W	6,37N,22W	Hickory			x	x			B			
Mooney Br.	C	2.2	Mouth	3,33N,10W	Texas			x	x				x		
Moore Br.	C	5.7	Mouth	27,35N,31W	Vernon			x	x			B			
Moores Br.	P	3.0	Mouth	34,35N,33W	Vernon			x	x			B			
Moores Br.	C	2.3	34,35N,33W	33,35N,33W	Vernon			x	x			B			
Moreau R.	P	37.0	Mouth	1,43N,13W	Cole			x	x			A	x		
Morgan Cr.	C	1.5	Mouth	17,43N,14W	Cole			x	x			B			
Mormon Fk.	C	21.2	Mouth	19,42N,32W	Bates			x	x			B			
Morris Br.	C	1.0	Mouth	12,49N,7W	Callaway			x	x			B			
Morris Hollow	C	1.7	Mouth	17,22N,16W	Ozark			x	x			B			
Moss Br.	C	2.4	Mouth	16,66N,37W	Nodaway			x	x			B			
Moss Cr.	P	13.7	Mouth	34,52N,25W	Carroll			x	x			B			
Moss Hollow	C	1.0	Mouth	Sur 1963,42N,5E	Jefferson			x	x			B			
Mossy Cr.	C	0.2	Mouth	07,40N,21W	Benton			x	x			B			
Mound Br.	C	8.9	Mouth	13,40N,31W	Bates			x	x			B			
Mound Cr.	C	4.0	Mouth	7,56N,23W	Livingston			x	x			B			
Mountain Cr.	P	6.8	Mouth	23,35N,17W	Laclede			x	x			B			
Mouse Cr.	C	1.5	Mouth	22,47N,32W	Jackson			x	x			B			
Mozingo Cr.	C	5.1	Mouth	13,64N,35W	Nodaway			x	x			B	x		
Mud Cr.	C	17.5	Mouth	20,55N,13W	Monroe	Randolph		x	x			B			
Mud Cr.	C	4.3	Mouth	22,26N,7E	Butler			x	x			B			
Mud Cr.	C	1.3	Mouth	08,34N,04E	St. Francois			x	x			B			
Mud Cr.	P	4.5	36,56N,26W	23,55N,26W	Caldwell			x	x			B			
Mud Cr.	C	6.7	23,55N,26W	18,54N,26W	Caldwell	Ray		x	x			B			
Mud Cr.	C	1.5	Mouth	6,51N,15W	Howard			x	x			B			

	IRR	LWW	AQL	CLF	CDF	WBC	SCR	DWS	IND

IRR-Irrigation
LWW (LWP)-Livestock & Wildlife Watering
AQL (WWH, HHP)-Protection of Warm Water Aquatic Life, Human Health-Fish Consumption
CLF (CLH)-Cool Water Fishery
CDF (CDH)-Cold Water Fishery
SCR-Secondary Contact Recreation
DWS-Drinking Water Supply
WBC-Whole Body Contact Recreation
IND-Industrial

* The Water Body Name, Missouri Use Designations Dataset Version 1.0, August 20, 2013 (8-20-13 MUDD V1.0), refers to all streams in the Missouri Use Designation Dataset Version 1.0, August 20, 2013, that are not otherwise listed in Table H.

TABLE H-STREAM CLASSIFICATIONS AND USE DESIGNATIONS

WATER BODY	CLASS	MILES	FROM	TO	COUNTY	COUNTY 2	IRR	LWW	AQL	CLF	CDF	WBC	SCR	DWS	IND
Mississippi R.	P	6.3	N Riverfront Park	Missouri R.	St. Louis City	St. Charles	x	x	x			B	x	x	x
Mississippi R.	P	28.3	Meramec R.	N Riverfront Park	St. Louis	St. Louis City	x	x	x				x	x	x
Mississippi R.	P	125.1	State Line	Ohio R.	Pemiscot	Mississippi	x	x	x			B	x	x	x
Mississippi R.	P	94.4	Cuivre R.	Lock and Dam 21	St. Charles	Marion		x	x			A	x	x	x
Mississippi R.	P	44.1	Missouri R.	Cuivre R.	St. Charles			x	x			A	x	x	x
Mississippi R.	P	44.6	Kaskaskia R.	Meramec R.	Ste. Genevieve	St. Louis	x	x	x			B	x	x	x
Mississippi R.	P	120.1	Ohio R.	Kaskaskia R.	Mississippi	Ste. Genevieve	x	x	x			B	x	x	x
Mississippi R.	P	37.5	Lock & Dam 21	Des Moines R.	Marion	Clark		x	x			A	x	x	x
Missouri R.	P	104.5	Mouth	Gasconade R.	St. Louis	Gasconade	x	x	x			B	x	x	x
Missouri R.	P	129.0	Chariton R.	Kansas R.	Chariton	Jackson	x	x	x			B	x	x	x
Missouri R.	P	135.0	Gasconade R.	Chariton R.	Gasconade	Chariton	x	x	x			B	x	x	x
Missouri R.	P	184.5	Kansas R.	State Line	Jackson	Atchison	x	x	x			B	x	x	x
Mistaken Cr.	P	6.5	Mouth	20,42N,7W	Osage			x	x			B			
Mistaken Cr.	C	1.5	20,42N,7W	30,42N,7W	Osage			x	x			B			
Moccasin Cr.	C	2.6	Mouth	26,63N,33W	Gentry			x	x			B			
Modoc Cr.	C	3.3	Mouth	25,46N,6W	Montgomery			x	x			B	x		
Monegaw Cr.	P	4.8	Mouth	21,38N,27W	St. Clair			x	x			A	x		
Monegaw Cr.	C	18.4	21,38N,27W	4,39N,28W	St. Clair			x	x			B	x		
Moniteau Cr.	P	25.7	Mouth	5,50N,14W	Howard			x	x			B	x		
Moniteau Cr.	C	14.4	5,50N,14W	16,52N,14W	Howard	Randolph		x	x			B			
Moniteau Cr.	C	16.1	16,46N,15W	21,46N,17W	Moniteau	Cooper		x	x			B	x		
Moniteau Cr.	P	19.6	Mouth	16,46N,15W	Cole	Moniteau		x	x			B	x		
Montgomery Br.	C	6.5	15,38N,23W	6,37N,22W	Hickory			x	x			B			
Mooney Br.	C	2.2	Mouth	3,33N,10W	Texas			x	x				x		
Moore Br.	C	5.7	Mouth	27,35N,31W	Vernon			x	x			B			
Moores Br.	P	3.0	Mouth	34,35N,33W	Vernon			x	x			B			
Moores Br.	C	2.3	34,35N,33W	33,35N,33W	Vernon			x	x			B			
Moreau R.	P	37.0	Mouth	1,43N,13W	Cole			x	x			A	x		
Morgan Cr.	C	1.5	Mouth	17,43N,14W	Cole			x	x			B			
Mormon Fk.	C	21.2	Mouth	19,42N,32W	Bates			x	x			B			
Morris Br.	C	1.0	Mouth	12,49N,7W	Callaway			x	x			B			
Morris Hollow	C	1.7	Mouth	17,22N,16W	Ozark			x	x			B			
Moss Br.	C	2.4	Mouth	16,66N,37W	Nodaway			x	x			B			
Moss Cr.	P	13.7	Mouth	34,52N,25W	Carroll			x	x			B			
Moss Hollow	C	1.0	Mouth	Sur 1963,42N,5E	Jefferson			x	x			B			
Mossy Cr.	C	0.2	Mouth	07,40N,21W	Benton			x	x			B			
Mound Br.	C	8.9	Mouth	13,40N,31W	Bates			x	x			B			
Mound Cr.	C	4.0	Mouth	7,56N,23W	Livingston			x	x			B			
Mountain Cr.	P	6.8	Mouth	23,35N,17W	Laclede			x	x			B			
Mouse Cr.	C	1.5	Mouth	22,47N,32W	Jackson			x	x			B			
Mozingo Cr.	C	5.1	Mouth	13,64N,35W	Nodaway			x	x			B	x		
Mud Cr.	C	17.5	Mouth	20,55N,13W	Monroe	Randolph		x	x			B			
Mud Cr.	C	4.3	Mouth	22,26N,7E	Butler			x	x			B			
Mud Cr.	C	1.3	Mouth	08,34N,04E	St. Francois			x	x			B			
Mud Cr.	P	4.5	36,56N,26W	23,55N,26W	Caldwell			x	x			B			
Mud Cr.	C	6.7	23,55N,26W	18,54N,26W	Caldwell	Ray		x	x			B			
Mud Cr.	C	1.5	Mouth	6,51N,15W	Howard			x	x			B			

	IRR	LWW	AQL	CLF	CDF	WBC	SCR	DWS	IND

IRR-Irrigation
LWW (LWP)-Livestock & Wildlife Watering
AQL (WWH, HHP)-Protection of Warm Water Aquatic Life, Human Health-Fish Consumption
CLF (CLH)-Cool Water Fishery
CDF (CDH)-Cold Water Fishery
SCR-Secondary Contact Recreation
DWS-Drinking Water Supply
WBC-Whole Body Contact Recreation
IND-Industrial

* The Water Body Name, Missouri Use Designations Dataset Version 1.0, August 20, 2013 (8-20-13 MUDD V1.0), refers to all streams in the Missouri Use Designation Dataset Version 1.0, August 20, 2013, that are not otherwise listed in Table H.

Precipitation Threshold Climatology
Derived from 1971-2000 Averages

*Annual/seasonal totals may differ from the sum of the monthly totals due to rounding.

Month	# Days Total ≥ 0.01"	# Days Total ≥ 0.10"	# Days Total ≥ 0.50"	# Days Total ≥ 1.00"
JAN	9.0	4.9	1.4	0.4
FEB	7.2	4.4	1.4	0.5
MAR	10.5	7.2	2.6	0.9
APR	10.8	7.3	2.9	0.9
MAY	11.1	7.2	2.7	1.3
JUN	8.7	5.9	2.7	1.2
JUL	8.4	5.9	2.8	0.9
AUG	8.1	5.6	2.6	1.3
SEP	8.4	5.4	1.9	0.5
OCT	7.4	4.3	2.0	0.6
NOV	9.7	6.1	2.8	1.1
DEC	8.7	5.1	1.5	0.8
Annual	108.4	69.5	27.5	10.4
Winter	24.9	14.5	4.2	1.6
Spring	32.5	21.6	8.3	3.1
Summer	25.2	17.4	8.1	3.4
Fall	25.5	15.8	6.8	2.3

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
MWCW, 2013a

Historical Climate Data

Precipitation Summary
Station: 237452 ST LOUIS SCIENCE CTR, MO

1971-2000 NCDC Normals

Select a different Station | Select a different County

Element	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Precip (in)	2.01	2.06	3.70	3.82	3.92	3.73	3.78	3.70	2.69	2.81	4.06	2.56	38.84

Precipitation Extremes
Period of Record: 1968-2001

Month	High (in)	Year	Low (in)	Year	1-Day Max (in)	Date
JAN	4.89	1995	0.23	1978	2.40	01-13-1995
FEB	4.94	1990	0.52	1973	2.70	02-07-1999
MAR	9.14	1998	1.41	2001	3.36	03-28-1977
APR	11.09	1994	1.06	1977	3.48	04-29-1996
MAY	12.20	1995	1.21	1972	3.51	05-17-1995
JUN	10.13	1998	0.68	1992	3.47	06-24-2000
JUL	6.52	1998	0.54	1997	2.52	07-10-1991
AUG	7.59	1970	0.18	1969	3.05	08-07-1995
SEP	8.69	1993	0.61	1988	3.02	09-23-1993
OCT	6.53	2001	0.75	1989	2.00	10-07-1977
NOV	8.02	1992	0.30	1999	3.28	11-07-1996
DEC	7.44	1971	0.61	1996	3.35	12-10-1971
Annual	53.13	1993	24.82	1976	3.51	05-17-1995
Winter	10.26	1993	2.94	1970	3.35	12-10-1971
Spring	20.38	1995	6.98	1901	3.51	05-17-1995
Summer	20.47	1998	5.31	1976	3.47	06-24-2000
Fall	17.07	1993	3.82	1995	3.28	11-07-1996

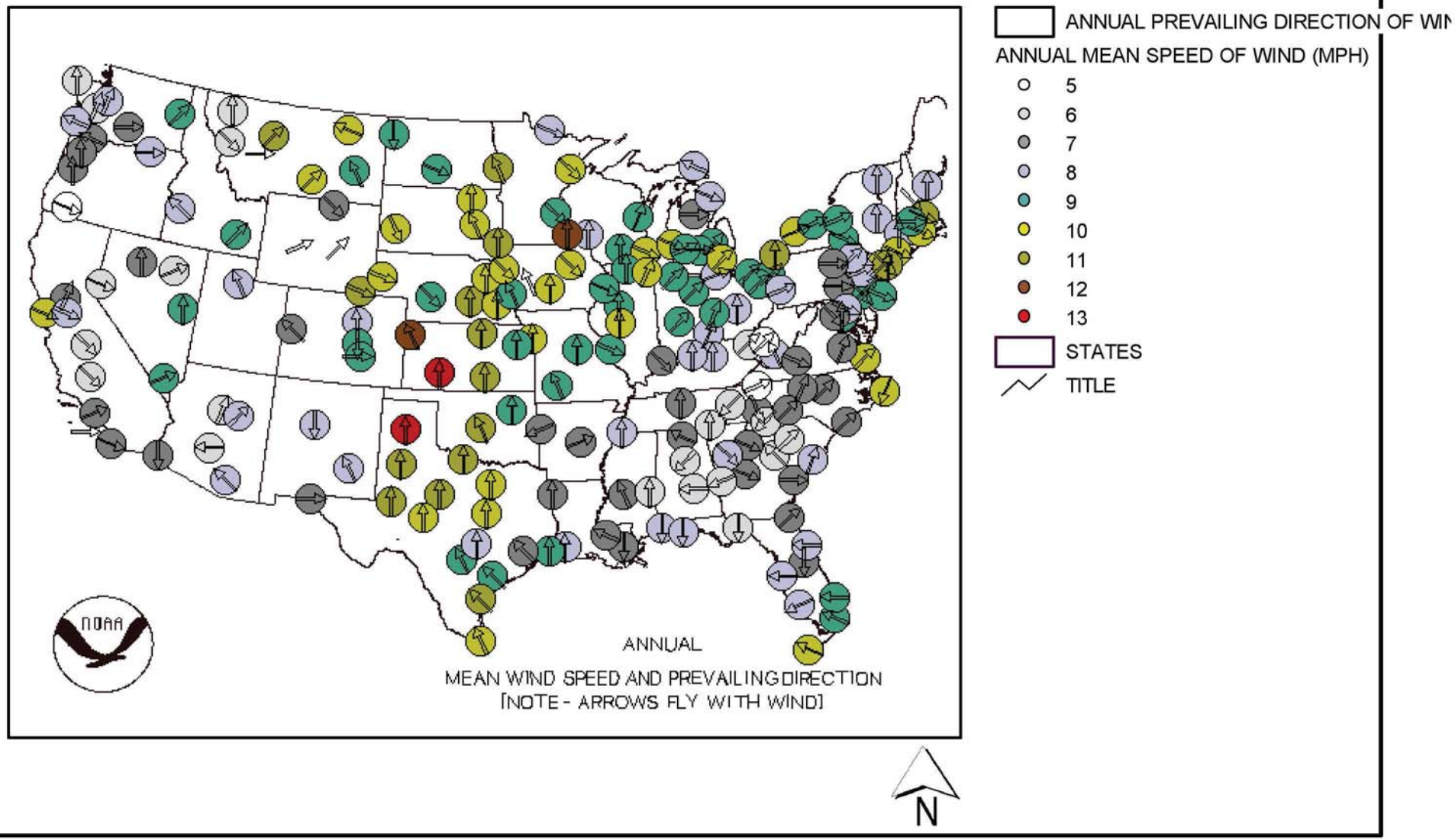
Temperature Threshold Climatology
Derived from 1971-2000 Averages

*Annual/seasonal totals may differ from the sum of the monthly totals due to rounding.

Month	# Days Max ≥ 90°F	# Days Max ≤ 32°F	# Days Min ≤ 32°F	# Days Min ≤ 0°F
JAN	0.0	11.0	25.2	1.6
FEB	0.0	5.5	19.7	0.4
MAR	0.0	1.2	11.8	0.0
APR	0.3	0.0	1.7	0.0
MAY	2.1	0.0	0.0	0.0
JUN	9.4	0.0	0.0	0.0
JUL	16.6	0.0	0.0	0.0
AUG	11.9	0.0	0.0	0.0
SEP	4.2	0.0	0.0	0.0
OCT	0.3	0.0	0.6	0.0
NOV	0.0	0.7	9.6	0.0
DEC	0.0	5.3	20.4	0.4
Annual	44.4	24.0	89.1	2.5
Winter	0.0	21.9	65.3	2.5
Spring	2.3	1.2	13.5	0.0
Summer	37.8	0.0	0.0	0.0
Fall	4.6	0.7	10.3	0.0

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
NCDC, 2013

ESRI ArcExplorer 1.1



Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
PFT, 1993

Petroleum Fuel & Terminal
Foot of Mullanphy Street
St. Louis, Missouri 63102
(314) 621-0522

Charles Gay
Fire Inspector
Fire Prevention Bureau
1421 North Jefferson
St. Louis, Missouri 63106

Dear Mr. Gay

Per our conversation on September 8, 1993. We discovered the leak during our yearly hydro teasting of our pipe lines/hoses. When we experienced a loss of 25# lb of pressure.

We then started to isolate the most likly place and this would be in the expansion joint at the sea wall. After excavating the site we then found a small pen hole in a 6 inch pipe line. After making the necessary repairs we decided to take this pipe line out of service.

We recovered 2 1/2 bbls of oil/soil to be disposed of. If you feel the need to contact me on this mater please feel free to do so at (314) 621-0522.

Thank you

Randel H. Lewis
Terminal Manager

HE 9/30/93

Post-It™ brand fax transmittal memo 7671 | # of pages ▸

To Howard Edmond	From Charles Gay
Co.	Co.
Dept.	Phone #
Fax #	Fax #

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
Sverdrup, 1996

REMEDIAL PLANNING ACTIVITIES AT SELECTED UNCONTROLLED HAZARDOUS SUBSTANCES DISPOSAL SITES IN A ZONE FOR EPA REGIONS VI, VII, & VIII

U.S. EPA CONTRACT NO. 68-W9-0032

Site: MOUND ST. PCB
ID #: MO000093682
Break: L.5
Other: 5-27-96

SCREENING SITE INSPECTION REPORT FOR SITE ASSESSMENT ACTIVITY AT MOUND STREET PCB SITE ST. LOUIS, MISSOURI

Work Assignment No.: 037-7JZZ

May 24, 1996

Prepared for:
U.S. Environmental Protection Agency

Prepared by:

SVERDRUP CORPORATION
4400 College Boulevard
Suite 160
Overland Park, Kansas 66211

30024051
Superfund

REMEDIAL PLANNING ACTIVITIES AT SELECTED UNCONTROLLED HAZARDOUS SUBSTANCES DISPOSAL SITES IN A ZONE FOR EPA REGIONS VI, VII, & VIII

U.S. EPA CONTRACT NO. 68-W9-0032

SCREENING SITE INSPECTION REPORT FOR SITE ASSESSMENT ACTIVITY AT MOUND STREET PCB SITE ST. LOUIS, MISSOURI

Work Assignment No.: 037-7JZZ

Prepared by: Michael W McCurdy Date: 5-24-96
Michael McCurdy, CHMM
Site Manager

Reviewed by: Michael T. May Date: 5-24-96
Michael T. May, Ph.D., P.G.
Technical Review

Reviewed by: Michael W McCurdy FOR Date: 5-24-96
Steve M. Hornung, P.E.
ARCS QA/QC Manager for Region VI, VII, & VIII

Reviewed by: C M Gross Date: 5/24/96
C. Michael Gross, P.G.
Director of Technical Services

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1.0 INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), Sverdrup Corporation, Inc. (Sverdrup), was tasked by the U. S. Environmental Protection Agency (EPA) Region VII, under Work Assignment Number 37-7JZZ, to conduct a Screening Site Investigation (SSI) at the Mound Street PCB Site located in St. Louis, Missouri. The CERCLIS I.D. number for the site is MO0000093682. St. Louis, Missouri is located in St. Louis County, on the eastern edge of the state. Sverdrup conducted SSI field activities during the week of April 1, 1996.

1.1 SCREENING SITE INSPECTION OBJECTIVES

The objectives of the Mound Street PCB SSI were to investigate the threat to human health and the surrounding environment associated with this site, and in particular, the potential for polychlorinated biphenyl (PCB) contamination. These objectives were evaluated by the verification of benzene and polynuclear aromatic hydrocarbon (PAH) contamination in the shallow alluvial aquifer, verification of soil PAH concentrations, identification of PCB levels below detection limits, and the associated potential impact of contaminants to human health and the environment. The surface water pathway is the primary pathway of concern for the site. The groundwater and soil exposure pathways are of concern in that they contribute to the surface water pathway.

Groundwater sampling and identification of contamination has previously been conducted adjacent to this site, as part of an SSI on the former Laclede Coal Gas Facility. The Mound Street PCB Site is a subsite of the Laclede Coal Gas Site. Contaminants (benzene, PAHs, and cyanide) have been detected in existing monitoring wells. These monitoring wells were installed in a water bearing zone on the west side of the St. Louis concrete flood wall, constructed by the Army Corps of Engineers. There is no groundwater use on the site or within a 4-mile radius of the site on the Missouri side of the Mississippi River. St. Louis and Illinois cities obtain drinking water from intakes located on the Mississippi River; however, only one drinking water intake is located within the 15-mile target distance limit. Several Illinois cities obtain drinking water from the groundwater; however, they are beyond the 4-mile radius target distance.

Soil sampling and identification of contamination has previously been conducted adjacent to this site, also as part of the SSI on the former Laclede Coal Gas Facility. Contaminants include benzene, toluene, xylene, PAHs, and cyanide. These identified contaminants were detected in shallow soil samples and in deeper samples collected during Field Analytical Support Program Screening in boreholes.

Surface water and sediment sampling have previously been conducted adjacent to this site, also as part of the SSI on the former Laclede Coal Gas Facility. Contaminants included PAHs, metals, and cyanide.

Oil samples were collected from the basement of the Mound Street PCB Site building during two different investigations; six samples by the St. Louis Division of Health, and six samples by the E&E/FIT during the Preliminary Assessment (PA) site reconnaissance of the Mound Street Power Plant Site. Two additional samples were collected from manholes in Mound Street by the E&E/FIT during the PA site reconnaissance. The oil samples were analyzed for PCBs, with all results being below the detection limits for PCBs.

1.2 SCOPE OF WORK

The scope of this SSI activity includes the following tasks:

- Review site-specific background information, including the PA report for the Mound Street PCB Site and documents related to the Laclede Coal Gas Facility.

- Prepare a Management Work Plan (MWP) for the activities at the site to include reports and other deliverables to be generated, a level of effort (LOE) schedule, along with an activity schedule with milestone completion dates. The MWP for the Mound Street PCB site was submitted to Region VII EPA on October 12, 1995.

- Conduct a site reconnaissance to verify site conditions and obtain additional background information. The site reconnaissance at the Mound Street PCB site was conducted by Sverdrup personnel on December 6, 1995.

- Conduct a SSI scoping meeting with the Region VII EPA Site Assessment Manager (SAM) to propose a strategy for sampling the site with available resources. The scoping meeting was held at the Region VII EPA headquarters on December 20, 1995.

- Prepare a Field Sampling Plan (FSP) for the site to include sampling procedures, field methods, proposed sample locations, analytical services request (ASR), quality assurance and quality control (QA/QC) measures, and project management. The FSP for the site was approved by Region VII EPA on March 26, 1996.

- Conduct sampling activities as per the sampling strategy discussed in the scoping meeting and procedures outlined in the FSP. Sampling activities at the site were conducted on April 2 - 3, 1996.

- Calculate a draft site score using Site Inspection Worksheets so that a priority for future work at the site, if warranted, can be assigned.

- Prepare a draft SSI report including a summary of site-specific information. The summary includes analytical results collected by Sverdrup and additional site recommendations.

- Prepare a final SSI report, incorporating any revisions requested by the Region VII EPA comments.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The Mound Street PCB Site is located in the City of St. Louis at the eastern end of Mound Street (near the intersection of Mound Street and First Street) (Figure 1). The site is on the western side of the concrete flood wall constructed along the Mississippi River by the U.S. Army Corps of Engineers. The geographic coordinates of the site are 38° 38' 34.0" north latitude and 90 10' 57.2" west longitude (Reference 8). The site can be reached by traveling north on Broadway from Interstate 64, or south on Broadway from the Salisbury Street exit off Interstate 70. From Broadway take Mullanphy Street east, and turn north (left) onto a gravel roadway just past the Petroleum, Fuel and Terminal-Apex Oil (PFT-Apex Oil) facility on the left. Take the gravel roadway north to Mound Street. The site is encompassed by Mound Street, the gravel roadway, and the PFT-Apex Oil facility (Figure 2).

2.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

The Mound Street PCB Site is part of the Laclede Coal Gas Site (MOD981715980). The Laclede Coal Gas Site also includes the PFT-Apex Oil facility located west and south of the Mound Street PCB Site (Figure 3).

The total area of the Mound Street PCB Site is estimated at approximately 1.5 acres (References 15 and 22). The buildings on the site were demolished in 1991, and the property currently has no structures upon it (Appendix A, Photo 1). The property is owned by McKinley Iron, Inc. located at 3620 North Hall Street, St. Louis, Missouri. Mr. Herman Gellman, representative of McKinley Iron, was present during a portion of the SSI site reconnaissance activities conducted at the site on December 6, 1995. Mr Gellman was interviewed during the site reconnaissance. He did not know if the basement walls and floor were removed during building demolition. He did state that the basement area was probably filled with demolition debris. He was not aware of any unusual observations made, such as stained soil or odors, during the building demolition. He estimated the basement depth to be between 12 and 14 feet. Mr. Gellman stated the property was originally purchased from Union Electric to salvage power plant equipment.

The site is roughly rectangular in shape and is bordered on three sides by industrial property (Figure 2). Gravel roads are located along the property perimeter, with Mound Street being the northern boundary. An east-west dirt path has been made across the property. No fencing or other barrier exists around the property. Bricks, rock, wood, metal, brush, and concrete debris are located on the southern portion of the property. Several small soil piles were observed along the southeastern edge of the property (Appendix A, Photo 2). Two 55-gallon drums were also observed adjacent to the debris. No visible markings were noted on the drums and no attempt was made to open them. The contents of the drums are unknown. The northern portion is overgrown with grass and weeds and other vegetation (Appendix A, Photo 3). The general surface runoff is toward the east and south. To the east is vacant property with railroad tracks, the concrete flood wall, and then the Mississippi River (Reference 22).

The St. Louis Metropolitan Sewer District (MSD), Brooklyn Street pump station is located approximately 575 feet north-northeast of the site. The pump station is located on the west side of the flood wall (Appendix A, Photo 4). Two wells sampled in 1991 by E&E/FIT and three manholes sampled by MSD in 1993 were identified (Figure 2). An abandoned pump house, once part of the Mound Street Power

Plant, is located on the east side of the flood wall. The abandoned pump house is in poor condition. At the time of the site reconnaissance visit, the water level of the Mississippi River was at the bottom of the pump house. According to Mr. Gellman, the property occupied by the abandoned pump house was deeded to the City of St. Louis for the construction of a bike path along the river (Reference 22).

The site is part of the Laclede Gas and Light Company former manufactured gas plant (FMGP), which operated in the late 1800s to the mid-1940s (Figure 3). Laclede Gas used a retort process for coal carbonization in the generation of gas. Approximately 930 million gallons of coal tar waste were produced at this facility. It is estimated that approximately 76 percent of the waste was sold, with the remaining 24 percent being buried on-site (Reference 4). This equates to approximately 224 million gallons of coal tar waste potentially buried at the site. On-site burial was typically conducted in unlined pits. In 1940, operations were split between Laclede Gas Light Company (Laclede Gas) and Laclede Power and Light Company (Laclede Electric) (References 3 and 4).

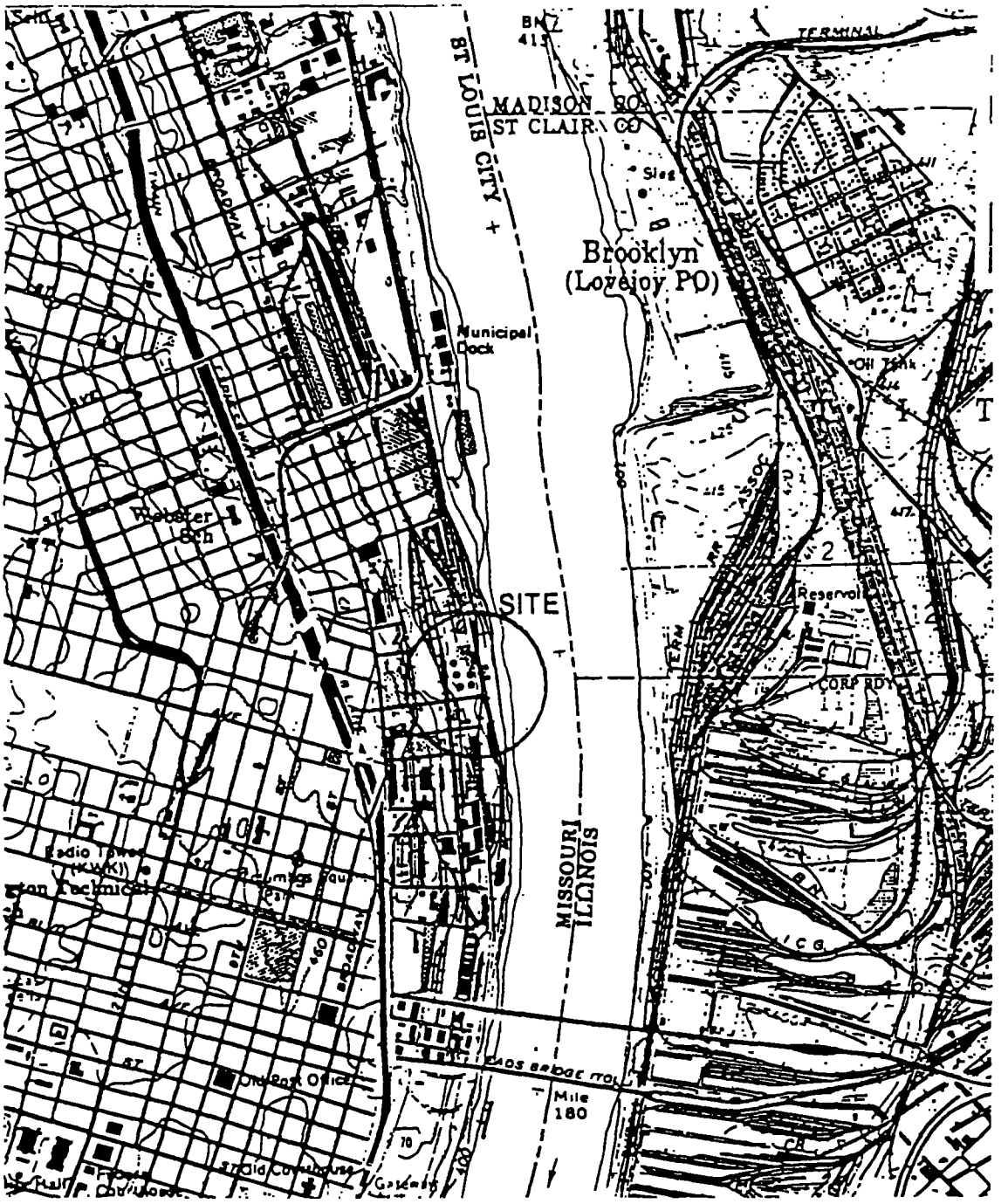
In 1945, Union Electric (UE) purchased the entire coal gas facility and operated the Mound Street Power Plant from 1945 to 1973. UE did not manufacture coal gas at this site. In 1969, the Apex Oil Company purchased the former coal gas works (Laclede Gas) from UE. UE, however, continued to operate its electrical facility from the former Laclede Electric works (Figure 4). The Apex Oil Company utilized the site as a tank farm for the storage of petroleum fuels until the mid-1980s, when it became an asphalt product terminal (Figure 4; References 3 and 4). The PFT-Apex Oil facility is currently still operating at this location.

In 1973, the UE property (Laclede Electric works) was transferred to the Tenlis Company. Tenlis dismantled the power generation and transmission equipment. Transformer oil was reportedly disposed by Midwest Oil Company. The dismantled equipment was sold as scrap metal (Reference 4).

In 1981, Tenlis transferred the property to AZCON (Reference 3). The operations of AZCON are unknown; however, it was reported in the MDNR PA report that AZCON could have been a metal recycling company (Reference 15).

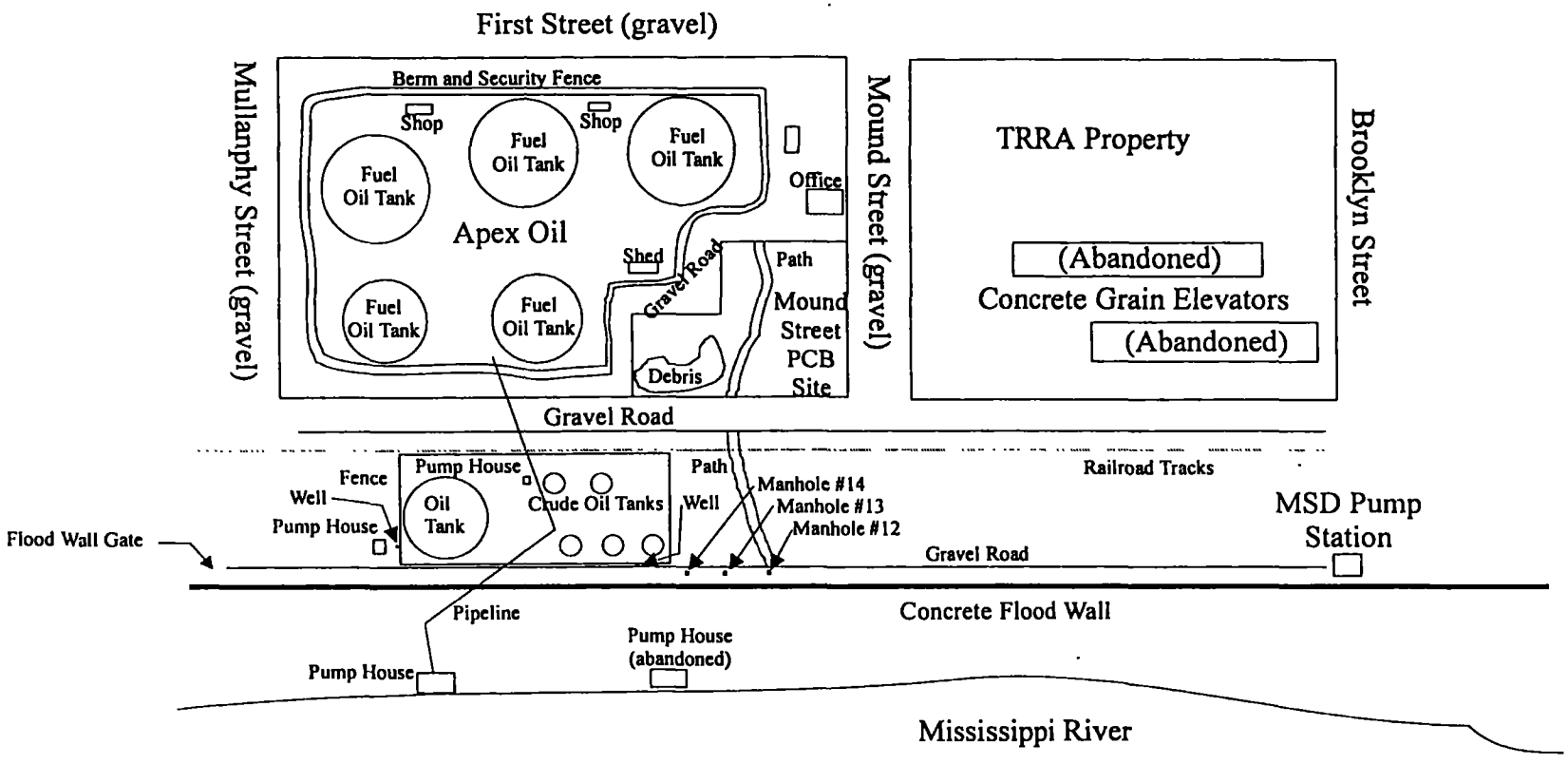
In 1985, Mound Street Corporation became the property owner and leased the building to an individual for an electric motor stripping operation (Reference 3). An oil fire occurred in the basement of the building in 1989, and the building was demolished in the spring of 1991 (Reference 15).

McKinley Iron became the owner of the property in 1993 (Reference 15). The property does not have any buildings or other structures, and is currently vacant (References 7 and 22).



Source: U.S. Geological Survey (USGS). 1954. Granite City, Illinois (photorevised 1974). 7.5 Minute Series Topographic Map.

Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	Site Location Map	Figure No.: 1
	SVERDRUP		11/95



Scale (Approx.)

Scale

0' 200' 400'

N

Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site. GEHM 1993. Activities Report, TRRA of St. Louis, First and Mound Streets Site, MDNR Spill Report #07143-KB-1331.

Project No.: 010865-370303

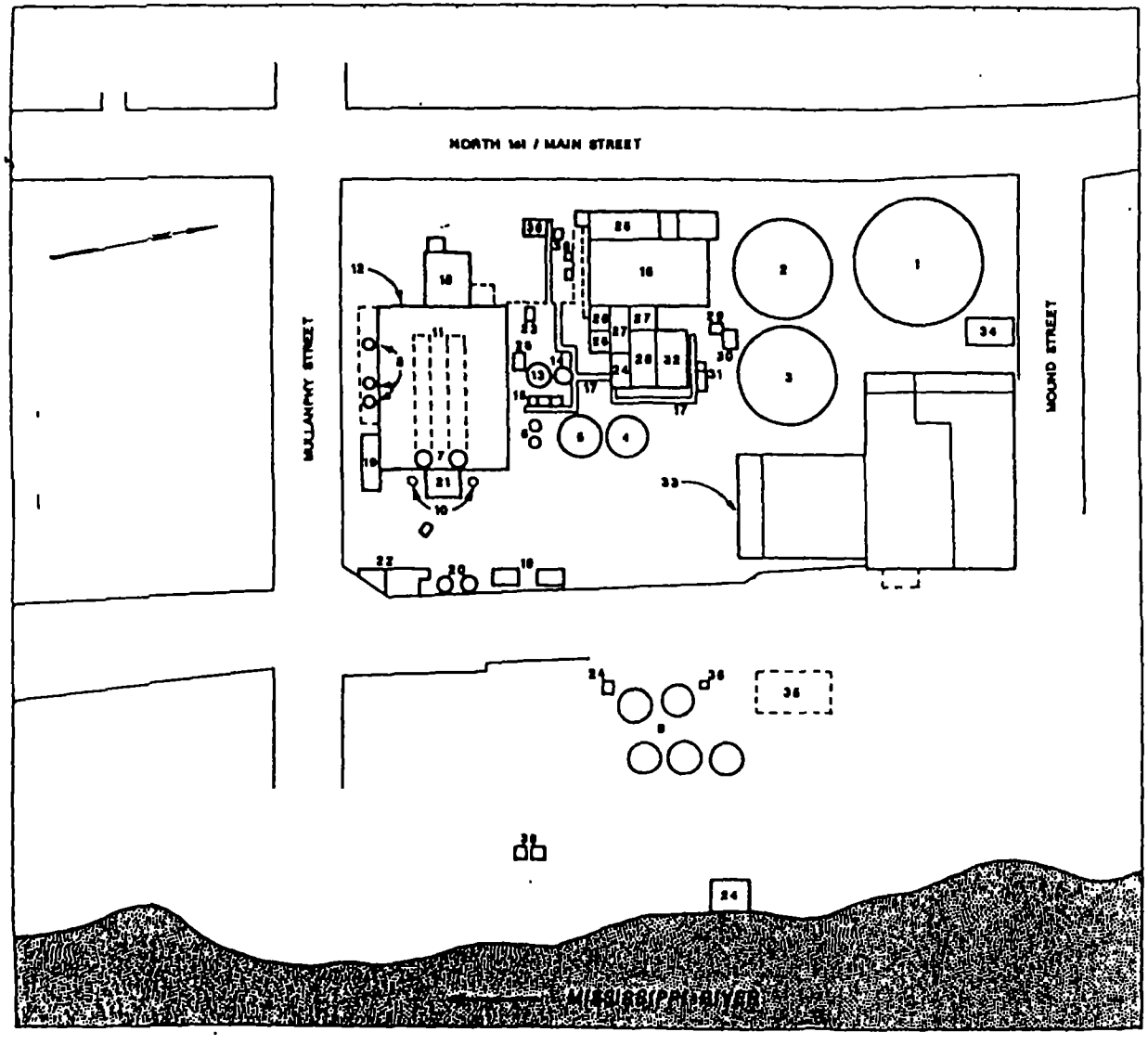
Mound Street PCB Site
St. Louis, Missouri

SVERDRUP

Site Map

Figure No.: 2

11/95



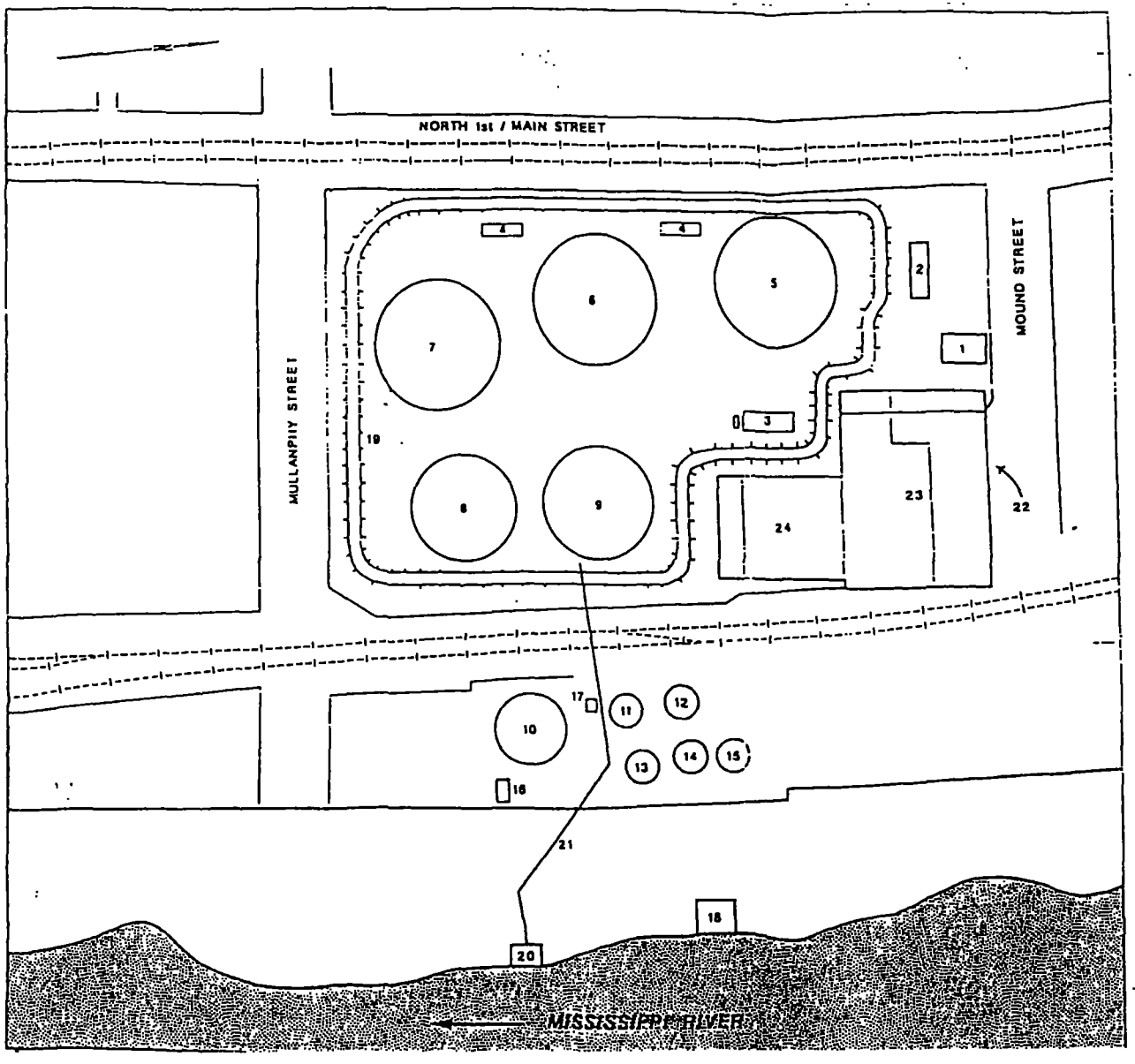
EXPLANATION

1. GAS HOLDER (787,927 Cubic Feet)
2. GAS HOLDER (666,431 Cubic Feet)
3. GAS HOLDER (337,368 Cubic Feet)
4. GAS PURIFIER (606 Cubic Yards)
5. GAS PURIFIER (606 Cubic Yards)
6. 2 - GAS SCRUBBERS (2,714 Cubic Feet Each)
7. 2 - TANKS, USE UNKNOWN (2,728 Cubic Feet Each)
8. 3 - TANKS, USE UNKNOWN (2,714 Cubic Feet Each)
9. 6 - FUEL OIL TANKS (130,725 Gallons Each)
10. 2 - RETORT SMOKE STACKS (80 Feet High And 8 Feet In Diameter Each)
11. 2 - BANKS OF RETORTS
12. RETORT HOUSE
13. AMMONIA WELL (56,111 Gallons)
14. AMMONIA WELL (22,626 Gallons)
15. TAR SEPARATOR (1,2244 Gallons)
16. PURIFIER HOUSE
17. PIPE TRENCHES (3 Feet Deep By 4 Feet Wide)
18. BLOWER HOUSE
19. GARAGE
20. TAR TANKS (53,844 Gallons Each)
21. STORAGE SHED
22. BLACKSMITH AND CARPENTER SHOP
23. STORAGE HOUSE
24. PUMP HOUSE
25. OFFICE AND METER ROOM
26. LABORATORY AND MACHINE SHOP
27. SCRUBBER HOUSE
28. CONDENSER HOUSE
29. GOVERNOR HOUSE
30. VALVE HOUSE
31. METER AND SWITCH HOUSE
32. EXHAUSTERS AND BLOWERS
33. LACLEDE ELECTRIC POWER FACILITY
34. OFFICE
35. TRANSFORMERS
36. UNKNOWN

MOUND STREET FACILITY
(LACLEDE GAS AND LIGHT CO.)
ST. LOUIS, MISSOURI
CIRCA 1900

SCALE
0 200
FEET

Source: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	Laclede Gas Coal Site circa 1900	Figure No.: 3
		SVERDRUP		11/95



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

1. OFFICE
2. TANKER TRUCK LOADING PLATFORM
3. EQUIPMENT SHED
4. EQUIPMENT/WORK SHOP
5. FUEL OIL TANK (80,000 Barrels)
6. FUEL OIL TANK (80,000 Barrels)
7. FUEL OIL TANK (80,000 Barrels)
8. FUEL OIL TANK (50,000 Barrels)
9. FUEL OIL TANK (55,000 Barrels)
10. OIL TANK
11. CRUDE OIL TANK
12. CRUDE OIL TANK
13. CRUDE OIL TANK
14. CRUDE OIL TANK
15. CRUDE OIL TANK
16. PUMP HOUSE
17. PUMP HOUSE
18. PUMP HOUSE (Abandoned)
19. CONTAINMENT BERM
    (For Fuel Oil Tanks, Capped With A Chain-link Fence)
20. PUMP HOUSE
21. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY

22. FORMER UNION ELECTRIC BUILDING
23. GENERATOR ROOM (Basement Plan)
24. BOILER ROOM (Basement Plan)

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)

SCALE
0 200
FEET

Source: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri SVERDRUP	Apex Oil Terminal and Union Electric Sites circa 1990	Figure No.: 4 11/95

2.3 PREVIOUS INVESTIGATIONS

The Mound Street PCB Site has had numerous investigations conducted since 1976.

- The U.S. Coast Guard investigated oil slicks in the Mississippi River, in the vicinity of the Mound Street PCB Site, three times between 1976 to 1987. The oil slicks were reportedly originating from the Mound Street Power Plant. The basement of the Mound Street Power Plant was the suspected source of oil; however, no specific source was identified. No samples were collected during any of the Coast Guard investigations (References 3 and 4).

- The St. Louis City Division of Health conducted an investigation of the Mound Street Power Plant on April 8, 1987. Six oil samples were collected from the basement of the Mound Street building and analyzed for PCBs. No PCB contamination was identified; however, detection limits were not recorded (References 3 and 4).

- The Ecology and Environment/Field Investigation Team (E&E/FIT) submitted a PA report of the Mound Street Power Plant Site on June 23, 1988. The field activities were conducted on September 17, 1987. Six oil, water and oil/water mixture samples were collected from the Mound Street building basement and two from manholes in Mound Street during the PA site reconnaissance (Figure 5). The samples were analyzed for PCBs. No PCB contamination was detected at a 1 mg/kg detection limit in any of the samples. The source of oil in the basement of the Mound Street Power Plant building (Mound Street PCB Site) was potentially identified as the adjacent PFT-Apex Oil terminal. It was stated in the report that PFT-Apex Oil had numerous spills, some of which entered the Mound Street building basement. Transformers and hydraulic oil tanks, located in the Mound Street building basement, were supposedly drained and removed in the 1970s; however, no records confirming the proper disposal of oil were available.

- The E&E/FIT conducted a site reconnaissance of the Laclede Gas and Light FMGP on November 20, 1990 for the preparation of the SSI work plan. Seepage was observed emanating from the foundation and piping system of an abandoned pump house, formerly part of the Mound Street Power Plant. The pipes were reportedly plugged with concrete; however, seepage was leaching through the concrete. The pump house is located on the eastern side of the flood wall, therefore, the seepage was going directly into the Mississippi River. No samples were collected and no description of the seepage material was made during the site reconnaissance (Reference 3).

- The E&E/FIT submitted a SSI report on the Laclede Gas and Light FMGP Site on October 29, 1991. Field activities for the SSI occurred on March 3-9, 1991. Subsurface soil, surface soil, sediment, surface water and groundwater samples were collected on and around the PFT-Apex Oil property. No samples were collected from the basement of the Mound Street Power Plant Building (Mound Street PCB Site), as originally planned, since the building was being demolished at the time of the SSI field activities. Numerous samples were collected in the vicinity of the Mound Street PCB Site. Only these sample results will be discussed below. Five borehole screening locations, four surface soil sample locations, three groundwater sample locations, three surface water sample locations, and three sediment sample locations are in the vicinity of the Mound Street PCB Site (Figures 6a and 6b). Screening results indicated the presence of benzene, toluene, xylene and PAHs in the subsurface soil in the vicinity of the Mound Street PCB Site (borings B01, B02, B03, B17 and B18). Boring B23 was utilized as a background location, and the results showed nondetect for volatiles, metals, and semivolatiles. Screening values for surface

water samples were nondetect for the same parameters. Screening analysis of sediment samples indicated the presence of xylene and PAHs. Surface and near-surface soil samples submitted for CLP analysis were collected from the 0 - 2 foot depth interval. Samples were analyzed for semivolatiles, total metals and cyanide. Cyanide and PAHs were detected above the background detection limits. Metal concentrations were negligible when compared to background levels. Sediment samples submitted for CLP analysis were analyzed for total petroleum hydrocarbons, volatiles, semivolatiles, cyanide and total metals. The extreme upgradient sample (Sample 402) exhibited the highest concentrations; however, results are comparable between sediment sample locations. No background sediment sample was collected. Analytical results for the soil screening samples, sediment samples and surface soil samples are shown in Table 1.

Five groundwater samples were collected (Samples 201, 202, 203, 204 and 206) and analyzed for volatiles, semivolatiles, cyanide and total metals. Groundwater sample analysis showed 65 ug/L acenapthalene, 25 ug/L fluorene, 46 ug/L phenanthene, 93 ug/L benzene and 1600 ug/L cyanide in Well 204. Well 203 sample analysis did not show any contamination except for 590 ug/L cyanide. Both cyanide results are "J" coded, the value is reported but not valid under approved QC procedures. Well 206 (background) did not show any contamination above detection limits.

Arsenic, barium, copper, chromium, nickel, selenium, vanadium, and zinc were not detected in four surface water samples (Samples 301, 302, 303 and 304), except as indicated. Surface water sample analysis showed lead levels at 7.0 ug/L for 301, 7.2ug/L for 301D, 9.7 ug/L for 302, $<$24 ug/L for 303, 18 ug/L for 304, and 15ug/L for 304D. Sample location 303 also showed barium at 280 ug/L, vanadium at 62 ug/L, zinc at $<$89 ug/L and an invalid selenium result of 11 ug/L. Sample location 304 and 304D showed chromium at 14 ug/L and 12 ug/L, respectively. Sample location 304 also had a result of 54 ug/L for zinc. Sample 304 was collected from the Illinois-American Water Company surface intake located across the Mississippi River from the site. Sample locations are shown in Figure 6. Surface water samples were analyzed for total petroleum hydrocarbons, volatiles, semivolatiles, cyanide and total metals. None of the samples collected during the Laclede Coal Gas SSI were analyzed for PCBs.

In the E&E/FIT SSI report, it is stated that a mixed source is present since BETX compounds "are not considered abundant in coal tar." The PAHs and cyanide were attributed to the former coal gas operations. It was also stated that some PAH contamination may be attributed to the adjacent PFT-Apex Facility, which stores oil and asphalt.

- On July 8, 1993 St. Louis MSD personnel discovered oil seeping into the Brooklyn Street storm water pump station, located at the eastern end of Brooklyn Street and approximately 400 feet north of the Mound Street PCB Site (Reference 7). This pump station is only operational during heavy precipitation or if the Mississippi River level is above flood stage. In July, 1993, the Mississippi River was above flood stage. A waste oil sample from the pump station wet well was collected and analyzed for PCBs by the MSD. A PCB concentration of 47 mg/L was detected (Reference 12). The possible source was identified as an underground storage tank (UST) on the adjacent property (Reference 19). On August 9, 1993, waste oil samples from three manholes located along the flood wall were collected and analyzed for PCBs by the MSD. These three manholes are part of the underdrain system for the flood wall and are not part of the storm sewer system. The concentrations of PCBs were 25.4 mg/L in Manhole F-GA1 (#12), 11.7 mg/L in Manhole F-GA1 (#13), 36.6 mg/L in Manhole F-GA1 (#14) (Reference 13). Five 55-gallon drums of waste oil were pumped out of the storm sewer by REACT Environmental Engineers and disposed of by

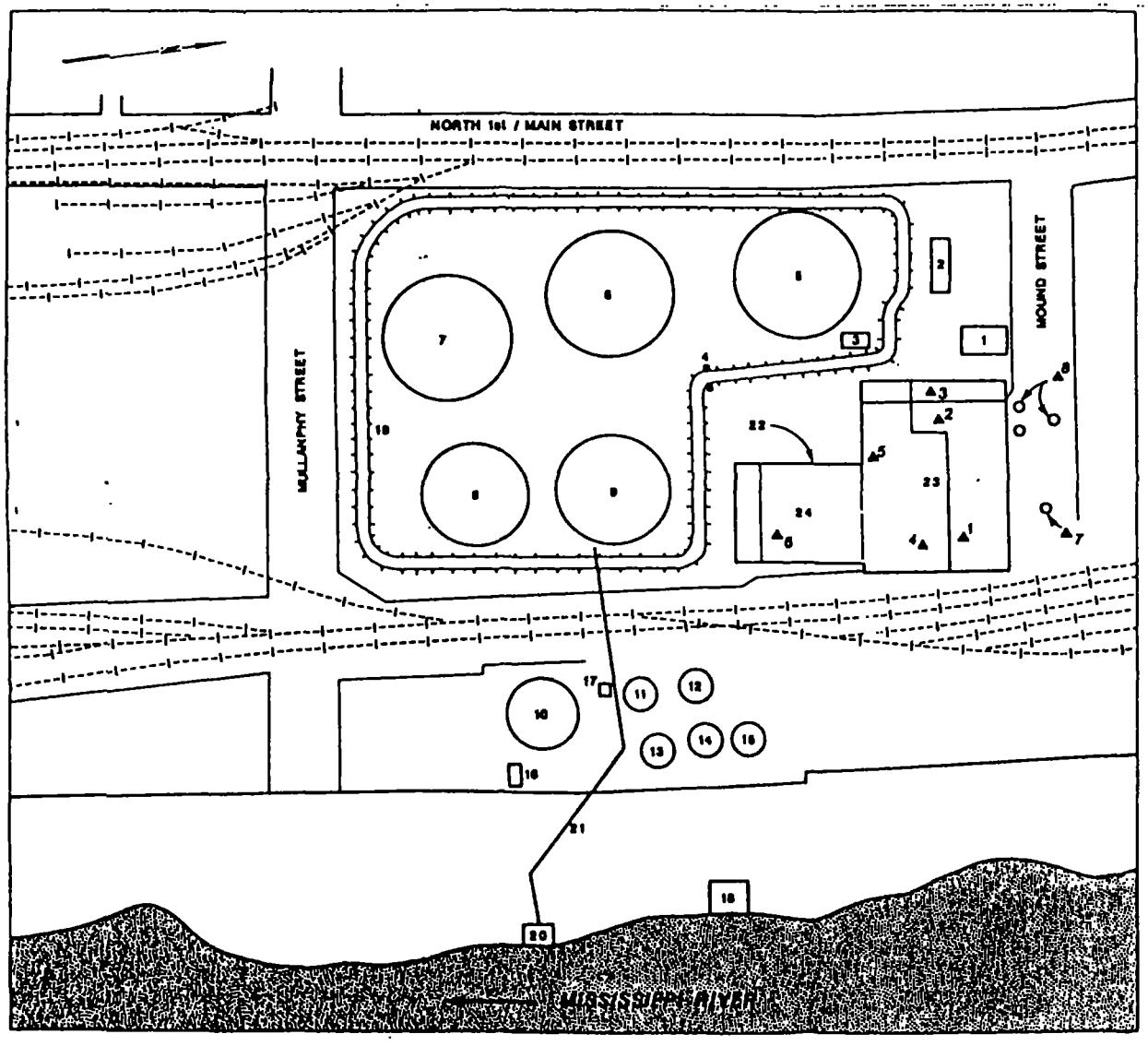
Tipton Environmental Services (References 5 and 7). In the conclusion of the Special Problem Investigation report completed by MSD, it is stated the UST appears to be the source of the oil in the pump station. It is further stated that ground saturation of oil from an old Union Electric facility is another possibility (Reference 19).

A 12,000-gallon UST (10.5 foot diameter by 18.5 feet long) containing petroleum products was discovered during an investigation to identify the potential source of the PCBs in the pump station (Reference 9). The UST was located on Terminal Railroad Association (TRRA) property, southwest of the Brooklyn Street pump station (Figure 7). The TRRA property is located on the north side of Mound Street, directly across from the Mound Street PCB Site (Appendix A, Photo 5). A sample was collected from the UST on July 14, 1993 by MSD. Sample analysis showed PCBs in the UST at 39 mg/L (Reference 12). The existence of the UST was unknown to TRRA prior to notification by the St. Louis Fire Marshall. The tank contents were removed on August 4, 1993 by Environmental Operations, under supervision by GEHM Corporation. Sixteen 55-gallon drums of sludge/liquid were removed from the UST. Sample analysis of the tank contents showed PCBs at less than 10 mg/kg (Reference 9). Analysis of soil samples collected from the UST excavation showed PCBs at less than 0.05 mg/kg (Reference 10). Approximately 30 cubic yards of soil were removed during excavation of a 16 foot wide, 25 foot long and 12 foot deep UST pit. It is estimated that less than 50 gallons of water was in the UST pit after excavation activities (Reference 10); however, no sample of the water was collected. On August 17, 1993 EnTech Engineering, under supervision by GEHM Corporation, conducted an Infrared Thermograph (IR/T) survey of the TRRA Site. No evidence of a leak plume was identified during this study. An anomaly was discovered, approximately 10 foot square, on the Mound Street PCB property. Boreholes were attempted at the location of the anomaly; however, they were abandoned after auger refusal at a depth of 5 feet due to encountering solid rock debris (Reference 9). The foundation or basement of the demolished Mound Street Site buildings could explain the presence of the IR/T anomaly (Reference 7).

A letter from Randel Lewis, Terminal Manager for the Petroleum Fuel and Terminal Facility, to Charles Gay, St. Louis City Fire Inspector, was written in response to a September 8, 1993 telephone conversation. In the letter, Mr. Lewis stated that a leak in a 6-inch pipeline was discovered at the facility. Repairs to the pipeline were made with approximately 2.5 barrels of oil/soil being disposed of. It was further stated that the pipeline was taken out-of-service. The letter does not indicate where the pipeline was located.

- The Missouri Department of Natural Resources (MDNR) submitted a PA report on the Mound Street PCB Site on March 21, 1994. Field activities for the PA occurred on November 11, 1993. No samples were collected during the PA. The conclusions of the PA report indicate that a threat from the groundwater pathway is very unlikely, a release to the Mississippi River appears likely, an exposure through the soil pathway is low and an exposure through the air pathway is also low.

No further incidences of oil in the Brooklyn Street pump station or manholes along the flood wall have occurred since the 1993 spill (Reference 6).



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

1. OFFICE
2. TANKER TRUCK LOADING PLATFORM
3. EQUIPMENT SHED
4. ENCLOSURE DRAIN PIPE
5. FUEL OIL TANK (80,000 Barrels)
6. FUEL OIL TANK (80,000 Barrels)
7. FUEL OIL TANK (80,000 Barrels)
8. FUEL OIL TANK (80,000 Barrels)
9. FUEL OIL TANK (55,000 Barrels)
10. OIL TANK
11. CRUDE OIL TANK
12. CRUDE OIL TANK
13. CRUDE OIL TANK
14. CRUDE OIL TANK
15. CRUDE OIL TANK
16. PUMP HOUSE
17. PUMP HOUSE
18. PUMP HOUSE (Abandoned)
19. CONTAINMENT BERM
(For Fuel Oil Tanks, Capped With A Chain-link Fence)
20. PUMP HOUSE
21. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY
(Currently Owned By Mound St. Corp.)

22. FORMER UNION ELECTRIC BUILDING
23. GENERATOR ROOM (Basement Plan)
24. BOILER ROOM (Basement Plan)

O STORM SEWER LID

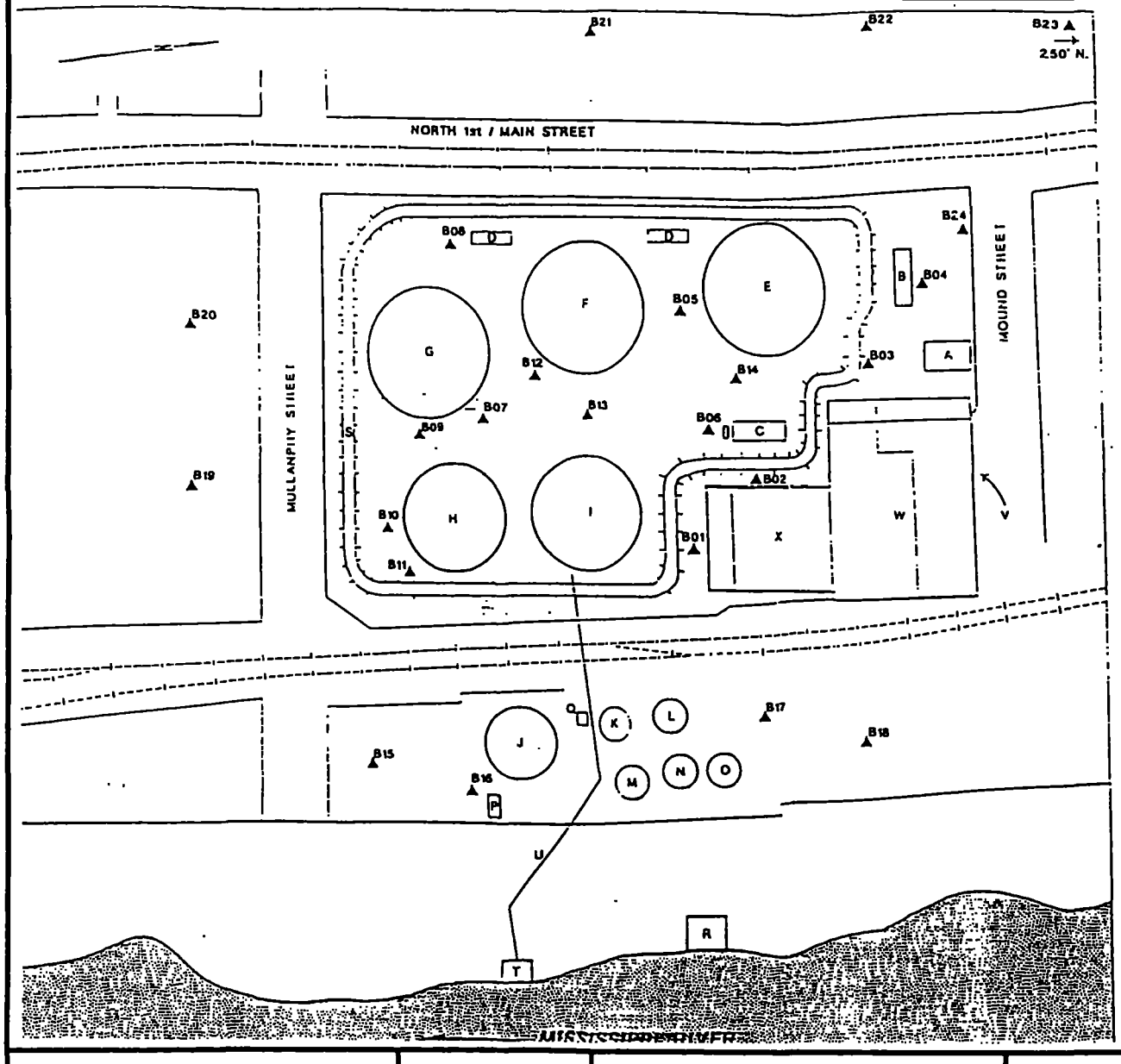
$\blacktriangle^2$ SAMPLE LOCATION AND IDENTIFICATION

MOUND STREET FACILITY
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)

FIGURE 2-2

SCALE
0 200
FEET

Source: E&E/FIT 1988. PA Mound Street Power Plant Site, St. Louis, Missouri	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri SVERDRUP	Mound Street Power Plant PA Sample Location Map	Figure No.: 5 11/95



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

- A. OFFICE
- B. TANKER TRUCK LOADING PLATFORM
- C. EQUIPMENT SHED
- D. EQUIPMENT/WORK SHOP
- E. FUEL OIL TANK (80,000 Barrels)
- F. FUEL OIL TANK (80,000 Barrels)
- G. FUEL OIL TANK (80,000 Barrels)
- H. FUEL OIL TANK (50,000 Barrels)
- I. FUEL OIL TANK (55,000 Barrels)
- J. OIL TANK
- K. CRUDE OIL TANK
- L. CRUDE OIL TANK
- M. CRUDE OIL TANK
- N. CRUDE OIL TANK
- O. CRUDE OIL TANK
- P. PUMP HOUSE
- Q. PUMP HOUSE
- R. PUMP HOUSE (Abandoned)
- S. CONTAINMENT BERM (For Fuel Oil Tanks, Capped With A Chain-link Fence)
- T. PUMP HOUSE
- U. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY

- V. FORMER UNION ELECTRIC BUILDING
- W. GENERATOR ROOM (Basement Plan)
- X. BOILER ROOM (Basement Plan)

B01 BORE HOLE (SCREENING) SAMPLE LOCATION

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)

SCALE
0 200
FEET

Source: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri

Project No.: 010865-370303

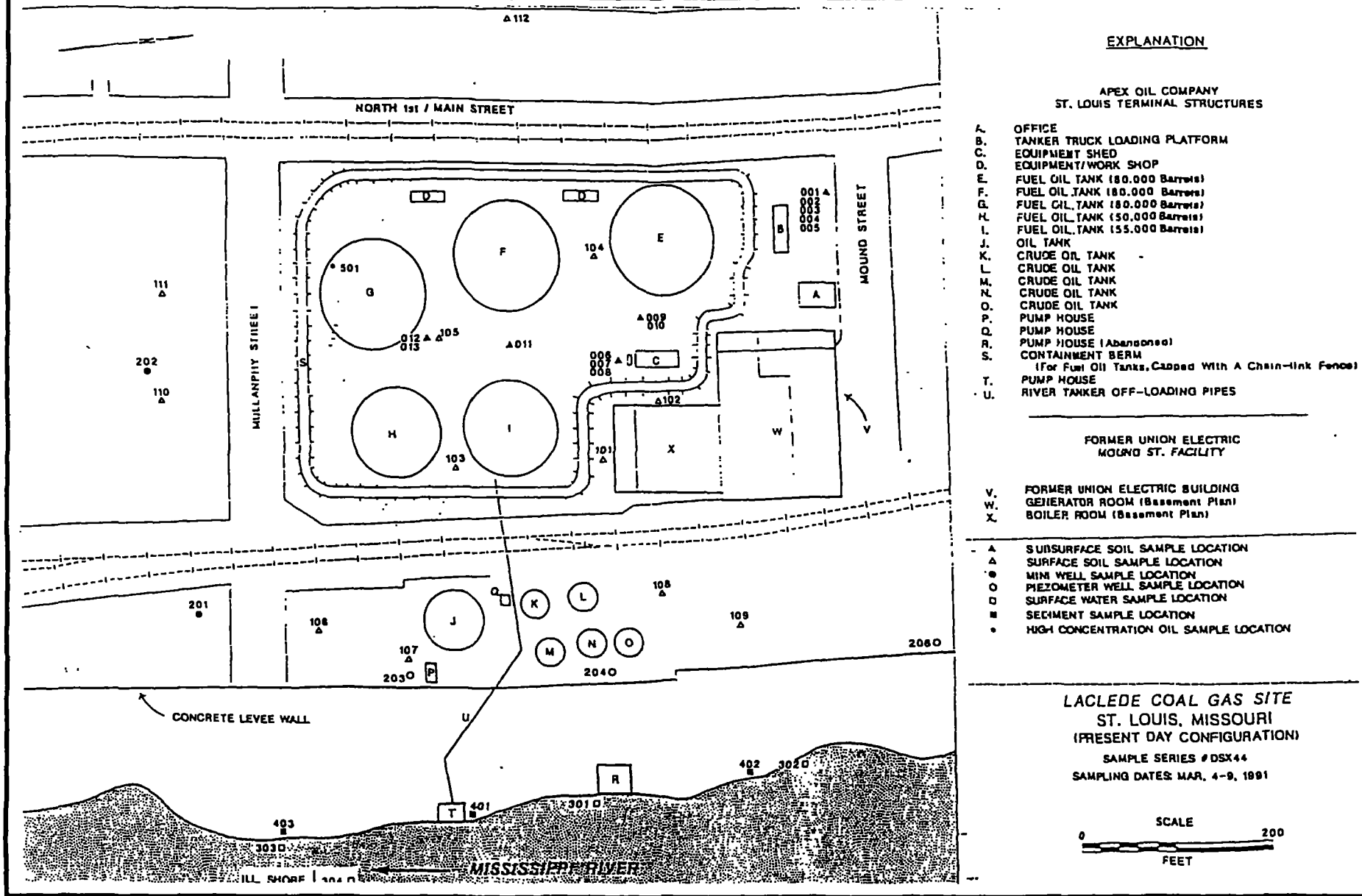
Mound Street PCB Site
St. Louis, Missouri

SVERDRUP

Laclede Coal Gas SSI
Screening Borehole
Sample Location Map

Figure No.: 6a

11/95



Source: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri SVERDRUP	Laclede Coal Gas SSI Soil, Sediment, Groundwater and Surface Water Sample Location Map	Figure No.: 6b 11/95

Table 1
Sample Analysis Results
1991 Laclede Coal Gas Site SSI
St. Louis, Missouri

Sample No. (Refer to Figure 6a)	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Fluor anthene (ug/kg)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Comments
Field Analytical Support Program – Mobile Laboratory Screening Results								
B01 (borehole soil sample)	1,200	380	1,700	16,000	3,700	NT[A]	NT	0-5 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	9,100	1,200	19,000	27,000	12,000	NT	NT	5-10 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	18,000	710	65,000	56,000	40,000	NT	NT	10-15 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	17,000	770	79,000	13,000	5,200	NT	NT	15-18 ft sample depth, same location as surface soil sample 101
B02 (borehole soil sample)	6,300	43,000	240,000	8,000	<500	<500	<500	0-5 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	6,100	1,700	57,000	15,000	ND[B]	ND	ND	5-10 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	69,000	110,000	570,000	ND	ND	ND	ND	10-15 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	7,500	650	33,000	ND	ND	ND	ND	15-21 ft sample depth, same location as surface soil sample 102
B03 (borehole soil sample)	1,040	22,000	22,000	<500	<500	<500	<500	0-5 ft sample depth

Table 1
Sample Analysis Results
1991 Laclede Coal Gas Site SSI
St. Louis, Missouri

Sample No. (Refer to Figure 6a)	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Fluor anthene (ug/kg)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Comments
Field Analytical Support Program -- Mobile Laboratory Screening Results								
B01 (borehole soil sample)	1,200	380	1,700	16,000	3,700	NT[A]	NT	0-5 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	9,100	1,200	19,000	27,000	12,000	NT	NT	5-10 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	18,000	710	65,000	56,000	40,000	NT	NT	10-15 ft sample depth, same location as surface soil sample 101
B01 (borehole soil sample)	17,000	770	79,000	13,000	5,200	NT	NT	15-18 ft sample depth, same location as surface soil sample 101
B02 (borehole soil sample)	6,300	43,000	240,000	8,000	<500	<500	<500	0-5 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	6,100	1,700	57,000	15,000	ND[B]	ND	ND	5-10 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	69,000	110,000	570,000	ND	ND	ND	ND	10-15 ft sample depth, same location as surface soil sample 102
B02 (borehole soil sample)	7,500	650	33,000	ND	ND	ND	ND	15-21 ft sample depth, same location as surface soil sample 102
B03 (borehole soil sample)	1,040	22,000	22,000	<500	<500	<500	<500	0-5 ft sample depth

Table 1
Sample Analysis Results
1991 Laclede Coal Gas Site SSI
St. Louis, Missouri
(continued)

Sample No.	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Fluor anthene (ug/kg)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Comments
Field Analytical Support Program -- Mobile Laboratory Screening Results								
302 (surface water sample)	<25	<25	<25	NT	NT	NT	NT	Surface water sample
303 (surface water sample)	<25	<25	<25	NT	NT	NT	NT	Surface water sample

Sample No. (Refer to Figure 6b)	Pyrene (mg/kg)	Benzo(k) fluor anthene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluor anthene (mg/kg)	Benzo(a) anthracene (mg/kg)	Chrysene (mg/kg)	Total PAHs (mg/kg)	Cyanide (mg/kg)	Comments
Surface Soil Samples -- CLP Analysis									
101 (B01)	ND[B]	ND	ND	ND	ND	ND	ND	33	0-2 ft sample depth
102 (B02)	21	ND	ND	ND	ND	ND	21	ND	0-2 ft sample depth
107 (B16)	ND	ND	ND	ND	ND	ND	73[E]	14	0-2 ft sample depth
108 (B17)	ND	ND	ND	ND	ND	ND	9.8[F]	98	0-2 ft sample depth
109 (B18)	6.7	3.4	4.2	4.9	4.5	4.3	40[G]	35	0-2 ft sample depth
112 (B21, background sample)	1.4	0.68	0.7	0.61	0.79	0.85	6.8[H]	<6.7	0-2 ft sample depth, background soil sample

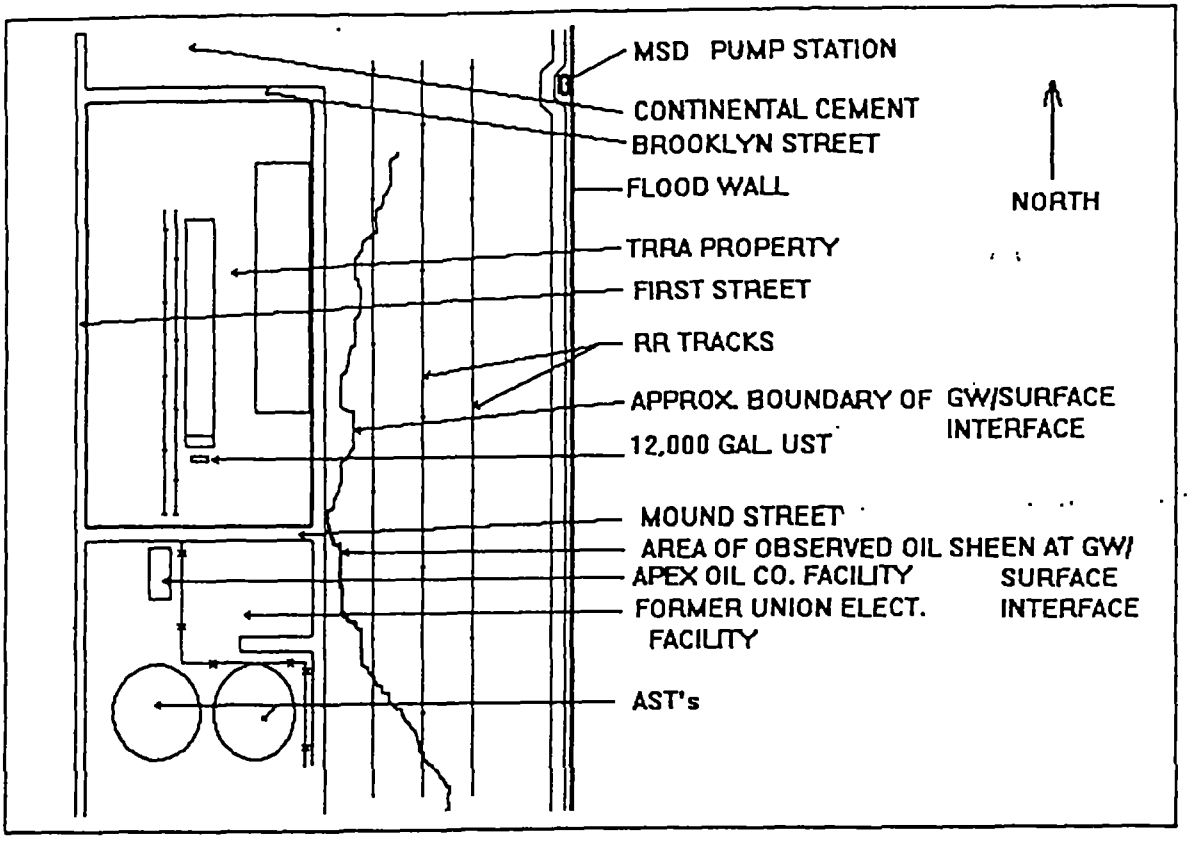
Table 1
Sample Analysis Results
1991 Laclede Coal Gas Site SSI
St. Louis, Missouri
(continued)

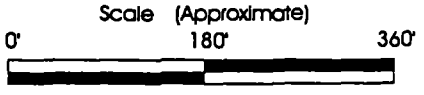
Sample No. (Refer to Figure 6b)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(ghi) perylene (ug/kg)	Phen anthene (ug/kg)	Fluor anthene (ug/kg)	Di-n-octyl phthalate (ug/kg)	Cyanide (ug/kg)	Total Hydro carbons (ug/kg)
Sediment Samples -- CLP Analysis										
401	ND/960[C]	ND/ND[C]	ND/430[C]	ND/460[C]	ND/ND[C]	ND/ND[C]	ND/750[C]	ND/470[C]	ND/ND[C]	3,100/ <3,100[C]
402	8,000	2,900	2,600	3,500	3,500	2,900	5,000	3,900	1,600	8,200
403	6,400J[D]	3,100	5,600	4,200	4,100	4,400	5,100	4,900	ND	4,900

	Arsenic (mg/kg)	Barium (mg/kg)	Copper (mg/kg)	Chromium (mg/kg)	Nickel (mg/kg)	Lead (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
401	3.7/4.0[C]	140/140[C]	9.1/8.2[C]	8.7/9.0[C]	10/11[C]	30J/13J[C,D]	ND/ND[C]	15/17[C]	35J/36J[C,D]
402	8.4	160	26	16	18	36J[D]	2.0J[D]	27	77J[D]
403	7.1	160	23	12	16	31J[D]	ND	25	64J[D]

A NT = Not Tested.
B ND = Non detected.
C Sample results/duplicate results.
D J = Results reported but are invalid by approved QC procedures.
E 60 mg/kg naphthalene and 13 mg/kg 2-methylnaphthalene detected.
F 1.1 mg/kg naphthalene, 2.5 mg/kg 2-methylnaphthalene, 2.4 mg/kg acenaphthylene, 0.69 mg/kg acenaphthene, and 3.1 mg/kg fluorene detected.
G 0.51 mg/kg naphthalene, 0.46 mg/kg acenaphthylene, 2.2 mg/kg phenanthrene, 0.78 mg/kg anthracene, 2.8 mg/kg fluoranthene, 2.7 mg/kg ideno(1,2,3-cd)pyrene, and 2.6 mg/kg dibenzo(g,h,i)perylene detected.
H 0.44 mg/kg phenanthene, 1.3 mg/kg fluoranthene, and below detection limit of 0.41 mg/kg for remaining PAHs.

Source: Reference 3.





Source: GEHM 1993. Activities Report, TRRA of St. Louis, First and Mound Streets Site, MDNR Spill Report #07143-KB-1331

Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	TRRA UST Location Map	Figure No.: 7
	SVERDRUP		11/95

2.4 WASTE CHARACTERISTICS

The contaminants of concern at the Mound Street PCB Site originate from at least two separate sources; 1) coal gas operations, and 2) electrical power generation and transmission operations. The former is a source for coal tar wastes and spent oxides, while the latter is a potential source for PCBs. Coal tar wastes include polynuclear aromatic hydrocarbons (PAHs) and phenolic compounds resulting from combustion processes, and spent iron oxides resulting from gas purification processes. Benzene, ethylbenzene, toluene and xylene are possible constituents of coal tar wastes. Iron oxides may contain sulphur, cyanide and small quantities of coal tar. PCBs are found in transformer and hydraulic oil. It is estimated that approximately 223,680,000 gallons of coal tar wastes may be buried on the former Laclede Coal Gas Site, which includes the Mound Street PCB Site (Reference 3). The quantity, if any, of PCB contaminated oil in the subsurface is not known.

2.5 CLIMATE AND DEMOGRAPHY

The St. Louis climate is characterized as having cold winters and long hot summers (Reference 26). Rainfall is fairly heavy and generally well distributed throughout the year at this site. Heavier rains occur in the spring and early summer. Snow falls nearly every winter, but complete cover is limited to only a few days per snowfall event. Total normal annual precipitation from all sources is about 36 inches (Reference 28). The prevailing wind is from the south (Reference 26).

The population within a 4-mile radius of the site is estimated at approximately 207,100 persons (Reference 3), with approximately 3,755 persons within a 1-mile radius on the Missouri side of the river (Reference 15).

2.6 TOPOGRAPHY AND DRAINAGE

The site is essentially flat, with a gentle slope to the east and south (Appendix A, Photo 6). A 500-year concrete flood wall was constructed by the Corps of Engineers and separates the site from the Mississippi River. The runoff from the site is collected in the storm sewer. The storm sewer is connected to the sanitary sewer system, with the wastewater flowing to the Bissle Point Treatment Plant located approximately 2.5 miles upstream (Reference 3).

3.0 SCREENING SITE INSPECTION WASTE AND SOURCE SAMPLING

3.1 SCREENING SITE INSPECTION (SSI)

Screening Site Inspection (SSI) field activities were conducted by Sverdrup personnel during the week of April 1, 1996. During the SSI scoping meeting, held on December 20, 1995, it was determined that the field activities would focus on obtaining data on PCB contamination at the site and the possible migration of contamination to the Mississippi River. Previous investigations have only focused on the FMGP source contamination. The sampling activities would include collection of groundwater samples from two existing monitoring wells, collection of subsurface soil samples to determine levels of contamination in the subsurface, and collection of appropriate QA/QC samples.

In order to demonstrate a release, sample locations must be chosen to demonstrate that the hazardous substance is present at levels significantly above the known background concentrations. Groundwater, soil, surface water and sediment sample data collected to date have all been analyzed for volatiles, semi-volatiles, cyanide and metals. Samples were collected from areas impacted by FMGP activities and background locations. Background is the ambient concentration of a hazardous substance and includes naturally occurring concentrations, concentrations from man-made sources other than the site being evaluated, and concentrations from the site. Generally, background levels are best supported by chemical analysis. The focus of the soil sampling activity was to obtain chemical data concerning contaminant concentrations in the soil.

The SSI field activities were conducted on April 2 - 3, 1996. Personnel involved in the SSI, their affiliation, and project responsibility, are as follows:

Pete Culver, U.S. EPA, Work Assignment Manager
Dave Crawford, U.S. EPA, Site Assessment Manager, Missouri
Herman Gellman, McKinley Iron, President
Tim Bishop, Petroleum, Fuel and Terminal, Facility Manager
Michael McCurdy, Sverdrup (EPA ARCS Contractor), Site Manager
Michael May, Sverdrup (EPA ARCS Contractor), Field Geologist
Randy Schademann, Ecology & Environment (EPA Contractor), Geoprobe™ Operator
Scott Hayes, Ecology & Environment (EPA Contractor), Field Technician
Andy Mazzeo, Ecology & Environment (EPA Contractor), Field Technician

3.2 SOURCE AREAS

The contaminants of concern at the Mound Street PCB Site originate from at least two separate sources; 1) coal gas operations, and 2) electrical power generation and transmission operations. The former is a source for coal tar wastes and spent oxides, while the latter is a potential source for PCBs. Coal tar wastes include PAHs and phenolic compounds resulting from combustion processes, and spent iron oxides resulting from gas purification processes. Benzene, ethylbenzene, toluene and xylene are possible constituents of coal tar wastes. Iron oxides may contain sulphur, cyanide and small quantities of coal tar. PCBs may be found in transformer and hydraulic oil.

Previous site industrial activities dictate the presence of oils; however, there is no documentation showing PCBs originating from the site. The exact source of the PCB contamination is unknown at this time.

3.3 SVERDRUP SSI SAMPLE LOCATIONS

Groundwater samples were collected from two existing monitoring wells installed by unknown parties on the adjacent PFT-Apex Oil Facility. Sample DC1CY-001/001D was collected from the South Well (Appendix A, Photo 7) and sample DC1CY-002 was collected from the North Well (Appendix A, Photo 8). These two wells are located between the potential source of PCB contamination (Mound Street Site) and the Mississippi River (Figure 8a). A summary of the samples collected is included in Table 2.

Subsurface soil samples were collected in the area of the former Mound Street building, and between the former building local and the Mississippi River (Figure 8b). Sample DC1CY-101 was collected near the southeastern corner of the former building local (Appendix A, Photo 9), with the intent of providing an impacted soil sample. Samples DC1CY-100/100D, DC1CY-102, DC1CY-103 and DC1CY-104 were collected between the former building local and the concrete flood wall (Appendix A, Photos 10 and 11). Samples DC1CY-102 and DC1CY-103 were collected in the same boring at depths of 18 to 20 feet and 25 to 27 feet, respectively. A summary of the samples collected is included in Table 2.

No surface water or sediment samples were collected and no air samples were collected as part of this investigation.

3.4 SSI SAMPLING RESULTS

A total of three groundwater samples, six soil samples, one aqueous rinsate sample, one water field blank, one water trip blank, and one soil trip blank were delivered to the Region VII EPA Laboratory on April 4, 1996. Samples were analyzed under activity number DC1CY. Lab analyses included the following methods:

VOCs: Water samples by Media-Group-Parameter (MGP) WV (water volatiles) and soil sample by MGP SV (soil volatiles)

Semi-VOCs: Water samples by MGP WS (water semivolatiles) and soil sample by MGP SS (soil semivolatiles)

PCBs: Water samples by MGP W24 (PCB - G. Beemont) and soil samples by MGP S16 (PCB - G. Beemont)

All samples were prepared as required, with appropriate acid preservatives added to the water sample, placed on ice, and a Field Chain of Custody was maintained according to EPA SOP 2130.2A, "Field Chain of Custody for Environmental Samples," May 1989.

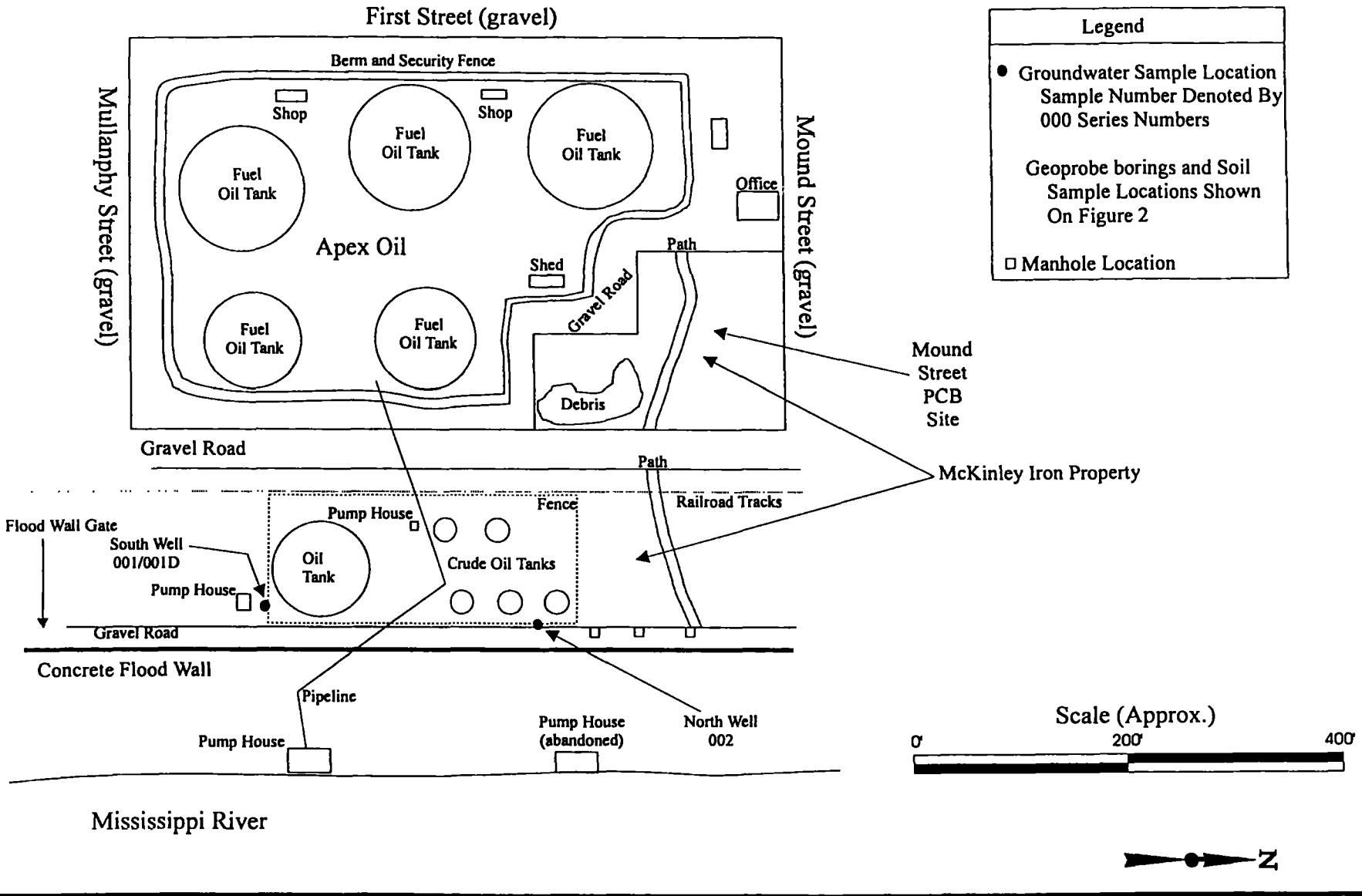
The SSI sampling data was validated by the Region VII EPA Laboratory.

Table 2
Sample Summary
Mound Street PCB Site
St. Louis, Missouri
Sample Series DC1CY
April 2 - 3, 1996

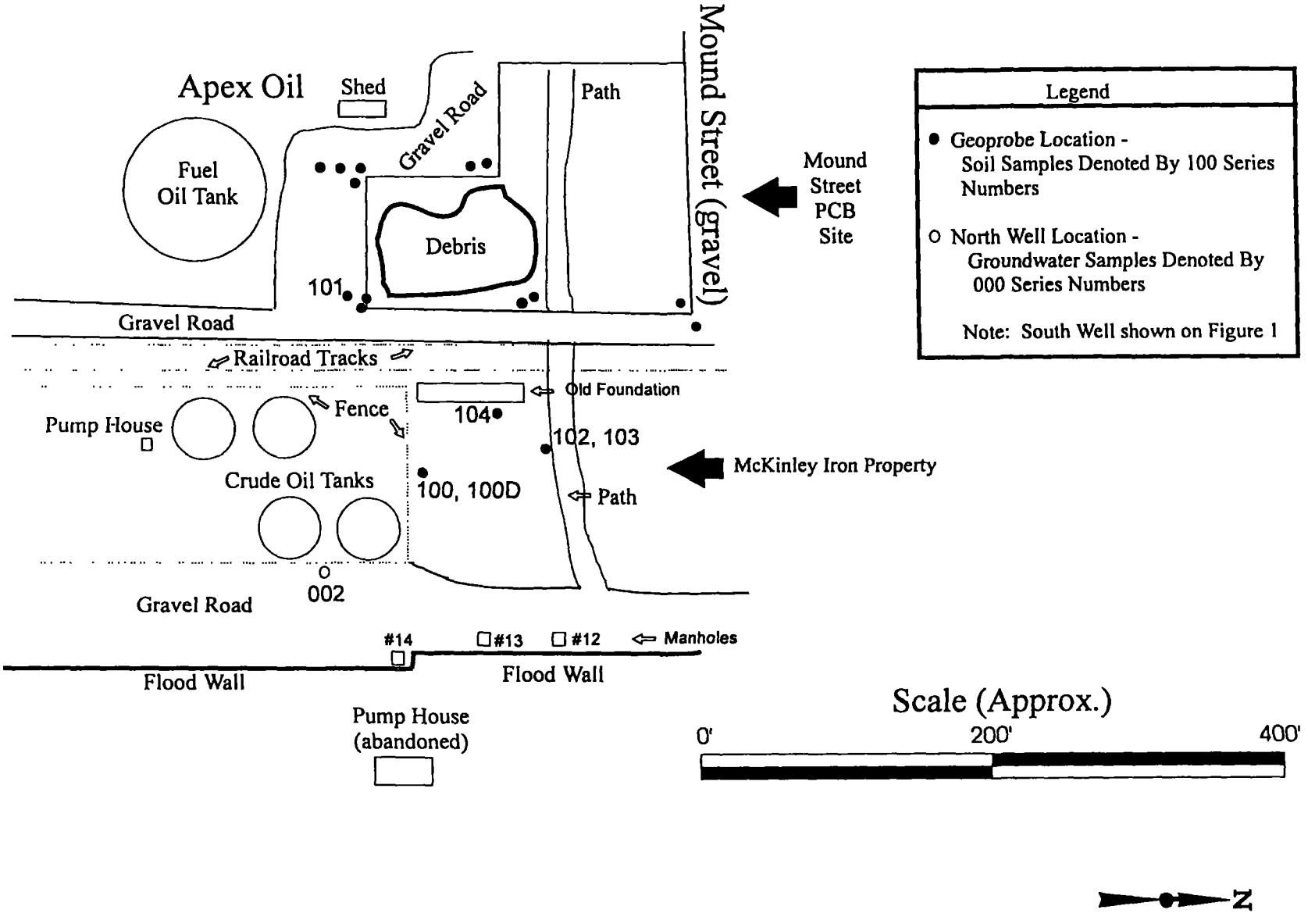
Sample No.	*Sample Description*	*Sample Location/Rationale*	*Analyses*	*Time/Date of Collection*
DC1CY-001	Existing South Well (Water)	Existing Monitoring Well - South Well/Identify contamination in aquifer	VOC Semi-vol PCB	11:28/4-3
DC1CY-001D	Existing South Well (Water)	Duplicate of DC1CY-001	VOC Semi-vol PCB	11:28/4-3
DC1CY-002	Existing North Well (Water)	Existing Monitoring Well - North Well/Identify contamination in aquifer	VOC Semi-vol PCB	12:15/4-3
DC1CY-003F	Field Blank (Water)	QA/QC	VOC Semi-vol PCB	9:15/4-3
DC1CY-007F	Trip Blank (Water)	QA/QC (Provided by Region VII Laboratory)	VOC	
DC1CY-008	Equipment Rinsate (Water)	QA/QC	VOC Semi-vol PCB	16:10/4-2
DC1CY-100	Off-site Geoprobe™ Boring (Soil)	Off-site/Identify contamination migration toward the Mississippi River from the former power plant building location.	VOC Semi-vol PCB	15:30/4-2
DC1CY-100D	Off-site Geoprobe™ Boring (Soil)	Duplicate of DC1CY-100	VOC Semi-vol PCB	15:30/4-2
DC1CY-101	On-site Geoprobe™ Boring (Soil)	Potential source area/Identify contamination at the former power plant building location.	VOC Semi-vol PCB	10:05/4-2

Table 2
Sample Summary
Mound Street PCB Site
St. Louis, Missouri
Sample Series DC1CY
April 2 - 3, 1996
(continued)

Sample No.	*Sample Description*	*Sample Location/Rationale*	*Analyses*	*Time/Date of Collection*
DC1CY-102	Off-site Geoprobe™ Boring (Soil)	Off-site/Identify contamination migration toward the Mississippi River from the former power plant building location.	VOC Semi-vol PCB	14:20/4-2
DC1CY-103	Off-site Geoprobe™ Boring (Soil)	Off-site/Identify contamination migration toward the Mississippi River from the former power plant building location.	VOC Semi-vol PCB	14:20/4-2
DC1CY-104	Off-site Geoprobe™ Boring (Soil)	Off-site/Identify contamination migration toward the Mississippi River from the former power plant building location.	VOC Semi-vol PCB	8:40/4-3
DC1CY-108F	Trip Black (Soil)	QA/QC (Provided by Region VII Laboratory)	VOC	



Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site.	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri SVERDRUP	Groundwater Sample Location Map	Figure No.: 8a 4/96



Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site.	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri SVERDRUP	Geoprobe-Soil Sample Location Map	Figure No.: 8b 4/96

Groundwater

A total of three groundwater samples were collected, prepared and delivered to the Region VII EPA Laboratory on April 4, 1996. All samples were analyzed for volatile organic compounds, semivolatile organic compounds and PCBs.

Prior to sample collection, the depth to water was measured using a Solinst electronic water level indicator. Depths were measured from the north side of the top of casing, which enabled the well volume to be calculated. The wells were purged until field parameters (pH, temperature, and specific conductance) had stabilized to within $\pm$ 10 percent. Field measurements were obtained using a YSI Incorporated Model 3560 Water Quality Monitoring System. A summary of field measurements obtained is included in Table 3.

Well purging was performed at a very low flow rate using a TAT Engineering peristaltic pump at the South Well and Geopump peristaltic pump at the North Well, with disposable tubing replaced prior to sampling. Extreme care was taken to prevent collecting an obviously turbid sample. Water samples were collected immediately after completion of purging activities, using the peristaltic pumps. Samples for volatile organic compounds were collected first, then the semivolatile and PCB samples were collected.

Previous groundwater sample data compiled by the E&E/FIT show the presence of VOCs and PAHs. Groundwater sample results obtained from the Sverdrup field activity are summarized in Table 4. Complete analytical data reports are included in Appendix C.

The results of this sampling indicate the presence of benzene and PAHs in the groundwater. Benzene was detected in the North Well at 38 μg/L. However, benzene was not detected above the 6 μg/L detection limit in the South Well. PAHs detected in the North Well sample were acenaphthene at 86 μg/L, fluorene at 29 μg/L, phenanthrene at 26 μg/L, and bis(ethylhexyl) phthalate at 32 μg/L. All analyzed compounds were nondetect in the South Well. PCBs were below detection limits in both the North and South Well.

Groundwater data appears consistent with historical data obtained from the site. Groundwater samples collected in 1991 by E&E/FIT showed 65 ug/L acenapthalene, 25 ug/L fluorene, 46 ug/L phenanthene, 93 ug/L benzene and 1600 ug/L cyanide in Well 204 (North Well). Well 203 (South Well) sample analysis did not show any contamination except for 590 ug/L cyanide. Both cyanide results were "J" coded, meaning the value is reported but is not valid under approved QC procedures.

Table 3
Field Measurement Summary
Mound Street PCB Site
St. Louis, Missouri
April 3, 1996

Well	*Well Depth (ft)*	*Depth to Water (ft)*	*Water Column (ft)*	*Estimated Purge Volume (gal)*	*Parameter Measurements*	*Comments*
South Well	46.06	26.07	19.99	1.4	pH =6.84, 6.98, 6.95, 6.98 Temp =19.2, 19.5, 19.8, 19.9 Cond =.948, .830, .936, .935	Peristaltic pump rate approximately 0.03 gpm. Well casing has a 1.5-inch port for sampling.
North Well	47.27	24.68	22.59	1.4	pH =6.75, 6.80, 6.78 Temp =18.6, 18.8, 19.7 Cond =.963, .958, .963	Peristaltic pump rate approximately 0.06 gpm. Well casing has a 1.5-inch port for sampling.

Temp = ° C.
Cond =mhos/cm
Minimum purge volume = 3 well volumes or measured parameters within 10%

Table 4
Groundwater Analysis Summary
Mound Street PCB Site
St. Louis, Missouri
April 3, 1996

Well	*Sample No.*	*benzene (ug/L)*	*acenaphthene (ug/L)*	*flourene (ug/L)*	*phenanthrene (ug/L)*	*bis(2-ethylhexyl) phthalate (ug/L)*
MCL	--------	5	----	----	----	----
South Well	DC1CY-001	<7	<1.1	<5	<1.1	<10
South Well Duplicate	DC1CY-001-D	<6	<1.1	<5	<1.1	<10
North Well	DC1CY-002	39	86	29	26	32

MCL = Maximum Contaminant Level
<## = Not detected at indicated detection level
Shading denotes well exceeds specific MCL or AL
* acetone (common laboratory contaminant) was detected in sample 001 (South Well) at 7 μg/L, and in 002 (North Well) at 8 μg/L.

Subsurface Soil

A total of six subsurface soil samples, including one duplicate, were collected, prepared and delivered to the Region VII EPA Laboratory on April 4, 1996. All samples were analyzed for volatile organic compounds, semivolatiles and PCBs. No background sample was collected for this field activity. Background concentrations identified during the 1991 Laclede Coal Gas SSI conducted by E&E/FIT will be used. The soil samples collected in this SSI were then compared to the background levels to determine if significant contamination above background levels existed at the site.

Soil samples were collected April 2 - 3, 1996. Samples were collected from four discrete locations using a Geoprobe™. The soil samples were collected from the following depths:

DC1CY-100	25 - 27 feet
DC1CY-101	17 - 19 feet
DC1CY-102	18 - 20 feet
DC1CY-103	25 - 27 feet
DC1CY-104	25 - 27 feet

Soil samples were collected by removing the sample from the sample tube and placing it in a disposable aluminum pan. Geoprobe™ boring rods and sample tube were decontaminated between samples.

Previous subsurface and surface soil sample data compiled by E&E/FIT show the presence of VOCs, PAHs and metals in the soils. Soil sample results obtained from the Sverdrup field activity are summarized in Table 5. Complete analytical data reports are included in Appendix C.

The soil sampling results for Sample DC1CY-102 indicate the presence of PAHs in the subsurface. Naphthalene was detected in Sample DC1CY-102 at 150 ug/kg, fluoranthene at 570 ug/kg, pyrene at 520 ug/kg, and carbon disulfide at 22 ug/kg. These results are less than the background levels identified below. Sample analysis showed levels of volatiles, semivolatiles and PCBs below the detection limits for the other sample locations (100, 100D, 103, and 104).

The compounds of concern were identified by comparing the average of the impacted area samples to the average background sample. Where the ratio of impacted sample to background sample exceeded 3, *this material was assumed to have originated from site activities* (U.S. EPA, 1992). Background for PCBs is assumed to be nondetect. Background levels for volatile organics and semivolatile organics were taken from the 1991 Laclede Coal Gas SSI conducted by E&E/FIT and are as follows:

Contaminant	Concentration	Contaminant	Concentration
Pyrene	1.40 mg/kg	Benzene	<0.25 mg/kg
Benzo(k)fluoranthene	0.68 mg/kg	Toluene	<0.25 mg/kg
Benzo(a)pyrene	0.70 mg/kg	Xylene	<0.25 mg/kg
Benzo(b)fluoranthene	0.61 mg/kg	Ethylbenzene	<0.25 mg/kg
Benzo(a)anthracene	0.79 mg/kg		
Chrysene	0.85 mg/kg		
Phenanthrene	0.44 mg/kg		
Fluoranthene	1.30 mg/kg		
Other PAHs	<0.41 mg/kg		
Total PAHs	6.80 mg/kg		

Health based screening concentrations for soils correspond to a 10^{-6} individual cancer risk or a noncancer exposure level corresponding to a reference dose (RfD) under specific exposure assumptions. Based on the Laclede Coal Gas SSI sampling results, the cancer risk screen concentrations for benzo(a)pyrene (0.088 mg/kg), benzo(b)fluoranthene (0.88 mg/kg), benzo(a)anthracene (0.88 mg/kg), and ideno(1,2,3-cd)pyrene (0.88 mg/kg) have been exceeded in soil sample DSX44-109 (Reference 3 and 31). A cancer risk screen concentration for pyrene, cyanide, fluoranthene, acenaphthene, anthracene, and fluoranthene has not been assigned. The RfD for pyrene (2,300 mg/kg) was not exceeded is soil sample DSX44-102; for cyanide (1,600 mg/kg), fluorene (3,100 mg/kg), and acenaphthene (4,700 mg/kg) was not exceeded in soil sample DSX44-108; and for anthracene (23,000 mg/kg) and fluoranthene (3,100 mg/kg) in soil sample DSX44-109 (Reference 3 and 31). Thr RfD for benzene (22 mg/kg), toluene (16,000 mg/kg), and xylene (160,000 mg/kg) was not exceeded in any soil sampled (Reference 3 and 31). A cancer risk screen concentration and benchmark RfD for naphthalene, 2-methylnaphthalene, acenaphthylene, and phenanthrene have not been determined (Reference 31).

Surface Water

No surface water and sediment samples were proposed or collected during the April 1996 SSI activity.

Air Quality

No air quality samples were proposed or collected during the April 1996 SSI activity.

Table 5
Soil Analysis Summary
Mound Street PCB Site
St. Louis, Missouri
April 2 - 3, 1996

Sample No.	*naphthalene (ug/kg)*	*fluoranthene (ug/kg)*	*pyrene (ug/kg)*	*carbon disulfide (ug/kg)*
DC1CY-100	<130	<100	<300	<8
DC1CY-100-D	<130	<100	<310	<10
DC1CY-101	<120	<98	<300	<6
DC1CY-102	150	570	520	22
DC1CY-103	<130	<110	<320	<6
DC1CY-104	<130	<100	<310	<6

<## = Not detected at indicated detection level

* acetone (common laboratory contaminant) was detected in sample 100 at 28 µg/L, 101 at 18 µg/L, 103 at 18 µg/L, and 104 at 17 µg/L.

** methylene chloride (common laboratory contaminant) was detected in sample 100 at 17 µg/L

3.5 MODIFICATIONS TO APPROVED FIELD SAMPLING PLAN

All SSI field activities were conducted in accordance with the Field Sampling Plan (FSP), approved by Region VII EPA on March 26, 1996 (Reference 23), and the Site Health and Safety Plan, approved by Sverdrup on February 8, 1996. Modifications to the FSP were as follows:

1) Soil and water sample numbers do not correspond to the numbers submitted in the FSP. The activity number is the same as submitted in the FSP.

2) Numerous attempts were made to collect subsurface soil samples from the area around the former building location. The Geoprobe™ could not penetrate through a solid layer, believed to be concrete, at a depth of approximately 18 - 20 feet. Attempts were made to collect soil samples above this solid layer; however, none were able to be obtained except for the southeastern corner sample (Figure 8b; Appendix A, Photo 9). In the southwestern corner of the former building location, the Geoprobe™ could not go beyond 4 feet and in a two instances, 1 foot. Attempts near the northeastern corner of the former building location were made with refusal occuring at 15 feet. A sample was attempted; however, only a small amount of brick and gravel was retrieved in the sample tube. Along the eastern edge of the former building location, refusal occurred at 18.5 feet. A sample was attempted; however, only a small amount of concrete and brick was retrieved. Water was observed in the soil sample tube; however, there was not enough water to sample. Attempts to collect soil and water samples were halted in this area due to bricks, rock and concrete debris encountered at the former building site (Figure 8b).

3) Subsurface soil samples were collected in a vacant area between the former building location and the concrete flood wall (Figure 8b; Appendix A, Photo 10). Five subsurface soil samples were collected in three sample locations. Two samples were collected from the same probe boring at 18 - 20 feet and at 25 - 27 feet below ground surface. One sample and duplicate were obtained from two adjacent borings in one area (Appendix A, Photo 11). The fifth sample was obtained approximately half way between the other two locations (Figure 8b).

4) Well purging was performed using a peristaltic pump instead of the Geoprobe™ vacuum system or disposable bailers. The peristaltic pump is more effective than the Geoprobe™ vacuum system and bailers could not be used, due to the small (1.5 inch) sampling port diameter on the monitoring wells.

5) Three well volumes were not extracted from the wells during purging activities. The water level was at 26.07 feet below ground surface at the South Well, and was at 24.68 feet below ground surface at the North Well. The bottom of the wells are 46.06 feet and 47.27 feet below ground surface for the South Well and North Well, respectively. Tubing was installed in the wells to pump from approximately 30 feet below ground surface. Pumping was conducted near the maximum head that the peristaltic pump could overcome. At the pumping rates attained by the peristaltic pumps, it would have required approximately 16 hours to remove one well volume. It was decided to collect water samples after the pH, temperature and conductivity parameters were within 10 percent for two consecutive readings, regardless of the volume removed.

3.6 QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) samples collected during the SSI include one groundwater duplicate (DC1CY-001D), one soil duplicate (DC1CY-100D), one water trip blank (DC1CY-007F), one soil trip blank (DC1CY-108F), one water field blank (DC1CY-003F), and one soil sample equipment rinsate (DC1CY-008) collected from the decontaminated sample tube.

Duplicate Analysis

Duplicate samples were used to measure sample homogeneity and precision. Field sampling precision is measured by the Relative Percent Difference (RPD) between the analytical results of the sample and its respective duplicate. The RPD is calculated by using the following equation:

$$RPD = \frac{(|X_1 - X_2|)}{(X_1 + X_2)/2} \times 100$$

Acceptance criteria specified for this investigation were defined in the FSP, and varied for water and soil matrices. One duplicate analysis was performed for each matrix, and included samples DC1CY-001-D for water and DC1CY-100-D for soil.

RPD data objectives outlined in the field sampling plan detailed a 20 percent RPD goal for water analyses, and a 35 percent RPD goal for soil analyses. All analyzed compounds from DC1CY-001 and DC1CY-001D water samples were below detection limits except for acetone. Acetone is a common laboratory contaminant, and was detected at 7 ug/L in Sample 001. Acetone was not detected in Sample 001D at a detection limit of 4 ug/L. Therefore, the RPD could not be calculated. The failure to meet RPD objective for water was not deemed significant. All analyzed compounds from DC1CY-100 and DC1CY-100D were below the detection limits except for acetone and methylene chloride. Both acetone and methylene chloride are common laboratory contaminants, and were detected at 28 ug/kg and 17 ug/kg, respectively, in sample 100. Acetone and methylene chloride were not detected in Sample 100D at a detection limit of 21 ug/kg and 70 ug/kg, respectively. Therefore, the RPD could not be calculated. The failure to meet RPD objective for soil was not deemed significant. The data and regulatory interpretation for both water and soil was not changed due to inability to calculate RPD values.

Field and Trip Blank Analysis

Two water blanks were included in this activity, a field blank (DC1CY-003F) and a trip blank (DC1CY-007F) and one soil blank, a trip blank (DC1CY108F). Field blanks were used as an indicator of sample contamination during the sample collection and handling activities, including sampling, transport, sample preparation, and analysis. Trip blanks were used to measure potential cross contamination during the shipping, storing, and transferring of samples.

The trip blank was prepared by the EPA Region VII Laboratory and carried in the iced sample cooler throughout the sampling event. The results of the water trip blank indicate the presence of acetone at 13 μg/L. The results of the soil trip blank indicate the presence of acetone at 580 μg/kg. Acetone is a common laboratory analysis contaminant. The soil trip blank results also indicate the presence of methyl ethyl ketone at 28 μg/kg, 4-methyl-2-pentanone at 10 μg/kg, 1,2-dichlorobenzene at 11 μg/kg, 1,3-dichlorobenzene at 27 μg/kg, and 1,4-dichlorobenzene at 26 μg/kg. The source of these compounds is

unknown; however, they were not detected in any other sample. It appears as though no contaminants were introduced to the sample containers during sample control.

The field blank was prepared in the field, using deionized water. The water was slowly poured into the appropriate sample containers for volatile organic, semivolatile and PCB analysis. The sample results indicate the presence of acetone at 20 μg/L. Acetone is a common laboratory analysis contaminant.

Performance Audit Sample Analysis

No performance audit sample was collected.

Equipment Rinsate Analysis

The rinsate sample was used to verify the effectiveness of the decontamination procedure. The rinsate blank was collected on April 2, 1996, at approximately 1610. The rinsate blank (DC1CY-008) was collected by pouring deionized water into the decontaminated sample tube used for collecting the soil from sample point DC1CY-100. Sample DC1CY-008 was analyzed for volatile organics, semivolatiles and PCBs. The results of this sample indicate the presence of acetone at 15 μg/L. Acetone is a common laboratory analysis contaminant. The results of the testing indicate that effective decontamination procedures were being performed, with minimal cross-contamination of samples occurring due to incomplete decontamination processes.

4.0 GROUNDWATER PATHWAY

4.1 GEOLOGIC/HYDROGEOLOGIC SETTING

The Mound Street PCB Site is located on a "narrow strip of alluvium" between the Mississippi River and limestone bedrock located in the area. Fill material, estimated at 15 to 18 feet thick, overlays the alluvium at the site (Reference 10). Stratified river aluvium consists of silt, clay, and silty clay which becomes coarser with depth and includes gravel lenses. The alluvium can be up to 80 feet thick, with clay and silty clay at shallow depths and silty sand and sand in the deeper portions (Reference 20). Prior to construction of the concrete flood wall, several borings were conducted in the vicinity of the site (Figure 9a; Reference 25). The logs for four borings (Figure 9b) show cinders, concrete, rock, and bricks to depths of approximately ten feet below ground surface nearest the site (Borings 842 and 862) and to depths of 15 to 26 feet toward the Mississippi River (Borings 823 and 824). Silt, clay or a mixture of silt and clay are shown underlying the cinders to the limestone bedrock, which was encountered at 24 feet below the ground surface in Boring 842 and at 38 feet in Boring 862. Bedrock was not encountered in Borings 823 and 824 (Reference 25). No confining layer is known to exist between the alluvium and bedrock. Also, no aquifer discontinuity exists within the 4-mile target distance limit (Reference 20). Based on Geoprobe borings conducted during the April, 1996, field activities, the location of the former Mound Street Building is underlain by rock, concrete, bricks and other debris. On the vacant property east of the site, native silt material was encountered to a depth of 27 feet (Reference 24).

The bedrock consists of upper Mississippian limestone formations which are, in descending order, the Ste. Genevieve Limestone, St. Louis Limestone, shaley limestones of the Salem Formation and Warsaw Formation, Burlington-Keokuk Limestone, and Fern Glen Formation (References 3 and 20). These formations are approximately 600 feet thick (Reference 3).The depth to bedrock is estimated to be from 20 to 30 feet (Reference 3). The shallowest aquitard in the area is the Maquoketa Shale at the top of the Ordovician System (Reference 20).

The depth to groundwater is generally approximately two feet above the Mississippi River and is estimated at 20 feet (Reference 3). Groundwater movement is toward the river, to the east and southeast of the site (References 20 and 21). The groundwater depth was measured at 25 feet below the ground surface during the field activities for this SSI.

Sinkholes and caves are found in the Mississippian bedrock within the target area. The karst aquifer probably does not directly underlie the site and probably does not affect contaminant transport from the site (Reference 21).

4.2 GROUNDWATER SAMPLE RESULTS

Groundwater sample results obtained from this activity are summarized in Table 4 (Section 3.0). Complete analytical data reports are included in Appendix C.

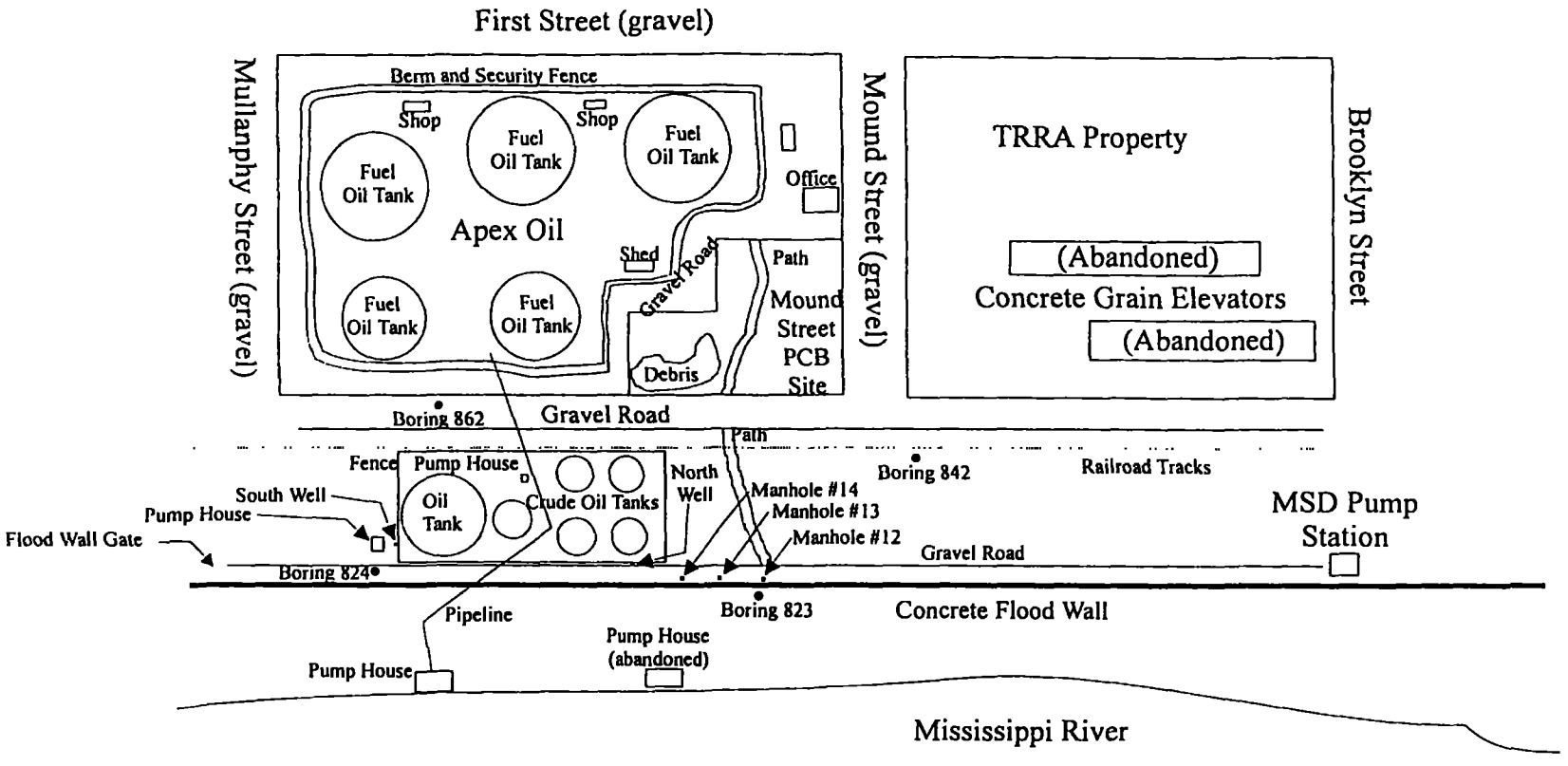
The results of this sampling indicate the presence of benzene and PAHs in the groundwater. Benzene was detected in the North Well at 38 μg/L. However, benzene was not detected above the 6 μg/L detection limit in the South Well. PAHs detected in the North Well sample were acenaphthene at 86 μg/L, fluorene at 29 μg/L, phenanthrene at 26 μg/L, and bis(ethylhexyl) phthalate at 32 μg/L. All analyzed compounds were nondetect in the South Well. PCBs were nondetect in both the North and South Well.

Groundwater data appears consistent with historical data obtained from the site. Groundwater samples collected in 1991 showed 65 ug/L acenapthalene, 25 ug/L fluorene, 46 ug/L phenanthene, 93 ug/L benzene and 1600 ug/L cyanide in Well 204 (North Well). Well 203 (South Well) sample analysis did not show any contamination except for 590 ug/L cyanide. Both cyanide results were "J" coded, reflecting that values are reported but are not valid under approved QC procedures. Groundwater samples were collected in 1991 during an investigation of the Laclede Coal Gas Site. Volatiles, PAHs and cyanide were detected in the groundwater samples collected. Samples were not analyzed for PCBs. Refer to Table 1 and Figures 6a and 6b for sample data and locations.

4.3 GROUNDWATER USAGE AND TARGETS

Groundwater within a 4-mile radius of the site is not used for drinking water (References 4, 17 and 20). Irrigation of agricultural crops is possibly conducted via groundwater. The site is not located within a wellhead protection area (Reference 20).

The Mississippi River is located approximately 100 feet east of the sampled monitoring wells and the groundwater level fluctuates with the river level (Reference 3, 20 and 21). Therefore, the groundwater-to-surface water migration route is a potential exposure pathway.



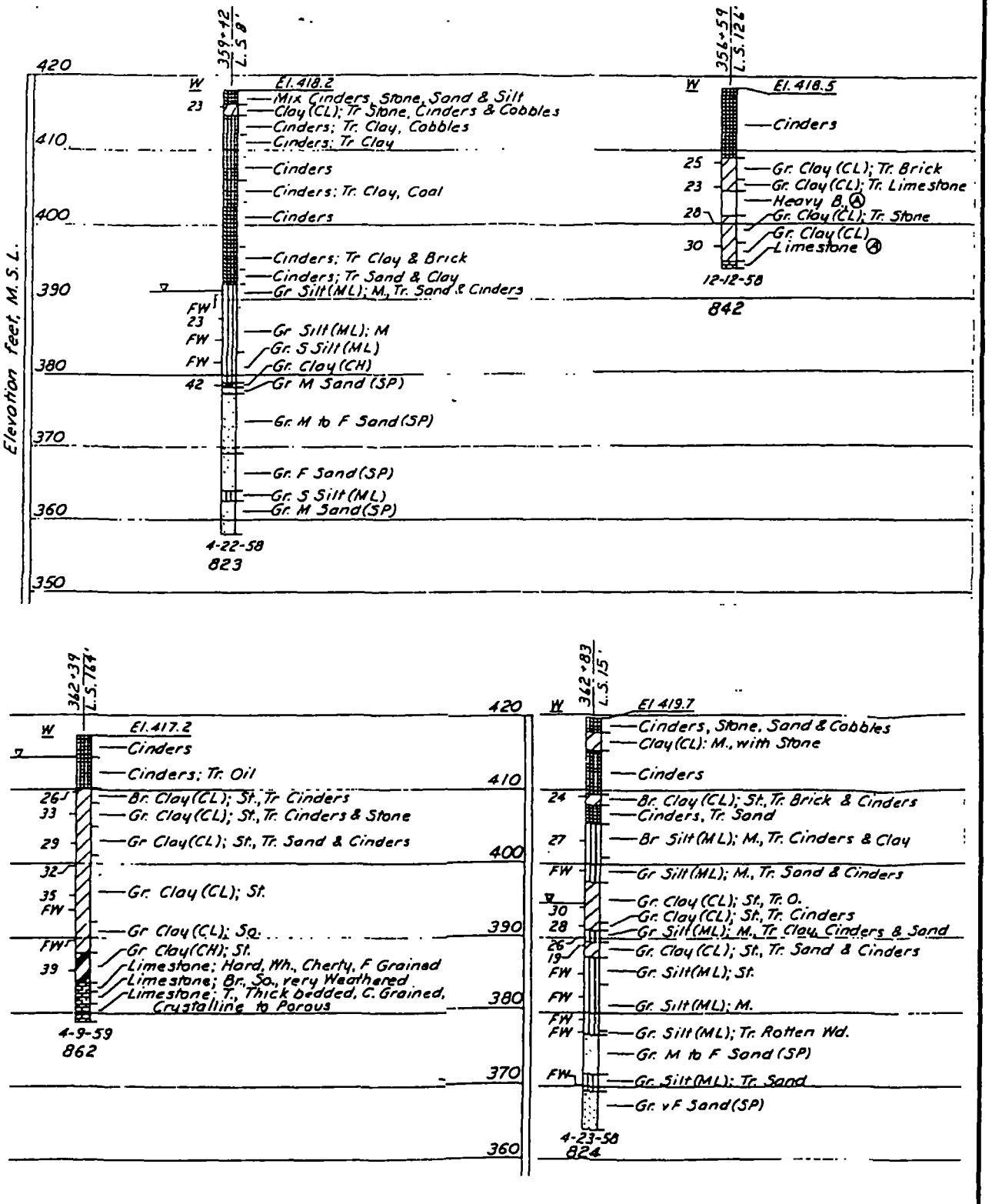
Scale (Approx.)

Scale

0' 200' 400'

N

Source: U.S. Army Corps of Engineers St. Louis District, 1962	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	U.S. Army Corps of Engineer Flood Wall Boring Location Map	Figure No.: 9a
		SVERDRUP		5/96



Source: U.S. Army Corps of Engineers-St. Louis District, 1962.

Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	Corps of Engineers Flood Wall Boring Data	Figure No.: 9b
	SVERDRUP		5/96

5.0 SURFACE WATER PATHWAY

5.1 SURFACE WATER PATHWAY

The Mound Street PCB Site is located approximately 300 feet west of the Mississippi River and is protected from flooding by a concrete flood wall located approximately 200 feet east of the site. Average streamflow on the Mississippi River is greater than 100,000 cubic feet per second (Reference 15). The 15-mile downstream distance limit is shown in Figure 10. The concrete flood wall was built to withstand the 500-year flood, therefore, the site is outside the 500-year flood plain of the Mississippi River. Surface water runoff from the site is collected in the storm sewer system, which is connected to the sanitary sewer system. The sanitary sewer system flows to the Bissle Point Treatment Plant, approximately 2.5 miles upstream of the site (Reference 15). No channels or ditches were observed crossing the site property.

During the site reconnaissance conducted by E&E/FIT on November 20, 1990, seepage was observed from the foundation and pipe system of an abandoned pump house, formerly part of the Mound Street Power Plant. Since the pump house was on the river side of the flood wall, direct observation of a release to the surface water pathway was made. However, the source of the seepage was not known or determined, no sample was collected, and no description of the material seeping into the river was made. It is assumed to be an oil substance or mixture; however, there is no evidence of the oil being contaminated with PCBs.

5.2 SURFACE WATER SAMPLE RESULTS

No surface water or sediment samples were collected during this site investigation. Surface water and sediment samples have been collected near the Mound Street PCB Site. Sample analysis results are shown in Table 1. These samples were not analyzed for PCBs. A raw water sample was collected from the East St. Louis water intake of the Illinois-American Water Company, by E&E/FIT, during field activities conducted March 3-9, 1991. No contaminants were detected except for 12-14 ug/L chromium, 15-18 ug/L lead and 46-54 ug/L zinc. However, the sample was not tested for PCBs. Subsurface soil samples and groundwater samples were collected for the surface water pathway (groundwater to surface water migration route). The results obtained from this activity are summarized in Tables 4 and 5 (Section 3.0). Complete analytical data reports are included in Appendix C.

<u>Subsurface Soil</u>

The soil sampling results for Sample DC1CY-102 indicate the presence of PAHs in the subsurface. Naphthalene was detected in Sample DC1CY-102 at 150 ug/kg, fluoranthene at 570 ug/kg, pyrene at 520 ug/kg, and carbon disulfide at 22 ug/kg. These results are less than the background levels identified during the 1991 SSI of the Laclede Coal Gas Site. Sample analysis showed levels of volatiles, semivolatiles and PCBs below the detection limits for the other sample locations (100, 100D, 103, and 104).

Subsurface soil samples were collected in 1991 during an investigation of the Laclede Coal Gas Site. Volatiles, PAHs and cyanide were detected. Samples were not analyzed for PCBs. Refer to Table 1 and Figures 6a and 6b for sample data and locations.

Groundwater

The results of this sampling indicate the presence of benzene and PAHs in the groundwater. Benzene was detected in the North Well at 38 μg/L. However, benzene was not detected above the 6 μg/L detection limit in the South Well. PAHs detected in the North Well sample were acenaphthene at 86 μg/L, fluorene at 29 μg/L, phenanthrene at 26 μg/L, and bis(ethylhexyl) phthalate at 32 μg/L. All analyzed compounds were nondetect in the South Well. PCBs were nondetect in both the North and South Well.

Groundwater samples were collected in 1991 during an investigation of the Laclede Coal Gas Site. Volatiles, PAHs and cyanide were detected in the groundwater samples collected. Samples were not analyzed for PCBs. Refer to Table 1 and Figures 6a and 6b for sample data and locations.

Surface Water

Samples collected during the 1991 investigation of the Laclede Coal Gas Site showed low concentrations of metals in the Mississippi River. Volatiles were not detected in the sediments; however PAHs, cyanide and metals were detected in the sediments. Samples were not analyzed for PCBs. Refer to Table 1 and Figures 6a and 6b for sample data and locations.

5.3 SURFACE WATER USAGE AND TARGETS

The Illinois American Water Company has a surface water intake at East St. Louis, located on the east side of the Mississippi River (Appendix A, Photo 12), less than one-tenth of a mile downstream from the subject site (References 3 and 20). The Illinois-American Water Company serves 19 communities with a combined service population of approximately 300,000 persons (References 15 and 17). The East St. Louis intake water is blended with an intake on Chouteau Island, approximately 10 miles upstream of the site. The East St. Louis intake provides approximately 60 percent of the required production (Reference 17). The likelihood of contaminants originating from the site entering the Illinois-American surface water intake is low for the following reasons:

> The surface water intake is located across the Mississippi River from the site and slightly downstream. The intake is almost directly across the river from the site.
>
> The Mississippi River has a flow of at least 100,000 cubic feet per second providing a dilution of 0.00001, per the Site Inspection Worksheets.
>
> Contaminants would enter the river along the western edge of the river and progress outward in a plume. Such a plume would unlikely reach the eastern bank in such a short distance, rather contaminants would move directly south via the channel of the river.

No other surface water intakes are located within the 15-mile downstream target limit, except for industrial water usage intakes (Reference 15).

The Mississippi River (Appendix A, Photo 13) is a primary target with the following use designations; irrigation, livestock and wildlife watering, protection of warm water aquatic life and human health-fish consumption, boating and canoeing, drinking water supply, and industrial uses (Reference 16). It is also

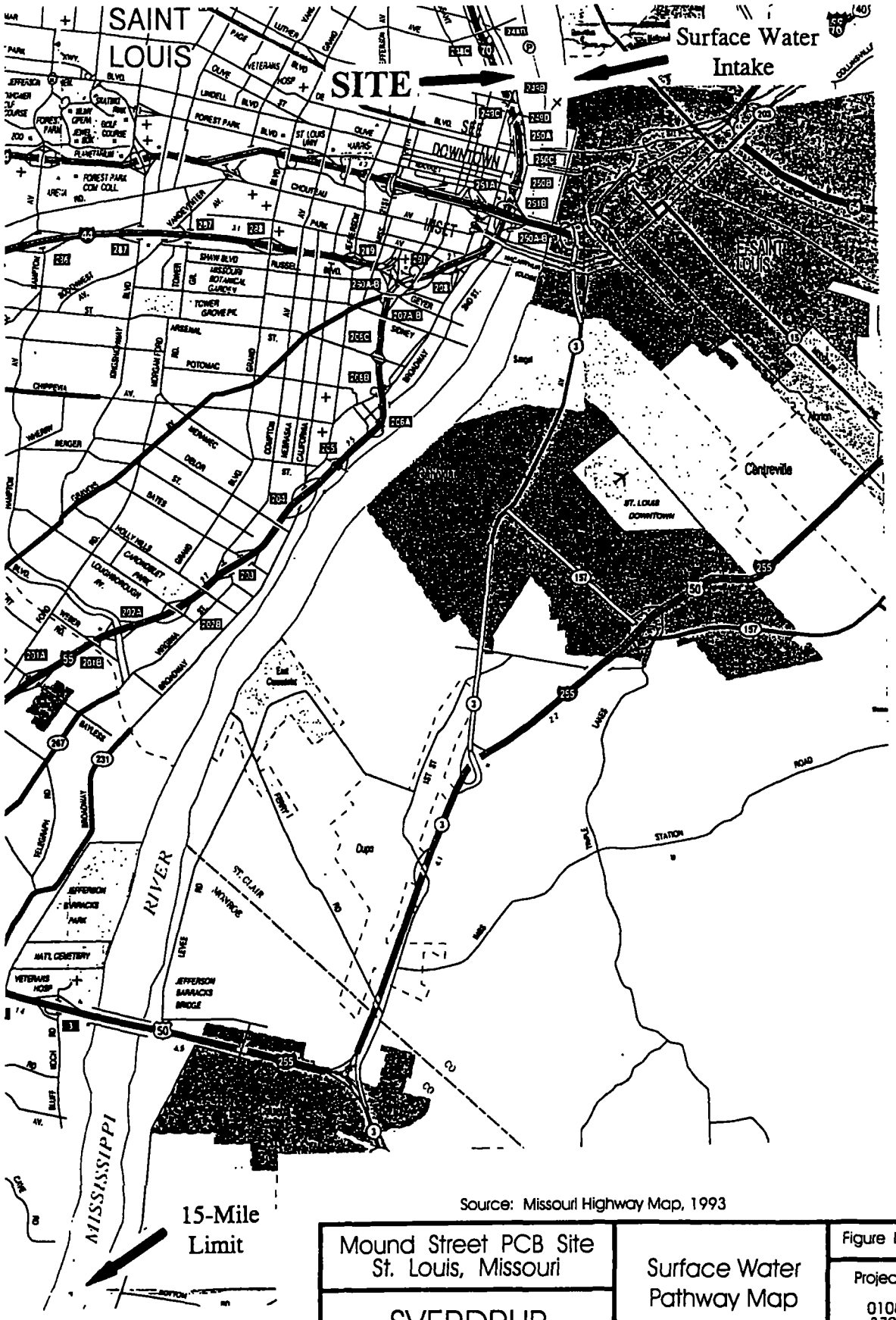
a primary fishery, with commercial and sport fishing occurring along the river. The commercial fish harvest by licensed fishermen in 1992 was reportedly 7,768 pounds for St. Louis County (Reference 18).

National Wetland Inventory Maps of the site area and 15 miles downstream along the Mississippi River were reviewed by MDNR during the completion of the PA. Approximately 0.7 miles of palustrine wetlands occur on the Illinois side of the river. No wetlands are reported on the Missouri side of the river (Reference 15).

State and federally listed and proposed threatened and endangered species which may occur in the vicinity of the site include the Pallid Sturgeon and Sicklefin Chub, big river fish that may have a wide range of occurance in the Mississippi River (Reference 2).

The Jefferson National Expansion Memorial, a 90-acre park with 2.7 million visitor per year (Reference 1), is located approximately 1 mile downstream of the site.

The Jefferson Barracks Park and National Cemetary are located approximately 15 miles downstream from the site (Reference 14).



Source: Missouri Highway Map, 1993

Mound Street PCB Site St. Louis, Missouri	Surface Water Pathway Map	Figure No.: 10
SVERDRUP		Project No.: 010865-370303
		5/96

6.0 SOIL EXPOSURE

6.1 PHYSICAL CONDITIONS

The Mound Street PCB Site is located in an industrial area near the Mississippi River. Fill material has been placed on the site to elevate it above the normal flood level (Reference 3). Fill near the site is approximately 12 deep and consists of demolition debris, including cinders, brick and cobble size stones (Reference 10). The former building basement was reportedly 12 - 14 feet below the ground surface and may have been filled with the building demolition debris (Reference 22). Beneath the fill is stratified native river alluvium. The area around the site is characterized as urban land, bottom land on 0 to 3 percent slopes. It is reported that these areas were originally bottom land or terrace land, and have been built-up with fill material (Reference 26). On the vacant property east of the site, native silt material was encountered to a depth of 27 feet (Reference 24).

Access to the site is unlimited, there are no fences or other barriers associated with this site. The site buildings were demolished in March of 1991 after an oil fire in the basement (Reference 3). The property is currently vacant with no structures present. Tall weeds were observed growing on the site during the December, 1995, site reconnaissance (Reference 22). No obvious erosional problems were observed during field activities (References 22 and 24).

6.2 SOIL SAMPLE RESULTS

Surface soil samples were collected in 1991 during an investigation of the Laclede Coal Gas Site. Volatiles, PAHs and cyanide were detected. Samples were not analyzed for PCBs. Refer to Table 1 and Figures 6a and 6b for sample data and locations.

6.3 SOIL EXPOSURE PATHWAY TARGETS

There are no residences on the site and the nearest residence is over one-quarter mile from the site (Reference 3). The nearest school is over one-half mile from the site (Reference 15). The surrounding area is commercial/industrial, with PFT-Apex Oil and TRRA being the closest facilities. Workers from each facility are in the vicinity of the site daily. However, they would not normally be physically on the Mound Street PCB Site, since it is a vacant lot and outside of their normal work areas (Reference 15).

Population within a 1-mile radius of the site is estimated at 3,755 persons on the Missouri side only (References 15). The population within a 4-mile radius of the site is approximately 207,100 persons (References 3). The following is an estimate of population in radial distance from the site, assuming the same density of people in each distance range:

Radial Distance	Percentage of Area		Population Range
0 - 0.25 mi	0.40		828
0.25 - 0.5 mi	1.17		2,423
0.5 - 1.0 mi	4.67		9,672
1.0 - 2.0 mi	18.76		38,852
2.0 - 3.0 mi	31.23		64,677
3.0 - 4.0 mi	43.76		90,627
		Total	207,100

The Jefferson National Expansion Memorial - Gateway Arch is approximately one mile downstream of the site. The National Park Service operates the park which encompasses 90 acres and has approximately 2.7 million visitors per year (Reference 1). No other sensitive environments occur within a 4-mile radius of the site (Reference 15).

7.0 AIR PATHWAY

Threats to the air pathway are evaluated as low because there have been no observed releases via the air pathway and there are few potential receptors. Air sampling was not conducted as part of this SSI. No air samples have been previously collected for this site.

8.0 SCREENING SITE INSPECTION SUMMARY

The Mound Street PCB Site is located in the City of St. Louis at the eastern end of Mound Street (near the intersection of Mound Street and First Street). The geographic coordinates of the site are 38° 38' 34.0" north latitude and 90° 10' 57.2" west longitude.

The Mound Street PCB Site is part of the Laclede Gas and Light Company former manufactured gas plant (FMGP) site, which operated in the late 1800s to the mid-1940s. On-site burial of coal tar wastes was typically conducted in unlined pits. In 1940, operations were split between Laclede Gas Light Company (Laclede Gas) and Laclede Power and Light Company (Laclede Electric). In 1945, Union Electric (UE) purchased the entire coal-gas facility and operated the Mound Street Power Plant from 1945 to 1973. UE did not manufacture coal-gas at this site. In 1969, the Apex Oil Company purchased the former coal gas works (Laclede Gas) from UE. UE, however, continued to operate its electrical facility from the former Laclede Electric works. In 1973, the UE property (Laclede Electric works) was transferred to the Tenlis Company. Tenlis dismantled the power generation and transmission equipment. Transformer oil was reportedly disposed by Midwest Oil Company. The dismantled equipment was sold as scrap metal. In 1981, Tenlis transferred the property to AZCON. The operations of AZCON are unknown; however, it was reported in the MDNR PA report that AZCON could have been a metal recycling company. In 1985, Mound Street Corporation became the property owner and leased the building to an individual for an electric motor stripping operation. An oil fire occurred in the basement of the building in 1989, and the building was demolished in the spring of 1991. McKinley Iron became the owner of the property in 1993.

The total area of the Mound Street PCB Site is estimated at approximately 1.5 acres. The property does not have any buildings or other structures, and is currently vacant.

Several investigations were conducted at this site over the last 20 years. Oil samples were collected on two different occasions from the former building basement. All PCB results have been below detection limits. Seepage was observed emanating from the foundation and piping system of an abandoned pump house, formerly part of the Mound Street Power Plant. The pipes were reportedly plugged with concrete; however, seepage was leaching through the concrete. The pump house is located on the eastern side of the flood wall, therefore, the seepage was going directly into the Mississippi River. No samples were collected and no description of the seepage material was made during the site reconnaissance. Soil, groundwater, surface water and sediment sampling conducted near the site identified the presence of volatile organics, PAHs and cyanide. The PAH and cyanide contamination was attributed to the former coal-gas operations. It was also stated that benzene, xylene, and some PAH contamination may be attributed to the adjacent PFT-Apex Facility.

Oil containing PCBs was discovered in July, 1993, at the Brooklyn Street storm-water pump station, located approximately 400 feet north of the Mound Street PCB Site. The possible source was identified as an underground storage tank (UST) on the adjacent property. The UST, removed in 1993, was located on Terminal Railroad Association (TRRA) property, southwest of the Brooklyn Street pump station. The TRRA property is located on the north side of Mound Street, directly across from the Mound Street PCB Site. In the conclusion of the Special Problem Investigation report completed by MSD, it is stated the UST appears to be the source of the oil in the pump station. It is further stated that ground saturation of oil from an old Union Electric facility is another possibility. No further incidences of oil in the Brooklyn Street pump station or manholes along the flood wall have occurred since the 1993 spill.

The Mound Street PCB Site is underlain by fill, Mississippi River alluvium, and limestone bedrock. Fill most likely consists of rock, brick, concrete, cinders, and other debris. Silt, clay or a mixture of silt and clay comprise the Mississippi River alluvium. No confining layer is known to exist between the alluvium and bedrock and no aquifer discontinuity exists within the 4-mile target distance limit. The depth to groundwater is approximately two feet above the Mississippi River and is estimated at 20 feet. Groundwater movement is toward the river, to the east and southeast of the site. The groundwater depth was measured at 25 feet below the ground surface during the field activities for this SSI. Groundwater samples from existing monitoring wells indicate the presence of benzene, cyanide and PAHs in the groundwater. The groundwater-to-surface water migration route is the pathway of most concern.

The Mound Street PCB Site is located approximately 300 feet west of the Mississippi River and is protected from flooding by a concrete flood wall located approximately 200 feet east of the site. Surface water runoff from the site is collected in the storm-sewer system, which is connected to the sanitary-sewer system. No channels or ditches were observed crossing the site property. Seepage was observed in 1990 leaking from the foundation and pipe system of an abandoned pump house, formerly part of the Mound Street Power Plant. Since the pump house is on the river side of the flood wall, direct observation of a release to the surface water pathway was made. Sampling of surface water and sediment indicate the presence of metals in the surface water, and the presence of xylene and PAHs in the sediment.

The Mound Street PCB Site is located in an industrial area near the Mississippi River. Access to the site is unlimited, there are no fences or other barriers associated with this site. The site buildings were demolished in March of 1991 after an oil fire in the basement. The property is currently vacant with no structures present. Tall weeds and other vegetation were observed growing on the site during the December, 1995, site reconnaissance. No obvious erosional problems were observed during field activities. Soil sampling indicate the presence of benzene, toluene, xylene and PAHs in the subsurface soil, and the presence of cyanide and PAHs in the surface soil. Health based screening concentrations for soils correspond to a 10^{-6} individual cancer risk or a noncancer exposure level corresponding to a reference dose (RfD) under specific exposure assumptions. Based on the Laclede Coal Gas SSI sampling results, the cancer risk screen concentrations for benzo(a)pyrene (0.088 mg/kg), benzo(b)fluoranthene (0.88 mg/kg), benzo(a)anthracene (0.88 mg/kg), and ideno(1,2,3-cd)pyrene (0.88 mg/kg) have been exceeded. The RfDs for pyrene (2,300 mg/kg), cyanide (1,600 mg/kg), fluorene (3,100 mg/kg), acenaphthene (4,700 mg/kg), anthracene (23,000 mg/kg), and fluoranthene (3,100 mg/kg) have been exceeded.

Threats via the air exposure pathway are considered low due to the vegetative cover and low volatility of the chemicals of concern. No air samples have been collected.

9.0 REFERENCES

1 Barra, Louise. National Park Service, Gateway Arch. March 15, 1994. Telephone conversation with Don Falls, MDNR. Subject: Park acreage and attendance.

2 Brabander, Jerry. U.S. Fish and Wildlife Service. June 14, 1993. Correspondence to Edwin Knight, MDNR. Subject: sensitive environments near the subject site.

3 Ecology and Environment/Field Investigation Team (E&E/FIT). October 29, 1991. Screening Site Inspection, Laclede Coal Gas, St. Louis, Missouri.

4 Ecology and Environment/Field Investigation Team (E&E/FIT). June 23, 1988. Preliminary Assessment, Mound Street Power Plant, St. Louis, Missouri.

5 Edmond, Howard. Metropolitan Sewer District. December 13, 1993. Telephone conversation with Don Falls, MDNR Hazardous Waste Program, Superfund Section.

6 Edmond, Howard. Metropolitan Sewer District. November 21, 1995. Telephone conversation with Mike May, Sverdrup.

7 Falls, Don. MDNR Hazardous Waste Program, Superfund Section. November 22, 1993a. Mound Street PCB Site Reconnaissance Memorandum.

8 Falls, Don. MDNR Hazardous Waste Program, Superfund Section. December 13, 1993b. Latitude/Longitude Calculation Worksheet.

9 GEHM Corporation (GEHM). September 1, 1993a. Activities Report, TRRA of St. Louis, First and Mound Streets Site, MDNR Spill Report #07143-KB-1331.

10 GEHM Corporation (GEHM). October 26, 1993b. UST Removal Closure Report.

11 Lewis, R.H., Petroleum Fuel and Terminal. Letter to Charles Gay, Fire Inspector. Subject: Identification of pipeline leak per a September 8, 1993 telephone conversation. (Received by Howard Edmond, MSD, on September 30, 1993).

12 Metropolitan Sewer District, Environmental Compliance Laboratory (MSD). July 19, 1993a. Sample analysis of Brooklyn Street pump station wet well and UST at Brooklyn and Mound.

13 Metropolitan Sewer District, Environmental Compliance Laboratory (MSD). August 13, 1993b. Sample analysis of Manhole F-GA1 (#12), (#13), and (#14).

14 Missouri State Highway Map. 1993.

15 Missouri Department of Natural Resources (MDNR). March 21, 1994a. Preliminary Assessment. Mound Street PCB Site, St. Louis, Missouri.

16 Missouri Department of Natural Resources (MDNR). March 30, 1994b. Missouri Water Quality Standards, 10 CSR 20-7.031.

17 Reed, Richard, Illinois American Water Company. December 29, 1993.Telephone conversation with Don Falls, MDNR Hazardous Waste Program, Superfund Section.

18 Robinson, J., MDC. March 15, 1994. Telephone conversation with Don Falls, MDNR Hazardous Waste Program, Superfund Section.

19 Smith, S.I., St. Louis MSD. July 8, 1993. Special Problem Investigation of Brooklyn Street Pump Station.

20 Starbuck, Edith. Missouri Department of Natural Resources, Division of Geology and Land Survey. December 29, 1993. PA/SI Report for the Mound Street Site, St. Louis, City.

21 Starbuck, Edith. Missouri Department of Natural Resources, Division of Geology and Land Survey. January 5, 1994. Existence of karst near the Mound Street Site.

22 Sverdrup Corporation. December 11, 1995. Field Log Book and Trip Report for Site Reconnaissance Activities at the Mound Street PCB Site, St. Louis, Missouri.

23 Sverdrup Corporation. March 4, 1996a. Field Sampling Plan, Mound Street PCB Site, St. Louis, Missouri.

24 Sverdrup Corporation. April 2, 1996b. Field Log Book and Trip Report for Site Sampling Activities at the Mound Street PCB Site, St. Louis, Missouri.

25 U.S. Army Corps of Engineers, St Louis District, (USACE). August 30, 1962. Flood Protection Reach 3, Floodwall and General Contract Items. Station 352+00 to Station 369+00 drawing and Soil Exploration Data.

26 U.S. Department of Agriculture, Soil Conservation Service (USDA). April 1982. Soil Survey of St. Louis County and St. Louis City, Missouri.

27 U.S. Department of Commerce, Bureau of Census (Census). 1990. 1990 Census of Population and Housing, Summary of Population and Housing Characteristics, Missouri.

28 U.S. Department of Commerce (USDC). 1983. The Climatic Atlas of the United States.

29 U.S. Environmental Protection Agency (U.S. EPA). May 3, 1996. Data Transmittal for Activity DC1CY, Mound Street PCB Site.

30 U.S. Environmental Protection Agency (U.S. EPA). 1992. Guidance for Performing Site Inspections under CERCLA. EPA 540-R-92-021.

31 U.S. Environmental Protection Agency (U.S. EPA). 1995. Hazard Ranking System. Superfund Chemical Data Matrix Table.

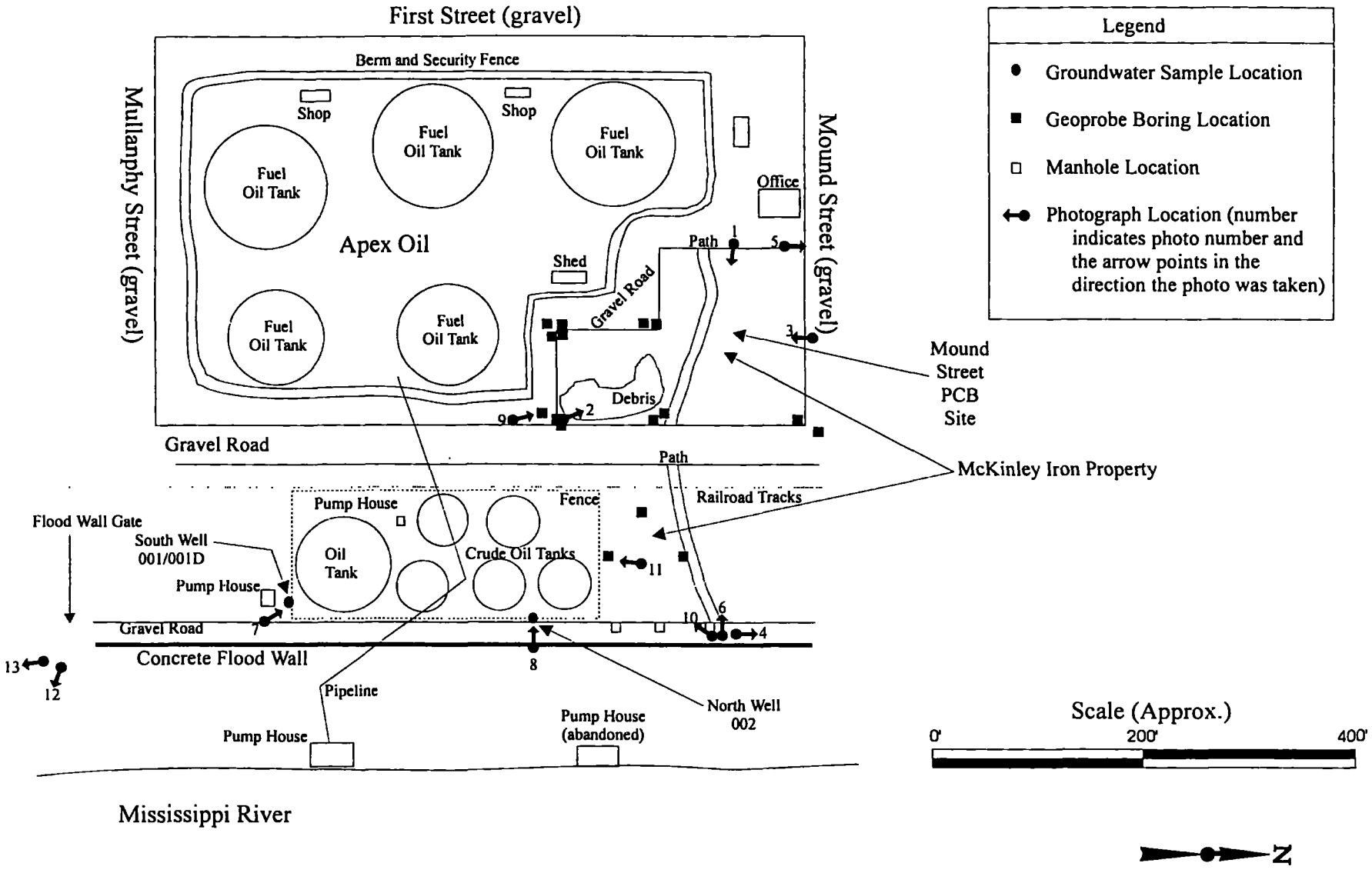
32 U.S. Environmental Protection Agency (USEPA). November 1992. The Hazard Ranking System Guidance Manual. Publication 9345.1-07. Washington, DC.

33 U. S. Geological Survey (USGS). 7.5 Minute Series Topographic Map. Granite City, Missouri-Illinois 1954 (photorevised 1974), Cahokia, Illinois-Missouri 1954 (photorevised 1974), Clayton, Missouri 1954 (photorevised 1974), French Village, Illinois 1954 (photorevised 1982), Monks Mound, Illinois 1954 (photorevised 1993), Webster Groves, Missouri 1954 (photorevised 1974).

34 U.S. Government Printing Office, Environmental Protection Agency, Hazard Ranking System Final Rule. December 14, 1990. 40 CFR Part 300. Federal Register/Volume 55/no. 241.

APPENDIX A

PHOTOGRAPH RECORD

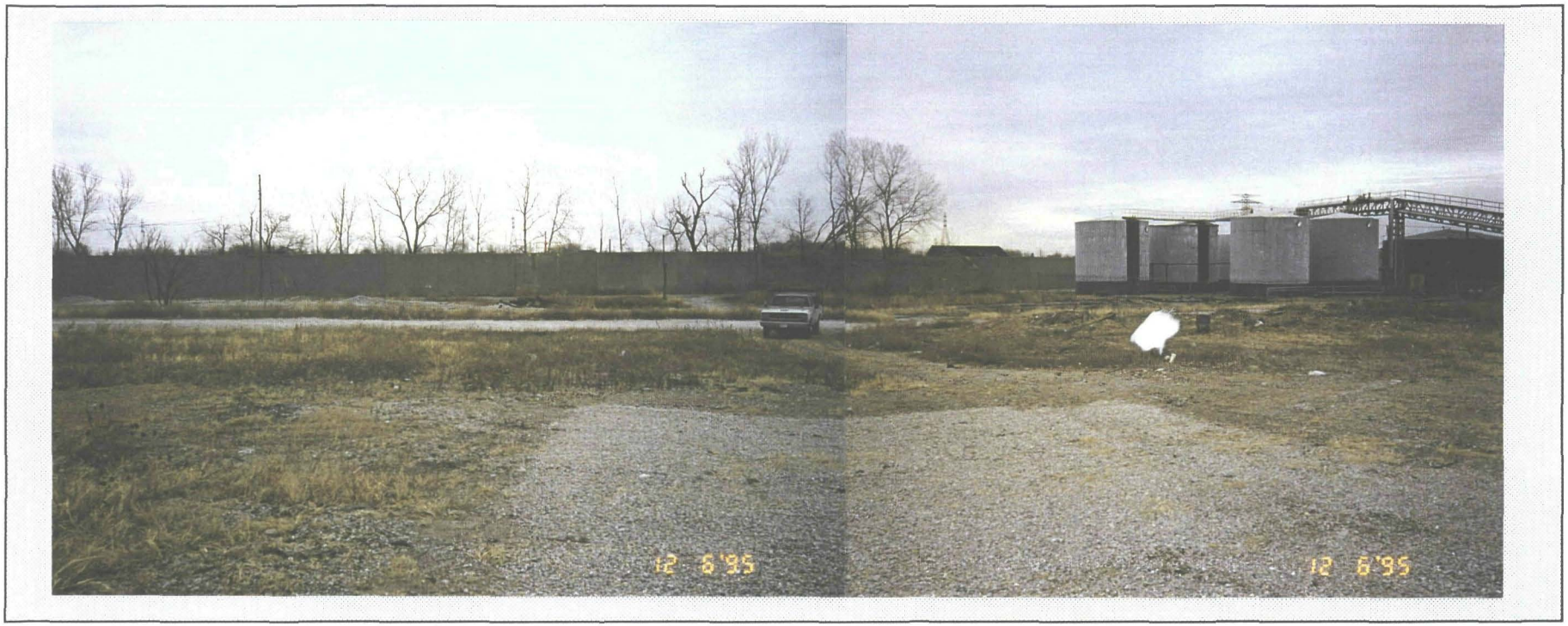


Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site.	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	Photograph Location Map	Figure No.: A-1
		SVERDRUP		5/96

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup



No. 1 (Roll 1, Photos 5 and 6)

Description: East view photomosaic of the site from the western border of the site. Note the PFT-Apex Oil tanks and flood wall in the background.

Photographer: M. McCurdy Witness: K. Harris Date: December 6, 1995

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 2 (Roll 1, Photo 1)

Description: Northwest view of the site from the southeast corner of the site. Note the debris piles in the background.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995

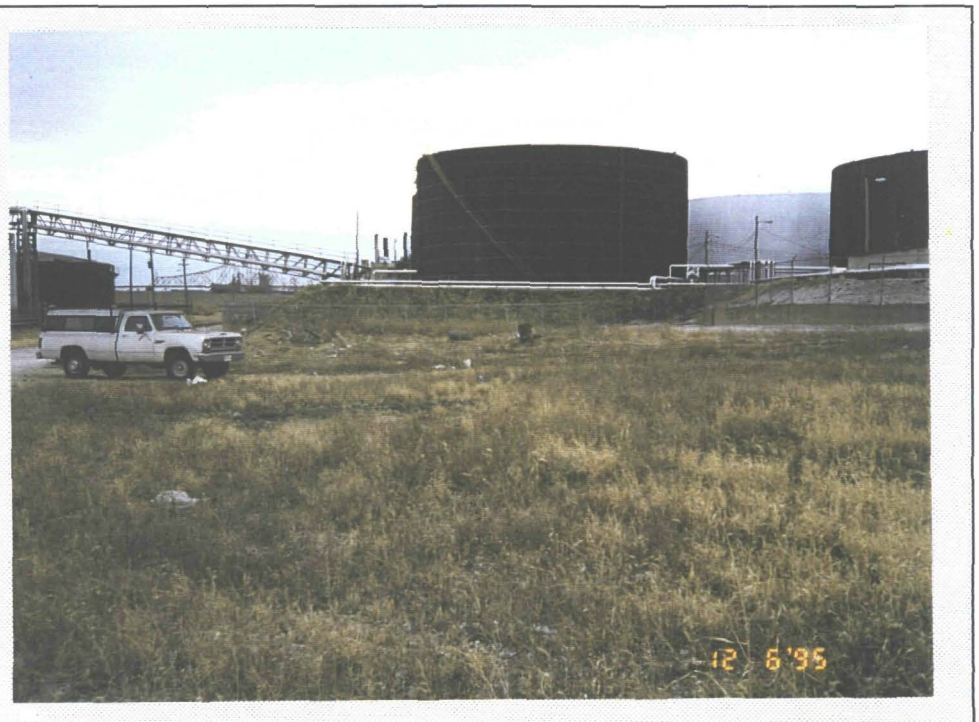
No. 3 (Roll 1, Photo 4)

Description: South view of the site from the northern edge showing vegetative cover. Note the PFT-Apex Oil tanks in the background.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995



Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 4 (Roll 1, Photo 11)

Description: North view along gravel road and along flood wall showing the MSD pump station.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995

No. 5 (Roll 1, Photo 7)

Description: North view showing the TRRA property from which an UST was removed in 1993.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

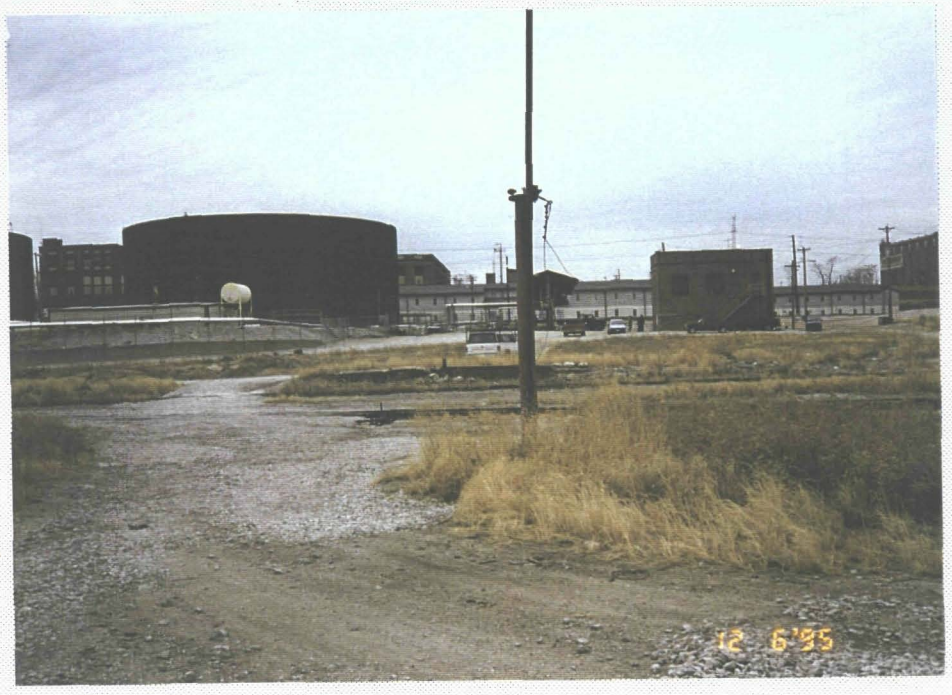
No. 6 (Roll 1, Photo 12)

Description: West view of the site from near the flood wall showing the site topography. Note the PFT-Apex Oil facility in the background

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995



No. 7 (Roll 1, Photo 14)

Description: Northwest view showing the South Well.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 8 (Roll 1, Photo 13)

Description: West view showing the north well on Petroleum, Fuel and Terminal property.

Photographer:
M. McCurdy

Witness: K. Harris

Date: December 6, 1995

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 9 (Roll 2, Photo 2)

Description: Northwest view showing the location of soil sample DC1CY-101 at the southeast corner of the site. Note the debris piles in the background.

Photographer: M. May

Witness: M. McCurdy

Date: April 3, 1996

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 10 (Roll 2, Photo 21)

Description: Southwest view showing the vacant property where soil samples DC1CY-100/100D, 102, 103 and 104 were collected. This property is east of the site, near the flood wall.

Photographer: M. May

Witness: M. McCurdy

Date: April 3, 1996

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 11 (Roll 2, Photo 9)

Description: South view showing the location of sample DC1CY-100/100D near the PFT-Apex Oil tanks adjacent to the flood wall.

Photographer: M. May

Witness: M. McCurdy

Date: April 3, 1996

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

No. 12 (Roll 2, Photo 24)

Description: East view across the Mississippi River showing the Illinois-American Surface Water Intake Pump House. Taken from the flood wall gate at Mullanphy Street.

Photographer: M. May

Witness: M. McCurdy

Date: April 3, 1996

Photographic Record

Site Name: **Mound Street PCB Site**
Site Location: **St. Louis, Missouri**
CERCLIS ID No.: **MO0000093682**
Sverdrup Project Reference No.: **010865-370303**

Sverdrup

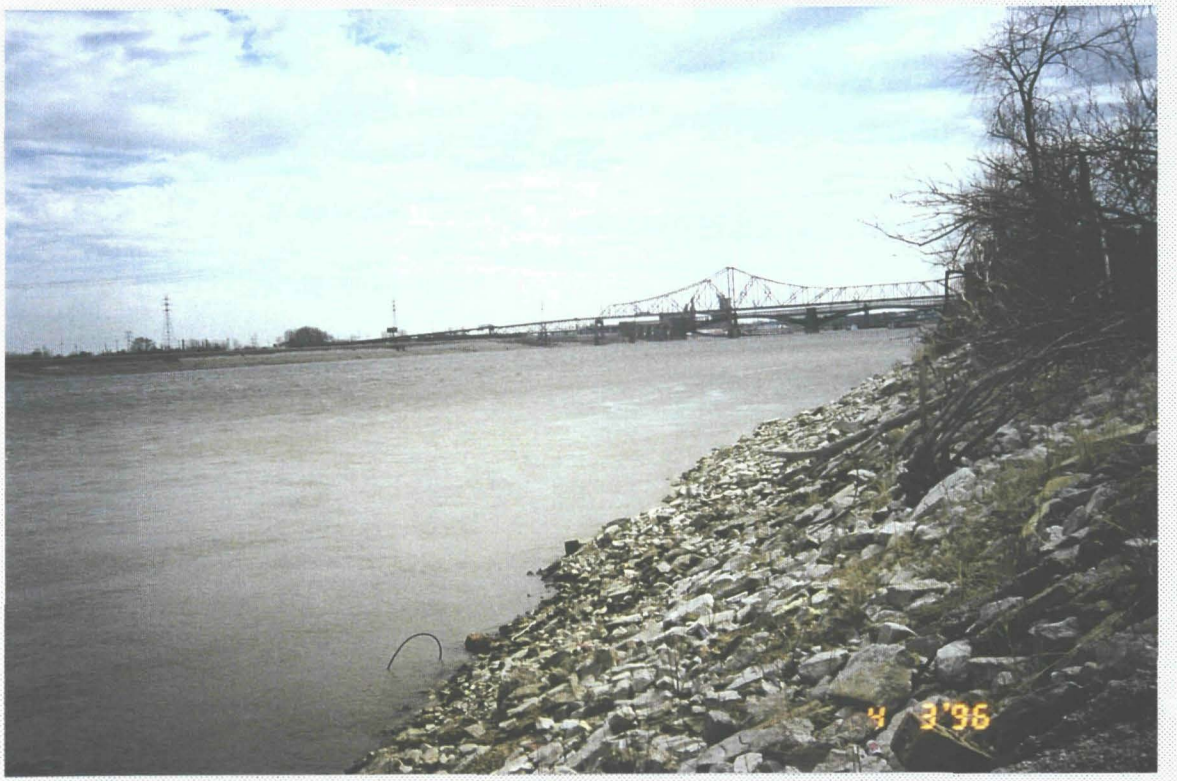
No. 13 (Roll 2, Photo 23)

Description: South view showing the Mississippi River. Note the M.L. King Bridge and Eads Bridge in the background. The Illinois-American surface water intake pump house is off the picture to the left. Taken from the flood wall gate at Mullanphy Street.

Photographer: M. May

Witness: M. McCurdy

Date: April 3, 1996



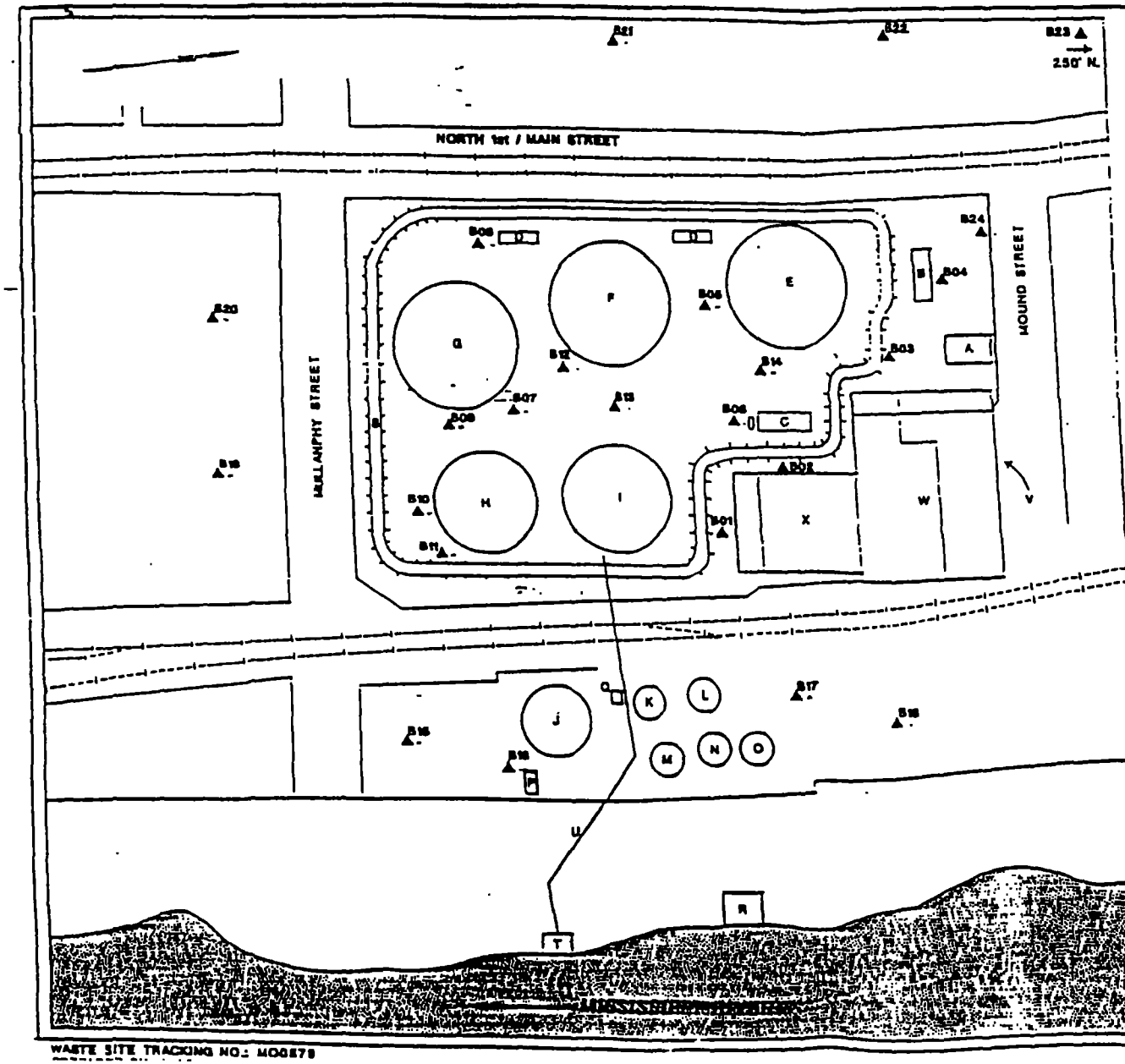
SECTION 6: FIELD ACTIVITIES

Field work was conducted March 3 through 9, 1991. The sample series assigned to this activity was DSX44. The FIT members and their respective tasks were: Keith Brown, Team Leader; Anne Melia, PASP coordinator; Chris Williams, Geoprobe operator and sampler; Patty Roberts, Assistant Geoprobe operator and sampler; Wes McCall, drilling supervisor and Site Safety Officer; John Peck, sampler and health and safety monitor; and Jon Strobel, sampler and assistant PASP coordinator. The FIT contracted John Mathes & Associates, Inc. to conduct all subsurface drilling. On-site personnel for John Mathes & Associates, Inc. were: Keith Bunselmyer, driller; and Jeff Crank and Jim Burker, driller's assistants. Additionally, William Oberle and Jacalyn Wheeler, E & E/FIT, were present on site March 6 and 7, 1991, to conduct a health and safety, and technical field audits.

The primary chemical hazards associated with the Laclede Coal Gas site involve soils contaminated with cyanide salts and/or PAHs. These materials could pose inhalation, direct contact, and ingestion hazards. Samples were collected in level-D and level-C personal protection. An HNu photo-ionization detector with 10.2 eV probe was used to monitor ambient levels of volatile compounds in the breathing zone. If the HNu registered readings above predetermined action levels, personal protection was upgraded to level-C. Otherwise, samples were collected in level-D personal protection.

6.1 SUBSURFACE SOIL SAMPLING

Subsurface soil sampling was conducted March 4 through 9, in an attempt to determine the areal and vertical extent of subsurface contamination. Initially, 24 locations were drilled with solid stem augers (Figure 6-1; Table 6-1). Their depths ranged from 2 feet to 38 feet. Originally, the work plan called for 18 locations to be drilled with solid stem augers to approximately 20 foot depths, with the exception of 1 location which was to be drilled to 50 feet deep. This deep sample was intended to determine the depth to bedrock and help assess the vertical contaminant zone. The 6 additional locations were added because subsurface rubble prohibited the advancement of the augers



EXPLANATION

APEX OIL COMPANY
ST. LOUIS TERMINAL STRUCTURES

- A. OFFICE
- B. TANKER TRUCK LOADING PLATFORM
- C. EQUIPMENT SHED
- D. EQUIPMENT/WORK SHOP
- E. FUEL OIL TANK (60,000 Barrels)
- F. FUEL OIL TANK (80,000 Barrels)
- G. FUEL OIL TANK (80,000 Barrels)
- H. FUEL OIL TANK (60,000 Barrels)
- I. FUEL OIL TANK (55,000 Barrels)
- J. OIL TANK
- K. CRUDE OIL TANK
- L. CRUDE OIL TANK
- M. CRUDE OIL TANK
- N. CRUDE OIL TANK
- O. CRUDE OIL TANK
- P. PUMP HOUSE
- Q. PUMP HOUSE
- R. PUMP HOUSE (Abandoned)
- S. CONTAINMENT BERM (For Fuel Oil Tanks, Capped With A Chain-link Fence)
- T. PUMP HOUSE
- U. RIVER TANKER OFF-LOADING PIPES

FORMER UNION ELECTRIC
MOUND ST. FACILITY

- V. FORMER UNION ELECTRIC BUILDING
- W. GENERATOR ROOM (Basement Plan)
- X. BOILER ROOM (Basement Plan)

B01 BORE HOLE (SCREENING) SAMPLE LOCATION

LACLEDE COAL GAS SITE
ST. LOUIS, MISSOURI
(PRESENT DAY CONFIGURATION)
FIGURE 6-1
SOIL BORING LOCATION MAP

SCALE
0 200
FEET

WASTE SITE TRACKING NO.: MO0578

FIT MAY

Table 6-1
Borehole Summary
Laclede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Borehole #	Depth (ft)	Approximate Location
B01	18	South of former Mound Street Power Plant
B02	21	Southwest of former Mound Street Power Plant
B03	19	South of P, F, & T Office
B04	19	North of tanker truck loading platform
B05	26	Approximately 15 feet south of northern-most fuel oil tank
B06	38	North of center of site within containment berm
B07	29	South of center of site within containment berm
B08	--	Southwest corner of site within containment berm
B09	--	South of center of site within containment berm
B10	--	Southeast corner of site within containment berm
B11	15	Southeast corner of site within containment berm
B12	11	Center of site within containment berm
B13	10	Center of site within containment berm
B14	26	North center of site within containment berm
B15	31	Southeast corner of site
B16		Southeast corner of site approximately 100 feet north of B15
B17	33	Northeast corner of site
B18	33	Northeast corner of site approximately 150 north of B17
B19	30	South of Mullanphy Street
B20	30	South of Mullanphy Street approximately 200 feet north of B19
B21	--	Approximately 80 feet north of North 1st Street
B22	--	Approximately 300 feet north of B21
B23	--	Approximately 450 feet north of B22
B24	23	Northeast corner of site

Note: See Figure 6-1 for borehole locations.

at several locations to only a few feet and, therefore, a representative sample could not be collected.

Samples were collected off the auger flights and screened on site for PAHs and VOCs in the FASP mobile laboratory (Tables 6-2 and 6-3). The samples were collected at 5 foot intervals: the PAH sample was a composite of 5 aliquots, 1 collected every foot; the VOC sample was a grab sample. Four of the sample locations determined by FASP analysis to be the most contaminated were resampled as follows: hollow stem augers equipped with continuous samplers were advanced, offset 1 to 5 feet from the screening boring (Figure 6-2, Table 6-4). A background location was sampled in the same manner. Due to subsurface rubble and debris, the continuous sampler could not be utilized at all locations. A split spoon sampler equipped with a 140 pound hammer was used at locations where the continuous sampler would not work. Samples were collected according to E & E, Inc. Standard Operation Procedures (SOPs) for borehole sampling, Gentech 5.9. Samples from the 4 locations that were resampled were submitted to EPA for volatiles, semi-volatiles, cyanides, and total metals analysis.

The background samples were inadvertently discarded along with the screening samples. This was not discovered by FIT until the SSI was completed and the team had returned to Kansas City. Split samples had been collected at all locations where samples were submitted to the EPA and which were also on PF & T property. Kathy Enright, of E & E/TAT in St. Louis, Missouri, sent the split samples collected for PF & T to E & E's Kansas City office. These samples were once again split, and 1 set was submitted to EPA to be used as the background sample. The other set was returned to PF & T.

The background samples were collected at a different location than stated in the work plan because bedrock was encountered at approximately 2 feet below the surface at this location; therefore, subsurface soil samples could not be collected there. FASP analysis had revealed that borehole #B24, the farthest upgradient screening sample, was below detection limits for all target compounds. It was known that the depth to bedrock was approximately 20 feet. Therefore, E & E/FIT relocated

Table 6-2
FASP Screening Results for Volatiles
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B01 A	1,200	380	1,700	0 - 5
B01 B	9,100	1,200	19,000	5 - 10
B01 C	18,000	710	65,000	10 - 15
B01 D	17,000	770	79,000	15 - 18
B02 A	6,300	43,000	240,000	0 - 5
B02 B	6,100	1,700	57,000	5 - 10
B02 C	69,000	110,000	570,000	10 - 15
B02 D	7,500	650	33,000	15 - 21
B03 A	1,040	22,000	22,000	0 - 5
B03 B	310	11,000	53,000	5 - 10
B03 C	1,800	6,300	3,500	10 - 15
B03 D	860	9,000	5,300	15 - 19
B04 A	< 250	450	5,600	0 - 5
B04 B	310	480	5,900	5 - 10
B04 C	< 250	250	5,100	10 - 15
B04 D	< 250	ND	440	15 - 19
B05 A	460	ND	ND	0 - 5
B05 B	ND	ND	ND	5 - 10
B05 C	ND	ND	420	10 - 15
B05 D	ND	ND	410	15 - 20
B05 E	ND	ND	ND	20 - 26
B06 A	48,000	1,700	120,000	0 - 5
B06 B	20,000	1,800	68,000	8 - 10
B06 BA	93,000	120,000	220,000	0 - 5
B06 BB	27,000	91,000	260,000	5 - 10
B06 BC	ND	ND	ND	10 - 15
B06 BD	< 250	< 250	ND	15 - 20
B06 BE	12,000	14,000	54,000	20 - 25
B06 BF	43,000	66,000	23,000	25 - 30
B06 BG	20,000	16,000	26,000	30 - 35
B06 BH	29,000	43,000	94,000	35 - 38
B07 A	1,000,000	17,000	2,500,000	3 - 8
B07 B	670,000	12,000	2,100,000	8 - 13
B07 C	370,000	ND	> 1,200,000	13 - 18
B07 D	140,000	2,500	> 21,000,000	18 - 23
B07 E	22,000	490	120,000	23 - 26
B07 F	51,000	2,800	340,000	26 - 29
B10 B	< 250	410	ND	5 - 10
B11 A	ND	ND	ND	0 - 5

Table 6-2 (cont.)

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B11 B	ND	ND	ND	5 - 10
B11 C	ND	ND	ND	10 - 15
B12 A	< 250	< 250	1,500	0 - 5
B12 B	910	1,600	4,400	5 - 11
B13 A	570	420	< 250	0 - 5
B13 B	670	450	2,300	5 - 10
B14 A	270,000	11,000	> 160,000	2 - 8
B14 B	790	9,100	> 24,000	8 - 13
B14 C	400,000	14,000	> 160,000	13 - 18
B14 D	340,000	12,000	> 210,000	18 - 23
B14 E	310,000	8,900	> 195,000	23 - 26
B14 F	2,200,000	63,000	> 1,000,000	---
B14 SS	93,000	110,000	440,000	---
B15 A	680	490	> 29,000	0 - 5
B15 B	290	ND	10,000	5 - 10
B15 C	< 250	ND	7,400	10 - 15
B15 D	< 250	ND	2,700	15 - 20
B15 E	ND	ND	ND	20 - 25
B15 F	ND	ND	ND	25 - 31
B16 A	820	860	15,000	0 - 3
B17 A	540	ND	21,000	0 - 5
B17 B	ND	ND	2,700	5 - 10
B17 C	ND	ND	ND	10 - 15
B17 D	ND	ND	ND	15 - 20
B17 E	ND	ND	ND	20 - 25
B17 F	ND	ND	ND	25 - 30
B17 G	ND	ND	ND	30 - 33
B18 A	< 250	ND	ND	0 - 5
B18 B	ND	ND	ND	5 - 10
B18 C	ND	ND	ND	10 - 15
B18 D	ND	ND	ND	15 - 20
B18 E	ND	ND	ND	20 - 25
B18 F	ND	ND	ND	25 - 30
B18 G	ND	ND	ND	30 - 33
B19 A	ND	ND	ND	0 - 5
B19 B	ND	ND	ND	5 - 10
B19 C	ND	ND	ND	10 - 15
B19 D	ND	ND	ND	15 - 20
B19 E	ND	ND	ND	20 - 25
B19 F	ND	ND	ND	25 - 30
B20 A	320	ND	ND	0 - 5
B20 B	ND	ND	ND	5 - 10
B20 C	ND	ND	ND	10 - 15
B20 D	ND	ND	ND	15 - 20

Table 6-2 (cont.)

Sample #	Benzene (µg/kg)	Toluene (µg/kg)	M-xylene (µg/kg)	Depth (feet)
B20 E	ND	ND	ND	20 - 25
B20 F	ND	ND	ND	25 - 30
B22 A	ND	ND	ND	---
B23 A	ND	ND	ND	0 - 4
B24 A	ND	ND	ND	0 - 5
B24 B	ND	ND	ND	5 - 10
B24 C	< 250	ND	ND	10 - 15
B24 D	400	ND	550	15 - 20
B24 E	460	ND	430	20 - 23
401	ND	ND	ND	N/A
402	ND	ND	1,600	N/A
403	< 250	< 250	420	N/A
301	ND	ND	ND	N/A
302	ND	ND	ND	N/A
303	ND	ND	ND	N/A
304	ND	ND	ND	N/A
DW 1	188	77	1,000	N/A
DW 2	330	48	1,100	N/A
CDW	ND	ND	ND	N/A
SS-Rinsate	ND	ND	ND	N/A

Note: Detection limit for soil/sediment samples = 250 µg/kg. Detection limit for water samples = 25 µg/L. See Figures 6-1 and 6-2 for sample locations.

B01 A through B24 E = soil samples
401 through 403 = sediment samples
301 through 304 = surface water samples
DW = decon water (units are µg/L)
CDW = clean decon water
ND = no detection
N/A = not applicable
SS = split spoon

Table 6-3
FASP Screening Results for PAHs
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991
Reported in µg/kg

Sample #	Fluor-anthene	Pyrene	Benzo(k) fluoranthene	Benzo(a) pyrene	Comments
B01 A	16,000	3,700	NA	NA	
B01 B	27,000	12,000	NA	NA	
B01 C	56,000	40,000	NA	NA	
B01 D	13,000	5,200	NA	NA	
B02 A	8,000	ND	ND	ND	
B02 B	15,000	ND	ND	ND	
B02 C	ND	ND	ND	ND	
B02 D	ND	ND	ND	ND	
B03 A	ND	ND	ND	ND	
B03 B	ND	ND	ND	ND	
B03 C	ND	ND	ND	ND	
B03 D	ND	ND	ND	ND	
B04 A	ND	ND	ND	ND	
B04 B	12,000	ND	ND	ND	
B04 C	9,000	ND	ND	ND	
B04 D	< 500	ND	ND	ND	chyrsene & benzo(a) anthracene = 1,200
B05 A	ND	ND	ND	ND	
B05 B	ND	ND	ND	ND	
B05 C	ND	ND	ND	ND	
B05 D	ND	ND	ND	ND	two unknown peaks
B05 E	ND	ND	ND	ND	
B06 A	55,000	110,000	54,000	40,000	anaphthalene, fluorene, anthracene, chrysene
B06 B	Blew out GC, peaks too large to integrate				
B06 BA	ND	ND	ND	ND	
B06 BB	ND	ND	ND	ND	
B06 BC	ND	ND	32,000	11,000	other identified peaks
B06 BD	ND	ND	ND	ND	
B06 BE	ND	ND	ND	ND	
B06 BF	ND	ND	ND	ND	
B06 BG	ND	ND	ND	ND	
B06 BH	17,000	ND	ND	ND	
B07 A	Peaks too large to integrate, no time to reanalyze				
B07 B	160,000	50,000	50,000	70,000	other PAHs present
B07 C	130,000	130,000	33,000	76,000	other PAHs present
B07 D	12,000	9,600	3,700	3,900	
B07 E	3,300	3,800	3,500	3,000	other PAHs present
B07 F	20,000	19,000	4,200	8,000	other PAHs present
B10 B	14,000	16,000	7,800	9,100	other PAHs present

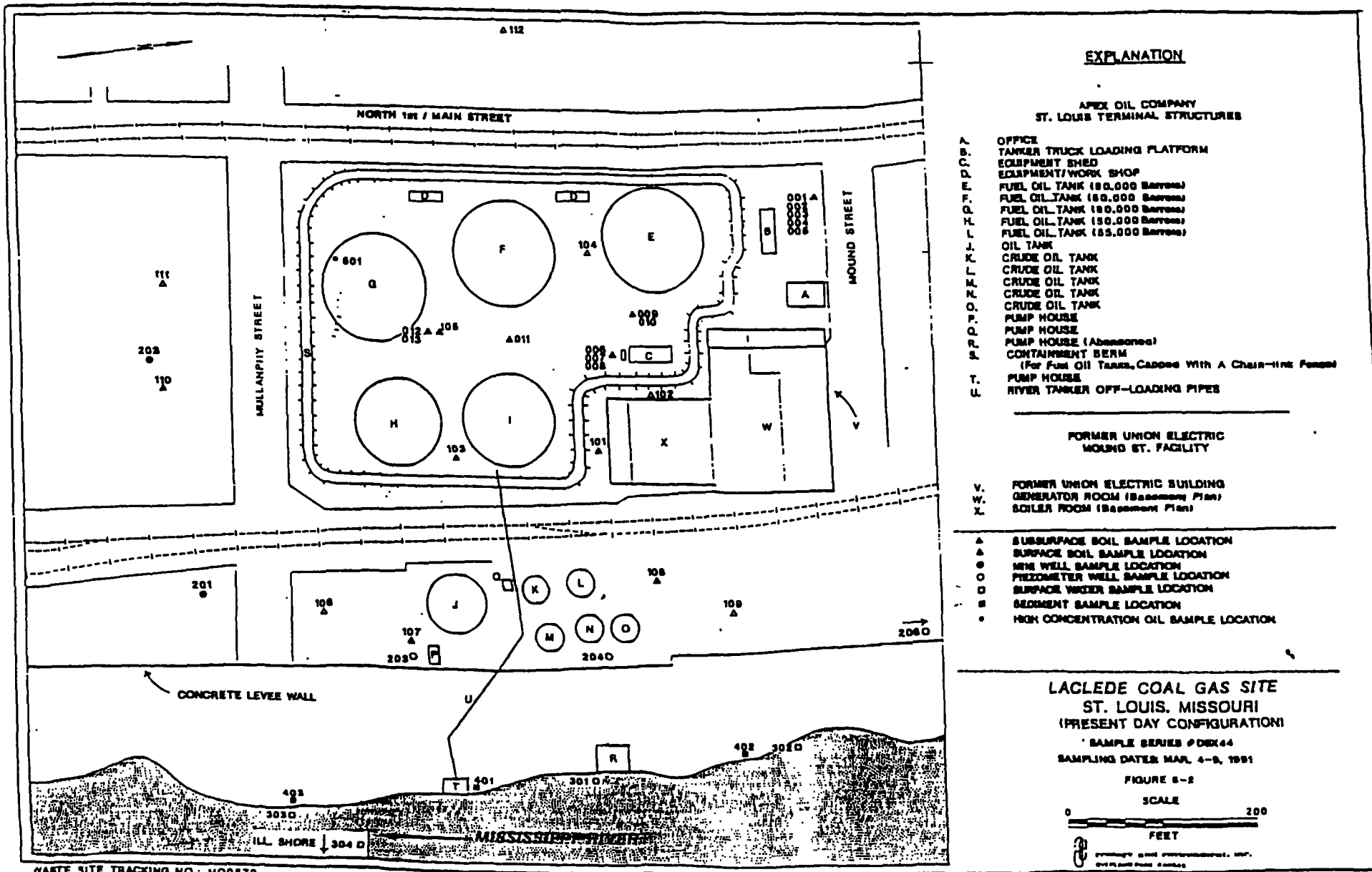
Table 6-3 (cont.)

B11 A	2,400	1,600	4,200	ND	other PAHs present
B11 B	?,100	2,100	7,000	10,000	other PAHs present
B11 C	7,800	ND	6,000	12,000	
B12 A	14,000	12,000	14,000	15,000	
B12 B	38,000	29,000	12,000	15,000	
B13 A	150,000	73,000	46,000	44,000	
B13 B	12,000	10,000	10,000	12,000	
B13 C	32,000	34,000	28,000	32,000	
B14 A	1,600,000	580,000	280,000	63,000	other identified peak
B14 B	2,200,000	1,000,000	370,000	310,000	other identified peak
B14 C	4,200,000	1,600,000	1,200,000		other identified peak
B14 D	4,300,000	1,300,000	490,000		other identified peak
B14 E	3,200,000	4,100,000	1,500,000	140,000	other identified peak
B14 F	Blew out GC, peaks too large to integrate				
B14 SS	1,400,000	880,000	230,000	130,000	
B15 A	ND	ND	ND	ND	
B15 B	4,900	1,300	ND	ND	
B15 C	ND	ND	ND	ND	
B15 D	ND	ND	ND	ND	
B15 E	ND	ND	ND	ND	
B15 F	ND	ND	ND	ND	
B16 A	19,000	30,000	ND	ND	early peaks
B17 A	ND	ND	ND	ND	
B17 B	ND	ND	ND	ND	
B17 C	ND	< 500	ND	ND	
B17 D	ND	ND	ND	ND	
B17 E	ND	ND	ND	ND	
B17 F	ND	ND	ND	ND	
B18 A	ND	ND	ND	ND	
B18 B	ND	ND	ND	ND	
B18 C	ND	ND	ND	ND	
B18 D	ND	ND	ND	ND	
B18 E	ND	ND	ND	ND	
B18 F	ND	ND	ND	ND	
B18 G	ND	ND	ND	ND	
B19 A	ND	ND	ND	ND	
B19 B	ND	ND	ND	ND	
B19 C	ND	ND	ND	ND	
B19 D	ND	ND	ND	ND	
B19 E	18,000	16,000	14,000	12,000	
B19 F	4,500	ND	2,800	ND	
B20 A	ND	2,900	< 500	ND	
B20 B	4,100	4,000	ND	545	
B20 C	ND	ND	ND	ND	
B20 D	ND	ND	ND	ND	
B20 E	ND	ND	ND	ND	
B20 F	2,600	3,200	3,500	4,500	
B22 A	3,800	3,500	2,800	ND	

Table 6-3 (cont.)

B23 A	ND	ND	ND	ND	
501	--	--	--	--	peaks close to retention time, but do not match
402	ND	ND	ND	ND	
403	2,600	5,400	4,200	3,800	
DDW	ND	ND	ND	ND	no peaks (µg/L)
SS Rinsate	ND	ND	ND	ND	no peaks (µg/L)
B24 A	ND	ND	ND	ND	
B24 B	ND	ND	ND	ND	
B24 C	ND	ND	ND	ND	
B24 D	ND	ND	ND	ND	
B24 E	ND	ND	ND	ND	

Note: Sample locations are shown on Figures 6-1 and 6-2. Sample 501 is an oil sample collected from tank #7, shown on Figure 6-2. Detection limits for soil/sediment = 500 µg/kg. Detection limits for water samples = 15 µg/l.
DDW = dirty decon water
SS = split spoon
NA = not analyzed
ND = not detected



WASTE SITE TRACKING NO.: MO0579
PREPARED BY: K. BROWN

FIT MAY 1991

Table 6-4
CLP Soil/Sediment Sample Summary
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Depth (feet)	Location Description
001	3 - 7	5 feet northwest of B24
002	7 - 11	5 feet northwest of B24
003	11 - 15	5 feet northwest of B24
004	15 - 19	5 feet northwest of B24
005	19 - 23	5 feet northwest of B24
006	3 - 8	2.5 feet north of B06
007	8 - 13	2.5 feet north of B06
008	8 - 12	2 feet south of B06
009	4 - 8	3 feet northwest of B14
010	12 - 14	3 feet northwest of B14
011	11 - 17	1.5 feet west of B07
012	5 - 11	1 foot north of B13
013	11 - 12.5	1 foot north of B13
101	0 - 2	B01
102	0 - 2	B02
103	0 - 2	South central tank farm
104	0 - 2	B05
105	0 - 2	B07
106	0 - 2	B15
107	0 - 2	B16
108	0 - 2	B17
109	0 - 2	B18
110	0 - 2	B19
111	0 - 2	B20
112	0 - 2	B21
401	N/A	150 feet south of southeast corner of the abandoned pump house
401D	N/A	150 feet south of southeast corner of the abandoned pump house
402	N/A	110 feet north of northeast corner of the abandoned pump house
403	N/A	330 feet south of southeast corner of the abandoned pump house

Note: Samples 001 through 013 collected from five aliquots, except VOCs were grab samples. Samples 101 through 112 collected from two aliquots. All samples were submitted to EPA for cyanide, semi-volatiles, and total metals analyses. Samples 001 through 113 and 401 through 403 were also analyzed for volatiles. Samples 401 through 403 were also analyzed for total petroleum hydrocarbons. See Figure 6-2 for sample locations.

D = Duplicate

N/A = Not applicable

the background sample location to the farthest northwest corner of PF & T property. This location is approximately 60 feet northwest (upgradient) of borehole #B04 (Figure 6-1).

6.2 SURFACE SOIL SAMPLING

Surface soil sampling was conducted March 4 through 7, to determine whether contamination was present in the 0- to 2-foot interval. Twelve samples were collected (Figure 6-2, Table 6-4). According to the work plan, these samples were to be collected using a power auger. However, due to excessive amounts of gravel and rubble present, the power auger could not be used efficiently. Therefore, all but one surface soil sample was collected with the subcontractor's drill rig.

Each sample was collected off the auger flights and consisted of two aliquots collected from one- and two-foot depths. The sample not collected with the drill rig was obtained with the use of the power auger. Three of the 12 surface soil samples collected, 110, 111, and 112, were inadvertently discarded along with the screening samples. Keith Brown and Scott Hayes returned to the site on March 13 and 14 and recollected these samples with a power auger. All samples were submitted to EPA for semi-volatile, cyanide, and total metals analyses. Samples were collected in accordance with the Region VII E & E/FIT SOP for soil sample collection, Geotech 5.17.

6.3 GROUND WATER SAMPLING

Ground water sampling was conducted March 5 through 9, to determine whether any coal tar wastes present have leached into the shallow ground water or migrated off site via the ground water. A total of 9 samples, including a duplicate, field blank, rinsate, and extra volume sample were collected (Figure 6-2, Table 6-5). The work plan called for the installation of 4 temporary mini-wells with the Geoprobe. Due to sub-surface rubble, only 2 mini-wells were installed. However, the Corps of Engineers (COE) has installed piezometer wells along the west side of the Mississippi River levee wall. The COE wells located just east of the site were sampled with the use of the Geoprobe vacuum system. One other COE piezometer well was sampled; it is located approximately 1,500 feet north (upgradient) of the site along the levee wall. This location

Table 6-5
Water Sampling Summary
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Depth (feet)	Static Water Level (SWL) (feet)	Location/Description
201	26	24	64 feet south from center of Mullanphy Street and 50 feet east of easternmost railroad
202	33	24	147 feet west of easternmost railroad and 78 feet south of center of Mullanphy Street
203	47.25	27.25	147 feet north of center of Mullanphy Street and 40 feet west of levee wall
204	48	26	363 feet north of center of Mullanphy Street and 25 feet west of levee wall
205F	N/A	N/A	Rinsate of augers and split spoon sampler
206	52	29	2,118 feet north of center of Mullanphy Street and 20 feet west of levee wall
206D			Duplicate of 206
207F	N/A	N/A	Field Blank
208	N/A	N/A	Geoprobe pipe rinsate sample
209F	N/A	N/A	Trip blank
301	Surface	N/A	Southeast corner of abandoned pump house
301D	Duplicate of above		
302	Surface	N/A	170 feet north of northeast corner of abandoned pump house
303	Surface	N/A	330 feet south of southeast corner of abandoned pump house
304	Surface	N/A	Illinois American drinking water intake in East St. Louis
304D			Duplicate of 304
501	Surface	N/A	Oil sample collected from PF & T tank #80-1

Note: See legend on next page.

Legend for Table 6-5

Note: Sample locations are shown on Figure 6-2. All water samples were submitted to EPA for volatiles, semi-volatiles, and total and dissolved metals analyses. Samples 301 through 304D were also analyzed for Total Petroleum Hydrocarbons. Sample #501 is an oil sample which was submitted to EPA for Total Petroleum Hydrocarbons, volatiles, and semi-volatiles analyses. Cyanide samples were preserved with sodium hydroxide. Metals samples were preserved with nitric acid.

D = duplicate
F = field blank or trip blank
N/A = not applicable

was chosen for the ground water background sample. The original background location could not be sampled because bedrock was only 2 feet deep. All samples were collected following the E & E Region VII SOP for ground water collection, Gentech 5.11. Total and dissolved metals samples were preserved with nitric acid; cyanide samples were preserved with sodium hydroxide; and all samples were stored on ice. Samples were delivered to EPA for volatiles, semi-volatiles, cyanide, total metals, and dissolved metals analyses. The field parameters, temperature, pH, and conductivity were measured and recorded in the field (Table 6-6).

6.4 SURFACE WATER/SEDIMENT SAMPLING

Surface water/sediment sampling was conducted March 6 through 7 to determine whether contaminants have migrated via the ground water/surface water interface. A total of 6 surface water samples were collected, including 2 duplicates (Figure 6-2, Table 6-5). All samples were collected according to the EPA Region VII SOP for surface water sample collection, 2334.7A. Samples were submitted to EPA for Total Petroleum Hydrocarbons, volatiles, semi-volatiles, cyanide, total metals, and dissolved metals analyses. Total and dissolved metals samples were preserved with nitric acid, cyanide samples were preserved with sodium hydroxide, and all samples were stored on ice. The field parameters temperature, pH, and conductivity, were measured and recorded in the field (Table 6-6).

A total of 4 sediment samples were collected, including a duplicate (Figure 6-2, Table 6-4). All samples were collected according to the EPA Region VII SOP for sediment sample collection, 2334.8A. Samples were submitted to EPA for Total Petroleum Hydrocarbons, volatiles, semi-volatiles, cyanide, and total metals analyses. Surface water and sediment samples were screened on site in the mobile lab for the presence of PAHs and VOCs (Tables 6-2 and 6-3).

6.5 PRODUCT SAMPLING

One oil sample was to be collected from the basement of the former Mound Street Power Plant, if the building was standing and oil was present in the basement. At the time of the SSI, the building was in the process of being razed. Due to the danger involved with entering

Table 6-6
Field Parameters for Water Samples
LaClede Coal Gas
St. Louis, Missouri
Sample Series DSX44
March 1991

Sample #	Temperature (C°)	pH	Conductivity (umhos)
301	7	8.15	440
301D	7	8.15	440
302	6	7.87	450
303	6	7.27	360
304	3	7.05	350
304D	3	7.05	350
201	11	7.58	1,500
202	7	7.81	2,000
203	9	6.32	1,500
204	9	6.21	1,400
206	11	6.14	1,600
206D	11	6.14	1,600
207F	--	---	--
208	4	7.00	16
209F	--	----	--

Note: See Figure 6-2 for sample locations.

this building, the sample was not collected. However, an oil sample (sample 501) was collected from an 80,000-gallon tank on site (Figure 6-2). This tank contained #6 oil, the same type of oil that was spilled in 1986 and entered the basement of the former power plant. This oil sample was submitted to EPA for total petroleum hydrocarbons, VOCs, and semi-volatiles analyses. It was also screened on site in the mobile lab. The chromatogram peaks were close to the retention times for the contaminants being screened, but did not match (Table 6-3).

SECTION 7: ANALYTICAL RESULTS

7.1 SURFACE SOIL SAMPLES (0-2 FEET)

The surface soil (0-2 feet) sampling data indicated that the majority of the 7-acre site is significantly contaminated with cyanide at greater than three times the detection limit of the background sample 112 (Figure 6-2; Table 7-1). Analysis of off site samples 110, 111, and 112 revealed no cyanide contamination over their detection limits of 6.2, 6.2, and 6.7, respectively (Figure 6-2).

Surface soil PAH contamination was less extensive than the surface soil cyanide contamination. Four out of the 12 samples collected contained a total PAH content greater than five times the concentration of the background sample. These were samples 104, 105, 107 and 109 (Figure 6-2; Table 7-1).

The cyanide contamination found on site can be attributed to the FMGP based on the fact that cyanide is an oxide waste produced during the gas purification process (see Section 4 for details). There should not be any attribution from current on site activities, because cyanide is not a constituent normally found in oil or asphalt.

Attribution of PAH contamination in the surface soil samples is difficult to assess. The oil sample data indicated significant concentrations of many PAH compounds (Appendix D, Sample 501). PF & T currently stores #6 oil and asphalt on site in very large quantities. In 1986, PF & T experienced a spill of said oil which covered most of the site. Thus, surface soil PAH contamination could be attributed to PF & T activities or to the FMGP, based on the fact that it was common practice for FMGPs to bury tar and purifier waste on site. PAHs are a major constituent of coal tar waste.

7.2 SUBSURFACE SOIL SAMPLES

FASP screening results indicated that the highest PAH contamination zone was located in the central portion of the tank farm currently on site (Figure 6-1; Tables 6-2 and 6-3). The approved work plan allowed E & E/FIT to collect CLP subsurface soil samples at four locations. A total of eight samples (006-013) were collected at depths ranging from 3

Table 7-1
PAHs and Cyanide In Surface Soils
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44
(mg/kg)

Compound	101	102	103	104	105	106	107	108	109	110	111	112*
Napthalene	--	--	--	--	--	--	60	1.1	0.51	--	--	0.41U
2-Methylnaphthalene	--	--	--	--	--	--	13	2.5	--	--	--	0.41U
2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	0.41U
Acenaphthylene	--	--	--	--	--	--	--	2.4	0.46	--	--	0.41U
Acenaphthene	--	--	--	--	--	--	--	0.69	--	--	--	0.41U
Fluorene	--	--	--	--	12	--	--	3.1	--	--	--	0.41U
Phenanthrene	--	--	--	20	55	1.5	--	--	2.2	1.5	0.85	0.44
Anthracene	--	--	--	--	--	--	--	--	0.78	--	--	0.41U
Fluoranthene	--	--	--	14	38	2.0	--	--	2.8	2.2	0.77	1.3
Pyrene	--	21	13	50	83	2.2	--	--	6.7	2.3	0.81	1.4
Benzo(a)anthracene	--	--	--	21	28	1.3	--	--	4.5	1.5	0.48	0.79
Chrysene	--	--	--	29	29	1.2	--	--	4.3	1.6	0.55	0.85
Benzo(b)fluoranthene	--	--	--	--	17	1.0	--	--	4.9	1.1	0.44	0.61
Benzo(k)fluroanthene	--	--	--	--	12	0.89	--	--	3.4	1.2	0.45	0.68
Benzo(a)pyrene	--	--	--	16	22	1.1	--	--	4.2	1.3	0.44	0.70
Indeno(1,2,3-CD) Pyrene	--	--	--	--	--	0.66	--	--	2.7	0.76	--	0.41U
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	0.41U
Dibenzo(g,h,i)perylene	--	--	--	--	12	0.71	--	--	2.6	0.76	--	0.41U
Total PAH Content	--	21	13	150	308	12.5	73	9.8	40.0	14.2	4.8	6.8
Cyanide	33	--	94	220	190	--	14	98	35	--	--	6.7U

* = Background sample
-- = Undetected (U); Detection limit stated for bckground sample.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

to 17 feet. An additional five samples (001-005) were collected at a background location (Figure 6-2; Table 6-4). CLP data revealed significant PAH contamination at least five times greater than background concentration at all four sampling locations (Table 7-2). Cyanide contamination was found to be significant to a depth of 11+ feet (Table 7-2).

All the soil samples were also analyzed for total and dissolved metals, as well as volatiles. However, results proved to be negligible when compared to background concentrations with the exception of significant concentrations of benzene, toluene, ethyl benzene, and total xylenes (BTEX) in samples 006 through 011 (except no toluene in sample 011). Significant benzene was also detected in sample 013. Styrene (14J µg/kg) was detected in sample 012.

As was the case with the surface soil samples, the cyanide contamination can be attributed to the FMGP. It is probable that the deep soil PAH contamination came from both the FMGP and the petroleum tank farm. The presence of mixed BTEX compounds and PAHs indicates a mixed source, as volatiles are not considered abundant in coal tar.

7.3 GROUND WATER SAMPLES

Ground water sampling data indicated no significant dissolved metals contamination when compared to background concentrations. Some organics were detected; however, in sample 204, piezometer well located downgradient of the site. This sample contained 3 PAHs: acenapthalene (65 µg/L), fluorene (25 µg/L), and phenanthene (46 µg/L); and 93 µg/L benzene (Figure 6-2; Appendix C). Additionally, cyanide was detected in all ground water samples at concentrations above the 17 µg/L detection limit: 520J µg/L in sample 201, 27J µg/L in sample 202, 590J µg/L in sample 203, and 1,600J µg/L in sample 204. Cyanide was not detected in the background sample.

7.4 SURFACE WATER AND SEDIMENT SAMPLES

Surface water and sediment was sampled at three locations downgradient of the site. Additionally, the East St. Louis raw water intake, located across the Mississippi River from the site was sampled

Table 7-2
PAHs and Cyanide in Subsurface Soil Samples
and Product Sample
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44
(mg/kg)

Compound	(2-7') 001*	(7-11') 002*	(11-15') 003*	(17-21') 004*	(19-23') 005*	(3-8') 006	(8-13') 007	(8-12') 008	(4-8') 009	(12-14') 010	(11-17') 011	(5-11') 012	(11-12.5') 013	501
Naphthalene	--	0.40U	--	--	--	23	87	2200	68	0.89	30	--	55	700
2-methylnaphthalene	--	0.40U	--	--	--	80	43	69	84	0.98	23	--	--	4000
2-chloronapththalene	--	0.40U	--	--	--	--	--	--	--	--	--	--	--	450
Acenaphthylene	--	0.40U	--	--	--	--	--	15	--	--	20	--	--	450
Acenaphtene	--	0.40U	--	--	--	--	--	32	12	0.15	15	--	22	620
Fluorene	--	0.40U	--	--	--	20	--	J	13	0.17	24	--	21	830
Phenanthrene	1.4	0.40U	--	--	--	63	20	J	46	0.51	71	--	59	4300
Anthracene	0.38	0.40U	--	--	--	--	--	J	--	--	23	--	18	810
Fluoranthene	2.0	0.52	0.54	--	--	--	--	--	--	--	180	--	39	620
Pyrene	2.8	0.53	0.80	--	--	48	J	J	J	J	J	--	65	2800
Benzo(a)anthracene	1.8	0.40U	--	--	--	18	--	J	--	--	99	--	21	1600
Chrysene	1.8	0.40U	0.44	--	--	18	--	J	16	0.18	94	--	21	2700
Benzo(b) fluoranthene	1.6	0.40U	--	--	--	--	--	61	--	--	76	--	15	--
Benzo(k)fluoranthene	1.4	0.40U	--	--	--	--	--	52	--	--	89	--	17	--
Benzo(a)pyrene	1.5	0.40U	--	--	--	--	--	95	--	--	120	--	23	970
Indeno(1,2,3-CD) pyrene	0.93	0.40U	--	--	--	--	--	37	--	--	75	--	--	--
Dibenzo(a,h)anthracene	--	0.40U	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(g,h,i)perylene	1.2	0.40U	--	--	--	--	--	44	--	--	68	--	--	--
Total PAH Content	16.8	1.1	1.8	--	--	270	150	2605	239	2.9	1027	--	376	20,850
Cyanide	26	24	--	--	--	87	180	860	--	48	250	170	--	--

* = Background sample
-- = Undetected (U) with detection limit given for background sample 002.
J = Detected, but results are invalid.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

(304 and 304D). The most upgradient of these samples (302 and 402) generally exhibited the most contamination, though concentrations are fairly comparable (Tables 7-3 and 7-4). An exception is total chromium (12-14 µg/L), lead (15-18 µg/L), and zinc (46-54 µg/L) detected in samples 304 and 304D, collected from the surface water intake. These metals were not detected in the dissolved fraction of these samples. The only organics deteced in these samples are relatively low levels of PAHs and cyanide found in the sediment samples (Table 7-4). A background sediment and surface water sample was not collected, so that no comparisonn to background can be made for these metals. However, sample concentrations are relatively low as compared to other samples collected.

7.5 PRODUCT SAMPLE

The oil sample (501) collected from an 80,000-gallon tank (Figure 2-3, tank #7) contained significant concentrations of many PAHs (Table 7-2). Attribution of PAH contamination on site is very difficult to assess, based on the fact that in 1986, PF & T experienced a spill of the same oil (#6) which was sampled, over the entire site. It was also common practice for FMGPs to bury their tar vastes on site. PAHs are a major constitudent of coal tar wastes. Thus, surface and subsurface soil PAH contamination could be attributable to either PF & T activities or the FMGP.

Table 7-3
Selected Total Metals
Sediment and Surface Water Samples
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44

Sample #	As	Ba	Cu	Cr	Ni	Pb	Se	V	Zn
				Sediment Samples (mg/kg)					
401	3.7	140	9.1	8.7	10	30J	--.--	15	35J
401D	4.0	140	8.2	9.0	11	13J	--.--	17	36J
402	8.4	160	26	16	18	36J	2.0J	27	77J
403	7.1	160	23	12	16	31J	--.--	25	64J
				Water Samples (µg/L)					
301	--.--	--.--	--.--	--.--	--.--	7.0	--.--	--.--	--.--
301D	--.--	--.--	--.--	--.--	--.--	7.2	--.--	--.--	--.--
302	--.--	--.--	--.--	--.--	--.--	9.7	--.--	--.--	--.--
303	--.--	280	--.--	--.--	--.--	24U	I*	62	89U
304	--.--	--.--	--.--	14	--.--	18	--.--	--.--	54
304D	--.--	--.--	--.--	12	--.--	15	--.--	--.--	--.--

* = Invalid analysis, but 11 µg/L dissolved selenium was detected in this sample.
U = Undetected; detection limit given if above detected values.
J = Results are reported, but invalid by approved QC procedures.

Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

Table 7-4
PAHs, Cyanide, and Total Hydrocarbons
Sediment Samples
Laclede Coal Gas Site
St. Louis, Missouri
E & E/FIT; March 1991
Sample Series DSX44

(µg/kg)	401	401D	402	403
Phenanthene	---	---	2900	4400
Fluoranthene	---	750	5000	5100
Pyrene	---	960	8000	6400J
Benzo(a)anthracene	---	460	3500	4200
Di-n-octyl phthalate	--	470	3900	4900
Benzo(k)fluoranthene	---	---	2900	3100
Benzo(a)pyrene	---	430	2600	5600
Benzo(GHI)perylene	---	---	3500	4100
Cyanide	---	---	1600	---
Total hydrocarbons	3100	3100U	8200	4900

J = Results are reported, but invalid by approved QC procedures.
U = Undetected, with detection limit given.
--- Indicated undetected with detection limits below detected values.

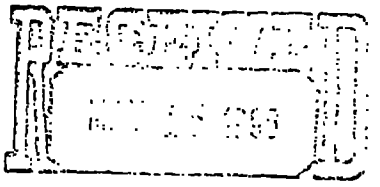
Note: See Figure 6-2 for sample locations and Appendix D for complete analytical results.

APPENDIX C

EPA ANALYTICAL DATA REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
25 FUNSTON ROAD
KANSAS CITY, KANSAS 66115



DATE: May 3 1996

SUBJECT: Data Transmittal for Activity #: DCICY
Site Description: Mound Street PCBs

FROM: Andrea Jirka, Program Manager
Regional Laboratory, Environmental Services Division

TO: Dave Crawford
SUPR

Attached is the data transmittal for the above-referenced site. The data contained in this transmittal have been approved by the Regional Laboratory. This should be considered a ____ Partial or _X_ Complete data transmittal (completes transmittal of _____). The Project Leader should notify the Regional Laboratory with 14 days of any changes in the LAST analytical database. If you have any questions, comments, or data changes, please contact Dee Simmons at 551-5129.

Attachment

cc: Analytical Data File

RECYCLE

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 001 QCC: _ MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: ___ ___ ___
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: ___ ___ ___

SAMPLE DES: South well water
LOCATION: St Louis MO
CASE/BATCH/SMO: ____/__/____ LAB: ___
STORET/AIRS NO: _____

	DATE	TIME	FROM REF PT
BEG:	4/3/96	12:15	EAST: ____
END:	4/3/96	13:35	NORTH: ____
			DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES
GLASS	ICED	WS	SEMIVOLATILES
GLASS	ICED	W24	PCB - G. BEEMONT
GLASS	ICED	W24	PCB - G. BEEMONT

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 001 QCC: D MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __

LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: DUPLICATE/SAMPLE 001 DATE TIME FROM REF PT

LOCATION: St Louis MO BEG: 4/3/96 12:15 EAST: ____

CASE/BATCH/SMO: ____/__/____ LAB: ___ END: 4/3/96 13:35 NORTH: ____

STORET/AIRS NO: ____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	WS	SEMIVOLATILES
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES
GLASS	ICED	W24	PCB - G. BEEMONT
GLASS	ICED	W24	PCB - G. BEEMONT

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 002 QCC: _ MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: North well water
LOCATION: St Louis MO
CASE/BATCH/SMO: ____/__/____ LAB: ___
STORET/AIRS NO: _____

	DATE	TIME	FROM REF PT
BEG:	4/3/96	12:15	EAST: ____
END:	4/3/96	12:45	NORTH: ____
			DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES
GLASS	ICED	WS	SEMIVOLATILES
GLASS	ICED	W24	PCB - G. BEEMONT
GLASS	ICED	W24	PCB - G. BEEMONT

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 003 QCC: F MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Field Blank
LOCATION: St Louis MO
CASE/BATCH/SMO: / / LAB:
STORET/AIRS NO:

	DATE	TIME	FROM REF PT
BEG:	4/3/96	9:15	EAST:
END:	4/3/96	9:15	NORTH:
			DOWN:

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES
GLASS	ICED	WS	SEMIVOLATILES
GLASS	ICED	W24	PCB - G. BEEMONT
GLASS	ICED	W24	PCB - G. BEEMONT

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER: OPERABLE UNIT:

Sample did not have "F" QC code RSCC added upon sample receipt. jm 4/4/96

SAMPLE COLLECTED BY : Michael McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII

ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 007 QCC: F MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __

LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: TRIP BLANK DATE TIME FROM REF PT

LOCATION: St Louis MO BEG: __/__/__ __:__ EAST: ____

CASE/BATCH/SMO: ____/__/____ LAB: ___ END: __/__/__ __:__ NORTH: ____

STORET/AIRS NO: ____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES

OK

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

ds

Sample Used - pr

Sample vials Not Labeled!

Contacted field personnel + noted on F.S. + COC pr 4/01

No Sample collected in field prepared by EPA

Do not write this on field sheet. pr

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 008 QCC: _ MEDIA: WATER PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: RINSATE DATE TIME FROM REF PT
LOCATION: St Louis MO BEG: 4/2/96 16:10 EAST: ____
CASE/BATCH/SMO: ____/__/____ LAB: ___ END: 4/2/96 16:20 NORTH: ____
STORET/AIRS NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	WS	SEMIVOLATILES
2-40 ML VIALS	HCL +COOL (4 C)	WV	WATER VOLATILES
GLASS	ICED	W24	PCB - G. BEEMONT
GLASS	ICED	W24	PCB - G. BEEMONT

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 100 QCC: _ MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Geoprobe soil
LOCATION: St Louis MO
CASE/BATCH/SMO: ____/__/____ LAB: ___
STORET/AIRS NO: _____

	DATE	TIME	FROM REF PT
BEG:	4/2/96	15:50	EAST: ____
END:	4/2/96	16:00	NORTH: ____
			DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SS	SEMIVOLATILES
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Mid (8607)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 100 QCC: D MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: DUPLICATE/SAMPLE 100 DATE TIME FROM REF PT
LOCATION: St Louis MO BEG: 4/2/96 16:00 EAST: ____
CASE/BATCH/SMO: ____/__/____ LAB: ___ END: 4/2/96 16:10 NORTH: ____
STORET/AIRS NO: _____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	SS	SEMIVOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Add (SG07)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 101 QCC: _ MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Geoprobe soil
LOCATION: St Louis MO
CASE/BATCH/SMO: ____/_/____ LAB: ___
STORET/AIRS NO: _____

	DATE	TIME	FROM REF PT
BEG:	4/2/96	10:55	EAST: ____
END:	4/2/96	11:05	NORTH: ____
			DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SS	SEMIVOLATILES
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Add (SG07)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER: ___ OPERABLE UNIT: ___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 102 QCC: _ MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Geo.probe soil
LOCATION: St Louis MO
CASE/BATCH/SMO: / /
STORET/AIRS NO:
LAB:

	DATE	TIME	FROM REF PT
BEG:	4/2/96	15:00	EAST:
END:	4/2/96	15:15	NORTH:
			DOWN:

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SS	SEMIVOLATILES
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Add (SG07)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 103 QCC: _ MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Geoprobe Soil
LOCATION: St Louis MO
CASE/BATCH/SMO: / / LAB:
STORET/AIRS NO:

	DATE	TIME	FROM REF PT
BEG:	4/2/96	15:15	EAST:
END:	4/2/96	15:30	NORTH:
			DOWN:

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SS	SEMIVOLATILES
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Add (SC07)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER: ___ OPERABLE UNIT: ___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 104 QCC: _ MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: Geoprobe boring
LOCATION: St Louis MO
CASE/BATCH/SMO: / /
STORET/AIRS NO:
LAB:

	DATE	TIME	FROM REF PT
BEG:	4/3/96	9:15	EAST:
END:	4/3/96	9:30	NORTH:
			DOWN:

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
GLASS	ICED	SS	SEMIVOLATILES
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES
GLASS	ICED	S16	PCB'S - G. BEEMONT

Add (SG07)% solids

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

SAMPLE COLLECTED BY : Michael W McCurdy

DRAFT

FIELD SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION VII
ENVIRONMENTAL SERVICES DIV. 25 FUNSTON RD. KANSAS CITY, KS 66115

FY: 96 ACTNO: DC1CY SAMNO: 108 QCC: F MEDIA: SOIL PL: TAPIA, CECILIA

ACTIVITY DES: MOUND STREET PCBS REF LATITUDE: __ __ __
LOCATION: ST. LOUIS MO PROJECT NUM: L33 PT: LONGITUDE: __ __ __

SAMPLE DES: TRIP BLANK DATE TIME FROM REF PT
LOCATION: St Louis MO BEG: __/__/__ __:__ EAST: ____
CASE/BATCH/SMO: ____/__/____ LAB: ___ END: __/__/__ __:__ NORTH: ____
STORET/AIRS NO: ____ DOWN: ____

ANALYSIS REQUESTED:

CONTAINER	PRESERVATIVE	MGP	NAME
2-40 ML VIALS	COOL (4 C)	SV	SOIL VOLATILES

Add (SSC7)% solids

VOA
% Solid

COMMENTS: FOR SUPERFUND ONLY: SUBSITE IDENTIFIER:___ OPERABLE UNIT:___

Sample used.

No sample collected in field prepared by EPA

Sample vials not labeled!

Contacted field personnel & noted on F.S. & COC 4/4/96 m

Do not write this on field sheet! m

SAMPLE COLLECTED BY : Michael W McCurdy

M 4/5/96

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION	SHEET
Michael McCurdy	Mound Street PCB	2 (DAY) 4 (MONTH) 96 (YEAR)	1 of 2

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: 8 oz CUBITAINER	80 oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt other sample numbers etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
DCICY 100	2 :				1 :		X				
DCICY 100D	2 :				1 :		X				
DCICY 101	2 :				1 :		X				
DCICY 102	2 :				1 :		X				
DCICY 103	2 :				1 :		X				
DCICY 008		4 : :			1 :	X					
DCICY 007F					X 1 :	X					HCL preservative also included in one of the coolers
DCICY108 F					X 1 :		X				

(Total of 5 coolers for 2 days)

Sample vials were not labeled. RSCC labeled vials upon sample receipt.
M 4/4/96

Complete

DESCRIPTION OF SHIPMENT

____ PIECE(S) CONSISTING OF ____ BOX(ES)

2 ICE CHEST(S): OTHER ____

MODE OF SHIPMENT

____ COMMERCIAL CARRIER ____

____ COURIER

X SAMPLER CONVEYED ____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD 4/4/96 11:33

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
Michael W McCurdy ☐ SEALED UNSEALED ☒	4/4/96	11:33	Diane Jacks ☐ SEALED UNSEALED ☒	analyze
RELINQUISHED BY ☐ SEALED UNSEALED ☐	DATE	TIME	RECEIVED BY ☐ SEALED UNSEALED ☐	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Michael McCurdy	Mound Street PCB	3 / 4 / 96	2 of 2

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: 8 oz CUBITAINER	80 oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS:OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
DCICY 104	2				1		X				
DCICY 001		4			1	X					
DCICY 001D		4			1	X					
DCICY 002		4			1	X					Air Bubbles in both vials of Some samples are also in one of the coolers from 4/2/96 (total 5 coolers for 12 days)
DCICY 003 FB		4			1	X					

This sample was not correctly identified as a field blank. RSCC added to samples + field sheets.

Comp

DESCRIPTION OF SHIPMENT	MODE OF SHIPMENT
____ PIECE(S) CONSISTING OF ____ BOX(ES)	____ COMMERCIAL CARRIER: ____
3 ICE CHEST(S): OTHER ____	____ COURIER
	X SAMPLER CONVEYED (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD — 4/4/96 1:33

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
Michael W McCurdy ☐ SEALED ☒ UNSEALED	4/4/96	11:37	Sam Jacks ☐ SEALED ☒ UNSEALED	analyze
RELINQUISHED BY ☐ SEALED ☐ UNSEALED	DATE	TIME	RECEIVED BY ☐ SEALED ☐ UNSEALED	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY ☐ SEALED ☐ UNSEALED	DATE	TIME	RECEIVED BY ☐ SEALED ☐ UNSEALED	REASON FOR CHANGE OF CUSTODY

ANALYSIS REQUEST REPORT — VALIDATED DATA

FOR ACTIVITY: DC1CY

TAPIA, CECILIA — 05/03/96 16:55:08 — ALL REAL SAMPLES AND FIELD Q.C.

INAL REPORT

: 96 ACTIVITY: DC1CY DESCRIPTION: MOUND STREET PCBS LOCATION: ST. LOUIS MISSOURI

STATUS: ACTIVE TYPE: SAMPLING - IN HOUSE ANALYSIS PROJECT: L33

BO DUE DATE IS 5/ 4/96. REPORT DUE DATE IS 6/ 2/96.

SPECTION DATE: 4/ 3/96 ALL SAMPLES RECEIVED DATE: 04/04/96

L DATA APPROVED BY LABO DATE: 05/03/96 FINAL REPORT TRANSMITTED DATE: 05/03/96

PECTED LABO TURNAROUND TIME IS 30 DAYS EXPECTED REPORT TURNAROUND TIME IS 60 DAYS

TUAL LABO TURNAROUND TIME IS 29 DAYS ACTUAL REPORT TURNAROUND TIME IS 30 DAYS

TE CODE: CY SITE: MOUND STREET POWER STATION

P.	QCC	M	DESCRIPTION	SAMPLE STATUS	#	CITY	STATE	AIRS/ STORET LOC	NO	SECT	LAY-ER	BEG. DATE	BEG. TIME	END. DATE	END. TIME
1		W	SOUTH WELL WATER	1		ST. LOUIS	MISSOURI					04/03/96	12:15	04/03/96	13:35
1	D	W	SOUTH WELL WATER/DUPLICATE	1		ST. LOUIS	MISSOURI					04/03/96	12:15	04/03/96	13:35
2		W	NORTH WELL WATER	1		ST. LOUIS	MISSOURI					04/03/96	12:15	04/03/96	12:45
3	F	W	FIELD BLANK	1		ST. LOUIS	MISSOURI					04/03/96	09:15	04/30/96	09:25
7	F	W	TRIP BLANK	1		ST. LOUIS	MISSOURI					00/00/00	00:00	00/00/00	00:00
8		W	RINSATE	1		ST. LOUIS	MISSOURI					04/02/96	16:10	04/02/96	16:20
0		S	GEOPROBE SOIL	1		ST. LOUIS	MISSOURI					04/02/96	15:50	04/02/96	16:00
0	D	S	GEOPROBE SOIL/DUPLICATE	1		ST. LOUIS	MISSOURI					04/02/96	16:00	04/02/96	16:10
1		S	GEOPROBE SOIL	1		ST. LOUIS	MISSOURI					04/02/96	10:55	04/02/96	11:05
2		S	GEOPROBE SOIL	1		ST. LOUIS	MISSOURI					04/02/96	15:00	04/02/96	15:15
3		S	GEOPROBE SOIL	1		ST. LOUIS	MISSOURI					04/02/96	15:15	04/02/96	15:30
4		S	GEOPROBE BORING	1		ST. LOUIS	MISSOURI					04/03/96	09:15	04/03/96	09:30
8	F	S	TRIP BLANK	1		ST. LOUIS	MISSOURI					00/00/00	00:00	00/00/00	00:00

EXPLANATION OF CODES AND INFORMATION ON ANALYSIS REQUEST DETAIL REPORT

PLE INFORMATION:

P. NO. = SAMPLE IDENTIFICATION NUMBER (A 3-DIGIT NUMBER WHICH IN COMBINATION WITH THE ACTIVITY NUMBER AND QCC, PROVIDES AN UNIQUE NUMBER FOR EACH SAMPLE FOR IDENTIFICATION PURPOSES)

= QUALITY CONTROL CODE (A ONE-LETTER CODE USED TO DESIGNATE SPECIFIC QC SAMPLES. THIS FIELD WILL BE BLANK FOR ALL NON-QC OR ACTUAL SAMPLES):
- B = CAL INCREASED CONCENTRATION FOR A LAB SPIKED DUP SAMPLE
- D = MEASURED VALUE FOR FIELD DUPLICATE SAMPLE
- F = MEASURED VALUE FOR FIELD BLANK
- G = MEASURED VALUE FOR METHOD STANDARD
- H = TRUE VALUE FOR METHOD STANDARD
- K = CAL INCREASED CONCENTRATION FOR FIELD SPIKED DUP SAMPLE
- L = MEASURED VALUE FOR A LAB DUPLICATE SAMPLE
- M = MEASURED VALUE FOR LAB BLANK
- N = MEASURED CONCENTRATION OF FIELD SPIKED DUPLICATE
- P = MEASURED VALUE FOR PERFORMANCE STANDARD
- R = CAL INCREASED CONCENTRATION RESULTING FROM LAB SPIKE
- S = MEASURED CONCENTRATION OF LAB SPIKED SAMPLE
- T = TRUE VALUE OF PERFORMANCE STANDARD
- W = MEASURED CONCENTRATION OF LAB SPIKED DUPLICATE
- Y = MEASURED CONCENTRATION OF FIELD SPIKED SAMPLE
- Z = CAL INCREASED CONCENTRATION RESULTING FROM FIELD SPIKE
- 1 = MEASURED VALUE OF FIRST SPIKED REPLICATE
- 2 = MEASURED VALUE OF SECOND SPIKED REPLICATE
- 3 = MEASURED VALUE OF THIRD SPIKED REPLICATE
- 4 = MEASURED VALUE OF FOURTH SPIKED REPLICATE
- 5 = MEASURED VALUE OF FIFTH SPIKED REPLICATE
- 6 = MEASURED VALUE OF SIXTH SPIKED REPLICATE
- 7 = MEASURED VALUE OF SEVENTH SPIKED REPLICATE

= MEDIA CODE (A ONE-LETTER CODE DESIGNATING THE MEDIA OF THE SAMPLE):
- A = AIR
- H = HAZARDOUS WASTE/OTHER
- S = SOLID (SOIL, SEDIMENT, SLUDGE)
- T = TISSUE (PLANT & ANIMAL)
- W = WATER (GROUND WATER, SURFACE WATER, WASTE WATER, DRINKING WATER)

CRIPTION = A SHORT DESCRIPTION OF THE LOCATION WHERE SAMPLE WAS COLLECTED

S/STORET LOC. NO. = THE SPECIFIC LOCATION ID NUMBER OF EITHER OF THESE NATIONAL DATABASE SYSTEMS, AS APPROPRIATE

E/TIME INFORMATION = SPECIFIC INFORMATION REGARDING WHEN THE SAMPLE WAS COLLECTED
- BEG. DATE = DATE SAMPLING WAS STARTED
- BEG. TIME = TIME SAMPLING WAS STARTED
- END DATE = DATE SAMPLING WAS COMPLETED
- END TIME = TIME SAMPLING WAS COMPLETED
- NOTE: A GRAB SAMPLE WILL CONTAIN ONLY BEG. DATE/TIME
  A TIMED COMPOSITE SAMPLE WILL CONTAIN BOTH BEG AND END DATE/TIME TO DESIGNATE DURATION OF SAMPLE COLLECTION

ER CODES
- V = VALIDATED

ANALYTICAL RESULTS/MEASUREMENTS INFORMATION:

COMPOUND = MGP (MEDIA-GROUP-PARAMETER) CODE AND NAME OF THE MEASURED CONSTITUENT OR CHARACTERISTIC OF EACH SAMPLE

UNITS = SPECIFIC UNITS IN WHICH RESULTS ARE REPORTED:
- C = CENTIGRADE (CELSIUS) DEGREES
- CFS = CUBIC FEET PER SECOND
- GPM = GALLONS PER MINUTE
- IN = INCHES
- I.D. = SPECIES IDENTIFICATION
- KG = KILOGRAM
- L = LITER
- LB = POUNDS
- MG = MILLIGRAMS (1 X 10-3 GRAMS)
- MGD = MILLION GALLONS PER DAY
- MPH = MILES PER HOUR
- MV = MILLIVOLT
- M/F = MALE/FEMALE
- M2 = SQUARE METER
- M3 = CUBIC METER
- NA = NOT APPLICABLE
- NG = NANOGRAMS (1 X 10-9 GRAMS)
- NTU = NEPHELOMETRIC TURBIDITY UNITS
- PC/L = PICO (1 X 10-12) CURRIES PER LITER
- PG = PICOGRAMS (1 X 10-12 GRAMS)
- P/CM2 = PICOGRAMS PER SQUARE CENTIMETER
- SCM = STANDARD CUBIC METER (1 ATM, 25 C)
- SQ FT = SQUARE FEET
- SU = STANDARD UNITS (PH)
- UG = MICROGRAMS (1 X 10-6 GRAMS)
- UMHOS = MICROMHOS/CM (CONDUCTIVITY UNITS)
- U/CC2 = MICROGRAMS PER 100 SQUARE CENTIMETERS
- U/CM2 = MICROGRAMS PER SQUARE CENTIMETER
- 1000G = 1000 GALLONS
- +/- = POSITIVE/NEGATIVE
- # = NUMBER

DATA QUALIFIERS = SPECIFIC CODES USED IN CONJUNCTION WITH DATA VALUES TO PROVIDE ADDITIONAL INFORMATION ON THE REPORTED RESULTS, OR USED TO EXPLAIN THE ABSENCE OF A SPECIFIC VALUE:
- BLANK = IF FIELD IS BLANK, NO REMARKS OR QUALIFIERS ARE PERTINENT. FOR FINAL REPORTED DATA, THIS MEANS THAT THE VALUES HAVE BEEN REVIEWED AND FOUND TO BE ACCEPTABLE FOR USE.
- I = INVALID SAMPLE/DATA - VALUE NOT REPORTED
- J = DATA REPORTED BUT NOT VALID BY APPROVED QC PROCEDURES
- K = ACTUAL VALUE OF SAMPLE IS < VALUE REPORTED
- L = ACTUAL VALUE OF SAMPLE IS > VALUE REPORTED
- M = DETECTED BUT BELOW THE LEVEL OF REPORTED VALUE FOR ACCURATE QUANTIFICATION
- O = PARAMETER NOT ANALYZED
- U = ACTUAL VALUE OF SAMPLE IS < THE MEASUREMENT DETECTION LIMIT (REPORTED VALUE)

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	001		001 D		002		003 F		007 F	
7 PCB-AROCLOR 1016	UG/L	0.40	U	0.40	U	0.40	U	0.40	U		
8 PCB-AROCLOR 1221	UG/L	0.30	U	0.30	U	0.30	U	0.30	U		
9 PCB-AROCLOR 1232	UG/L	0.10	U	0.10	U	0.10	U	0.10	U		
0 PCB-AROCLOR 1242	UG/L	0.10	U	0.10	U	0.10	U	0.10	U		
1 PCB-AROCLOR 1248	UG/L	0.20	U	0.20	U	0.20	U	0.20	U		
2 PCB-AROCLOR 1254	UG/L	0.14	U	0.10	U	0.077	U	0.050	U		
3 PCB-AROCLOR 1260	UG/L	0.060	U	0.060	U	0.060	U	0.060	U		
1 PHENOL, BY GC/MS	UG/L	1.3	U	1.3	U	1.3	U	1.3	U		
3 ETHER,BIS(2-CHLOROETHYL), BY GC/MS	UG/L	3	U	3	U	3	U	3	U		
4 CHLOROPHENOL, 2-	UG/L	2.7	U	2.7	U	2.7	U	2.7	U		
5 DICHLOROBENZENE,1,3-, BY GC/MS	UG/L	2.2	U	2.2	U	2.2	U	2.2	U		
6 DICHLOROBENZENE,1,4-	UG/L	2.3	U	2.3	U	2.3	U	2.3	U		
7 BENZYL ALCOHOL	UG/L	1.3	U	1.3	U	1.3	U	1.3	U		
8 DICHLOROBENZENE,1,2-, BY GC/MS	UG/L	2.5	U	2.5	U	2.5	U	2.5	U		
9 CRESOL, ORTHO(2-METHYLPHENOL)	UG/L	2.3	U	2.3	U	2.3	U	2.3	U		
0 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS	UG/L	1.4	U	1.4	U	1.4	U	1.4	U		
1 CRESOL, PARA-(4-METHYLPHENOL)	UG/L	3.3	U	3.3	U	3.3	U	3.3	U		
2 N-NITROSODIPROPYLAMINE	UG/L	1.5	U	1.5	U	1.5	U	1.5	U		
3 HEXACHLOROETHANE, BY GC/MS	UG/L	2.4	U	2.4	U	2.4	U	2.4	U		
4 NITROBENZENE, BY GC/MS	UG/L	1.5	U	1.5	U	1.5	U	1.5	U		
5 ISOPHORONE, BY GC/MS	UG/L	5	U	5	U	5	U	5	U		
5 NITROPHENOL,2-	UG/L	2.1	U	2.1	U	2.1	U	2.1	U		
7 DIMETHYLPHENOL,2,4, BY GC/MS	UG/L	2.1	U	2.1	U	2.1	U	2.1	U		
3 BENZOIC ACID, BY GC/MS	UG/L	20	U	20	U	20	U	20	U		
9 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS	UG/L	1.4	U	1.4	U	1.4	U	1.4	U		
) DICHLOROPHENOL, 2,4-	UG/L	3.1	U	3.1	U	3.1	U	3.1	U		

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	001		001 D		002		003 F		007 F
WS21 TRICHLOROBENZENE,1,2,4, BY GC/MS	UG/L	5	U	5	U	5	U	5	U	
WS22 NAPHTHALENE, BY GC/MS	UG/L	2	U	2	U	2	U	2	U	
WS23 CHLOROANILINE,4-	UG/L	5	U	5	U	5	U	5	U	
WS24 HEXACHLOROBUTADIENE, BY GC/MS	UG/L	1.9	U	1.9	U	1.9	U	1.9	U	
WS25 PHENOL,4-CHLORO-3-METHYL	UG/L	2.8	U	2.8	U	2.8	U	2.8	U	
WS26 METHYLNAPHTHALENE, 2-	UG/L	1.8	U	1.8	U	1.8	U	1.8	U	
WS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS	UG/L	10	U	10	U	10	U	10	U	
WS28 TRICHLOROPHENOL,2,4,6	UG/L	2.5	U	2.5	U	2.5	U	2.5	U	
WS29 TRICHLOROPHENOL,2,4,5	UG/L	3	U	3	U	3	U	3	U	
WS30 CHLORONAPHTHALENE, 2-	UG/L	1.5	U	1.5	U	1.5	U	1.5	U	
WS31 NITROANILINE,2-(ORTHO)	UG/L	5	U	5	U	5	U	5	U	
WS32 PHTHALATE, DIMETHYL, BY GC/MS	UG/L	10	U	10	U	10	U	10	U	
WS33 ACENAPHTHYLENE, BY GC/MS	UG/L	1.3	U	1.3	U	1.3	U	1.3	U	
WS34 NITROANILINE,3-	UG/L	10	U	10	U	10	U	10	U	
WS35 ACENAPHTHENE, BY GC/MS	UG/L	1.1	U	1.1	U	86		1.1	U	
WS36 DINITROPHENOL,2,4, BY GC/MS	UG/L	20	U	20	U	20	U	20	U	
WS37 NITROPHENOL,4-	UG/L	14	U	14	U	14	U	14	U	
WS38 DIBENZOFURAN	UG/L	1.2	U	1.2	U	1.2	U	1.2	U	
WS39 DINITROTOLUENE,2,4, BY GC/MS	UG/L	10	U	10	U	10	U	10	U	
WS40 DINITROTOLUENE,2,6-	UG/L	5	U	5	U	5	U	5	U	
WS41 PHTHALATE, DIETHYL, BY GC/MS	UG/L	5	U	5	U	5	U	5	U	
WS42 ETHER, 4-CHLOROPHENYL PHENYL	UG/L	5	U	5	U	5	U	5	U	
WS43 FLUORENE, BY GC/MS	UG/L	5	U	5	U	29		5	U	
WS44 NITROANILINE,4-	UG/L	16	U	16	U	16	U	16	U	
WS45 PHENOL,4,6-DINITRO-2-METHYL	UG/L	10	U	10	U	10	U	10	U	
WS46 N-NITROSODIPHENYLAMINE, BY GC/MS	UG/L	1	U	1	U	1.0	U	1	U	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

	COMPOUND	UNITS	001		001 D		002		003 F		007 F	
47	ETHER, 4-BROMOPHENYL PHENYL	UG/L	5	U	5	U	5	U	5	U		
48	HEXACHLOROBENZENE, BY GC/MS	UG/L	5	U	5	U	5	U	5	U		
49	PENTACHLOROPHENOL, BY GC/MS	UG/L	20	U	20	U	20	U	20	U		
50	PHENANTHRENE, BY GC/MS	UG/L	1.1	U	1.1	U	26		1.1	U		
51	ANTHRACENE, BY GC/MS	UG/L	5	U	5	U	5	U	5	U		
52	PHTHALATE, DI-N-BUTYL-, BY GC/MS	UG/L	5	U	5	U	5	U	5	U		
53	FLUORANTHENE, BY GC/MS	UG/L	5	U	5	U	5	U	5	U		
54	PYRENE, BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
55	PHTHALATE, BUTYL BENZYL	UG/L	10	U	10	U	10	U	10	U		
56	DICHLOROBENZIDINE, 3,3'	UG/L	25	U	25	U	25	U	25	U		
57	ANTHRACENE, BENZO(A), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
58	PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS	UG/L	10	U	10	U	32		10	U		
59	CHRYSENE, BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
60	PHTHALATE, DI-N-OCTYL-, BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
61	FLUORANTHENE, BENZO(B), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
62	FLUORANTHENE, BENZO(K), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
63	PYRENE, BENZO(A), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
64	PYRENE, INDENO(1,2,3-CD)	UG/L	10	U	10	U	10	U	10	U		
65	ANTHRACENE, DIBENZO(A,H), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
66	PERYLENE,BENZO(G,H,I), BY GC/MS	UG/L	10	U	10	U	10	U	10	U		
67	CARBAZOLE	UG/L	10	U	10	U	10	U	10	U		
3	CHLOROMETHANE, BY GC/MS	UG/L	7	U	7	U	7	U	7	U	7	U
4	BROMOMETHANE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
5	VINYL CHLORIDE, BY GC/MS	UG/L	5	U	5	U	5	U	5	U	5	U
6	CHLOROETHANE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
7	METHYLENE CHLORIDE (DICHLOROMETHANE)	UG/L	4	U	4	U	4	U	4	U	28	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	001		001 D		002		003 F		007 F	
8 DICHLOROETHYLENE,1,1-	UG/L	4	U	4	U	4	U	4	U	4	U
9 DICHLOROETHANE,1,1, BY GC/MS	UG/L	3	U	3	U	3	U	3	U	3	U
1 CHLOROFORM, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
2 DICHLOROETHANE,1,2, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
3 TRICHLOROETHANE,1,1,1-, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
4 CARBON TETRACHLORIDE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
5 BROMODICHLOROMETHANE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
6 DICHLOROPROPANE,1,2, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
7 BENZENE, BY GC/MS	UG/L	7	U	6	U	39		6	U	7	U
9 TRICHLOROETHYLENE	UG/L	4	U	4	U	4	U	4	U	4	U
0 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS	UG/L	5	U	5	U	5	U	5	U	5	U
1 DIBROMOCHLOROMETHANE, BY GC/MS	UG/L	3	U	3	U	3	U	3	U	3	U
2 TRICHLOROETHANE,1,1,2-, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
4 BROMOFORM, BY GC/MS	UG/L	3	U	3	U	3	U	3	U	3	U
5 TETRACHLOROETHYLENE	UG/L	4	U	4	U	4	U	4	U	4	U
6 TOLUENE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
7 TETRACHLOROETHANE,1,1,2,2, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
8 CHLOROBENZENE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
9 ETHYL BENZENE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
0 ACETONE, BY GC/MS	UG/L	7		4	U	8		20		13	
1 CARBON DISULFIDE, BY GC/MS	UG/L	3	U	3	U	3	U	3	U	3	U
2 METHYL ETHYL KETONE (2-BUTANONE)	UG/L	15	U	15	U	15	U	15	U	15	U
4 HEXANONE, 2-	UG/L	14	U	14	U	14	U	14	U	14	U
5 4-METHYL-2-PENTANONE(MIBK)	UG/L	3	U	3	U	3	U	3	U	3	U
6 STYRENE, BY GC/MS	UG/L	4	U	4	U	4	U	4	U	4	U
0 DICHLOROPROPYLENE,TRANS-1,3	UG/L	3	U	3	U	3	U	3	U	3	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

	COMPOUND	UNITS	001		001 D		002		003 F		007 F	
67	XYLENE, M AND/OR P	UG/L	8	U	8	U	4	U	8	U	8	U
70	XYLENE, ORTHO	UG/L	4	U	4	U	4	U	4	U	4	U
72	DICHLOROBENZENE,1,4-(PARA)	UG/L	5	U	5	U	5	U	5	U	5	U
74	DICHLOROBENZENE,1,3-(META)	UG/L	4	U	4	U	4	U	4	U	4	U
77	DICHLOROBENZENE,1,2-(ORTHO)	UG/L	4	U	4	U	4	U	4	U	4	U
78	DICHLOROETHYLENE,TRANS-1,2	UG/L	3	U	3	U	3	U	3	U	3	U
32	DICHLOROETHYLENE,CIS-1,2	UG/L	4	U	4	U	4	U	4	U	4	U
01	SAMPLE NUMBER	NA	001		001		002		003		007	
02	ACTIVITY CODE	NA	DC1CY		DC1CY		DC1CY		DC1CY		DC1CY	

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100		100 D		101		102	
SG07 SOLIDS, PERCENT	%		79.4		77.9		81.4		74.4	
SP17 PCB-AROCLOR 1016	UG/KG		80	U	80	U	80	U	80	U
SP18 PCB-AROCLOR 1221	UG/KG		60	U	60	U	60	U	60	U
SP19 PCB-AROCLOR 1232	UG/KG		20	U	20	U	20	U	20	U
SP20 PCB-AROCLOR 1242	UG/KG		20	U	20	U	20	U	20	U
SP21 PCB-AROCLOR 1248	UG/KG		40	U	40	U	40	U	40	U
SP22 PCB-AROCLOR 1254	UG/KG		10	U	10	U	10	U	10	U
SP23 PCB-AROCLOR 1260	UG/KG		10	U	10	U	10	U	10	U
SS01 PHENOL, BY GC/MS	UG/KG		530	U	540	U	520	U	560	U
SS02 CARBAZOLE	UG/KG		330	U	330	U	320	U	350	U
SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS	UG/KG		150	U	150	U	150	U	160	U
SS04 CHLOROPHENOL, 2-	UG/KG		400	U	410	U	390	U	430	U
SS05 DICHLOROBENZENE,1,3-, BY GC/MS	UG/KG		100	U	100	U	98	U	110	U
SS06 DICHLOROBENZENE,1,4-	UG/KG		130	U	130	U	120	U	130	U
SS07 BENZYL ALCOHOL	UG/KG		250	U	260	U	250	U	270	U
SS08 DICHLOROBENZENE,1,2-, BY GC/MS	UG/KG		150	U	150	U	150	U	160	U
SS09 CRESOL, ORTHO(2-METHYLPHENOL)	UG/KG		680	U	690	U	660	U	730	U
SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS	UG/KG		130	U	130	U	120	U	130	U
SS11 CRESOL, PARA-(4-METHYLPHENOL)	UG/KG		680	U	690	U	660	U	730	U
SS12 N-NITROSODIPROPYLAMINE	UG/KG		300	U	310	U	300	U	320	U
SS13 HEXACHLOROETHANE, BY GC/MS	UG/KG		100	U	100	U	98	U	110	U
SS14 NITROBENZENE, BY GC/MS	UG/KG		130	U	130	U	120	U	130	U
SS15 ISOPHORONE, BY GC/MS	UG/KG		230	U	230	U	220	U	240	U
SS16 NITROPHENOL,2-	UG/KG		350	U	360	U	340	U	380	U
SS17 DIMETHYLPHENOL,2,4, BY GC/MS	UG/KG		330	U	330	U	320	U	350	U
SS18 BENZOIC ACID, BY GC/MS	UG/KG		1100	U	1100	U	1100	U	1200	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100		100 D		101		102	
19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS	UG/KG		250	U	260	U	250	U	270	U
20 DICHLOROPHENOL, 2,4-	UG/KG		480	U	490	U	470	U	510	U
21 TRICHLOROBENZENE,1,2,4, BY GC/MS	UG/KG		76	U	77	U	74	U	81	U
22 NAPHTHALENE, BY GC/MS	UG/KG		130	U	130	U	120	U	150	
23 CHLOROANILINE,4-	UG/KG		1000	U	1000	U	980	U	1100	U
24 HEXACHLOROBUTADIENE, BY GC/MS	UG/KG		76	U	77	U	74	U	81	U
25 PHENOL,4-CHLORO-3-METHYL	UG/KG		480	U	490	U	470	U	510	U
26 METHYLNAPHTHALENE, 2-	UG/KG		150	U	150	U	150	U	160	U
27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS	UG/KG		76	U	77	U	74	U	81	U
28 TRICHLOROPHENOL,2,4,6	UG/KG		430	U	440	U	420	U	460	U
29 TRICHLOROPHENOL,2,4,5	UG/KG		530	U	540	U	520	U	560	U
30 CHLORONAPHTHALENE, 2-	UG/KG		180	U	180	U	170	U	190	U
31 NITROANILINE,2-	UG/KG		230	U	230	U	220	U	240	U
32 PHTHALATE, DIMETHYL, BY GC/MS	UG/KG		200	U	210	U	200	U	220	U
33 ACENAPHTHYLENE, BY GC/MS	UG/KG		180	U	180	U	170	U	190	U
34 NITROANILINE,3-	UG/KG		680	U	690	U	660	U	730	U
35 ACENAPHTHENE, BY GC/MS	UG/KG		180	U	180	U	170	U	190	U
36 DINITROPHENOL,2,4, BY GC/MS	UG/KG		1500	U	1500	U	1500	U	1600	U
37 NITROPHENOL,4-	UG/KG		76	U	77	U	74	U	81	U
38 DIBENZOFURAN	UG/KG		230	U	230	U	220	U	240	U
39 DINITROTOLUENE,2,4, BY GC/MS	UG/KG		580	U	590	U	570	U	620	U
40 DINITROTOLUENE,2,6-	UG/KG		250	U	260	U	250	U	270	U
41 PHTHALATE, DIETHYL, BY GC/MS	UG/KG		430	U	440	U	420	U	460	U
42 ETHER, 4-CHLOROPHENYL PHENYL	UG/KG		230	U	230	U	220	U	240	U
43 FLUORENE, GC/MS	UG/KG		200	U	210	U	200	U	220	U
44 NITROANILINE,4-	UG/KG		1600	U	1700	U	1600	U	1700	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100		100 D		101		102	
PHENOL,4,6-DINITRO-2-METHYL	UG/KG		600	U	620	U	590	U	650	U
N-NITROSODIPHENYLAMINE, BY GC/MS	UG/KG		50	U	51	U	49	U	54	U
ETHER, 4-BROMOPHENYL PHENYL	UG/KG		230	U	230	U	220	U	240	U
HEXACHLOROBENZENE, BY GC/MS	UG/KG		200	U	210	U	200	U	220	U
PENTACHLOROPHENOL, BY GC/MS	UG/KG		530	U	540	U	520	U	560	U
PHENANTHRENE, BY GC/MS	UG/KG		200	U	210	U	200	U	220	U
ANTHRACENE, BY GC/MS	UG/KG		280	U	280	U	270	U	300	U
PHTHALATE, DI-N-BUTYL-, BY GC/MS	UG/KG		330	U	330	U	320	U	350	U
FLUORANTHENE, BY GC/MS	UG/KG		100	U	100	U	98	U	570	
PYRENE, BY GC/MS	UG/KG		300	U	310	U	300	U	520	
PHTHALATE, BUTYL BENZYL	UG/KG		280	U	280	U	270	U	300	U
DICHLOROBENZIDINE, 3,3'	UG/KG		5000	U	5100	U	4900	U	5400	U
ANTHRACENE, BENZO(A), BY GC/MS	UG/KG		380	U	390	U	370	U	400	U
PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS	UG/KG		450	U	460	U	440	U	480	U
CHRYSENE, BY GC/MS	UG/KG		300	U	310	U	300	U	320	U
PHTHALATE, DI-N-OCTYL-, BY GC/MS	UG/KG		180	U	180	U	170	U	190	U
FLUORANTHENE, BENZO(B), BY GC/MS	UG/KG		180	U	180	U	170	U	190	U
FLUORANTHENE, BENZO(K), BY GC/MS	UG/KG		330	U	330	U	320	U	350	U
PYRENE, BENZO(A), BY GC/MS	UG/KG		380	U	390	U	370	U	400	U
PYRENE, INDENO(1,2,3-CD)	UG/KG		530	U	540	U	520	U	560	U
ANTHRACENE, DIBENZO(A,H), BY GC/MS	UG/KG		530	U	540	U	520	U	560	U
PERYLENE,BENZO(G,H,I), BY GC/MS	UG/KG		350	U	360	U	340	U	380	U
CHLOROMETHANE, BY GC/MS	UG/KG		16	U	21	U	12	U	20	U
BROMOMETHANE, BY GC/MS	UG/KG		32	U	42	U	24	U	39	U
VINYL CHLORIDE, BY GC/MS	UG/KG		24	U	31	U	18	U	29	U
CHLOROETHANE, BY GC/MS	UG/KG		24	U	31	U	18	U	29	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100		100 D		101		102	
V07 METHYLENE CHLORIDE (DICHLOROMETHANE)	UG/KG		17		21	U	12	U	20	U
V08 DICHLOROETHYLENE,1,1, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V09 DICHLOROETHANE,1,1, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V10 DICHLOROETHYLENE,TRANS-1,2	UG/KG		8	U	10	U	6	U	10	U
V11 CHLOROFORM, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V12 DICHLOROETHANE,1,2, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V13 TRICHLOROETHANE,1,1,1-, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V14 CARBON TETRACHLORIDE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V15 BROMODICHLOROMETHANE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V16 DICHLOROPROPANE,1,2, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V17 BENZENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V18 DICHLOROPROPYLENE,TRANS-1,3	UG/KG		8	U	10	U	6	U	10	U
V19 TRICHLOROETHYLENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V21 DIBROMOCHLOROMETHANE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V22 TRICHLOROETHANE,1,1,2-, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V24 BROMOFORM, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V25 TETRACHLOROETHYLENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V26 TOLUENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V28 CHLOROBENZENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V29 ETHYL BENZENE, BY GC/MS	UG/KG		8	U	10	U	6	U	10	U
V30 ACETONE, BY GC/MS	UG/KG		28		70	U	18		53	U
V31 CARBON DISULFIDE, BY GC/MS	UG/KG		8	U	10	U	6	U	22	
V32 METHYL ETHYL KETONE	UG/KG		16	U	21	U	12	U	20	U
V34 HEXANONE, 2-	UG/KG		16	U	21	U	12	U	20	U

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008		100		100 D		101		102	
'35 4-METHYL-2-PENTANONE(MIBK)	UG/KG			16	U	21	U	12	U	20	U
'36 STYRENE, BY GC/MS	UG/KG			8	U	10	U	6	U	10	U
'44 DICHLOROBENZENE,1,4-	UG/KG			8	U	10	U	6	U	10	U
'49 XYLENE, ORTHO	UG/KG			8	U	10	U	6	U	10	U
'57 XYLENE, M AND/OR P	UG/KG			16	U	21	U	6	U	20	U
'60 DICHLOROBENZENE, 1, 3-	UG/KG			8	U	10	U	6	U	10	U
'61 DICHLOROBENZENE, 1, 2-	UG/KG			8	U	10	U	6	U	10	U
'63 DICHLOROETHYLENE, CIS -1,2	UG/KG			8	U	10	U	6	U	10	U
'17 PCB-AROCLOR 1016	UG/L	0.40	U								
18 PCB-AROCLOR 1221	UG/L	0.30	U								
'19 PCB-AROCLOR 1232	UG/L	0.10	U								
'20 PCB-AROCLOR 1242	UG/L	0.10	U								
'21 PCB-AROCLOR 1248	UG/L	0.20	U								
'22 PCB-AROCLOR 1254	UG/L	0.050	U								
'23 PCB-AROCLOR 1260	UG/L	0.060	U								
501 PHENOL, BY GC/MS	UG/L	1.3	U								
503 ETHER,BIS(2-CHLOROETHYL), BY GC/MS	UG/L	3	U								
504 CHLOROPHENOL, 2-	UG/L	2.7	U								
505 DICHLOROBENZENE,1,3-, BY GC/MS	UG/L	2.2	U								
506 DICHLOROBENZENE,1,4-	UG/L	2.3	U								
507 BENZYL ALCOHOL	UG/L	1.3	U								
508 DICHLOROBENZENE,1,2-, BY GC/MS	UG/L	2.5	U								
509 CRESOL, ORTHO(2-METHYLPHENOL)	UG/L	2.3	U								
510 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS	UG/L	1.4	U								
511 CRESOL, PARA-(4-METHYLPHENOL)	UG/L	3.3	U								
512 N-NITROSODIPROPYLAMINE	UG/L	1.5	U								

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100	100 D	101	102
S13 HEXACHLOROETHANE, BY GC/MS	UG/L	2.4 U				
S14 NITROBENZENE, BY GC/MS	UG/L	1.5 U				
S15 ISOPHORONE, BY GC/MS	UG/L	5 U				
S16 NITROPHENOL,2-	UG/L	2.1 U				
S17 DIMETHYLPHENOL,2,4, BY GC/MS	UG/L	2.1 U				
S18 BENZOIC ACID, BY GC/MS	UG/L	20 U				
S19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS	UG/L	1.4 U				
S20 DICHLOROPHENOL, 2,4-	UG/L	3.1 U				
S21 TRICHLOROBENZENE,1,2,4, BY GC/MS	UG/L	5 U				
S22 NAPHTHALENE, BY GC/MS	UG/L	2 U				
S23 CHLOROANILINE,4-	UG/L	5 U				
S24 HEXACHLOROBUTADIENE, BY GC/MS	UG/L	1.9 U				
S25 PHENOL,4-CHLORO-3-METHYL	UG/L	2.8 U				
S26 METHYLNAPHTHALENE, 2-	UG/L	1.8 U				
S27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS	UG/L	10 U				
S28 TRICHLOROPHENOL,2,4,6	UG/L	2.5 U				
S29 TRICHLOROPHENOL,2,4,5	UG/L	3 U				
S30 CHLORONAPHTHALENE, 2-	UG/L	1.5 U				
S31 NITROANILINE,2-(ORTHO)	UG/L	5 U				
S32 PHTHALATE, DIMETHYL, BY GC/MS	UG/L	10 U				
S33 ACENAPHTHYLENE, BY GC/MS	UG/L	1.3 U				
S34 NITROANILINE,3-	UG/L	10 U				
S35 ACENAPHTHENE, BY GC/MS	UG/L	1.1 U				
S36 DINITROPHENOL,2,4, BY GC/MS	UG/L	20 U				
S37 NITROPHENOL,4-	UG/L	14 U				
S38 DIBENZOFURAN	UG/L	1.2 U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008		100		100 D		101		102	
9 DINITROTOLUENE,2,4, BY GC/MS	UG/L	10	U								
0 DINITROTOLUENE,2,6-	UG/L	5	U								
1 PHTHALATE, DIETHYL, BY GC/MS	UG/L	5	U								
2 ETHER, 4-CHLOROPHENYL PHENYL	UG/L	5	U								
3 FLUORENE, BY GC/MS	UG/L	5	U								
4 NITROANILINE,4-	UG/L	16	U								
5 PHENOL,4,6-DINITRO-2-METHYL	UG/L	10	U								
6 N-NITROSODIPHENYLAMINE, BY GC/MS	UG/L	1	U								
7 ETHER, 4-BROMOPHENYL PHENYL	UG/L	5	U								
8 HEXACHLOROBENZENE, BY GC/MS	UG/L	5	U								
9 PENTACHLOROPHENOL, BY GC/MS	UG/L	20	U								
0 PHENANTHRENE, BY GC/MS	UG/L	1.1	U								
1 ANTHRACENE, BY GC/MS	UG/L	5	U								
2 PHTHALATE, DI-N-BUTYL-, BY GC/MS	UG/L	5	U								
3 FLUORANTHENE, BY GC/MS	UG/L	5	U								
4 PYRENE, BY GC/MS	UG/L	10	U								
5 PHTHALATE, BUTYL BENZYL	UG/L	10	U								
6 DICHLOROBENZIDINE, 3,3'	UG/L	25	U								
7 ANTHRACENE, BENZO(A), BY GC/MS	UG/L	10	U								
8 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS	UG/L	10	U								
9 CHRYSENE, BY GC/MS	UG/L	10	U								
0 PHTHALATE, DI-N-OCTYL-, BY GC/MS	UG/L	10	U								
1 FLUORANTHENE, BENZO(B), BY GC/MS	UG/L	10	U								
2 FLUORANTHENE, BENZO(K), BY GC/MS	UG/L	10	U								
3 PYRENE, BENZO(A), BY GC/MS	UG/L	10	U								
4 PYRENE, INDENO(1,2,3-CD)	UG/L	10	U								

COMPOUND	UNITS	008		100	100 D	101	102
WS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS	UG/L	10	U				
WS66 PERYLENE,BENZO(G,H,I), BY GC/MS	UG/L	10	U				
WS67 CARBAZOLE	UG/L	10	U				
WV03 CHLOROMETHANE, BY GC/MS	UG/L	7	U				
WV04 BROMOMETHANE, BY GC/MS	UG/L	4	U				
WV05 VINYL CHLORIDE, BY GC/MS	UG/L	5	U				
WV06 CHLOROETHANE, BY GC/MS	UG/L	4	U				
WV07 METHYLENE CHLORIDE (DICHLOROMETHANE)	UG/L	4	U				
WV08 DICHLOROETHYLENE,1,1-	UG/L	4	U				
WV09 DICHLOROETHANE,1,1, BY GC/MS	UG/L	3	U				
WV11 CHLOROFORM, BY GC/MS	UG/L	4	U				
WV12 DICHLOROETHANE,1,2, BY GC/MS	UG/L	4	U				
WV13 TRICHLOROETHANE,1,1,1-, BY GC/MS	UG/L	4	U				
WV14 CARBON TETRACHLORIDE, BY GC/MS	UG/L	4	U				
WV15 BROMODICHLOROMETHANE, BY GC/MS	UG/L	4	U				
WV16 DICHLOROPROPANE,1,2, BY GC/MS	UG/L	4	U				
WV17 BENZENE, BY GC/MS	UG/L	6	U				
WV19 TRICHLOROETHYLENE	UG/L	4	U				
WV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS	UG/L	5	U				
WV21 DIBROMOCHLOROMETHANE, BY GC/MS	UG/L	3	U				
WV22 TRICHLOROETHANE,1,1,2-, BY GC/MS	UG/L	4	U				
WV24 BROMOFORM, BY GC/MS	UG/L	3	U				
WV25 TETRACHLOROETHYLENE	UG/L	4	U				
WV26 TOLUENE, BY GC/MS	UG/L	4	U				
WV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS	UG/L	4	U				
WV28 CHLOROBENZENE, BY GC/MS	UG/L	4	U				

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	008	100	100 D	101	102
29 ETHYL BENZENE, BY GC/MS	UG/L	4 U				
50 ACETONE, BY GC/MS	UG/L	15				
51 CARBON DISULFIDE, BY GC/MS	UG/L	3 U				
32 METHYL ETHYL KETONE (2-BUTANONE)	UG/L	15 U				
34 HEXANONE, 2-	UG/L	14 U				
35 4-METHYL-2-PENTANONE(MIBK)	UG/L	3 U				
36 STYRENE, BY GC/MS	UG/L	4 U				
40 DICHLOROPROPYLENE,TRANS-1,3	UG/L	3 U				
57 XYLENE, M AND/OR P	UG/L	8 U				
70 XYLENE, ORTHO	UG/L	4 U				
72 DICHLOROBENZENE,1,4-(PARA)	UG/L	5 U				
74 DICHLOROBENZENE,1,3-(META)	UG/L	4 U				
77 DICHLOROBENZENE,1,2-(ORTHO)	UG/L	4 U				
78 DICHLOROETHYLENE,TRANS-1,2	UG/L	3 U				
82 DICHLOROETHYLENE,CIS-1,2	UG/L	4 U				
01 SAMPLE NUMBER	NA	008	100	100	101	102
02 ACTIVITY CODE	NA	DC1CY	DC1CY	DC1CY	DC1CY	DC1CY

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	103		104		108 F		
G07 SOLIDS, PERCENT	%	74.7		77.1		99.3		
P17 PCB-AROCLOR 1016	UG/KG	80	U	80	U			
P18 PCB-AROCLOR 1221	UG/KG	60	U	60	U			
P19 PCB-AROCLOR 1232	UG/KG	20	U	20	U			
P20 PCB-AROCLOR 1242	UG/KG	20	U	20	U			
P21 PCB-AROCLOR 1248	UG/KG	40	U	40	U			
P22 PCB-AROCLOR 1254	UG/KG	10	U	10	U			
P23 PCB-AROCLOR 1260	UG/KG	10	U	10	U			
S01 PHENOL, BY GC/MS	UG/KG	560	U	540	U			
S02 CARBAZOLE	UG/KG	350	U	340	U			
S03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS	UG/KG	160	U	160	U			
S04 CHLOROPHENOL, 2-	UG/KG	430	U	410	U			
S05 DICHLOROBENZENE,1,3-, BY GC/MS	UG/KG	110	U	100	U			
S06 DICHLOROBENZENE,1,4-	UG/KG	130	U	130	U			
S07 BENZYL ALCOHOL	UG/KG	270	U	260	U			
S08 DICHLOROBENZENE,1,2-, BY GC/MS	UG/KG	160	U	160	U			
S09 CRESOL, ORTHO(2-METHYLPHENOL)	UG/KG	720	U	700	U			
S10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS	UG/KG	130	U	130	U			
S11 CRESOL, PARA-(4-METHYLPHENOL)	UG/KG	720	U	700	U			
S12 N-NITROSODIPROPYLAMINE	UG/KG	320	U	310	U			
S13 HEXACHLOROETHANE, BY GC/MS	UG/KG	110	U	100	U			
S14 NITROBENZENE, BY GC/MS	UG/KG	130	U	130	U			
S15 ISOPHORONE, BY GC/MS	UG/KG	240	U	230	U			
S16 NITROPHENOL,2-	UG/KG	380	U	360	U			
S17 DIMETHYLPHENOL,2,4, BY GC/MS	UG/KG	350	U	340	U			
S18 BENZOIC ACID, BY GC/MS	UG/KG	1200	U	1100	U			

COMPOUND	UNITS	103		104		108 F		
19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS	UG/KG	270	U	260	U			
20 DICHLOROPHENOL, 2,4-	UG/KG	510	U	490	U			
21 TRICHLOROBENZENE,1,2,4, BY GC/MS	UG/KG	80	U	78	U			
22 NAPHTHALENE, BY GC/MS	UG/KG	130	U	130	U			
23 CHLOROANILINE,4-	UG/KG	1100	U	1000	U			
24 HEXACHLOROBUTADIENE, BY GC/MS	UG/KG	80	U	78	U			
25 PHENOL,4-CHLORO-3-METHYL	UG/KG	510	U	490	U			
26 METHYLNAPHTHALENE, 2-	UG/KG	160	U	160	U			
27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS	UG/KG	80	U	78	U			
28 TRICHLOROPHENOL,2,4,6	UG/KG	460	U	440	U			
29 TRICHLOROPHENOL,2,4,5	UG/KG	560	U	540	U			
30 CHLORONAPHTHALENE, 2-	UG/KG	190	U	180	U			
31 NITROANILINE,2-	UG/KG	240	U	230	U			
32 PHTHALATE, DIMETHYL, BY GC/MS	UG/KG	210	U	210	U			
33 ACENAPHTHYLENE, BY GC/MS	UG/KG	190	U	180	U			
34 NITROANILINE,3-	UG/KG	720	U	700	U			
35 ACENAPHTHENE, BY GC/MS	UG/KG	190	U	180	U			
36 DINITROPHENOL,2,4, BY GC/MS	UG/KG	1600	U	1600	U			
37 NITROPHENOL,4-	UG/KG	80	U	78	U			
38 DIBENZOFURAN	UG/KG	240	U	230	U			
39 DINITROTOLUENE,2,4, BY GC/MS	UG/KG	620	U	600	U			
40 DINITROTOLUENE,2,6-	UG/KG	270	U	260	U			
41 PHTHALATE, DIETHYL, BY GC/MS	UG/KG	460	U	440	U			
42 ETHER, 4-CHLOROPHENYL PHENYL	UG/KG	240	U	230	U			
43 FLUORENE, GC/MS	UG/KG	210	U	210	U			
44 NITROANILINE,4-	UG/KG	1700	U	1700	U			

COMPOUND	UNITS	103		104		108	F		
S45 PHENOL,4,6-DINITRO-2-METHYL	UG/KG	640	U	620	U				
S46 N-NITROSODIPHENYLAMINE, BY GC/MS	UG/KG	54	U	52	U				
S47 ETHER, 4-BROMOPHENYL PHENYL	UG/KG	240	U	230	U				
S48 HEXACHLOROBENZENE, BY GC/MS	UG/KG	210	U	210	U				
S49 PENTACHLOROPHENOL, BY GC/MS	UG/KG	560	U	540	U				
S50 PHENANTHRENE, BY GC/MS	UG/KG	210	U	210	U				
S51 ANTHRACENE, BY GC/MS	UG/KG	290	U	280	U				
S52 PHTHALATE, DI-N-BUTYL-, BY GC/MS	UG/KG	350	U	340	U				
S53 FLUORANTHENE, BY GC/MS	UG/KG	110	U	100	U				
S54 PYRENE, BY GC/MS	UG/KG	320	U	310	U				
S55 PHTHALATE, BUTYL BENZYL	UG/KG	290	U	280	U				
S56 DICHLOROBENZIDINE, 3,3'	UG/KG	5400	U	5200	U				
S57 ANTHRACENE, BENZO(A), BY GC/MS	UG/KG	400	U	390	U				
S58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS	UG/KG	480	U	470	U				
S59 CHRYSENE, BY GC/MS	UG/KG	320	U	310	U				
S60 PHTHALATE, DI-N-OCTYL-, BY GC/MS	UG/KG	190	U	180	U				
S61 FLUORANTHENE, BENZO(B), BY GC/MS	UG/KG	190	U	180	U				
S62 FLUORANTHENE, BENZO(K), BY GC/MS	UG/KG	350	U	340	U				
S63 PYRENE, BENZO(A), BY GC/MS	UG/KG	400	U	390	U				
S64 PYRENE, INDENO(1,2,3-CD)	UG/KG	560	U	540	U				
S65 ANTHRACENE, DIBENZO(A,H), BY GC/MS	UG/KG	560	U	540	U				
S66 PERYLENE,BENZO(G,H,I), BY GC/MS	UG/KG	380	U	360	U				
V03 CHLOROMETHANE, BY GC/MS	UG/KG	12	U	12	U	10	U		
V04 BROMOMETHANE, BY GC/MS	UG/KG	24	U	24	U	20	U		
V05 VINYL CHLORIDE, BY GC/MS	UG/KG	18	U	18	U	15	U		
V06 CHLOROETHANE, BY GC/MS	UG/KG	18	U	18	U	15	U		

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	103		104		108	F		
/07 METHYLENE CHLORIDE (DICHLOROMETHANE)	UG/KG	12	U	12	U	10	U		
/08 DICHLOROETHYLENE,1,1, BY GC/MS	UG/KG	6	U	6	U	5	U		
/09 DICHLOROETHANE,1,1, BY GC/MS	UG/KG	6	U	6	U	5	U		
/10 DICHLOROETHYLENE,TRANS-1,2	UG/KG	6	U	6	U	5	U		
/11 CHLOROFORM, BY GC/MS	UG/KG	6	U	6	U	5	U		
/12 DICHLOROETHANE,1,2, BY GC/MS	UG/KG	6	U	6	U	5	U		
/13 TRICHLOROETHANE,1,1,1-, BY GC/MS	UG/KG	6	U	6	U	5	U		
/14 CARBON TETRACHLORIDE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/15 BROMODICHLOROMETHANE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/16 DICHLOROPROPANE,1,2, BY GC/MS	UG/KG	6	U	6	U	5	U		
/17 BENZENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/18 DICHLOROPROPYLENE,TRANS-1,3	UG/KG	6	U	6	U	5	U		
/19 TRICHLOROETHYLENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS	UG/KG	6	U	6	U	5	U		
/21 DIBROMOCHLOROMETHANE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/22 TRICHLOROETHANE,1,1,2-, BY GC/MS	UG/KG	6	U	6	U	5	U		
/24 BROMOFORM, BY GC/MS	UG/KG	6	U	6	U	5	U		
/25 TETRACHLOROETHYLENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/26 TOLUENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS	UG/KG	6	U	6	U	5	U		
/28 CHLOROBENZENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/29 ETHYL BENZENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/30 ACETONE, BY GC/MS	UG/KG	18		17		580			
/31 CARBON DISULFIDE, BY GC/MS	UG/KG	6	U	6	U	5	U		
/32 METHYL ETHYL KETONE	UG/KG	12	U	12	U	28			
/34 HEXANONE, 2-	UG/KG	12	U	12	U	10	U		

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 6-DC1CY VALIDATED DATA

COMPOUND	UNITS	103		104		108	F		
V35 4-METHYL-2-PENTANONE(MIBK)	UG/KG	12	U	12	U	10			
V36 STYRENE, BY GC/MS	UG/KG	6	U	6	U	5	U		
V44 DICHLOROBENZENE,1,4-	UG/KG	6	U	6	U	26			
V49 XYLENE, ORTHO	UG/KG	6	U	6	U	5	U		
V57 XYLENE, M AND/OR P	UG/KG	12	U	12	U	5	U		
V60 DICHLOROBENZENE, 1, 3-	UG/KG	6	U	6	U	27			
V61 DICHLOROBENZENE, 1, 2-	UG/KG	6	U	6	U	11			
V63 DICHLOROETHYLENE, CIS -1,2	UG/KG	6	U	6	U	5	U		
Z01 SAMPLE NUMBER	NA	103		104		108			
Z02 ACTIVITY CODE	NA	DC1CY		DC1CY		DC1CY			

ACTIVITY DC1CY MOUND STREET PCBS

IE PROJECT LEADER SHOULD CIRCLE ONE - STORET, AIRS, OR ARCHIVE.

CIRCLE ONE: STORET AIRS ARCHIVE

DATA APPROVED BY LABO FOR TRANSMISSION TO PROJECT LEADER ON 05/03/96 13:32:27 BY

APPENDIX D

CITED REFERENCES

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality
Hazardous Waste Program

Reference 1

TELEPHONE OR CONFERENCE RECORD

File: Mound Street PCBs

Date: March 15, 1994

TELEPHONE (314) 425-4468

CONFERENCE

Incoming ( )
Outgoing (X)

Field ( )
Office ( )

SUBJECT: Jefferson National Expansion Memorial - Gateway Arch

PERSONS INVOLVED

Name	Representing
Ms. Louise Barra	National Park Service, Gateway Arch
Don Falls	MDNR, Hazardous Waste Program

SUMMARY OF CONVERSATION:

I phoned the public affairs office of the Jefferson National Expansion Memorial in St. Louis and spoke with a Ms. Louise Barra. Ms. Barra is a public affairs officer with the National Park Service. I asked Ms. Barra if she could tell me the exact acreage of the park and the total annual attendance. Ms. Barra informed me that the park encompasses just over 90 acres and the total annual attendance for all the park property, including the parking structure, is approximately 2.7 million people.

FINAL RESULTS:

This information will be incorporated into the Mound Street PCB Preliminary Assessment.

Don Falls

Don Falls
Environmental Specialist
Hazardous Waste Program

DF:so

Reference 3

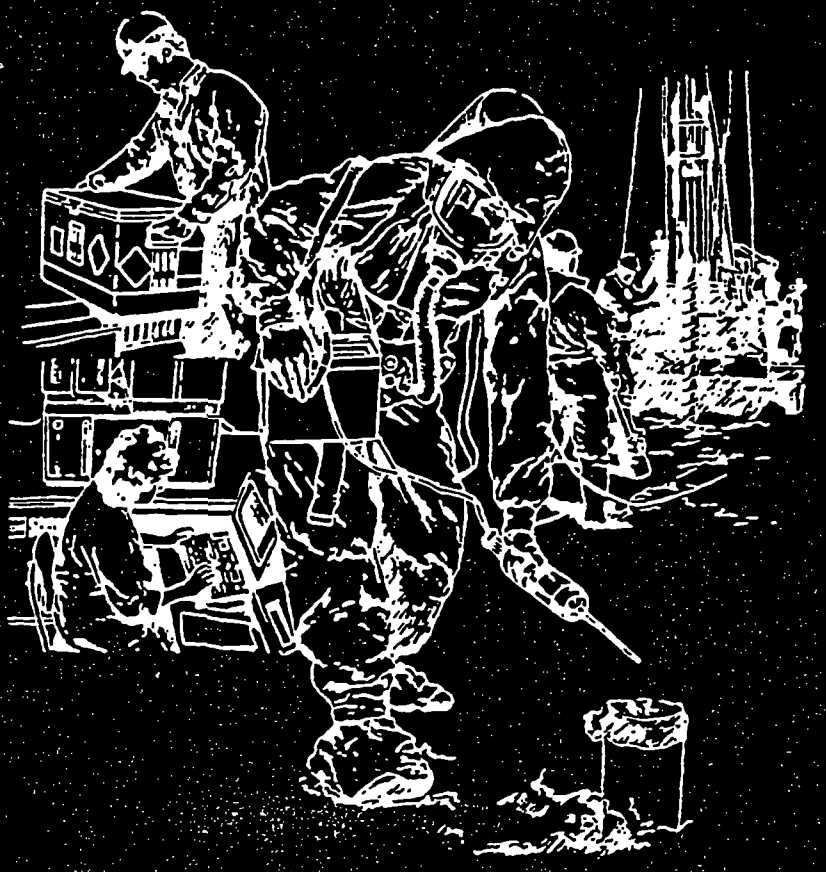
Final Report
Screening Site Inspection
Laclede Coal Gas
St. Louis, Missouri
EPA ID# MOD981715980
TDD #F-07-9008-020 PAN #FM00579SA
Site #Y33 Project #002
Prepared by E & E/FIT for the
Region VII EPA RPO
Project Manager: Keith Brown
Superfund Contact: Greg Reesor
Date: October 29, 1991

EPA

HAZARDOUS
SITE
EVALUATION
DIVISION

RECEIVED
FEB 18 199
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Field Investigation Team Zone II



CONTRACT NO.
68-01-7347

ecology and environment, inc.

Reference 4

Preliminary Assessment
Mound Street Power Plant
St. Louis, Missouri
TDD #F-07-8708-29 PAN #FM00579PA
Site #Y33 Project #001
Prepared by: E & E/FIT for Region VII EPA
Task Leader: Eric Hess, E & E/FIT
Superfund Contact: Pauletta R. France-Isetts
Date: June 23, 1988

Reference 5

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality
Hazardous Waste Program

TELEPHONE OR CONFERENCE RECORD

File: Mound Street PCB Site

Date: December 13, 1993

TELEPHONE (314) 436-8735

CONFERENCE

Incoming ( )
Outgoing (X)

Field ( )
Office (X)

SUBJECT: Mound Street PCB Site

PERSONS INVOLVED

Name	Representing
Don Falls	MDNR/HWP
Howard Edmond	Metropolitan Sewer District
Anne Olberding	USEPA, Region VII (913) 551-7718
Bob Jackson	USEPA, Region VII (913) 551-7020

SUMMARY OF CONVERSATION:

I phoned Mr. Howard Edmond of the MSD (Metropolitan Sewer District) to find out exactly how the waste oil was seeping into the Brooklyn Street pump station. Mr. Howard explained that sometime around the middle of July 1993, oil was noticed seeping from the storm sewer into the wet well of the pump station. Mr. Howard said that the Brooklyn Street pump station only pumps storm water, and therefore only operates during periods of rain. Mr. Howard said that the oil stayed on top of the wet well, and was later pumped off by React Environmental. He said that it was possible that some of the oil made it out to the river. Mr. Howard said that the MSD laboratory did the analysis on the samples that he collected. The results indicate Aroclor 1254 in the oil at 47 parts per million.

I then asked Mr. Howard if he was familiar with the history of the Mound Street site. He related that there was a rumor that the basement of the former Union Electric building, which occupied part of the site, was said to be full of old transformers, and was claimed to be an EPA (U.S. Environmental Protection Agency) Superfund site where a "poor cleanup" was performed before the building was demolished.

Mr. Howard further said that he believes that the City of St Louis may now own the former Union Electric property, and Inspector Charles Gay with the St. Louis Fire Department would know more about the site, because he has been working on the site for some time.

ACTION TAKEN:

I phoned the St. Louis City Fire Department (314/298-1900) and asked to speak with Mr. Charles Gay. The secretary there said that Mr. Gay was out of the office, but would leave a message for him to call me. I then called Ms. Anne Olberding, EPA Region VII, and asked if she was aware of an EPA cleanup in the vicinity of the Mound and First Streets in St. Louis. Ms. Olberding said that location did not ring a bell, but she would search Cerclis according to site latitude and then send me the results.

In addition, I also spoke with Mr. Bob Krager, MDNR, Hazardous Waste Program, and asked if he was aware of any Superfund activities at the former Union Electric property at Mound Street. Mr. Krager said that he was unaware of any activities at that particular location and suggested that I contact Mr. Bob Jackson at EPA Region VII. I phoned Mr. Jackson who said that he would check the TOSCA records. Mr. Jackson called back and informed me that he could find nothing in the records about an EPA cleanup at the Union Electric power plant near Mound Street.

FINAL RESULTS:

This information will be used in the Mound Street PCB preliminary assessment.

Don Falls

Don Falls
Environmental Specialist

DF:so

Sverdrup **TELECON MEMO** Reference 6

Memo No. 1 Job No. 10865-370303

Date Nov 21 19 95 Time 9:00 am - 9:25

Between (Svc) Mike Mau Placed ✓ Rec'd

And Howard Edmond Tel (314) 436-8735

Of St. Louis Metropolitan Sewer District (MSD)

Subject Mound Street PCBs / UST's / Manhole Sampling

(1) - old granary building south end - found an old UST, got in manhole & floodwalls TRRA

- never could really determine exact source

- Removal was turned over to city of St. Louis & Railroad - was on railroad property

- Chief Horne - Fire Inspector (may have city Block & Lot #s) 289-1900

(worked with fire marshall - Railroad ↳ N+W or Ill. Central

- little street between granary & pump station ↳ operates only during rain

- floodwall manholes - not sewerage but underground drainage keeps

- no seepage of oil from 1993 that he knows of - no complaints

DNR & EPA taken care both times

- Samples on identifying source / 768-6200 permit dept. MSD

City - permit office Hampton Ave

- City Block & Lot #

F-GAI (12) (13) (14)

floodwall → manhole Nothing to do with MSD

- Corp of Engineers need to check

Original:
cc:

Page 1 of 3

Sverdrup **TELECON MEMO**

Memo No. 1 Job No. 10865-370303

Date Nov. 21 19 95 Time 9:00 m

Between (S v C) Mike May Placed ✓ Rec'd ____

And Howard Edmond Tel (314) 436-8735

Of St. Louis M.S.D.

Subject Mound Street PCBs / USTs & other sources / pump septic

City Block & Block #

Old # 622-3313 - House Numbering
↳ (Address)
Then they can get you block #

- Pumps to Bissell pt. Treatment
  - 10 E Grand
  - 3 or 4 miles
  - But
  - goes to interceptor sewer first then to treatment plant ("any bodies guess as to how it really works!")

Boundary
- Dakota to N. North comes to Bissell Point Plant
- goes west to Kings Highway
- Out airport

- Record of sampling under FOI
  FOI - need to write letter

Howard Edmond's boss ← Bernard Rains
Director of Environmental Compliance of MSD
No. 10 E Grand
St. Louis, MO 63147

Original:
cc:

Sverdrup **TELECON MEMO**

Memo No. 1 Job No. 10865-370303

Date Nov-21 19 95 Time 9:00 m

Between (S v C) Mike May Placed ____ Rec'd ____

And Howard Edmond Tel (314) 436-8735

Of St. Louis M.S.D.

Subject Mound Street PCBs / UST's & other sources / pump system

Summary

- reiterated that the manholes were not "storm drainage" related. The pump station only pumps under circumstances of exceedingly heavy precipitation or if the River level is at or exceeding flood stage. Manholes are for protection of the flood wall (underground H,O) not storm sewer.
- If there would have been oil recognized since 1993 then Howard's crews would have definitely reported the oil in the manholes or pumping station
- call Chief Horne first, before calling city for lot & block #'s - May have this information already.

Original:
cc:

FILE: Mound Street PCB's

Reference 7

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: November 22, 1993

TO: Mound Street PCB Site

FROM: Don Falls, Environmental Specialist
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Mound Street PCB Site Reconnaissance

On November 11, 1993, I traveled to the Mound Street PCB site to conduct a site reconnaissance and meet with Mr. Daryl Bowles and Mr. David Gehm of the GEHM Corporation. The site is located at Mound and Brooklyn Streets, on the Riverfront, in downtown St Louis. I arrived at the site at 8:35 a.m. and first made a vehicle reconnaissance of the area within 1/4 mile of the site. The weather was clear and sunny with a temperature of approximately 55 degrees.

At 9:00 a.m., I met with Mr. Bowles and Mr. Gehm at the old terminal building. They were at the site to oversee the removal of waste oil that had been temporarily stored on-site from an earlier underground storage tank removal. I first asked Mr. Bowles if he could show me where the Metropolitan Sewer District pump station was located. He directed me to the pump station located at the end of Brooklyn Street, approximately 400 feet from the old terminal building. The pump station is located next to the flood wall and is surrounded by a security fence. I noted that five 55-gallon drums marked as waste oil and PCBs (Polychlorinated Biphenyl) were stored against the pump station south wall.

I then asked Mr. Bowles if he would show me exactly where the boring attempts were made that he had referred to in his activities report. We walked across Mound Street to an area immediately east of the old terminal building. This area appeared as an anomaly on the IR/T (Infrared Thermograph) survey completed in August 1993 by Entech Engineering as part of GEHM Inc.'s investigation of the site. Mr. Bowles explained that the drilling attempts were unsuccessful due to solid rock, cinder block, and other debris being encountered at a depth of about five feet. Mr. Bowles informed me that a long-time employee of Apex Fuel Company claims that Union Electric Company once used a building at this particular site to store transformers. The

RECYCLED PAPER

basement of this building was said to be full of waste oil when the building was demolished several years ago. Mr. Bowles indicated that the foundation or basement of this demolished building might explain the IR/T anomaly.

I asked Mr. Gehm about the capabilities of the IR/T and if it could image at depths of several feet. He said that he thought that the IR/T could image areas of dissimilar makeup to a depth of about 20 feet. Mr. Bowles added that buried objects as small as five-gallon buckets have been identified with the instrument. Mr. Gehm said that the IR/T images are taken using a lift bucket and are taken at a height of about 30 feet above the ground.

At 10:15 a.m., Mr. Gehm and Mr. Bowles said that they had to leave to finish with the removal of the waste oil. I thanked them for their assistance and told them that I would stay in touch with them. After taking more photographs of the area, I then left the site at approximately 11:00 a.m.

DF:so

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Mound Street PCB's CERCLIS #: MO0000009367

AKA: _____ SSID: _____

ADDRESS: 100 Mound Street

CITY: St. Louis STATE: MO ZIP CODE: 63102

SITE REFERENCE POINT: Center of former Union Electric Property.

USGS QUAD MAP NAME: Granite City, IL TOWNSHIP: 45 (N)/S RANGE: 7 (E)/W

SCALE: 1:24,000 MAP DATE: 1954 SECTION: ____ 1/4 ____ 1/4 ____ 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: 5th Principal

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 90 ° 07 ' 30 " LATITUDE: 38 ° 37 ' 30 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 90 ° 10 ' 00 " LATITUDE: 38 ° 37 ' 30 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 195

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 64 . 42 "

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 1 ' 4 . 42 "

D) ADD TO STARTING LATITUDE: 38 ° 37 ' 30 . 00 " + 1 ' 4 . 42 =

SITE LATITUDE: 38 ° 38 ' 34 . 00 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 173

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 57 . 15 "

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 0 ' 57 . 15 "

D) ADD TO STARTING LONGITUDE: 90 ° 10 ' 00 . 00 " + 0 ' 57 . 15 =

SITE LONGITUDE: 90 ° 10 ' 57 . 15 "

INVESTIGATOR: Don Falls DATE: 12/13/93

Reference 9

ACTIVITIES REPORT
TRRA of St. Louis
First & Mound Streets Site
MDNR Spill Report
07143 - KB - 1331

RECEIVED
SEP 15 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

The GEHM Corporation
1417 Bingham Rd.
P.O. Box 65
Boonville, MO 65233

THE GEHM Corporation

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4.0 SITE ACTIVITIES 4.1 Tank Contents Removal 4.2 Infrared Thermographic Survey 4.3 Drilling/Sampling	3 3 4 6
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ACTIVITIES REPORT
TRRA of St. Louis
First & Mound Streets Site
MDNR SPILL REPORT # 07143 - KB -1331

1.0 PROJECT SYNOPSIS

This is a report of activities and findings resulting from the discovery of oils seeping into a pump station operated by Metropolitan Sewer District (MSD) in St. Louis, Missouri. On July 14, 1993, MSD reported this situation to the MDNR. MSD analytical information revealed PCB levels of less than 50 ppm in the oils seeping into the pump station. Additionally, a sample was obtained from waste oil contained in an underground storage tank present in the area, and owned by Terminal Railroad Association of St. Louis (TRRA). The St. Louis Fire Department (SLFD) notified TRRA on July 28, 1993 and requested the contents of the tank be removed. TRRA was unaware of the existence of the tank prior to notification by the SLFD.

In response to the situation, TRRA initiated and completed the following tasks:

- **Contents of the tank were removed** on August 4, 1993. The tank was completely cleaned and freed of all liquids. The material was containerized on-site in 55 gallon drums for characterization and disposal.

- An **Infrared Thermographic Survey was conducted** of the area in an attempt to characterize leak plumes or trails.

- **Three borings** were advanced in the immediate area to determine subsurface soil conditions. Two soil samples were obtained from the site and submitted to a qualified laboratory for chemical analysis.

This report documents the response efforts and findings of the investigatory activities.

2.0 DESCRIPTION OF SURROUNDING PROPERTIES

The property is bordered by gravel roads on the north, east, and south sides. To the west is a gravel covered area containing truck scales and operated by Apex Oil Co. Across the road (Mound Street), and to the south is an empty lot formerly occupied by Union Electric Company of Missouri. To the east are several sets of railroad tracks immediately adjacent to the flood wall. To the north (across Brooklyn Street), is a facility operated by Continental Cement Company (apparently used for cement loading/unloading). The MSD Pump Station is situated adjacent to the flood wall and approximately 400-500 ft. north-east of the tank location. Southwest of the property (across Mound street) is a bulk petroleum storage/distribution facility. This facility is characterized by several large

(>500,000 gallon capacity) above ground storage tank systems.

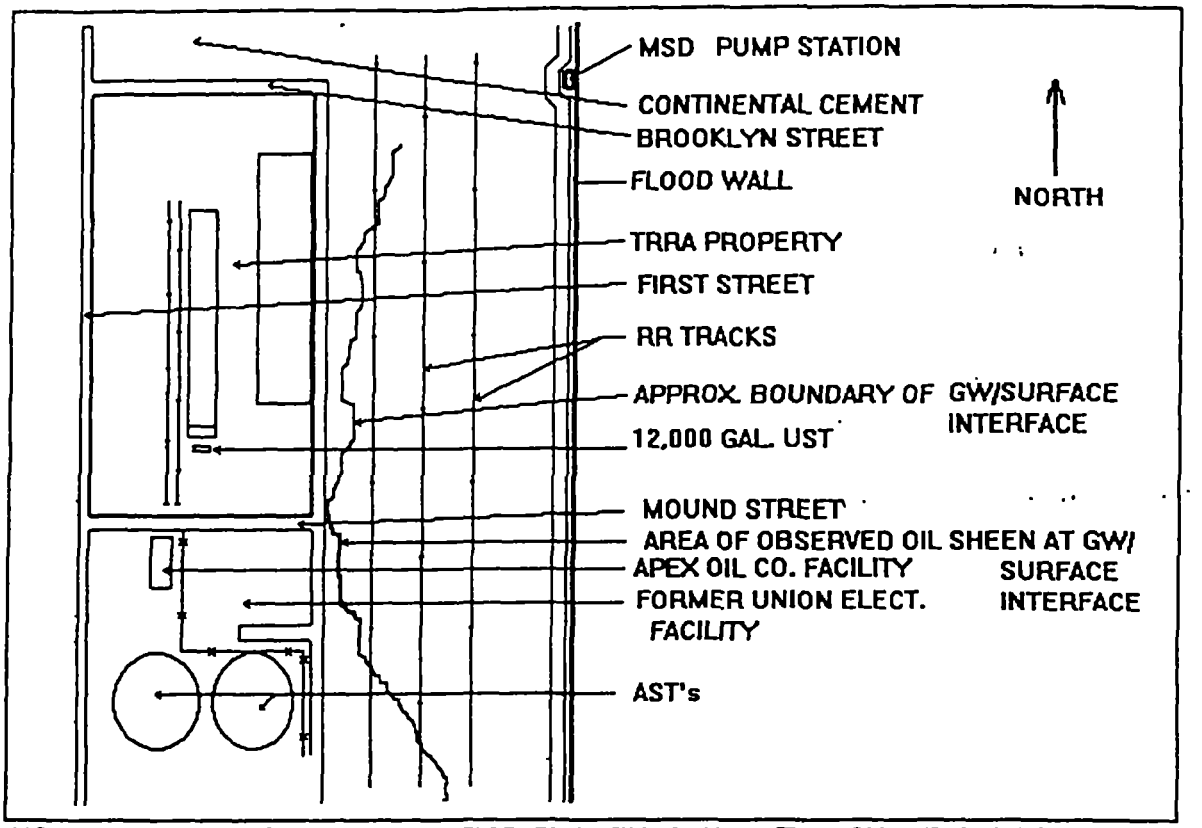


FIGURE 1: AREA SKETCH SHOWING PROPERTY AND SURROUNDING PROPERTIES. (APPROX. SCALE: 1"=180')

Numerous combined sewer, water and other utilities exist (some abandoned) throughout the area which were not completely defined for this report. Utilities which were obvious from site observations and from conversations with MSD personnel included a sewer line adjacent to the TRRA property along Mound Street, and a main line extending west from the pump station. Several underground utility lines run parallel to the railroad tracks and flood wall in a north - south direction. A TRRA property drawing identified a vitrified pipe drain traversing the site from approximately the tank location to the southeast corner of the property (copy provided in attachments). No attempts were made intrusively to locate and verify the existence of this pipe, however, IR/T did not provide a signature typical of an underground conduit acting as a migratory pathway.

A slight gradient (approx. 1:20) typifies the immediate area from west to east.

Groundwater was encountered on the site at a depth of 8 to 8.5 feet from surface. However, site activities were conducted one day following the crest of the Mississippi River on August 1, 1993. Evidence of extreme hydrostatic pressure in the area was observed by water shooting approximately 10 feet high from a Corps of Engineers piezometer located adjacent to the flood wall (approximately 400 feet from the UST), and by a groundwater/surface interface along the area between the eastern most road and the railroad tracks (see Figure 1). Observations of this interface revealed an apparent petroleum sheen present in many areas where the groundwater was seeping from the

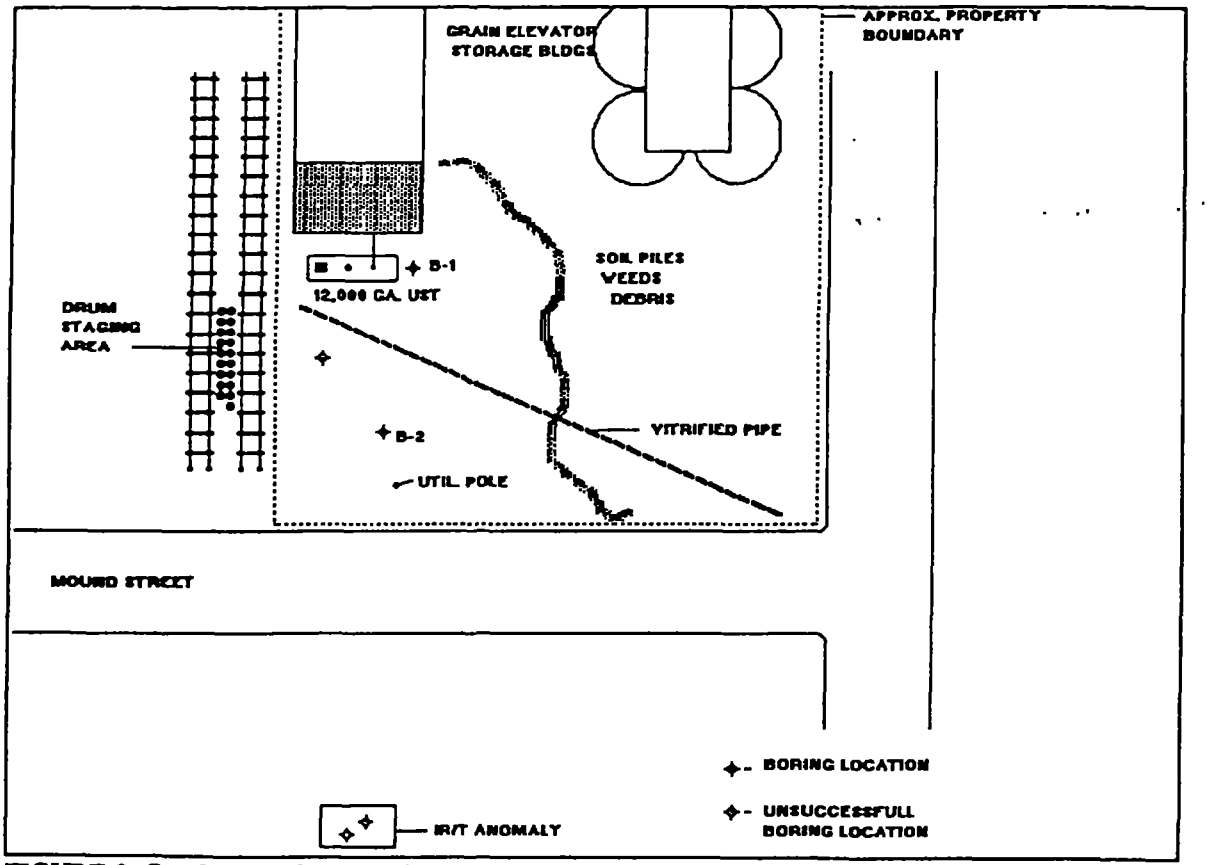


FIGURE 2: SITE SKETCH DEPICTING PROMINENT FEATURES. (APPROX. SCALE: 1"=200')

interface. A sheen was observed in an area extending from a line approximately even with the south side of the TRRA property, south to a line approximately even with the south side of the former Union Electric property.

3.0 SITE DESCRIPTION

The parcel of property identified as TRRA property and where the UST exists, measures approximately 150 ft. by 340 ft. The property is generally situated in a north-south direction between the ends of Mound and Brooklyn Streets, St. Louis County, St. Louis, Missouri. Two structures are on the property which appear to be abandoned grain elevator and storage/handling structures constructed of reinforced concrete. The larger of the two structures measures approximately 40 ft. by 160 ft. and is situated along the east side of the property. The smaller structure measures approximately 20 ft. by 170 ft., is situated along the west side of the property with the UST located at the south end. A railroad siding runs adjacent to this smaller structure as well.

4.0 SITE ACTIVITIES

The purpose of the site activities was twofold. First was in response to the requests of the SLFD assuming the tank as the most likely source of the contaminants entering the MSD pump station, and secondly, to assess the most likely migratory pathway of the contaminants for the purpose of determining the most effective abatement measures.

4.1 Tank Contents Removal.

On August 4, 1993, field personnel were mobilized to the site to conduct removal of the tank contents and cleaning of the tank. This procedure was accomplished by Environmental Operations, St. Louis, Missouri. A vacuum truck was used to pump material from the tank then placed in 55 gallon drums, staged on site. The tank was entered, following Confined Space Entry Procedures to remove and clean the remaining product and debris. Samples of the waste were obtained and submitted to American Interplex Corporation for analyses and summarized in the following table.

TANK WASTE ANALYSIS SUMMARY			
PARAMETER	UNIT	RESULT	METHOD
IGNITABILITY	°F	Non-ignitable below 212	EPA 1010
TOTAL HALIDES	mg/Kg	880	EPA 9020
PCB	mg/Kg	<10	EPA 600/4-81/045
HEAT CONTENT	BTU/lb	9480	ASTM D240
TCLP:			EPA 1311 (FEDERAL REGISTER/VOL. 57, NO. 227/NOVEMBER 24, 1992), 3010A, 6010A, 7470.
SILVER	mg/l	<.007	
ARSENIC	mg/l	<.02	
BARIUM	mg/l	2.1	
CADMIUM	mg/l	.019	
CHROMIUM	mg/l	.0096	
MERCURY	mg/l	<.01	
LEAD	mg/l	<.1	
SELENIUM	mg/l	<.02	

Note: Analysis parameters were selected for the purpose of determining disposal options.

Sixteen drums (approximately 880 gallons) of sludge/liquid, and one drum containing solid debris were generated. The waste was dual phased consisting of 60% ethylene glycol and 40% waste oils (based on appearance).

The tank system was constructed of steel and riveted with the top of the tank at ground surface. An eighteen inch diameter manway centered the tank with a two inch line extending from the tank, above grade, through the wall of the nearby structure. Tank dimensions were 10.5' dia., and 18.5' in length providing a capacity of 12,000 gallons. Tank depth was at 10.5 feet from surface.

4.2 Infrared Thermographic Survey (IR/T).

An Infrared Thermographic Survey was conducted in the immediate area on August 17, 1993 by EnTech Engineering, Inc. Infrared Thermography (IR/T) was selected to be performed at this site due to its ability to provide on-site, real time data. IR/T measures the heat energy emitted from the earths surface stored during daylight hours. Areas of dissimilar chemical or physical make-up (such as petroleum contaminated soils versus non-petroleum contaminated soils) emits stored heat energy at different rates. IR/T is used to identify potential contaminated areas in relation to a known source such as an Underground Storage Tank, Pipeline, etc.

The results of the IR/T investigation for this site did not portray evidence of a leak

plume, trail or other leak signature which would suggest a release capable of migrating from the UST to any point off-site.

The investigation did, however, indicate an anomaly on the former Union Electric Company property south of the TRRA property (see Figure 2). An area measuring approximately 10' x 10' was identified. IR/T cannot identify the cause of an anomaly without either an intrusive investigation or knowledge of a potential source of an anomaly. At the request and permission of Inspector Charles Gay (SLFD), this area was investigated and described in section 4.3.

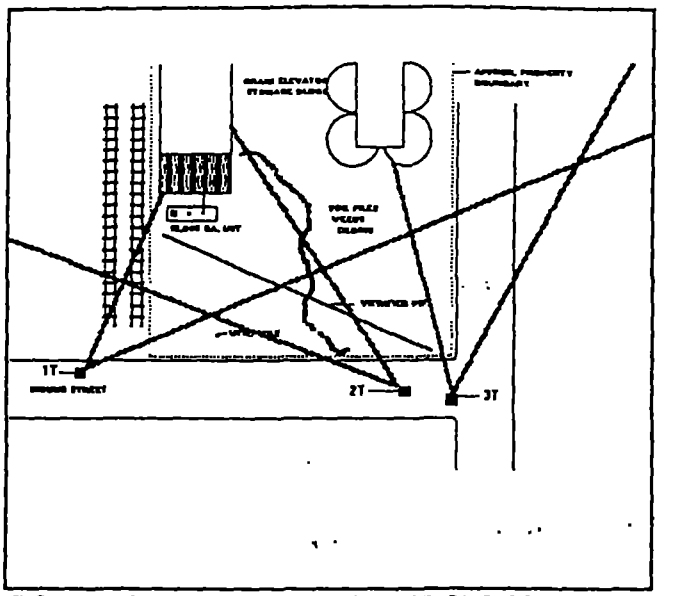
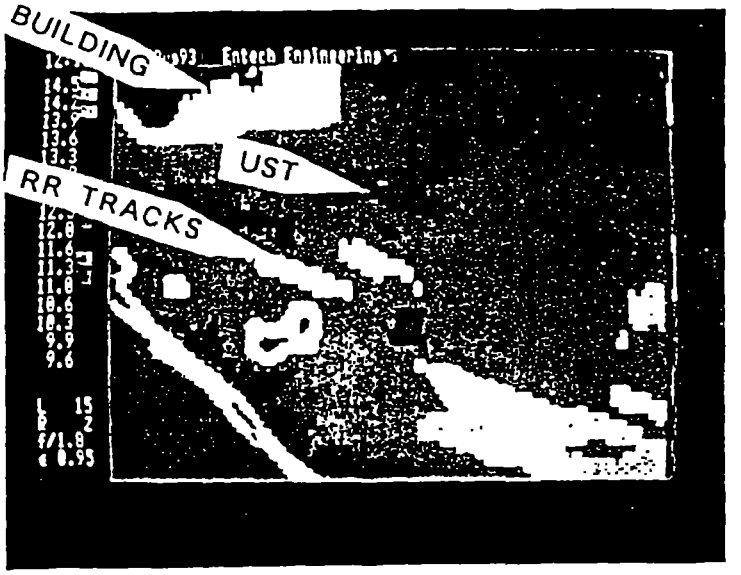


FIGURE 3: SITE SKETCH SHOWING AREAS DEPICTED ON IR/T THERMOGRAMS.

From the IR/T data generated, three views were selected for presentation in this report. These views are depicted on the following site sketch and the thermograms are presented on the following pages. The data was gathered between 11:00 p.m and midnight from a lift truck at approximately 30'. The corresponding photographs are provided for the purpose of reference.

gineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270



VISUAL IMAGE NUMBER: 1V THERMOGRAM IMAGE NUMBER: 1T

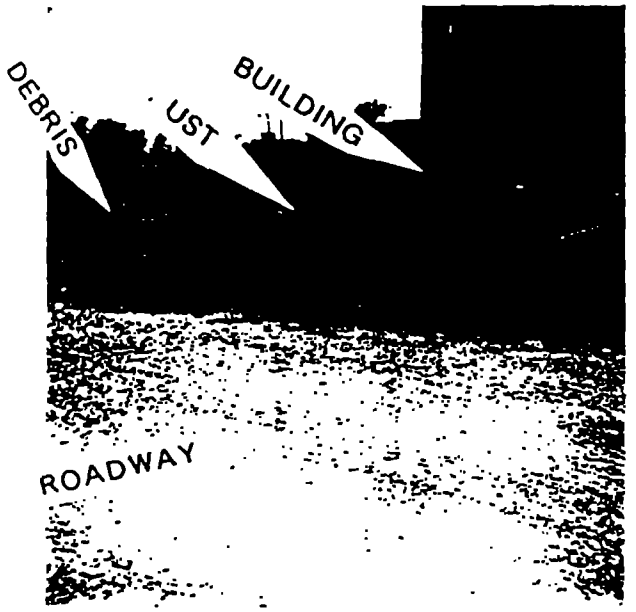
LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

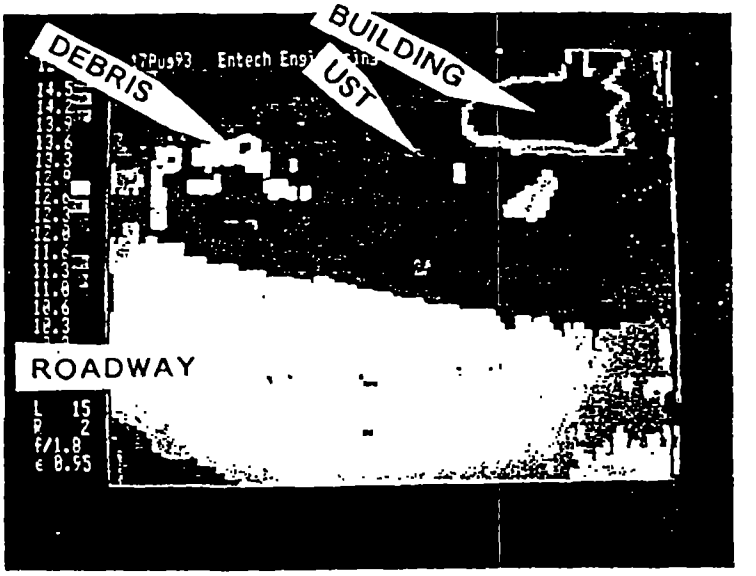
ITEM: Example data image

LOCATION: Refer to drawing item #1

INVESTIGATION DATE: 8/17/93

EnTech
ngineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270





VISUAL IMAGE NUMBER: 2V THERMOGRAM IMAGE NUMBER: 2T

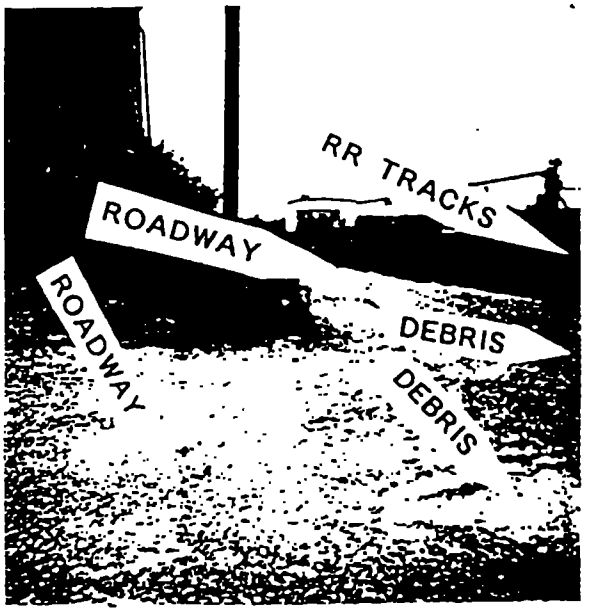
LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

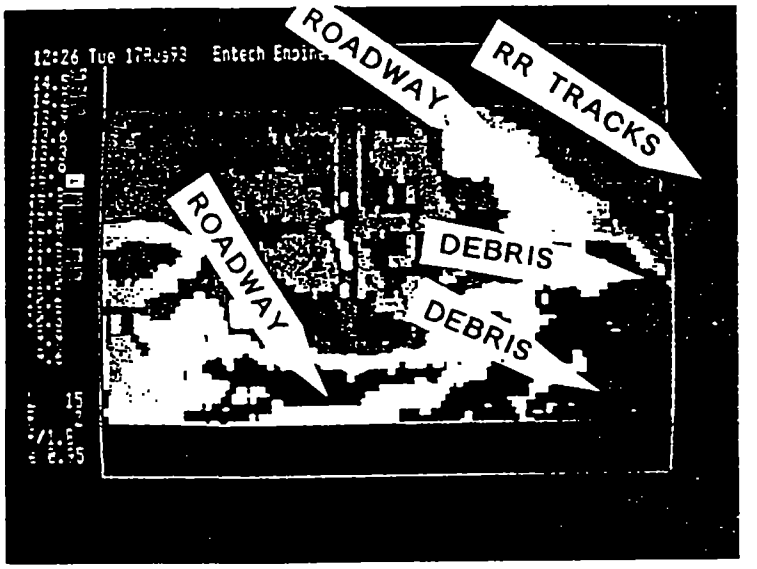
ITEM: Example data image

LOCATION: Refer to drawing item #2

INVESTIGATION DATE: 8/17/93

EnTech Engineering, Inc.
SPECIALISTS IN NON-DESTRUCTIVE TESTING • 111 Marine Lane • St. Louis, MO 63146 • U.S.A. • (314) 434-5255 • FAX: (314) 434-3270





VISUAL IMAGE NUMBER: 3V THERMOGRAM IMAGE NUMBER: 3T

LOCATION: Terminal R.R.
1st and Mound Street
St. Louis, Missouri

ITEM: Example data image

LOCATION: Refer to drawing item #3

INVESTIGATION DATE: 8/17/93

4.3 Drilling/Sampling.

On August 4, 1993, a drilling crew was mobilized to the site and a total of five boring attempts were made. Three attempts were unsuccessful with auger refusal at five feet. One unsuccessful attempt was made on site approximately 30 feet south of the west end of the tank. Solid debris was encountered to a depth of 5 feet and the attempt was abandoned. At the request and permission of Inspector Charles Gay (SLFD), two other attempts were made in the area of the IR/T anomaly discovered within the former Union Electric Property. Both attempts were abandoned at a depth of 5 feet encountering solid rock debris.

The two successful attempts were located at the east (down gradient) end of the tank location, and approximately 37.5 feet south of the tank location. One sample was obtained from each of these borings and submitted to a qualified laboratory per analysis presented in the following table

SAMPLE RESULTS SUMMARY TABLE
(in ppm)

I.D	LOCATION	TPH	PCB	BENZENE	TOLUENE	E. BENZENE	XYLENES
01	10 FT. DEPTH	67	<0.05	<0.002	<0.002	<0.002	<0.002
02	8 FT. DEPTH	23	<0.05	<0.002	<0.002	<0.002	<0.002

5.0 SUMMARY/DISCUSSION

Analysis of the tank contents reveal a mixture of Ethylene Glycol (Antifreeze) and Waste Oil and should be disposed of in accordance with State and Federal Regulations.

The tank is scheduled for removal the first of October, 1993. Removal will be in accordance with MDNR UST Closure Guidance.

Results of site activities suggest the tank as the source of the oil seepage into the pump station unlikely for the following reasons:

- The pump station is located topographically upgradient from the UST.
- Soil sample results are not indicative of a release sufficient to supply free product from the UST to the pump station.

- IR/T failed to reveal anomalies on or around the site indicative of a leak plume, trail or signature.

- Water was not present in the tank. (Given the depth to groundwater 8.5', and depth to the tank bottom, 10.5', and the extreme amount of hydrostatic pressure in the area.)

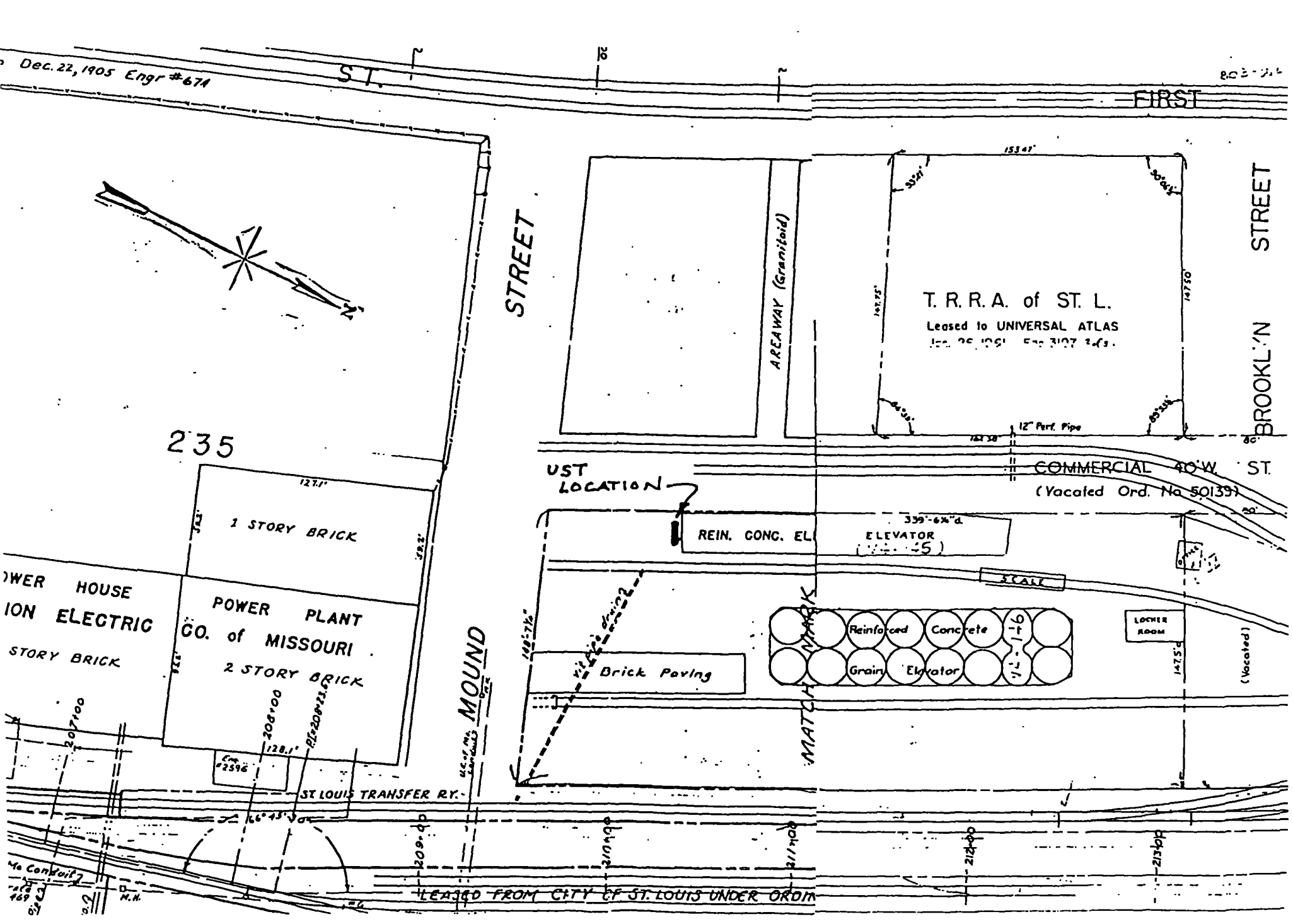
Additionally, the presence of the sheen at the groundwater/surface interface suggests a problem much more widespread than that of a single source. It is likely, the rising groundwater from the effects of the flooding in the immediate area had a direct affect on the sudden presence of the oil in the pump station.

Report Distribution List:

1. Ms. Kris Davidson, Environmental Specialist
   Missouri Department of Natural Resources
   Hazardous Waste Program - Superfund Section
   P.O. Box 176
   Jefferson City, Missouri 65102

2. Mr. Charles Gay, Fire Inspector
   St. Louis Fire Department
   Fire Prevention Bureau
   1421 N. Jefferson
   St. Louis, Missouri 63106

3. Mr Bob Ripper
   Terminal Railroad Association of St. Louis
   700 North Second Street
   St. Louis, Missouri 63102


Dec. 22, 1905 Engr #671
ST.
FIRST
STREET
AREAWAY (Granitoid)
T. R. R. A. of ST. L.
Leased to UNIVERSAL ATLAS
BROOKLYN STREET
12" Perf. Pipe
COMMERCIAL 40'W. ST.
(Vacated Ord. No 50139)
235
1 STORY BRICK
POWER PLANT
CO. of MISSOURI
2 STORY BRICK
OWER HOUSE
ION ELECTRIC
STORY BRICK
UST LOCATION
REIN. CONC. EL
ELEVATOR
5 CALK
Reinforced Concrete
Grain Elevator
LOCKER ROOM
(Vacated)
Brick Paving
MOUND
MATCH
ST. LOUIS TRANSFER RY.
LEASED FROM CITY OF ST. LOUIS UNDER ORDIN

GHEM CORPORATION
RAIL ROAD - ST. LOUIS

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Soils w/Const. Debris and Red Brick Debris to 10'		
5			
	Groundwater 8.5'		
		SS 10'	
10	Terminate Boring 10'		
15			
20			
25			
30			
35			

GROUNDWATER DATA

COUNTERED AT 8.5' FEET

_____ FEET AFTER _____ HOURS

_____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.
2645 Postalwait St. Louis MO 63118

DATE: 3/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .01

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Soil w/Const. Debris to 3'		
	Refusal 3'		
5			
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Postaloozi St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

BORING NO. .02

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Black Silty Clay to 8'		
5		SS x 2@8'	
	Terminate Boring 8'		
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT 8.5' FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

2649 Postmark St. Louis MO 63118

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .03

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ - BLOWS PER FOOT 10 20 30 40 50
	Black Silty Clay w/Const. Debris to 8'		
5		SS 8'	
	Terminate Boring 8'		
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

AT _____ FEET AFTER _____ HOURS

AT _____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.
2649 Pestalozzi St. Louis MO 63118

DATE: 8/5/93	PROJECT NO.: 5780		Boring No.
DRILLER: GB	LOGGER: GB	AUGER:	.04
SURFACE ELEVATION:		HOLLOW STEM: H.S	

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Brown Clay w/Rock Debris To 3'		
	Refusal 3'		
5			
10			
15			
20			
25			
30			
35			

GROUNDWATER DATA

COUNTERED AT _____ FEET

_____ FEET AFTER _____ HOURS

_____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.
2649 Pestalozzi St. Louis MO 63118

DATE: 8/5/93	PROJECT NO.: 5780		Boring No.
DRILLER: GB	LOGGER: GB	AUGER: SF	.05
SURFACE ELEVATION:		HOLLOW STEM	

DEPTH IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	STANDARD PENETRATION RESISTANCE (ASTM D 1586) △ = BLOWS PER FOOT 10 20 30 40 50
	Brown Clay w/Const. Debris to 5'		
5	Refusal 5'		
10			
15			
20			
25			
0			
5			

GROUNDWATER DATA

ENCOUNTERED AT _____ FEET

_____ FEET AFTER _____ HOURS

_____ FEET AFTER _____ HOURS

_____ FREE WATER NOT ENCOUNTERED DURING DRILLING

Environmental Operations, Inc.

3649 Forestwood St. Louis MO 63110

DATE: 8/5/93 | PROJECT NO.: 5780

DRILLER: GB | LOGGER: GB | AUGER: SF

SURFACE ELEVATION: | HOLLOW STEM:

Boring No. .06

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 16, 1993

ATTN: Mr. Daryl Bowles

Control No. 3520

Sample Description: Two (2) soil received on 8/9/93
Re: Terminal Rr Assoc. of St. Louis Mound & First Streets
(Site) St. Louis, MO Project No. 0116
P.O. No. 080-693 116

Result:

Parameter	Unit	01 8-4-93 0930	02 8-4-93 0945
Total Petroleum Hydrocarbons	mg/Kg	67	23
PCB	mg/Kg	<0.05	<0.05
Benzene	mg/Kg	<0.002	<0.002
Toluene	mg/Kg	<0.002	<0.002
Ethylbenzene	mg/Kg	<0.002	<0.002
m- & p-Xylenes	mg/Kg	<0.002	<0.002
o-Xylenes	mg/Kg	<0.002	<0.002

Method: Modified EPA 418.1, EPA 3550, 8080, 5030, 8020

Remark: Results are presented on an as-received basis.

Enclosure: Chain of custody

AMERICAN INTERPLEX CORPORATION

MWM/tj

By Michael W. McNerlin
Michael W. McNerlin
Laboratory Director

GEHM Corporation

REQUEST

Submitted by: (Name/Telephone/Date)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
THE GEHM CORPORATION 1417 BINGHAM RD., P.O. BOX 65 BOONVILLE, MO 65233-0065 DARYL BOWLES 816-882-3485	AMERICAN INTERPLEX CORP. 8600 KANIS RD. LITTLE ROCK, AR. 72204-2322	TERMINAL RR ASSOC. OF ST. LOUIS MOUND & FIRST STREETS (SITE) ST. LOUIS, MO. BOB RIPPER 314-539-4712

Project No.:	Applicable Regulatory No.:	P.O. #: (For Lab)	Samplers Signature:
0116	07143-KB-1331	080-693 116	Daryl K. Bowles

	Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST: BTEX (8020)	TPH (418.1)	TPH MO_MOD (418.1)	OA-1 (OWA)	OA-2 (OWA)	TOG (413.1)	PCB CONT. (8080)	OTHER	OTHER	OTHER
(1)	01	SOIL	ICE	8-4-93	0930	X		X				X			
(2)	02	SOIL	ICE	8-4-93	0945	X		X				X			

COMMENTS/SPECIAL INSTRUCTIONS:
- NORMAL TURN AROUND
- PLEASE FAX RESULTS TO: DARYL BOWLES 816-882-5766

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Daryl K. Bowles	8-6-93	1100	Martha Lucio	08-07-93	0815
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 20, 1993

ATTN: Mr. Daryl Bowles

Control No. 3586

Sample Description: One (1) glycol/oil collected by Environmental Operations received on 8/12/93
Re: Gehm Corp 0111

Result:

Parameter	Unit	5780	Regulatory Level
Ignitability	°F	Non-Ignitable below 212	-
Toxicity Characteristic Leaching Procedure			
Solids	%	100	-
Silver	mg/l	<0.007	5.0
Arsenic	mg/l	<0.2	5.0
Barium	mg/l	2.1	100.0
Cadmium	mg/l	0.019	1.0
Chromium	mg/l	0.0096	5.0
Mercury	mg/l	<0.01	0.2
Lead	mg/l	<0.1	5.0
Selenium	mg/l	<0.2	1.0

Method: EPA 1010, EPA 1311 (Federal Register/Vol. 57, No. 227/November 24, 1992), 3010A, 6010A, 7470

Enclosure: Chain of custody

AMERICAN INTERPLEX CORPORATION

SL/tm

By Steven Lovell
Steven Lovell
Technical Director

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

August 20, 1993

ATTN: Mr. Daryl Bowles

Control No. 3521

Sample Description: One (1) oil/glycol received on 8/9/93
P.O. No. 050593 DB

Result:

Parameter	Unit	TANK WASTE 8-04-93 1000
Total Halides	mg/Kg	880
PCB	mg/kg	<10
Heat Content	BTU/lb	9480

Method: EPA 9020, 600/4-81/045, ASTM D240

Remark: As requested analysis for Toxicity Characteristic Leaching Procedure and Flash Point was performed on additional sample referenced American Interplex Corporation Control No. 3586. Analysis performed on oil layer only.

Enclosure: Chain of Custody

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

SL/tm

GEHM Corporation

REQUEST

Submitted by: (Name/Telephone)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
DARYL R. BOWLES, CHMM THE GEHM CORPORATION P.O. BOX 65 BOONVILLE, MO 65233 (816) 882-3485	American Interplex Corporation 8800 Kanis Rd. Little Rock, AR 72204-2322	Terminal Railroad Association of St. Louis First & Mound Streets St. Louis, MO Mr. Bob Ripper (314) 539-5196

Project No.: 0118	Applicable Regulatory No.: 07143-KB-1331	P.O. #: (For Lab) 050583 DB	Samplers Signature: Daryl R. Bowles

Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST												
					BTEX (8020)	TPH (418.1)	TPH MOD. (418.1)	OA-1 (IOWA)	BTU VALUE	pH	TOX (CHLORINE)	FLASH POINT (CC)	PCB CONTENT (8080)	TCLP METALS*	OTHER	OTHER	OTHER
TANK WASTE	SLUDGE	N/A	08-04-93	1000					X		X	X	X	X			

COMMENTS/SPECIAL INSTRUCTIONS:
* METALS INCLUDED ARE: ARSENIC, BARIUM, CADMIUM, CHROMIUM, LEAD, MERCURY, SELINIUM, SILVER.

PLEASE FAX RESULTS TO: 816-882-5786

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Daryl R. Bowles	8-6-93	1100	Martin Sivia	08-07-93	0915
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

[redacted]

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

COMPANY Environmental operations CONTACT Michael Lechner PROJECT NO. 5780 Page 1 of 1

ADDRESS 2649 Pestalozzi DATE 8-11-93 P.O. NO.

CITY/STATE/ZIP St Louis MO 63118 DUE DATE AICC N 3580

PHONE (314) 771-8442 FAX ( )

SPECIAL INSTRUCTIONS: ATTN: Krista

Referance: Gehm Corp. Gas. # 0111

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

ITEM	LAB NO.	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	TCLP metals	Flashpoint									COMMENTS
1	1	70% Glycol / 30% waste oil	8-11-93		Glass 32oz	X	X									
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER
				[illegible]	8/11/93	C 1300	

Reference 10

THE GEHM Corporation
1417 Bingham Road
Post Office Box 65
Boonville, MO 65233

816-882-3485
816-882-5766 (Fax)

RECEIVED
OCT 28 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

October 26, 1993

Ms. Kris Davidson, Environmental Specialist
Missouri Department of Natural Resources
Hazardous Waste Program - Superfund Section
P.O. Box 176
Jefferson City, Missouri 65102

RE: **UST Removal Closure Report**

Dear Ms. Davidson,

We are submitting the enclosed report on behalf of Terminal Railroad Association (TRRA) of St. Louis. The report contains soil sample analysis results as requested by TRRA. I hope you find this information useful in your investigation of the area.

Should you have any questions regarding this report or require additional information, please call me at (816) 882-3485.

Sincerely,

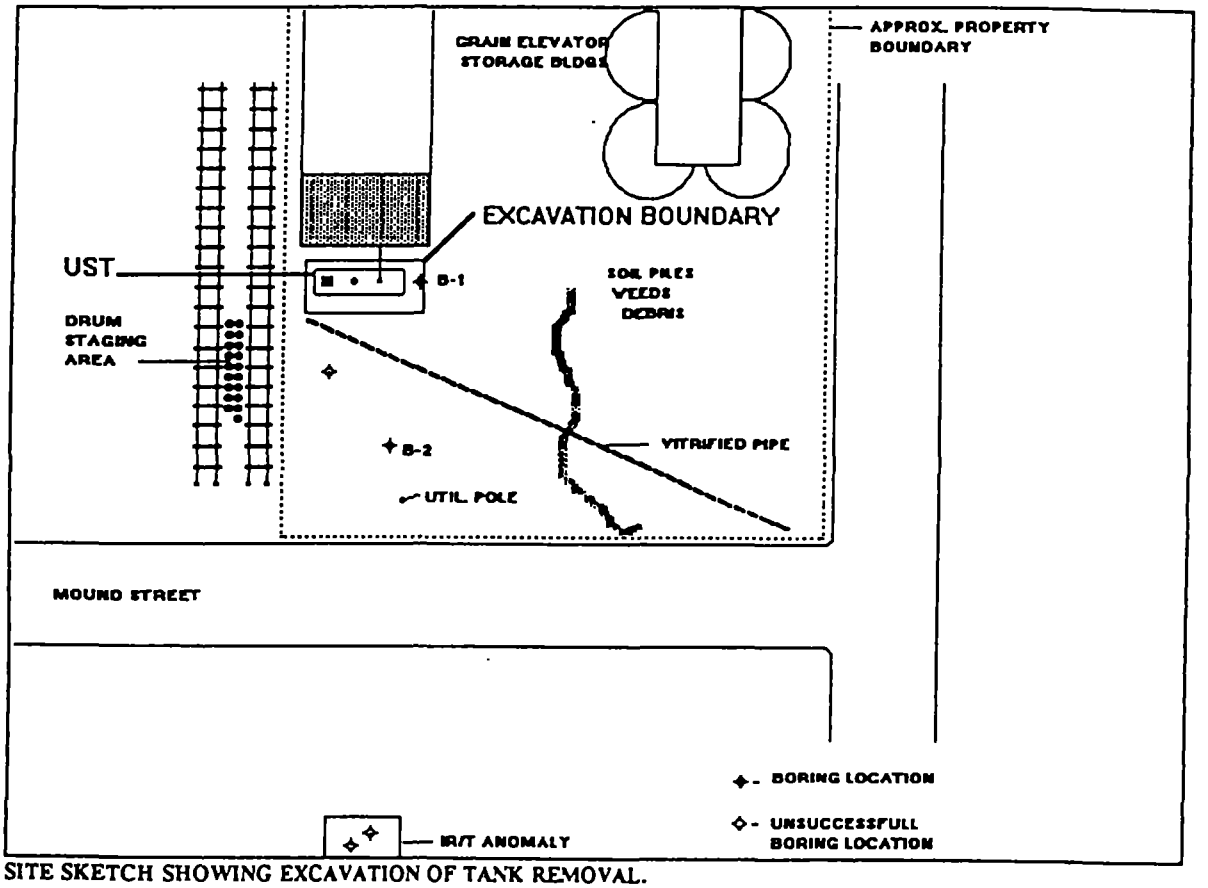
Daryl R. Bowles, CHMM
Director,
Environmental Field Services

cc: Mr Bob Ripper
Terminal Railroad Association of St. Louis
700 North Second Street
St. Louis, Missouri 63102

UST CLOSURE REPORT
for
Terminal Railroad Association

OWNER/FACILITY INFORMATION:

Facility Name:	NONE	UT# N/A	
Address	First & Mound Streets		
County St. Louis	City	St. Louis, MO	Zip Code 63102
Telephone/Contact	(314) 539-4712	Mr. Bob Ripper	
Date of Tank Removal	October 11, 1993		



SITE SKETCH SHOWING EXCAVATION OF TANK REMOVAL.

PROJECT SYNOPSIS

This underground storage tank removal project is a result of the discovery of oils seeping into a pump station operated by Metropolitan Sewer District (MSD) in St. Louis, Missouri. On July 14, 1993, MSD reported this situation to the MDNR. MSD analytical information revealed PCB levels of less than 50 ppm in the oils seeping into the pump station. Additionally, a sample was obtained from waste oil contained in an underground storage tank present in the area, and owned by Terminal Railroad Association of St. Louis (TRRA). The St. Louis Fire Department (SLFD) notified TRRA on July 28, 1993 and requested the contents of the tank be removed. TRRA was unaware of the existence of the tank prior to notification by the SLFD.

In response to the situation, TRRA initiated and completed the following tasks:

- **Contents of the tank were removed** on August 4, 1993. The tank was completely cleaned and freed of all liquids. The material was containerized on-site in 55 gallon drums for characterization and disposal.

- An **Infrared Thermographic Survey was conducted** of the area in an attempt to characterize leak plumes or trails.

- **Three borings** were advanced in the immediate area to determine subsurface soil conditions. Two soil samples were obtained from the site and submitted to a qualified laboratory for chemical analysis.

The results of these efforts are documented in an ACTIVITIES REPORT dated Setember 1, 1993 which documents the response efforts and findings of the investigatory activities.

This UST had no record of registration with the Missouri Department of Natural Resources. TRRA indicated no knowlege of the existence of the tank prior to notification by the SLFD. The UST removal project included removal of the soil overburden, removal of the tank, obtaining samples of the soils below the tank, on the down gradient wall and of the soil pile, disposal of the tank as scrap metal, and backfilling the excavation.

1.0 SAMPLE RESULTS

Soil sampling for this UST removal project included sampling below the tank and the down gradient wall. Additionally, one composite sample of excavated soil was obtained.

SAMPLE RESULTS SUMMARY TABLE
(in ppm)

I.D	LOCATION	TPH	BENZENE	TOLUENE	E. BENZENE	XYLENES	PCB's
PIT	FROM BELOW TANK, 2 COMPOSITE POINTS AT EACH END, OF NATIVE SOIL, 12FT. DEPTH	<5	<0.002	<0.002	<0.002	<0.004	<.05
DGW	FROM DOWN GRADIENT WALL (EAST WALL), 10.5 FT. DEPTH	< 5	<0.002	<0.002	<0.002	<0.004	<.05
SP	FROM FOUR COMPOSITE POINTS OF THE EXCAVATED SOILS	66	<0.002	0.002	<0.002	0.004	<.05

2.0 LOCATION OF LINES AND UTILITIES

Underground lines or utilities were not discovered in the immediate area during excavation activities. However, an area drawing supplied by TRRA denotes a vitrified pipe extending across the site. (See Sketch Section 5.0)

3.0 FORMER LOCATIONS OF TANK(S)

One 10,000 gallon tank was located at the south end of the eastern most building on the property. The tank overburden consisted of grass and soil. The product line extended north from the tank approximately 10 feet and entered the building through a concrete wall at ground elevation.

4.0 DEPTH & SIZE OF TANK

Tank capacity was 10,000 gallons. Dimensions were 10.5 ft. diameter by 18.5 ft long. The top of the tank was exposed at grade elevation.

5.0 EXCAVATION BOUNDARIES

The excavation was limited to that necessary for tank removal. This excavation extended approximately 4 feet beyond the outer limits of the tank to a depth of 12 feet. Final dimensions of the tank pit excavation was 16 ft wide, 25 feet long and 12 feet deep.

6.0 ABOVE GROUND TANKS & PIPING

There were no above ground tank systems at this site.

7.0 DISTANCE TO WELLS, STREAMS, AND LAKES.

There were no private drinking water wells, or lakes within .5 miles of the tank location. The site is adjacent to the Mississippi River approximately 1,000 feet to the east.

8.0 SOILS DESCRIPTION

Soils encountererd was black junk fill with cinders to a depth of 12 feet. Below, native soils consisted of typical river sands/silts.

9.0 PHOTOGRAPHS

PHOTO #1: NORTH EAST VIEW SHOWING TANK AT BEGINNING OF EXCAVATION.

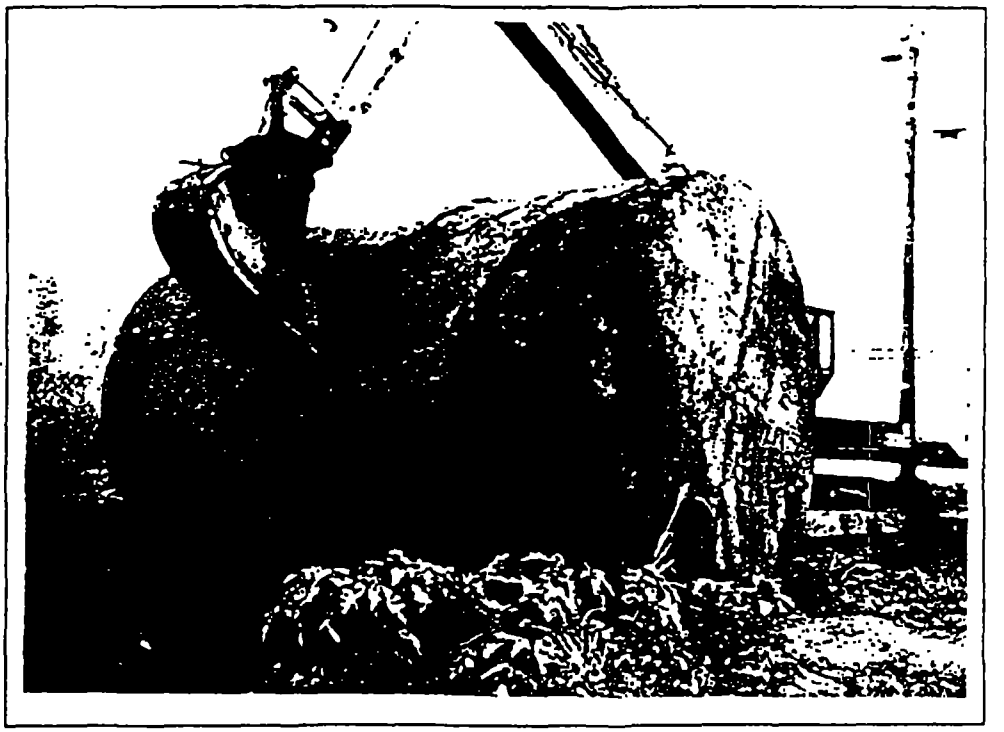


PHOTO #2: BOTTOM AND END OF TANK AFTER REMOVAL.

PHOTO #3: BOTTOM OF PIT AND EAST END OF EXCAVATION.

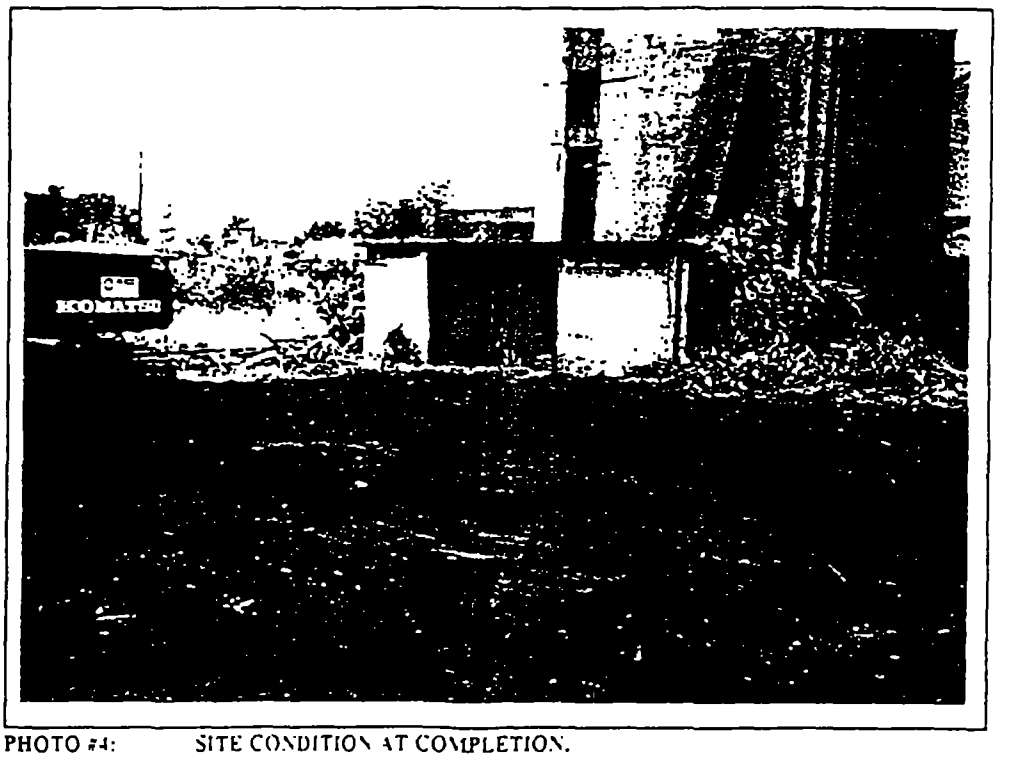


PHOTO #4: SITE CONDITION AT COMPLETION.

11.0 DESCRIPTION OF RESIDUAL CONTAMINATION

Based on odor and appearance, no contaminated media was observed during tank removal operations.

12.0 AMOUNT OF EXCAVATED SOILS

Approximately 30 cubic yards of soil was removed in efforts to remove the tank and affected soils.

13.0 SLUDGE IN TANKS

The tank had previously been emptied of all contents and cleaned. Fifteen drums of Waste Oil/ethylene glycol sludge/liquid was generated for disposal.

15.0 DISPOSAL OF TANK CONTENTS

Tank contents is currently awaiting acceptance for disposal by a licensed and permitted disposal company.

16.0 DISPOSAL OF TANK(S)

The tank was transported to, and disposed of through scrap metal recycling at Grossman Iron & Steel Company, St. Louis, MO.

17.0 FORMER CONTENTS OF TANK(S)

TRRA indicated the tank originally was used to store Fuel Oil.

18.0 DEPTH OF GROUNDWATER

After tank removal, a small amount of water was present in the tank pit area estimated at < 50 gallons. This water was absorbed into the loose soils in the pit during subsequent excavation activities. No other water accumulated or was encountered.

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

The Gehm Corporation (C-1270)
Post Office Box 65
Boonville, MO 65233

October 19, 1993

ATTN: Mr. Daryl Bowles

Control No. 4528

Sample Description: Three (3) soil received on 10/13/93
Re: Terminal Railroad Assn. 0119
P.O. No. 101-293 0119

Result:

Parameter	Unit	Pit 10-11-93 1020	DGW 10-11-93 1022	SP 10-11-93 1025
Total Recoverable Petroleum Hydrocarbons	mg/Kg	<5	<5	66
PCB	mg/Kg	<0.05	<0.05	<0.05
Benzene	mg/Kg	<0.002	<0.002	<0.002
Toluene	mg/Kg	<0.002	<0.002	<0.002
Ethylbenzene	mg/Kg	<0.002	<0.002	<0.002
m- & p-Xylenes	mg/Kg	<0.002	<0.002	<0.002
o-Xylene	mg/Kg	<0.002	<0.002	<0.002

Method: Modified EPA 418.1, EPA 3550, 8080, 5030A, 8020

Remark: Results are presented on an as-received basis.

Enclosure: Chain of Custody

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

MWM/tj

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

THE GEHM Corporation

Submitted by: (Name/Telephone/Date)	Lab: (Name/Address/Telephone)	Client Name/Project Location: (Contact/Phone #)
THE GEHM CORPORATION 1417 BINGHAM RD, P.O. BOX 65 BOONVILLE, MO 65233 DARYL BOWLES 816-882-3485	AMERICAN INTERPLEX CORP. 8600 KANIS RD. LITTLE ROCK, AR 72204 501-224-5060	TERMINAL RAILROAD ASSN. FIRST & MOUND STREETS ST. LOUIS, MO BOB ROPPER 314-539-4712

Project No.:	Applicable Regulatory No.:	P.O. #: (For Lab)	Samplers Signature:
0119	N/A	101-295 0119	

AIC #	Sample ID	Matrix	Preservative	Date	Time	ANALYSIS REQUEST: BTEX (8020)	TPH (418.1)	TPH MO MOD (418.1)	OA-1 (OWA)	OA-2 (OWA)	TOH (413.1)	PCB CONT. (8080)	OTHER	OTHER	OTHER
1	PIT	SOIL	ICE	10-11-93	1020	X		X				X			
2	DGW	SOIL	ICE	10-11-93	1022	X		X				X			
3	SP	SOIL	ICE	10-11-93	1025	X		X				X			

COMMENTS/SPECIAL INSTRUCTIONS:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	10-12-93	1000			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
			[signature]	10/13/93	e 1030

Petroleum Fuel & Terminal
Foot of Mullanphy Street
St. Louis, Missouri 63102
(314) 621-0522

Reference 11

Charles Gay
Fire Inspector
Fire Prevention Bureau
1421 North Jefferson
St. Louis, Missouri 63106

Dear Mr. Gay

Per our conversation on September 8, 1993. We discovered the leak during our yearly hydro teasting of our pipe lines/hoses. When we experienced a loss of 25# lb of pressure.

We then started to isolate the most likly place and this would be in the expansion joint at the sea wall. After excavating the site we then found a small pen hole in a 6 inch pipe line. After making the necessary repairs we decided to take this pipe line out of service.

We recovered 2 1/2 bbls of oil/soil to be disposed of. If you feel the need to contact me on this mater please feel free to do so at (314) 621-0522.

Thank you

Randel H. Lewis
Terminal Manager

HE
9/30/93

Post-it™ brand fax transmittal memo 7671 | # of pages >

To Howard Edmond	From Charles Gay
Co.	Co.
Dept.	Phone #
Fax #	Fax #

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
INSTRUMENTATION ANALYSIS

Reference 12

Lab. No. 270 Sample Source: Wet Well Date Received 7-9-93

Sample Date 7-8-93 Time: ☐ Grab ☐ Comp Collected by:

☒ IR ☐ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☐ TLC ☐

☐ **Priority Pollutant** mg/L (except as noted)

☐ **VOLATILES:**

acrolein	
acrylonitrile	
benzene	
bromodichloromethane	
bromoform	
bromomethane	
carbon tetrachloride	
chlorobenzene	
chloroethane	
2-chloroethyl vinyl ether	
chloroform	
chloromethane	
dibromochloromethane	
1,2-dichlorobenzene	
1,3-dichlorobenzene	
1,4-dichlorobenzene	
1,1-dichloroethane	
1,2-dichloroethane	
1,1-dichloroethene	
trans-1, 2-dichloroethene	
1,2-dichloropropane	
1, 3-dichloropropene, cis	
1, 3-dichloropropene, trans	
ethyl benzene	
methylene chloride	
1,1,2,2-tetrachloroethane	
tetrachloroethene	
toluene	
1,1,1-trichloroethane	
1,1,2-trichloroethane	
trichloroethene	
vinyl chloride	

☐ **ACIDS:**

4-chloro-3-methylphenol	
2-chlorophenol	
2,4-dichlorophenol	
2,4-dimethylphenol	
4, 6-dinitro-2-methylphenol	

ACIDS: (Cont'd)

2,4-dinitrophenol	
2-nitrophenol	
4-nitrophenol	
pentachlorophenol	
phenol	
2,4,6-trichlorophenol	

☐ **BASE/NEUTRALS**

acenaphthene	
acenaphthylene	
anthracene	
benzidine	
benzo(a)anthracene	
benzo(a)pyrene	
benzo (b) fluoranthene	
benzo (g,h,i) perylene	
benzo (k) fluoranthene	
bis (2-chloroethoxy) methane	
bis (2-chloroethyl) ether	
bis (2-chloroisopropyl) ether	
bis (2-ethylhexyl) phthalate	
4-bromophenyl phenyl ether	
butyl benzyl phthalate	
2-chloronaphthalene	
4-chlorophenyl phenyl ether	
chrysene	
dibenzo (a,h) anthracene	
3,3-dichlorobenzidine	
diethyl phthalate	
dimethyl phthalate	
di-n-butyl phthalate	
di-n-octyl phthalate	
2,4-dinitrotoluene	
2,6-dinitrotoluene	
1,2-diphenylhydrazine	
fluoranthene	
fluorene	
hexachlorobenzene	
hexachlorobutadiene	

BASE/NEUTRALS: (Cont'd)

hexachlorocyclopentadiene	
hexachloroethane	
indeno (1,2,3-cd) pyrene	
isophorone	
naphthalene	
nitrobenzene	
N-nitrosodimethylamine	
N-nitrosodi-n-propylamine	
N-nitrosodiphenylamine	
phenanthrene	
pyrene	
2,3,7,8-tetrachlorodibenzo-p-dioxin	
1,2,4-trichlorobenzene	

☐ **PESTICIDES:**

aldrin	
alpha-BHC	
beta-BHC	
gamma-BHC	
delta-BHC	
chlordane	
4,4'-DDD	
4,4-DDE	
4,4-DDT	
dieldrin	
alpha-endosulfan	
beta-endosulfan	
endousulfan sulfate	
endrin	
endrin aldehyde	
heptachlor epoxide	
heptachlor	
☒ PCB-1016	<5.0
☒ PCB-1221	↓
☒ PCB-1232	↓
☒ PCB-1242	↓
☒ PCB-1248	<5.0
☒ PCB-1254	+3 = 47.0
☒ PCB-1260	<1.0
toxaphene	

☐ Gas Chromatography results:

☐ Thin-Layer Chromatography results:

☒ Appearance: Dark oil

☒ Infrared Spectroscopy (a) methods utilized: Smear test

(b) results: 2920 cm⁻¹ - Triplet - Strong
1460 cm⁻¹ - Singlet - Moderate
1380 cm⁻¹ - Singlet - Moderate

☒ Odor: Gasoline

☐ API Gravity:

☐ Solubilities:

☐ Ultraviolet/Visible Spectroscopy results:

☐ Distillation Range:

☐ Flash Point:

☐

☒ Special Tests: (specify) Dexsil "Clor-n-oil" PCB screening Kit 1/50 Dilution > 50ppm PC

Conclusions Infrared Spectra on Sample # 0434 and #270 are similar.

Date Transmitted: 7/19/93 by: Daniel F. Tunida

64-130WW

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
INSTRUMENTATION ANALYSIS

Lab. No. 434 Sample Source: UST Brooklyn & Mound Date Received 7/15/93

Sample Date 7/14/93 Time: _____ ☒ Grab ☐ Comp Collected by: _____

☒ IR ☒ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☐ TLC ☐ _____

☐ **Priority Pollutant** mg/L (except as noted)

☐ **VOLATILES:**

acrolein	
acrylonitrile	
benzene	
bromodichloromethane	
bromoform	
bromomethane	
carbon tetrachloride	
chlorobenzene	
chloroethane	
2-chloroethyl vinyl ether	
chloroform	
chloromethane	
dibromochloromethane	
1,2-dichlorobenzene	
1,3-dichlorobenzene	
1,4-dichlorobenzene	
1,1-dichloroethane	
1,2-dichloroethane	
1,1-dichloroethene	
trans-1, 2-dichloroethene	
1,2-dichloropropane	
1, 3-dichloropropene, cis	
1, 3-dichloropropene, trans	
ethyl benzene	
methylene chloride	
1,1,2,2-tetrachloroethane	
tetrachloroethene	
toluene	
1,1,1-trichloroethane	
1,1,2-trichloroethane	
trichloroethene	
vinyl chloride	

☐ **ACIDS:**

4-chloro-3-methylphenol	
2-chlorophenol	
2,4-dichlorophenol	
2,4-dimethylphenol	
4, 6-dinitro-2-methylphenol	

ACIDS: (Cont'd)

2,4-dinitrophenol	
2-nitrophenol	
4-nitrophenol	
pentachlorophenol	
phenol	
2,4,6-trichlorophenol	

☐ **BASE/NEUTRALS**

acenaphthene	
acenaphthylene	
anthracene	
benzidine	
benzo(a)anthracene	
benzo(a)pyrene	
benzo (b) fluoranthene	
benzo (g,h,i) perylene	
benzo (k) fluoranthene	
bis (2-chloroethoxy) methane	
bis (2-chloroethyl) ether	
bis (2-chloroisopropyl) ether	
bis (2-ethylhexyl) phthalate	
4-bromophenyl phenyl ether	
butyl benzyl phthalate	
2-chloronaphthalene	
4-chlorophenyl phenyl ether	
chrysene	
dibenzo (a,h) anthracene	
3,3-dichlorobenzidine	
diethyl phthalate	
dimethyl phthalate	
di-n-butyl phthalate	
di-n-octyl phthalate	
2,4-dinitrotoluene	
2,6-dinitrotoluene	
1,2-diphenylhydrazine	
fluoranthene	
fluorene	
hexachlorobenzene	
hexachlorobutadiene	

BASE/NEUTRALS: (Cont'd)

hexachlorocyclopentadiene	
hexachloroethane	
indeno (1,2,3-cd) pyrene	
isophorone	
naphthalene	
nitrobenzene	
N-nitrosodimethylamine	
N-nitrosodi-n-propylamine	
N-nitrosodiphenylamine	
phenanthrene	
pyrene	
2,3,7,8-tetrachlorodibenzo-p-dioxin	
1,2,4-trichlorobenzene	

☐ **PESTICIDES:**

aldrin	
alpha-BHC	
beta-BHC	
gamma-BHC	
delta-BHC	
chlordane	
4,4'-DDD	
4,4-DDE	
4,4-DDT	
dieldrin	
alpha-endosulfan	
beta-endosulfan	
endousulfan sulfate	
endrin	
endrin aldehyde	
heptachlor epoxide	
heptachlor	
☒ PCB-1016	<1.0
☒ PCB-1221	<1.0
☒ PCB-1232	<1.0
☒ PCB-1242	<1.0
☒ PCB-1248	<1.0
☒ PCB-1254	39.0
☒ PCB-1260	<1.0
toxaphene	

☐ Gas Chromatography results: _____

☐ Thin-Layer Chromatography results: _____

☒ Appearance: Dark oil

☒ Infrared Spectroscopy (a) methods utilized: Smear test

(b) results: 2920 – Strong – Triplet
1460 – Moderate – Triplet
1380 – Moderate – Triplet

☒ Odor: Gasoline & oil

☐ API Gravity: _____

☐ Solubilities: _____

☐ Ultraviolet/Visible Spectroscopy results: _____

☐ Distillation Range: _____

☐ Flash Point: _____

☐ _____

☐ Special Tests: (specify)

Conclusions Infrared spectra on Samples #434 and #270 are similar.

Date Transmitted: 7/19/93 by: Daniel T Jenida

Reference 13

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
SPECIAL SAMPLE FORM

Lab. No. 886 ☐ Comp ☒ Grab Date Received 8/9/93

Sample Date 8/9/93 Sample Time 0845 to

Requested by: REDMOND Collected by: SAME

Sample Source: MH # MH 12 F-6A1 Truck No.

Sampling Location: NEXT TO FLOOD WALL & MULCAHY PK

Reason for sample: TO DETERMINE IF PCB's PRESENT

☐ Trunk ☐ Sanitary ☐ Stream ☐ Storm ☐ Seepage ☐ STP ☐ Hauler

☐ Industry ☐ Other (explain)

Analysis: except as noted ☐ mg/L ☐ ug/L ☐ mg/kg ☐ % comp ☐ other

☐ pH	(units)	☐ F		☐ Hg	
☐ SPC	(umhos/cm)	☐ Cl		☐ As	
☐ ALK		☐ CN		☐ Ba	
☐ ACI		☐ CNA		☐ Be	
☐ TS		☐ KJN		☐ Cd	
☐ SS		☐ NH_3		☐ Cr	
☐ VSS		☐ NO_3		☐ Cu	
☐ %V		☐ NO_2		☐ Fe	
☐ SET	(ml/L)	☐ PHT		☐ Pb	
☐ GRE		☐ PHO		☐ Ni	
☐ BOD		☐ SO_4		☐ Se	
☐ COD		☐ SO_3		☐ Ag	
☐ TOC		☐ S		☐ Zn	
☐ PHE		☐ SUR		☐ Tl	
☐		☐		☐ Sb	
☐		☐		☐	
☐		☐		☐	
☐ Color:		☐ Cr^{+6}		☐	

☐ Odor: ☐ Tot. Hardness

☐ Appearance: ☐ Tot. Chlorine

☐ Organics ☐ IR ☐ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☒ ID

☐ Biological: ☐ Bioassay: ☐ Total Coli: No./100ml

☐ Fecal Coli: No./100ml

☐ Microscopic: ☐ FecalStrep: No./100ml

Remarks: CHECK FOR PCB'S

Date Transmitted: 8/17/93 by: MARIO J. DRYAIM

75 - DEC/LAB

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
INSTRUMENTATION ANALYSIS

Lab. No. 886 Sample Source: Manhole F-6A1 (#12) Date Received 8/9/93

Sample Date 8/9/93 Time: 0845 ☒ Grab ☐ Comp Collected by: _____

☒ IR ☒ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☐ TLC ☐ _____

☐ **Priority Pollutant** mg/L (except as noted)

☐ **VOLATILES:**

	acrolein	
	acrylonitrile	
X	benzene	21.3
	bromodichloromethane	
	bromoform	
	bromomethane	
	carbon tetrachloride	
	chlorobenzene	
	chloroethane	
	2-chloroethyl vinyl ether	
	chloroform	
	chloromethane	
	dibromochloromethane	
	1,2-dichlorobenzene	
	1,3-dichlorobenzene	
	1,4-dichlorobenzene	
	1,1-dichloroethane	
	1,2-dichloroethane	
	1,1-dichloroethene	
	trans-1, 2-dichloroethene	
	1,2-dichloropropane	
	1, 3-dichloropropene, cis	
	1, 3-dichloropropene, trans	
X	ethyl benzene	32.3
	methylene chloride	
	1,1,2,2-tetrachloroethane	
	tetrachloroethene	
X	toluene	21.3
	1,1,1-trichloroethane	
	1,1,2-trichloroethane	
	trichloroethene	
	vinyl chloride	

☐ **ACIDS:**

	4-chloro-3-methylphenol	
	2-chlorophenol	
	2,4-dichlorophenol	
	2,4-dimethylphenol	
	4, 6-dinitro-2-methylphenol	

ACIDS: (Cont'd)

	2,4-dinitrophenol	
	2-nitrophenol	
	4-nitrophenol	
	pentachlorophenol	
	phenol	
	2,4,6-trichlorophenol	

☐ **BASE/NEUTRALS**

	acenaphthene	
	acenaphthylene	
	anthracene	
	benzidine	
	benzo(a)anthracene	
	benzo(a)pyrene	
	benzo (b) fluoranthene	
	benzo (g,h,i) perylene	
	benzo (k) fluoranthene	
	bis (2-chloroethoxy) methane	
	bis (2-chloroethyl) ether	
	bis (2-chloroisopropyl) ether	
	bis (2-ethylhexyl) phthalate	
	4-bromophenyl phenyl ether	
	butyl benzyl phthalate	
	2-chloronaphthalene	
	4-chlorophenyl phenyl ether	
	chrysene	
	dibenzo (a,h) anthracene	
	3,3-dichlorobenzidine	
	diethyl phthalate	
	dimethyl phthalate	
	di-n-butyl phthalate	
	di-n-octyl phthalate	
	2,4-dinitrotoluene	
	2,6-dinitrotoluene	
	1,2-diphenylhydrazine	
	fluoranthene	
	fluorene	
	hexachlorobenzene	
	hexachlorobutadiene	

BASE/NEUTRALS: (Cont'd)

	hexachlorocyclopentadiene	
	hexachloroethane	
	indeno (1,2,3-cd) pyrene	
	isophorone	
	naphthalene	
	nitrobenzene	
	N-nitrosodimethylamine	
	N-nitrosodi-n-propylamine	
	N-nitrosodiphenylamine	
	phenanthrene	
	pyrene	
	2,3,7,8-tetrachlorodibenzo-p-dioxin	
	1,2,4-trichlorobenzene	

☐ **PESTICIDES:**

	aldrin	
	alpha-BHC	
	beta-BHC	
	gamma-BHC	
	delta-BHC	
	chlordane	
	4,4'-DDD	
	4,4-DDE	
	4,4-DDT	
	dieldrin	
	alpha-endosulfan	
	beta-endosulfan	
	endosulfan sulfate	
	endrin	
	endrin aldehyde	
	heptachlor epoxide	
	heptachlor	
X	PCB-1016	<1.0
X	PCB-1221	↓
X	PCB-1232	↓
X	PCB-1242	↓
X	PCB-1248	<1.0
X	PCB-1254	25.4
X	PCB-1260	<1.0
	toxaphene	

☐ Gas Chromatography results: Run Method 203 on Volatiles

GC/FID resemble Diesel Fuel

☐ Thin-Layer Chromatography results: _____

☐ Appearance: _____

☒ Infrared Spectroscopy (a) methods utilized: Smear test

(b) results: 2920 cm⁻¹ - Triplet - Stretch
1460 cm⁻¹ - Singlet - Medium
1380 cm⁻¹ - Singlet - Moderate
1590 cm⁻¹ - Singlet - Moderate

☐ Odor: _____

☐ API Gravity: _____

☐ Solubilities: _____

☐ Ultraviolet/Visible Spectroscopy results: _____

☐ Distillation Range: _____

☐ Flash Point: _____

☐ _____

☐ Special Tests: (specify)

Conclusions Both Infrared spectra and GC/FID resemble Diesel Fuel

Date Transmitted: 8/13/93 by: Daniel Flemida

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
SPECIAL SAMPLE FORM

Lab. No. 887 ☐ Comp ☒ Grab Date Received 8/9/93

Sample Date 8/9/93 Sample Time: 0835 to

Requested by: HEDMOND Collected by: SAME

Truck No.

Sample Source: MH # MH013 F-641

Sampling Location: NEXT TO FLOOD WALL AT MULLANPHY

Reason for sample: TO DETERMINE IF PCB'S PRESENT

☐ Trunk ☐ Sanitary ☐ Stream ☐ Storm ☐ Seepage ☐ STP ☐ Hauler

☐ Industry ☐ Other (explain)

Analysis: except as noted ☐ mg/L ☐ ug/L ☐ mg/kg ☐ % comp ☐ other

☐ pH	(units)	☐ F		☐ Hg	
☐ SPC	(umhos/cm)	☐ Cl		☐ As	
☐ ALK		☐ CN		☐ Ba	
☐ ACI		☐ CNA		☐ Be	
☐ TS		☐ KJN		☐ Cd	
☐ SS		☐ NH_3		☐ Cr	
☐ VSS		☐ NO_3		☐ Cu	
☐ %V		☐ NO_2		☐ Fe	
☐ SET	(ml/L)	☐ PHT		☐ Pb	
☐ GRE		☐ PHO		☐ Ni	
☐ BOD		☐ SO_4		☐ Se	
☐ COD		☐ SO_3		☐ Ag	
☐ TOC		☐ S		☐ Zn	
☐ PHE		☐ SUR		☐ Tl	
☐		☐		☐ Sb	
☐		☐		☐	
☐		☐		☐	
☐ Color:		☐ Cr^{+6}		☐	

☐ Odor: ☐ Tot. Hardness

☐ Appearance: ☐ Tot. Chlorine

☐ Organics ☐ IR ☐ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☒ ID

☐ Biological: ☐ Bioassay:

☐ Microscopic:

☐ Total Coli: No./100ml

☐ Fecal Coli: No./100ml

☐ FecalStrep: No./100ml

Remarks: CHECK FOR PCB'S

Date Transmitted: 8/17/93 by: MARIO J. DARRIN

75 - DEC/LAB

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
INSTRUMENTATION ANALYSIS

Lab. No. 887 Sample Source: Manhole F-6A1 (#13) Date Received 8/9/93

Sample Date 8/9/93 Time: 0835 ☒ Grab ☐ Comp Collected by: _____

☒ IR ☒ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☐ TLC ☐ _____

☐ **Priority Pollutant** mg/L (except as noted)

☐ **VOLATILES:**

	acrolein	
	acrylonitrile	
X	benzene	21.0
	bromodichloromethane	
	bromoform	
	bromomethane	
	carbon tetrachloride	
	chlorobenzene	
	chloroethane	
	2-chloroethyl vinyl ether	
	chloroform	
	chloromethane	
	dibromochloromethane	
	1,2-dichlorobenzene	
	1,3-dichlorobenzene	
	1,4-dichlorobenzene	
	1,1-dichloroethane	
	1,2-dichloroethane	
	1,1-dichloroethene	
	trans-1, 2-dichloroethene	
	1,2-dichloropropane	
	1, 3-dichloropropene, cis	
	1, 3-dichloropropene, trans	
X	ethyl benzene	21.0
	methylene chloride	
	1,1,2,2-tetrachloroethane	
	tetrachloroethene	
X	toluene	< 1.0
	1,1,1-trichloroethane	
	1,1,2-trichloroethane	
	trichloroethene	
	vinyl chloride	

☐ **ACIDS:**

	4-chloro-3-methylphenol	
	2-chlorophenol	
	2,4-dichlorophenol	
	2,4-dimethylphenol	
	4, 6-dinitro-2-methylphenol	

ACIDS: (Cont'd)

	2,4-dinitrophenol	
	2-nitrophenol	
	4-nitrophenol	
	pentachlorophenol	
	phenol	
	2,4,6-trichlorophenol	

☐ **BASE/NEUTRALS**

	acenaphthene	
	acenaphthylene	
	anthracene	
	benzidine	
	benzo(a)anthracene	
	benzo(a)pyrene	
	benzo (b) fluoranthene	
	benzo (g,h,i) perylene	
	benzo (k) fluoranthene	
	bis (2-chloroethoxy) methane	
	bis (2-chloroethyl) ether	
	bis (2-chloroisopropyl) ether	
	bis (2-ethylhexyl) phthalate	
	4-bromophenyl phenyl ether	
	butyl benzyl phthalate	
	2-chloronaphthalene	
	4-chlorophenyl phenyl ether	
	chrysene	
	dibenzo (a,h) anthracene	
	3,3-dichlorobenzidine	
	diethyl phthalate	
	dimethyl phthalate	
	di-n-butyl phthalate	
	di-n-octyl phthalate	
	2,4-dinitrotoluene	
	2,6-dinitrotoluene	
	1,2-diphenylhydrazine	
	fluoranthene	
	fluorene	
	hexachlorobenzene	
	hexachlorobutadiene	

BASE/NEUTRALS: (Cont'd)

	hexachlorocyclopentadiene	
	hexachloroethane	
	indeno (1,2,3-cd) pyrene	
	isophorone	
	naphthalene	
	nitrobenzene	
	N-nitrosodimethylamine	
	N-nitrosodi-n-propylamine	
	N-nitrosodiphenylamine	
	phenanthrene	
	pyrene	
	2,3,7,8-tetrachlorodibenzo-p-dioxin	
	1,2,4-trichlorobenzene	

☐ **PESTICIDES:**

	aldrin	
	alpha-BHC	
	beta-BHC	
	gamma-BHC	
	delta-BHC	
	chlordane	
	4,4'-DDD	
	4,4-DDE	
	4,4-DDT	
	dieldrin	
	alpha-endosulfan	
	beta-endosulfan	
	endousulfan sulfate	
	endrin	
	endrin aldehyde	
	heptachlor epoxide	
	heptachlor	
X	PCB-1016	< 1.0
X	PCB-1221	↓
X	PCB-1232	↓
X	PCB-1242	↓
X	PCB-1248	< 1.0
X	PCB-1254	11.7
X	PCB-1260	< 1.0
	toxaphene	

☐ Gas Chromatography results: Run Method 203 on Volatiles

GC/FID resembles Diesel Fuel

☐ Thin-Layer Chromatography results: _____

☐ Appearance: _____

☒ Infrared Spectroscopy (a) methods utilized: Smear test

(b) results: 2926 cm⁻¹ - Strong - Triplet
1462 cm⁻¹ - Moderate - Singlet
1378 cm⁻¹ - Moderate - Singlet
1599 cm⁻¹ - Moderate - Singlet

☐ Odor: _____

☐ API Gravity: _____

☐ Solubilities: _____

☐ Ultraviolet/Visible Spectroscopy results: _____

☐ Distillation Range: _____

☐ Flash Point: _____

☐ _____

☐ Special Tests: (specify)

Conclusions Infrared spectra and GC/FID resemble Diesel Fuel

Date Transmitted: 8/13/93 by: Daniel Florida

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
SPECIAL SAMPLE FORM

Lab No: 888 ☐ Comp ☒ Grab Date Received 8/9/93

Sample Date 8/9/93 Sample Time: 0825 to

Requested by: REDMOND Collected by: SAME

Truck No.

Sample Source: MH F MH 14 F-6A1

Sampling Location: NEXT TO FLUID WALL AT MULLANPHY

Reason for sample: TO DETERMINE IF PCB'S PRESENT

☐ Trunk ☐ Sanitary ☐ Stream ☐ Storm ☐ Seepage ☐ STP ☐ Hauler

☐ Industry ☐ Other (explain)

Analysis: except as noted ☐ mg/L ☐ ug/L ☐ mg/kg ☐ % comp ☐ other

☐ pH	(units)	☐ F		☐ Hg	
☐ SPC	(umhos/cm)	☐ Cl		☐ As	
☐ ALK		☐ CN		☐ Ba	
☐ ACI		☐ CNA		☐ Be	
☐ TS		☐ KJN		☐ Cd	
☐ SS		☐ NH_3		☐ Cr	
☐ VSS		☐ NO_3		☐ Cu	
☐ %V		☐ NO_2		☐ Fe	
☐ SET	(ml/L)	☐ PHT		☐ Pb	
☐ GRE		☐ PHO		☐ Ni	
☐ BOD		☐ SO_4		☐ Se	
☐ COD		☐ SO_3		☐ Ag	
☐ TOC		☐ S		☐ Zn	
☐ PHE		☐ SUR		☐ Tl	
☐		☐		☐ Sb	
☐		☐		☐	
☐		☐		☐	
☐ Color:		☐ Cr^{+6}		☐	

☐ Odor: ☐ Tot. Hardness

☐ Appearance: ☐ Tot. Chlorine

☐ Organics ☐ IR ☐ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☒ ID

☐ Biological: ☐ Bioassay:

☐ Microscopic:

☐ Total Coli: No./100ml

☐ Fecal Coli: No./100ml

☐ FecalStrep: No./100ml

Remarks: CHECK FOR PCB'S

Date Transmitted: 8/17/93 by: MARIO J. DEPRIMO

75 - DEC/LAB

MSD ENVIRONMENTAL COMPLIANCE LABORATORY
INSTRUMENTATION ANALYSIS

Lab. No. 888 Sample Source: Manhole F-6A1 (#14) Date Received 8/9/93

Sample Date 8/9/93 Time: 0825 ☒ Grab ☐ Comp Collected by:

☒ IR ☒ GC ☐ LEL ☐ RAD ☐ UV ☐ FLUOR ☐ TLC ☐

☐ **Priority Pollutant** mg/L (except as noted)

☐ **VOLATILES:**

	acrolein	
	acrylonitrile	
X	benzene	21.0
	bromodichloromethane	
	bromoform	
	bromomethane	
	carbon tetrachloride	
	chlorobenzene	
	chloroethane	
	2-chloroethyl vinyl ether	
	chloroform	
	chloromethane	
	dibromochloromethane	
	1,2-dichlorobenzene	
	1,3-dichlorobenzene	
	1,4-dichlorobenzene	
	1,1-dichloroethane	
	1,2-dichloroethane	
	1,1-dichloroethene	
	trans-1, 2-dichloroethene	
	1,2-dichloropropane	
	1, 3-dichloropropene, cis	
	1, 3-dichloropropene, trans	
X	ethyl benzene	21.0
	methylene chloride	
	1,1,2,2-tetrachloroethane	
	tetrachloroethene	
X	toluene	21.
	1,1,1-trichloroethane	
	1,1,2-trichloroethane	
	trichloroethene	
	vinyl chloride	

☐ **ACIDS:**

	4-chloro-3-methylphenol	
	2-chlorophenol	
	2,4-dichlorophenol	
	2,4-dimethylphenol	
	4, 6-dinitro-2-methylphenol	

ACIDS: (Cont'd)

	2,4-dinitrophenol	
	2-nitrophenol	
	4-nitrophenol	
	pentachlorophenol	
	phenol	
	2,4,6-trichlorophenol	

☐ **BASE/NEUTRALS**

	acenaphthene	
	acenaphthylene	
	anthracene	
	benzidine	
	benzo(a)anthracene	
	benzo(a)pyrene	
	benzo (b) fluoranthene	
	benzo (g,h,i) perylene	
	benzo (k) fluoranthene	
	bis (2-chloroethoxy) methane	
	bis (2-chloroethyl) ether	
	bis (2-chloroisopropyl) ether	
	bis (2-ethylhexyl) phthalate	
	4-bromophenyl phenyl ether	
	butyl benzyl phthalate	
	2-chloronaphthalene	
	4-chlorophenyl phenyl ether	
	chrysene	
	dibenzo (a,h) anthracene	
	3,3-dichlorobenzidine	
	diethyl phthalate	
	dimethyl phthalate	
	di-n-butyl phthalate	
	di-n-octyl phthalate	
	2,4-dinitrotoluene	
	2,6-dinitrotoluene	
	1,2-diphenylhydrazine	
	fluoranthene	
	fluorene	
	hexachlorobenzene	
	hexachlorobutadiene	

BASE/NEUTRALS: (Cont'd)

	hexachlorocyclopentadiene	
	hexachloroethane	
	indeno (1,2,3-cd) pyrene	
	isophorone	
	naphthalene	
	nitrobenzene	
	N-nitrosodimethylamine	
	N-nitrosodi-n-propylamine	
	N-nitrosodiphenylamine	
	phenanthrene	
	pyrene	
	2,3,7,8-tetrachlorodibenzo-p-dioxin	
	1,2,4-trichlorobenzene	

☐ **PESTICIDES:**

	aldrin	
	alpha-BHC	
	beta-BHC	
	gamma-BHC	
	delta-BHC	
	chlordane	
	4,4'-DDD	
	4,4-DDE	
	4,4-DDT	
	dieldrin	
	alpha-endosulfan	
	beta-endosulfan	
	endousulfan sulfate	
	endrin	
	endrin aldehyde	
	heptachlor epoxide	
	heptachlor	
X	PCB-1016	21.0
X	PCB-1221	↓
X	PCB-1232	↓
X	PCB-1242	↓
X	PCB-1248	21.0
X	PCB-1254	36.6
X	PCB-1260	21.0
	toxaphene	

☐ Gas Chromatography results: Run Method 253 on Volatiles

GC/FID resembles Diesel Fuel

☐ Thin-Layer Chromatography results:

☐ Appearance:

☒ Infrared Spectroscopy (a) methods utilized: Smear test

(b) results: 2930 cm⁻¹ - Strong - Triplet
1460 cm⁻¹ - Moderate - Singlet
1380 cm⁻¹ - Moderate - Singlet
1600 cm⁻¹ - Moderate - Singlet

☐ Odor:

☐ API Gravity:

☐ Solubilities:

☐ Ultraviolet/Visible Spectroscopy results:

☐ Distillation Range:

☐ Flash Point:

☐

☐ Special Tests: (specify)

Conclusions Infrared spectra and GC/FID resemble Diesel Fuel.

Date Transmitted: 8/13/93 by: Daniel Flanda

Reference 15

PRELIMINARY ASSESSMENT

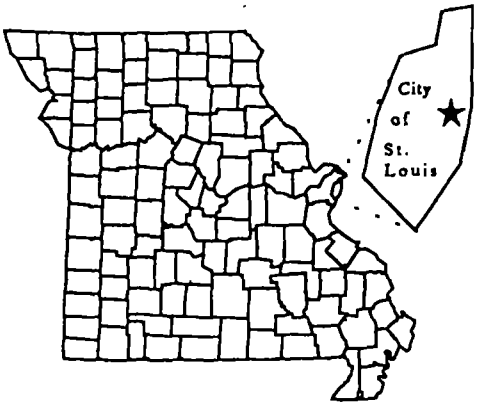
MOUND STREET PCB'S

CITY OF ST. LOUIS, MISSOURI

March 21, 1994

Missouri Department of Natural Resources

Hazardous Waste Program



Prepared By	Reviewed By	Approved By
Don Falls	James L. Kavanaugh	Edwin Knight
Environmental Specialist	Chief, Site Evaluation Unit	Chief Superfund Section

Reference 16

Rules of
Department of Natural Resources
Division 20—Clean Water Commission
Chapter 7—Water Quality

Title		Page
10 CSR 20-7.010	Prevention of Pollution from Wells to Subsurface Waters of the State (Rescinded July 10, 1980)	3
10 CSR 20-7.015	Effluent Regulations	3
10 CSR 20-7.020	Effluent Regulations (Rescinded July 11, 1980)	10
10 CSR 20-7.030	Water Quality Standards (Rescinded December 11, 1977)	10
10 CSR 20-7.031	Water Quality Standards	10

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DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality
Hazardous Waste Program

TELEPHONE OR CONFERENCE RECORD

File: Mound Street PCB Site

Date: December 29, 1993

TELEPHONE

Incoming (X)
Outgoing ( )

CONFERENCE

Field ( )
Office (X)

SUBJECT: Mound Street PCB Site, Drinking Water Intakes

PERSONS INVOLVED

Name	Representing
Eddie Starbuck	MDNR, Geology and Land Survey
Don Falls	MDNR, Hazardous Waste Program
Sally McConkey	Illinois Water Survey
Richard Reed	Illinois American Water Company

SUMMARY OF CONVERSATION:

Eddie Starbuck phoned to let me know that she had reviewed her notes from her previous work on the St. Louis Ship site and discovered a note that indicates that there is a drinking water intake located downstream of the Mound Street PCB site (approximately one mile) on the Illinois side of the Mississippi River. Her notes give the location of this intake as the SE 1/4 of the SW 1/4 of Section 11, T2N, R10W.

Eddie said she obtained this information from the Illinois Water Survey approximately two years ago and that their phone numbers are (217) 333-7223 and 333-5482.

ACTION TAKEN

I phoned the Illinois Water Survey and spoke with Ms. Sally McConkey. Ms. McConkey referred me to the Illinois American Water Company at (618) 874-1873. I then phoned Illinois American Water Company and spoke with a Mr. Richard Reed, Assistant Production Supervisor. Mr. Reed informed me that the Illinois American Water Company utilizes two water intake locations, one at Chouteau Island, which is about 10 miles upstream from the Mound Street site, and the intake in Section 11 in East St. Louis, Illinois. Mr. Reed said that their water company serves 19 medium to small communities with a combined service population of approximately 300,000. He also said that the East St. Louis intake has a

production capacity of 30 million gallons a day and is blended with water from the Chouteau Island intake. The East St. Louis intake provides approximately 60% of the total according to Mr. Reed.

FINAL RESULTS:

This information will be incorporated into the Mound Street PCB Preliminary Assessment.

Don Falls

Don Falls
Environmental Specialist

DF:so

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality
Hazardous Waste Program

Reference 18

TELEPHONE OR CONFERENCE RECORD

File: Mound Street PCBs

Date: March 15, 1994

TELEPHONE (314) 882-9880

Incoming ( )
Outgoing (X)

CONFERENCE

Field ( )
Office (X)

SUBJECT: Fish Consumption From the Mississippi River at St. Louis

PERSONS INVOLVED

Name	Representing
Jack Robinson	Missouri Department of Conservation
Don Falls	MDNR, Hazardous Waste Program

SUMMARY OF CONVERSATION:

I contacted the Missouri Department of Conservation (MDOC) office in Columbia to see if their department has any records concerning annual fish consumption from the Mississippi River at St. Louis. I was referred to Mr. Jack Robinson, a fisheries biologist with the MDOC who is responsible for records of commercial fish harvest on the Missouri, Meramec, and Mississippi Rivers.

Mr. Robinson explained that MDOC did not have information on actual consumption of fish, but only on the numbers caught by commercial fishermen. This information also does not include the numbers of fish taken and eaten by sports fishers.

Mr. Robinson said that he would send me the information on annual harvest from the Mississippi River later in the week. Mr. Robinson suggested that the Missouri Department of Health might have figures on the actual amount of fish consumed because of their previous studies on Chlordane and fish.

FINAL RESULTS:

This information will be included in the Mound Street PCBs Preliminary Assessment.

Don Falls

Don Falls
Environmental Specialist
Hazardous Waste Program

CHECK OF DATA

P.2

RIVER= TOTAL COUNTY=TOTAL

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
ASIATIC CARP	.	.	6065	728	69	8	1510	181	.	.	7642	917
GRASSCARP	.	.	10762	2260	947	199	5770	1212	20	4	17499	3675
PADDLEFISH	.	.	2612	784	1361	408	1144	343	50	15	5167	1550
EEL	.	.	.	.	.	.	104	19	227	41	331	60
GAR	.	.	4083	408	60	6	3171	317	913	91	8227	823
G S CARP	.	.	26708	5075	165	28	60163	11431	.	.	87016	16533
SUCKER	.	.	4059	365	550	49	11577	1042	.	.	16186	1457
STURGEON	.	.	4468	1117	1353	338	11150	2788	30	8	17001	4250
BOWFIN	.	.	820	57	.	.	10	1	.	.	830	58
BLUE CAT	.	.	10598	5829	6415	3528	12617	6939	10848	5964	40478	22265
CHANNEL CAT	.	.	7188	3953	578	208	90990	50044	20036	11020	118592	65226
BULLHEAD	.	.	31	7	52	12	502	120	400	96	985	236
FLATHEAD	.	.	4466	2412	1522	822	69536	37549	2905	1569	78429	42352
DRUM	.	.	8919	1338	1412	212	37823	5673	2188	328	50342	7551
CARP	.	.	66367	7964	2727	327	75146	9018	512	61	144752	17370
BUFFALO	.	.	87332	20960	12841	3082	95506	22873	3069	737	198548	47652
TOTAL	.	.	244476	53257	29832	9228	476519	149551	41198	19936	792025	231972
DAYS			2938		480		105907		5930			

Total reported harvest from the Missouri, Mississippi, & St Francis Rivers in 1992

MAR 21 '94 15:27

1992

CHECK OF DATA

Total harvest reported from the Mississippi River

RIVER= MISSISSIPPI COUNTY=TOTAL

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
ASIATIC CARP	.	.	2372	285	69	8	930	112	.	.	3371	405
BIGHEAD CARP	.	.	6413	1347	437	92	2813	591	.	.	9663	2029
PADDLEFISH	.	.	2512	754	1361	408	902	271	50	15	4825	1447
EEL	.	.	.	.	.	.	98	18	227	41	325	58
GAR	.	.	2590	259	10	1	1440	144	904	90	4944	494
BIG S CARP	.	.	14788	2810	145	28	49226	9353	.	.	64159	12190
SUCKER	.	.	2109	190	510	46	10671	960	.	.	13290	1196
STURGEON	.	.	3024	756	1393	338	7643	1911	30	8	12050	3013
BONFIN	.	.	820	57	.	.	10	1	.	.	830	58
BLUE CAT	.	.	4465	2456	6040	3322	6832	3758	8875	4881	26212	14417
CHANNEL CAT	.	.	5078	2793	378	208	72575	39916	18406	10123	96437	53040
BULLHEAD	.	.	30	7	52	12	270	65	400	96	752	180
FLATHEAD	.	.	2616	1413	1522	822	47919	25876	2325	1255	54382	29366
DRUM	.	.	5191	779	1330	199	29340	4401	2118	316	37971	5696
CARP	.	.	30209	3625	832	100	36154	4338	450	54	67645	8117
BUFFALO	.	.	37791	9070	11256	2701	66274	15906	3007	722	118328	28399
TOTAL	.	.	120008	26599	25295	8286	333097	107619	36704	17602	515184	160107
DAYS			1571		407		58430		4961			

RIVER= MISSISSIPPI COUNTY=HURON S

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
BLUE CAT	.	.	.	.	.	.	.	.	414	228	414	228
CHANNEL CAT	.	.	.	.	.	.	201	111	492	270	693	381
BULLHEAD	.	.	.	.	.	.	109	26	.	.	109	26
FLATHEAD	.	.	.	.	.	.	97	52	31	17	128	69
DRUM	.	.	.	.	.	.	217	33	10	1	227	34
CARP	.	.	.	.	.	.	100	12	.	.	100	12
BUFFALO	.	.	.	.	.	.	561	135	.	.	561	135
TOTAL	.	.	.	.	.	.	1285	368	947	517	2232	885
DAYS							526		108			

RIVER= MISSISSIPPI COUNTY=BOONE 11

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
GRASSCARP	.	.	70	15	.	.	350	73	.	.	420	88
PADDLEFISH	.	.	300	90	300	90	15	4	.	.	615	184
BIG S CARP	.	.	150	28	20	4	.	.	.	.	170	32
STURGEON	.	.	100	25	.	.	.	.	.	.	100	25
BONFIN	.	.	20	1	.	.	.	.	.	.	20	1
BLUE CAT	.	.	40	22	.	.	225	124	.	.	265	146
CHANNEL CAT	.	.	160	88	.	.	560	308	.	.	720	396
FLATHEAD	.	.	300	162	.	.	256	138	.	.	556	300
DRUM	.	.	.	.	.	.	568	85	.	.	568	85

CHECK OF DATA

CHANNEL CAT	.	.	375	206	.	.	587	323	2221	1222	3183	1751
FLATHEAD	.	.	106	57	.	.	764	413	70	38	940	508
DRUM	.	.	84	13	.	.	185	28	243	36	512	77
CARP	.	.	705	85	.	.	99	12	20	2	824	99
BUFFALO	.	.	1259	302	.	.	2036	489	.	.	3295	791
TOTAL	.	.	3169	698	.	.	3711	1276	2634	1335	9524	3509
DAYS				24				4174		707		

RIVER= MISSISSIPPI COUNTY=ST GENEVIEVE 96

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
GAR	.	.	.	.	.	.	.	.	100	10	100	10
Q S CARP	.	.	12	2	.	.	70	13	.	.	82	16
CHANNEL CAT	.	.	.	.	.	.	.	.	25	14	25	14
BULLHEAD	.	.	.	.	.	.	.	.	126	30	126	30
FLATHEAD	.	.	.	.	.	.	.	.	50	27	50	27
DRUM	.	.	.	.	.	.	25	4	.	.	25	4
CARP	.	.	.	.	.	.	.	.	50	6	50	6
BUFFALO	.	.	30	7	.	.	15	4	280	67	325	78
TOTAL	.	.	42	9	.	.	110	21	630	154	782	184
DAYS				5				5		118		

RIVER= MISSISSIPPI COUNTY=ST LOUIS 97

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
PADDLEFISH	.	.	175	52	.	.	.	.	.	.	175	52
GAR	.	.	33	3	.	.	.	.	1	0	34	3
Q S CARP	.	.	255	48	.	.	.	.	.	.	255	48
STURGEON	.	.	60	15	.	.	.	.	.	.	60	15
BLUE CAT	.	.	541	298	.	.	25	14	235	129	801	441
CHANNEL CAT	.	.	154	85	.	.	493	271	2056	1131	2703	1487
FLATHEAD	.	.	10	5	.	.	145	78	539	291	694	375
DRUM	.	.	67	10	.	.	15	2	88	13	170	25
CARP	.	.	705	85	.	.	.	.	.	.	705	85
BUFFALO	.	.	1150	276	.	.	121	29	900	216	2171	521
TOTAL	.	.	3150	878	.	.	799	394	3819	1780	7768	3052
DAYS				17				293		274		

RIVER= MISSISSIPPI COUNTY=SCOTT 101

SPECIE	SEINE POUNDS	SEINE DOLLARS	TRAMMEL NET POUNDS	TRAMMEL NET DOLLARS	GILL NET POUNDS	GILL NET DOLLARS	HOOP NET POUNDS	HOOP NET DOLLARS	TROT LINE POUNDS	TROT LINE DOLLARS	TOTAL POUNDS	TOTAL DOLLARS
GRASSCARP	.	.	35	7	.	.	.	.	.	.	35	7
EEL	.	.	.	.	.	.	.	.	10	2	10	2
GAR	.	.	.	.	.	.	.	.	50	5	50	5
BLUE CAT	.	.	50	27	.	.	.	.	2379	1309	2429	1336
CHANNEL CAT	.	.	.	.	.	.	22	12	2079	1143	2101	1156
BULLHEAD	.	.	.	.	.	.	.	.	20	5	20	5
FLATHEAD	.	.	.	.	.	.	36	19	50	27	86	46

1992
Reported commercial harvest of licensed fishermen from the Mississippi River — St. Louis county
dollar value is live-weight wholesale value.

SPECIAL PROBLEM INVESTIGATION
DEPARTMENT OF ENVIRONMENTAL COMPLIANCE

Reference 19

CONTROL NUMBER: 93 (YR) 07 (MO) 08 (DAY)

CROSS REFERENCE:

NEW FILE: BROOKLYN STREET PUMP STATION

TO: HOWARD EDMOND FROM: SI SMITH
DATE ASSIGNED: 07-08-93 TIME: 0800
SUBJECT: OIL IN BROOKLYN STREET PUMP STATION
SPECIAL INSTRUCTIONS: LOCATE SOURCE OF OIL ENTERING BROOKLYN STREET PUMP STATION AND TAKE CORRECTIVE ACTION

STREET ADDRESS: FOOT OF BROOKLYN STREET ZIP CODE: 63102
NEAREST INTERSECTION: MULLANPHY MAP COORDINATES: 28-D-19

TYPE OF PROBLEM: OIL ENTERING PUMP STATION
TRUNK SEWER: BCH TRTMT PLANT: BISSELL WATER COURSE: N/A

VOLUME: UNKNOWN QUANTITY: UNKNOWN
CAUSE: SOURCE: POSSIBLE LEAKING TANK

PERSON REPORTING: TELEPHONE:
CONTACT PERSON: JAMES GARAVAGLIA TELEPHONE: 622-3588

DATE OF INCIDENT: ON GOING RESPONSIBLE PARTY: CITY OF ST. LOUIS
REGULATORY AGENCY CONTACTED: MSD, MODNR, FIRE DEPT, & CITY OF ST. LOUIS
CLEAN UP BY: REACT ENVIRONMENTAL ENGINEERS

COMPLETION DATE: 08-19-93 DAMAGES BILLED ($):

INVESTIGATIVE ACTION SUMMARY: 07-08-93 Call from MSD pump station stating oil was entering Brooklyn pump station. I obtained a sample for analysis. Started looking for possible source. Located an under ground storage tank, which has large hole in the top, on the south side of a vacant building located just west of the pump station and south of Brooklyn Street. A sample of the oil still in this tank was collected. The analysis of the oil from the pump sta contained 47 mg/l of 1254 pcb's and the oil from the tank contained 39 mg/l of 1254 pcb's. I contacted Charlie Gay of the Fire Marshall's office and met him at the site on 07-16-93 to show him the problem and to obtain help in finding owner of property. Charlie contacted Chief Horn, informed him of the situation, Chief Horn contacted James Garavaglia of the comptroller's office. We met at site. It was determined at this time that the City of St. Louis is the owner of the east half of the property between 1st St. and the flood wall and Wheeler Ferry Company owns the west half. Cont. Page two

CONCLUSION: It appears at this time an underground storage tank is the cause of this problem. Also the possibility exist of ground saturation of oil from an old Union Electric building.

Copy sent to: Date:

SPECIAL PROBLEM INVESTIGATION continued:

93 Yr 07 Mo 08 Day

BROOKLYN PUMP STATION

DETAILS OF INVESTIGATION: The City is to locate owners of the property and take action on getting area cleaned up. They contacted React Environmental Engineers.

07-16-93 Met with city engineers and React to determine what is to be done. At the present time React is placing booms in the wet well of the pump station to soak up the oil entering. It was not determined at this time what to do with the underground tank. React wanted to trench along the sewer entering the pump station but due to the high water table and the possibility of causing a major problem with the flood waters no trench at this time.

07-26-93 Returned to the pump station to follow up on the clean up. React did not place booms in station they only put absorbent pads. The pump station maintenance crew removed the pads to prevent them from being pulled into the pumps since they were not tied down. I contacted the city comptroller and informed him of this problem. React contacted me and I told them that they had to use booms inside the station and tied to prevent any possibility of being pulled into the pumps or move outside station into the first manhole up stream to collect the oil.

07-27-93 Met Chief Horn at the pump station. React has installed boom and they are tied. Checked the underground tank and nothing has been done to the tank. It still has oil standing in the bottom. It appears that there could be at least 6 to 8 inches of oil in the tank. There is still a small oil sheen on the water entering the station. Chief Horn is to find out what is to be done with the tank and let me know.

07-28-93 Met Chief Horn and Clifford Trice, chief engineer for Terminal Railroad Association at the site of the underground tank. It has been determined that the property belongs to Terminal Railroad. They are to take steps to remove the tank.

07-29-93 Received call from Daryl Bowles, Gehm Corp, rep for Terminal Railroad requesting copies of analysis on pump station and tank. They are to preform an infrared test on area to try and determine just where the oil is entering the sewer. Test is to be done first week of August. Copies of analysis sent.

08-03-93 Made follow up on progress of clean up. The area around the tank has been cleaned up and graded but the opening to the tank has been covered. No way at this time to tell if tank has been pumped. The booms at the pump station do not appear to have been serviced since they were last installed. TE

SPECIAL PROBELM INVESTIGATION continued

93 Yr 07 Mo 08 Day

BROOKLYN PUMP STATION

08-04-08 Met with Terminal Railroad, consulting company and fire department underground tank is being pumped out today. Tank will be removed as soon as the water level goes down. The infrared pictures that were taken do not indicate the source of oil in pump station is from tank. They did indicated a possible location of another underground tank on the city property just south of Mound Street. Fire department was notified.

08-08-93 1015 Hrs Received call from Chief Horne requesting my presents at 1st & Mullanphy. Three manholes were located along the flood wall which contained a large amount of oil. Could not determine at this time where oil is coming from. The manholes are holding water. I will return 08-09-93 to collect samples to find out if pcb's are present. There is some question as to the manholes belonging to MSD or the City.

08-09-93 Collected oil samples from all three manholes. Waiting on analysis.

08-10-93 Met Charlie Gay of fire department. He wanted to know where the manholes were located that contain this last source of oil. Also wanted to look at clean up that was preformed on the underground tank. The tank has been pumped and washed out. The oil has been remove.

08-17-93 The analysis of the samples taken from the manholes indicated they also contained a small amount of pcb 1254. These manhole belong to the city and Fire Marshall Horne was notified of this fact and also the results of the analysis on the manholes. The pads at the pump station have not been changed as of 08-17-93. Chief Horne was also informed of this situation.

08-19-93 The pads at the pump station were changed yesterday 08-18-93. The City of St. Louis is now taking care of having this problem cleaned up.

Reference 20

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: December 29, 1993

TO: Don Falls, Environmental Specialist, HWP, DEQ

FROM: Edith Starbuck, Geologist, Environmental Geology Section, DGLS

SUBJECT: PA/SI Geology Report for the Mound Street Site, St. Louis City

Enclosed is my report on the geologic and hydrologic considerations for the Mound Street Site. The report addresses specific conponents of the HRS. Please let me know if you have any questions or comments or need additional information.

RECEIVED
'94 JAN 3 AM 11 27
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

RECYCLED PAPER

3.0.1 General Considerations

The Mound Street site is located on the riverfront in the City of St. Louis. It is east of Second Street between Mound and Brooklyn Streets.

3.0.1.1 Groundwater target distance limit

The site is located on a narrow strip of alluvium between an area of limestone bedrock and the Mississippi River. (Ref. 1) The groundwater within the alluvium will move generally in the direction of the river, that is, to the east or southeast, and it will eventually discharge to the river. During unusually high river stages, the groundwater may temporarily flow away from the river. Since no confining layer is known to exist between the alluvial aquifer and the bedrock of Mississippian limestone (Ref. 4, p. I-136), the groundwater target distance should extend for a four mile radius from the site.

3.0.1.2 Aquifer boundaries

The shallowest material at the site is fill material. Its thickness is unknown, but is estimated at 15 to 18 feet.

The alluvium consists of a mixture of stratified sediments deposited by the river. Based on findings at a nearby site, the alluvium is made up of clay, and silty clay in the top 10 to 30 feet, but becomes generally coarser with depth, becoming silty sand and sand. Lenses of gravel can be found. (Ref. 2, p. 3-19 to 3-33) The total thickness of the alluvium is estimated at approximately 80 feet. The alluvial aquifer can be expected to yeild large quantities of fresh water. (Ref. 15, p. 21) The depth to water will be approximately 20 feet. The bedrock is Mississippian aged limestone.

The Mississippian System in this area is made up of a sequence of limestone, cherty limestone, and sandy or shaley limestones. This system includes, in decending order; the Ste. Genevieve Limestone, St. Louis Limestone, Salem Formation, Warsaw Formation, Burlington-Keokuk Limestone, and the Fern Glen Formation. (Ref. 13) The Salem and Warsaw formations are generally shaley limestones and do contain shale beds in the St. Louis area. (Ref. 14, p. 101-110) However, the thickness and position of shale horizons varies within this area (Ref. 14, figs 88, 89, 91, 92) The shallowest reliable aquitard in the area is the Maquoketa Shale at the top of the Ordovician System. The Mississippian aquifer might yield small quantities of fresh water in the target area, (Ref. 15, Ref. 16) but very little data is available. Any groundwater below the Maquoketa is expected to be mineralized. (Ref. 15, Ref. 16)

3.0.1.2.1 Aquifer interconnections

Drilling at a nearby site encountered no confining material between the alluvium and bedrock. (Ref. 4, p. I-136) The bedrock and alluvium can be considered one aquifer for HRS purposes.

3.0.1.2.2 Aquifer discontinuities

The alluvial aquifer is bounded by the limits of its deposition within the target area. Bedrock faulting in the area does not completely transect the Mississippian aquifer. No aquifer discontinuity exists within the target area.

3.1 Likelihood of release

3.1.2 Potential to release

3.1.2.2 Net precipitation

The assigned net precipitation factor value for the site is 3. (Ref. 3, figure 3-2)

3.1.2.3 Depth to aquifer

The depth to groundwater at the site is approximately 20 feet. The alluvial sediments at this depth may not be good aquifer material, however, the depth at which the alluvial material is saturated should be considered the aquifer. The depth to aquifer factor value is 5. (Ref. 3, table 3-5)

3.1.2.4 Travel time

The hydraulic conductivity for the shallow part of the alluvium consisting of silty clay and clay has been calculated at 9.9×10^{-6}. (Ref. 4, p. 6-26) It's thickness ranges from 10 to 30 feet. The travel time factor value is 15. (Ref. 3, table 3-7)

3.3.1 Nearest well

There is not believed to be any groundwater use within the target area. (Ref. 4, p. I-136; Ref. 5; Ref. 6). The nearest well factor value is 0. (Ref. 3, table 3-11)

3.3.4 Wellhead protection area

There is no wellhead protection area within the target area.

4.1.1.1 Definition of hazardous substance migration path for overland/flood migration component

The site is located on top of the flood wall constructed to protect the area from flooding. No channels or ditches were observed crossing the site. (Ref. 7) Much of the site is relatively flat. The eastern edge of the area slopes to the east, toward the river. The site is less than 300 feet from the river.

4.1.1.2 Target distance limit

The target distance limit should include the Mississippi River from the area downgradient from the site to a point fifteen miles downstream. This should be at approximately Mississippi River mile marker 166.

4.1.2.1.2.1 Potential to release by overland flow

4.1.2.1.2.1.2 Runoff

The drainage area for the site is less than 50 acres. (Ref. 8) the drainage area value is 1. (Ref. 3, table 4-3) The soil at the site appeared to be somewhat coarse textured. (Ref. 7) A moderate infiltration rate would be expected. The soil group designation is B. (Ref. 3, table 4-4) The two-year, 24-hour rainfall for the area is approximately 3.5 inches. (Ref. 9)

The rainfall/runoff value is 4. (Ref. 3, table 4-5) The runoff factor value is 1. (Ref. 3, table 4-6)

4.1.2.1.2.1.3 Distance to surface water

Since no ditches or channels were noted, the distance to surface water is estimated as a straight line between the site and the river. This distance is about 300 feet. (Ref. 8) The distance to surface water factor value is 20. (Ref. 3, table 4-7)

4.1.2.1.2.2 Potential to release by flood

4.1.2.1.2.2.2 Flood frequency

The site is located on top of a flood wall constructed to withstand a 500-year flood. It is elevated above the floodplain and therefore, the flood frequency factor value is 0. (Ref. 3, table 4-9)

4.1.2.3.1 Nearest intake

On the Missouri side of the Mississippi River, the nearest intakes are approximately 10 miles upstream from the site and 126 miles downstream. (Ref. 11) Information from the Illinois Water Survey indicates that there is a public water supply intake within the target area on the Illinois side. This intake is in the SE 1/4 of the SW 1/4 of section 11, T.2 N., R.10 W. in St. Clair County, Illinois. (Ref. 10) This would be less than one mile downstream from the site.

The Mississippi River is a very large river with an average flow greater than 100,000 cfs. (Ref. 12, p. 180) The assigned dilution weight is 0.00001. (Ref. 3, table 4-13) Because of this small dilution weight, the intake factor value is 0. (Ref. 3, p. 51613)

REFERENCES

1. Geologic Map of St. Louis City and County, Missouri, K.G. Brill, DGLS, 1991.

2. Remedial Investigation Report for the St. Louis Site, prepared for U.S. Department of Energy under the Formerly Utilized Site Remedial Action Program by Bechtel National, June 1991.

3. Federal Register, vol. 55, No. 241.

4. Radiological, Chemical, and Hydrogeological Characterization Report for the St. Louis Downtown Site in St. Louis, Missouri, prepared for the U.S. Department of Energy under the Formerly Utilized Site Remedial Action Program by Bechtel National, September, 1990.

5. Census of Missouri Public Water Systems, 1991, DEQ.

6. Well records for the area on file at DGLS.

7. Field observations, 10/6/93.

8. Granite City 7.5 minute topographic quadrangle, U.S. Geological Survey, 1954, photorevised 1982.

9. Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Department of Commerce.

10. Telephone messages from Dorothy Waller, Illinois Water Survey, June 11, and 12, 1992.

11. Census of Missouri Public Water systems, 1991, DEQ.

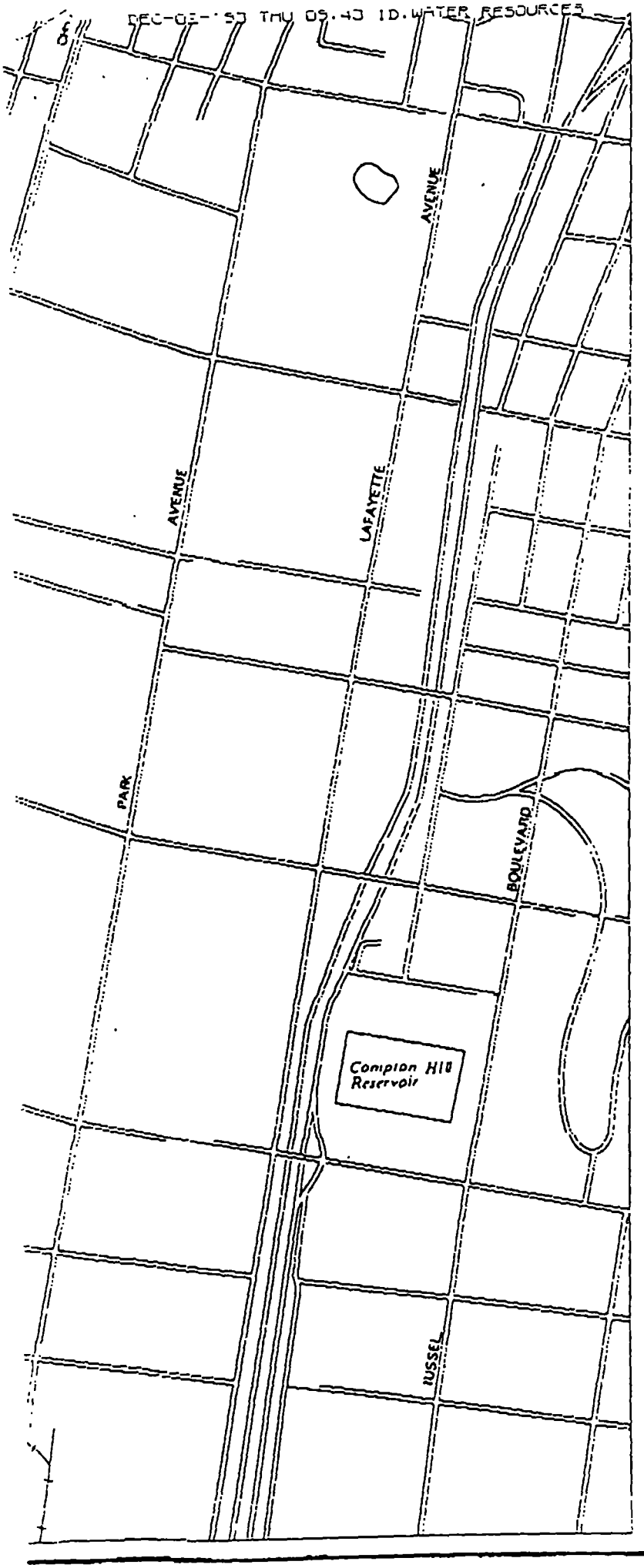
12. Water Resources Data, Missouri, Water Year 1989, U.S. Geological Survey Water-Data Report MO-89-1.

13. Geologic Map of St. Louis City and County, Missouri, K.G. Brill, DGLS, 1991.

14. Paleozoic Succession in Missouri-Part 4, Mississippian System, Report of Investigation No. 70, Part 4; Thomas L. Thompson; DGLS, 1986.

15. Water Resources, St. Louis Area, Missouri, Water Resources Report No. 30; Don E. Miller, et. al.; DGLS/USGS; 1974.

16. Groundwater Areas Map in Groundwater Maps of Missouri; Missouri Geological Survey and Water Resources; 1963.



shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established

To determine if flood insurance is available in this community, [illegible] Program, at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

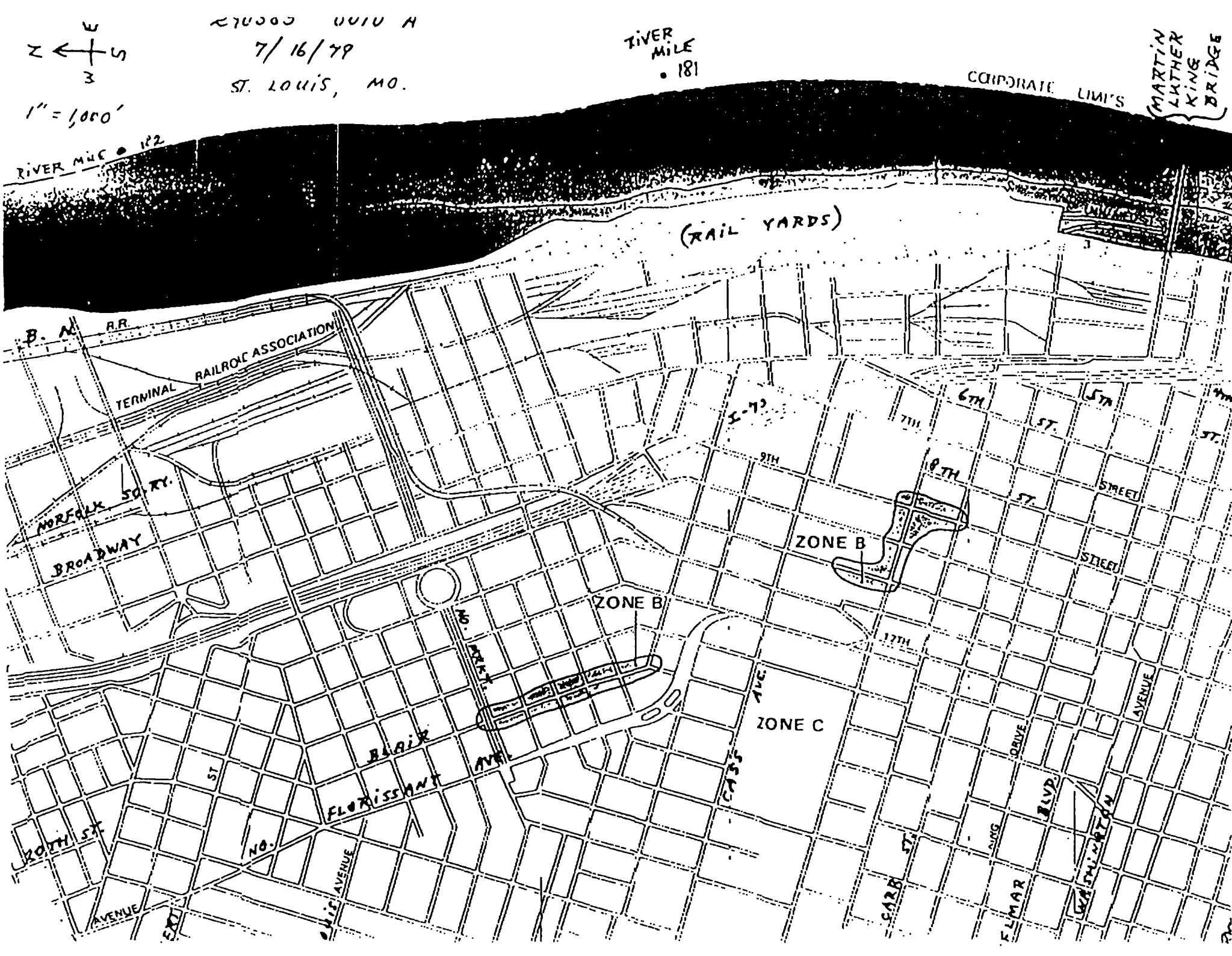
CITY OF
ST. LOUIS, MISSOURI
INDEPENDENT CITY

PANEL 10 OF 40
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
290385 0010 A

EFFECTIVE DATE:
JULY 10, 1979

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



7/16/79
ST. LOUIS, MO.
1" = 1,000'
RIVER MILE • 181
RIVER MILE • 182
CORPORATE LIMITS
MARTIN LUTHER KING BRIDGE
(RAIL YARDS)
B. N. R.R.
TERMINAL RAILROAD ASSOCIATION
NORFOLK SO. RY.
BROADWAY
I-73
9TH
7TH
6TH ST.
5TH ST.
8TH ST.
STREET
STREET
ZONE B
ZONE B
ZONE C
17TH
NO. MARKET
BLAIR
FLORISSANT AVE.
CASS AVE.
20TH ST.
NO. ST
AVENUE
AVENUE
CARR ST.
ELMAR BLVD.
WASHINGTON AVENUE

STATE OF MISSOURI
OFFICE INFORMATION MEMO

DATE: 6/11/92 TIME: 3:30 ☐ AM ☒ PM

TO: Edie

DEPARTMENT OR DIVISION:

FROM: Dorothy Walley

DEPARTMENT OR COMPANY: ILL Wtr Survey

PHONE NO: 217-333-7223

RECEIVED BY: KB

☐ Called/was here to see you ☐ Wants to see you ☐ Will call again
☐ Wants you to call ☐ URGENT ☐ Returned your call
☐ Prepare for my signature ☐ For your information ☐ Review
☐ Take necessary action ☐ For your signature ☐ As requested

REMARKS MESSAGES

Pub. Wtr. Supply Intakes on Miss. River:

(2) in East St L. - Illinois American Wtr Co.

T4N - R10W - S.25 (SW corner)

T2N - R10W - S.11 (SE corner of SW 1/4)

(1) in Alton

T5N - R1CW - S.4 (SE corner)

none in Illinois Cc (217) 333-5482

MO 999-9007 (5-86)

Surface Wtr. Sect. Sally Broeren

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: January 5, 1994

TO: Don Falls, Environmental Specialist, HWP, DEQ

FROM: Edith Starbuck, Geologist, DGLS

SUBJECT: Existence of karst near the Mound Street Site

Sinkholes and caves can be found in the Mississippian bedrock within the target area. The sinkholes are represented as closed depressions on the Granite City topographic map. Also, the existence of karst features is discussed in the DGLS publication, "Engineering Geology of St. Louis County, Missouri". The karst aquifer probably does not directly underlie the site, however, and it is not likely to be affected by contaminant migration from the site. If the site is actually on the bedrock residual area, any water that percolates down into it should move toward the alluvial aquifer since groundwater movement is toward the river.

Please let me know if you have any further questions about the site geology (314)368-2136.

ES:kb

RECEIVED
'94 JAN 7 AM 11 06
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

RECYCLED PAPER

MOUND STREET SITE STRATIGRAPHY

	Stratigraphic Unit	Composition	Thickness (ft.)	Remarks
Quaternary System	Alluvium	Clay, silt, sand, gravel	80	High yield aquifer
Mississippian System	Ste. Genevieve Formation	Silty to sandy limestone	470 - 530	Yields small to moderate quantities of water
	St. Louis Limestone			
	Salem Formation			
	Burlington-Keokuk Limestone	Cherty limestone	240	
	Fern Glen Formation	Red limestone and shale	100	
	Chouteau Group	Limestone, shale and siltstone	0 - 122	
Devonion System	Sulphur Springs Group	Sandstone and limestone	0 - 60	
	Grassy Creek Shale	Carbonaceous Shale	0 - 50	
Silurian System		Cherty limestone	0 - 200	
Ordovician System	Maquoketa Shale	Silty, limey, or dolomitic shale	150	Confining layer

RECEIVED
JAN 6 1994
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Header Data

Log # 019835 Owner:NORTHWESTERN COOPERAGE CO St:MO Cnty:ST. LOUIS
SE SE NE TRS: S02 T45N R07E
Alias: Lat.:38,40,23.648N
Type well:Private Well Long.:90,11,25.660W
Type log: S Quad:38090C6
Driller:HAVERSTICK WELL CO Date: /
Driller License No: Confidential:N Release Dt. /
Logger:C.E. ROBERTSON Date:08/1961

Elev.: 420 Elev.S Yield: 260 SWL:(a) H20 @:
T.D.: 80 base: DrDwn: 31 SWL:(b)

Bedrock at: 75 Samples saved:N Int. cored: 0 to 0
Top Fm.:HOLOCENE ALLUVIUM
Bot Fm.:MISSISSIPPIAN SYSTEM
Problems:
Remarks:

Construction Data

Log #:019835 Date Completed: /

CASING: Dpth: 59 Diam: 8.00 I/O:O Sz. Hole: 0.00 Sz. Below: 0.00
0 0.00
0 0.00
0 0.00

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Top:HOLOCENE ALLUVIUM
Formations Bot:MISSISSIPPIAN SYSTEM
Other data sources:
Remarks:

Stratigraphy Data

Log #:019835

Top	Base	Name	--Lith-- Pr Sc Mn	Minerals Pri	Oc	Sec	Oc	Mnr	Oc
0	75	HOLOCENE ALLUVIUM	CL SD GR		0		0		0
75	80	MISSISSIPPIAN SYSTEM	LS SD		0		0		0

Printed on 12/30/93 at 10:45:40.

Header Data

Log #: 001655
Owner: BELCHER HOTEL
Alias type: Facility ID
Alias: 010000
Type well: Noncommunity Public Well
Type log: D
Driller:
Date: /
Driller License No:
Logger:
Date: /
St: MO Cnty: ST. LOUIS
NE SW SW TRS: S13 T45N R07E
Lat.:
Long.:
Quad: UNKNOWN
Confidential: N Release Dt. /

Elev.: 420 Elev.S Yield: 150 SWL:(a) H20 @:
T.D.: 2200 base: DrDwn: 000 SWL:(b)

Bedrock at: 0 Samples saved: N Int. cored: 0 to 0
Top Fm.:
Bot Fm.:
Problems:
Remarks:

Construction Data

Log #: 001655 Date Completed: 09/1951

CASING:	Dpth:	Diam:	I/O:	Sz. Hole:	Sz. Below:
	80	160.0	O	0.00	0.00
	0	0.00			
	0	0.00			
	0	0.00			

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Top:
Formations Bot:
Other data sources:
Remarks:

Stratigraphy Data

Log #: 001655

Top	Base	Name	--Lith-- Pr	Sc	Mn	Minerals Pri	Oc	Sec	Oc	Mnr	Oc
0	230	ST LOUIS LIMESTONE	LS	SH			0		0		0
230	350	SALEM FORMATION	LS	CH			0		0		0
350	380	UNKNOWN	SH				0		0		0
380	460	WARSAW FORMATION	LS	SH			0		0		0
460	630	KEOKUK-BURLINGTON LS. UNDIFF	LS	SH			0		0		0
630	720	FERN GLEN FORMATION	LS	SH	CH		0		0		0
720	760	KINDERHOOK SHALE	SH				0		0		0
760	880	SILURIAN SYSTEM	LS				0		0		0
880	1040	MAQUOKETA SHALE	SH	LS			0		0		0
1040	1180	KIMMSWICK LIMESTONE	LS				0		0		0
1180	1240	DECORAH GROUP	LS	CH			0		0		0
1240	1370	PLATTIN LIMESTONE	LS				0		0		0
1370	1502	JOACHIM DOLOMITE	SH	LS			0		0		0
1502	1640	ST. PETER-EVERTON FMS. UNDIFF	SS				0		0		0
1640	2200	CAMBRIAN SYSTEM	SS	LS			0		0		0

Printed on 12/30/93 at 10:49:09.

- - - - - - - - - - - - - - - - Header Data - - - - - - - - - - - - - - - -

Log # 003616 Owner:CUPPLES COMPANY St:MO Cnty:ST. LOUIS
SE NE NW TRS: S02 T45N R07E
Alias: Lat.:
Type well:Private Well Long.:
Type log: S Quad:UNKNOWN
Driller:WISE Date:05/1936
Driller License No: Confidential:N Release Dt. /
Logger:GROHSKOPF Date: /

Elev.: 421 Elev.S Yield: 15 SWL:(a) H20 @:
T.D.: 885 base: DrDwn: 0 SWL:(b)

Bedrock at: 0 Samples saved:N Int. cored: 0 to 0
Top Fm.:ST LOUIS LIMESTONE
Bot Fm.:SILURIAN SYSTEM
Problems:
Remarks:

- - - - - - - - - - - - - - Stratigraphy Data - - - - - - - - - - - -

Log #:003616

Top	Base	Name	--Lith-- Pr	Sc	Mn	Minerals Pri	Oc	Sec	Oc	Mnr	Oc
0	210	ST LOUIS LIMESTONE	LS	SH			0		0		0
210	325	SALEM FORMATION	LS	CH	SH		0		0		0
325	435	WARSAW FORMATION	SH	LS	CH		0		0		0
435	595	KEOKUK-BURLINGTON LS. UNDIFF	CH	LS			0		0		0
595	700	FERN GLEN FORMATION	CH	LS	SH		0		0		0
700	735	CHOUTEAU GROUP	LS	CH			0		0		0
735	755	CHATTANOOGA SHALE	SH				0		0		0
755	885	SILURIAN SYSTEM	LS	SD	DL		0		0		0

Printed on 12/30/93 at 10:47:17.

- - - - - - - - - - - - - - - H e a d e r D a t a - - - - - - - - - - - - - - -

.Log # Owner:FISHER CHEMICAL CO St:MO Cnty:ST. LOUIS
002748 NW SE SE TRS: S02 T45N R07E
Alias: Lat.:
Type well:Private Well Long.:
Type log: S Quad:UNKNOWN
Driller:WISE Date:08/1933
Driller License No: Confidential:N Release Dt. /
Logger:GLEASON Date: /

Elev.: 430 Elev.S Yield: 30 SWL:(a) H20 @:
T.D.: 210 base: DrDwn: 150 SWL:(b)

Bedrock at: 45 Samples saved:N Int. cored: 0 to 0
Top Fm.:ST LOUIS LIMESTONE
Bot Fm.:ST LOUIS LIMESTONE
Problems:
Remarks:

- - - - - - - - - - - - C o n s t r u c t i o n D a t a - - - - - - - - - -

Log #:002748 Date Completed:08/1933

CASING: Dpth: 30 Diam: 8.00 I/O:O Sz. Hole: 0.00 Sz. Below: 8.00
0 0.00
0 0.00
0 0.00

GROUT:	Type	Rig	Methd	Dt Abnd	Plug Date	Top	Bottom
				/	/	0	0

PUMP:	Cap	Type	Set at	TDH	Scrn Typ	Size	Lgth	Slot
	0		0	0		0	0	0

Well Treat	Type Dev	Typ Compl	Perf. Interval	Tube Pres.	Oil	Gas
			Top: 0 Bot: 0			

Open Top:ST LOUIS LIMESTONE
Formations Bot:ST LOUIS LIMESTONE
Other data sources:
Remarks:

- - - - - - - - - - - - S t r a t i g r a p h y D a t a - - - - - - - - - -

Log #:002748

Top	Base	Name	--Lith-- Pr	Sc	Mn	Pri	Oc	Sec	Oc	Mnr	Oc
45	210	ST LOUIS LIMESTONE	LS	CH			0		0		0

Printed on 12/30/93 at 10:46:32.

Reference 21

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: January 5, 1994

TO: Don Falls, Environmental Specialist, HWP, DEQ

FROM: Edith Starbuck, Geologist, DGLS

SUBJECT: Existence of karst near the Mound Street Site

Sinkholes and caves can be found in the Mississippian bedrock within the target area. The sinkholes are represented as closed depressions on the Granite City topographic map. Also, the existence of karst features is discussed in the DGLS publication, "Engineering Geology of St. Louis County, Missouri". The karst aquifer probably does not directly underlie the site, however, and it is not likely to be affected by contaminant migration from the site. If the site is actually on the bedrock residual area, any water that percolates down into it should move toward the alluvial aquifer since groundwater movement is toward the river.

Please let me know if you have any further questions about the site geology (314)368-2136.

ES:kb

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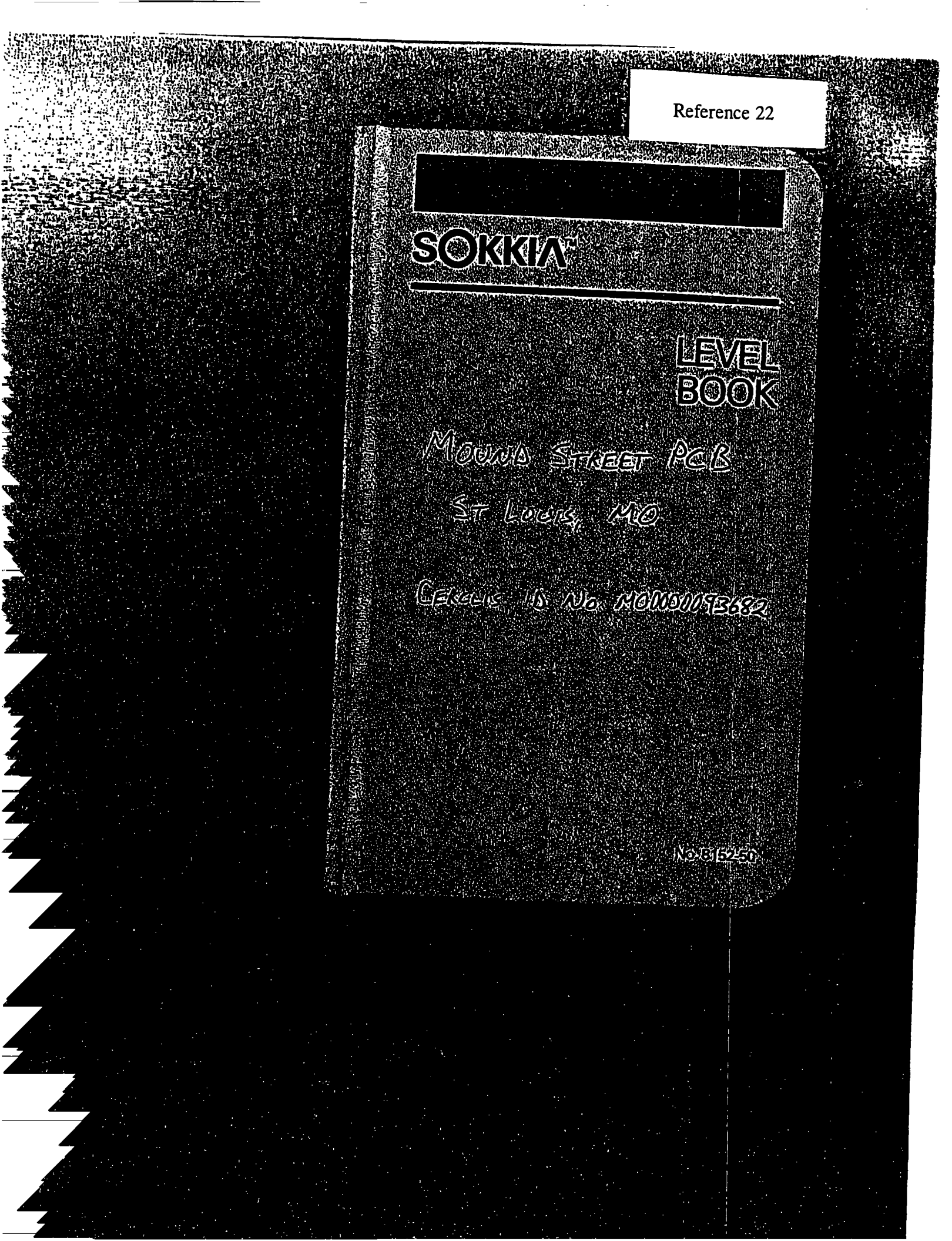
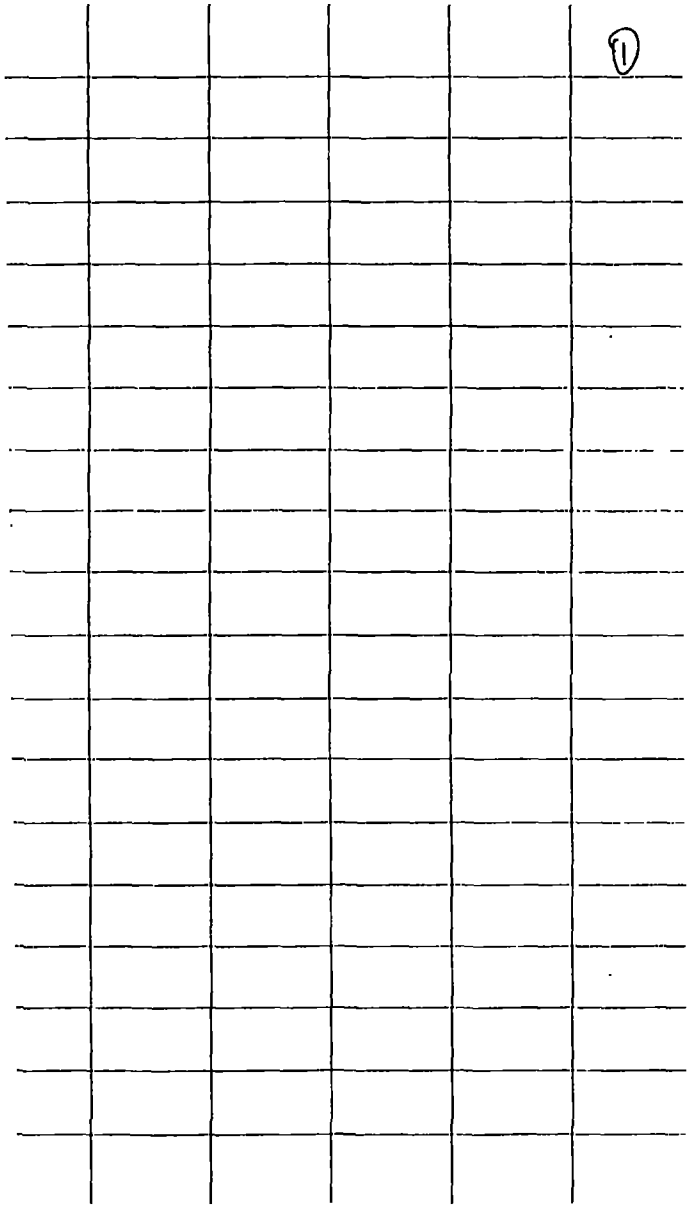
'94 JAN 7 AM 11 06
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Reference 22





② Site Recon visit - Dec 6, 1995

0700 Leave SvE Overland Park, KS Office

1100 Arrive SvE St Louis office
pickup Kevin Harris

1130 Leave SvE St Louis Office

1200 arrive site
begin making site schematic

1215 Herman arrives at site
interview him (McKinley Iron rep)

1230 Herman left site

temperature 30's
mostly cloudy, slight breeze

Michael W McCurdy
12/6/95

Map A ③

Michael W McCurdy
12/6/95

(4)

12:32 (1) looking north at south end of property

12:32 (2) looking north along gravel road

12:33 (3) looking ene toward flood wall

12:34 (4) looking south at north end of property

12:35 (5) looking east from west side

12:37 (6) looking sse from west side

12:38 (7) abandoned ground elevators to N (TRRA property)

[See map on preceeding page for picture location and viewing direction]

Michael W McCurdy
12/6/95

(5)

Herman Gallman interview 12:15-12:30

property size is approx 1.5 acres

basement may be as deep as 12-14' deep into the basement — don't know if removed concrete wall or floor

deeded abandoned pump house to city for bike path own since property east of site (between gravel road & flood wall)

property originally purchased from UE for salvage of equipment no other operations conducted at the site

Michael W McCurdy
12/6/95

(6)

- general drainage is to the east & southeast

(8) looking east from gravel road (Additional property)

(9) looking SSE from gravel road (Apex tanks)

(10) looking NNE from gravel road

(11) looking north along flood wall - pump station (MSD)

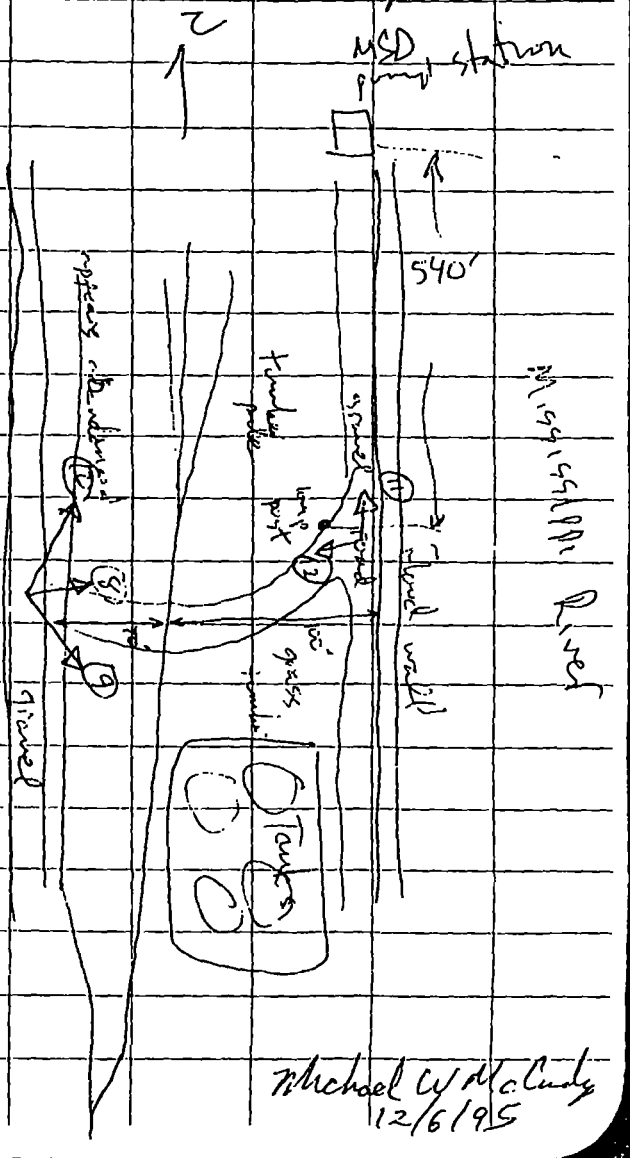
(12) looking west toward site

[See map on following page for picture location and viewing direction]

Michael W McCurdy
12/6/95

See Map A

Map B (7)



Michael W McCurdy
12/6/95

(8)

could not locate RW 12 & 11 from Corps map

Found identified MHs from corps map

UE MH abandoned

other MH abandoned

Inlet F of Corp map is for surface runoff - some runoff from site may enter this storm drain - however, it appears most surface runoff would travel east & south

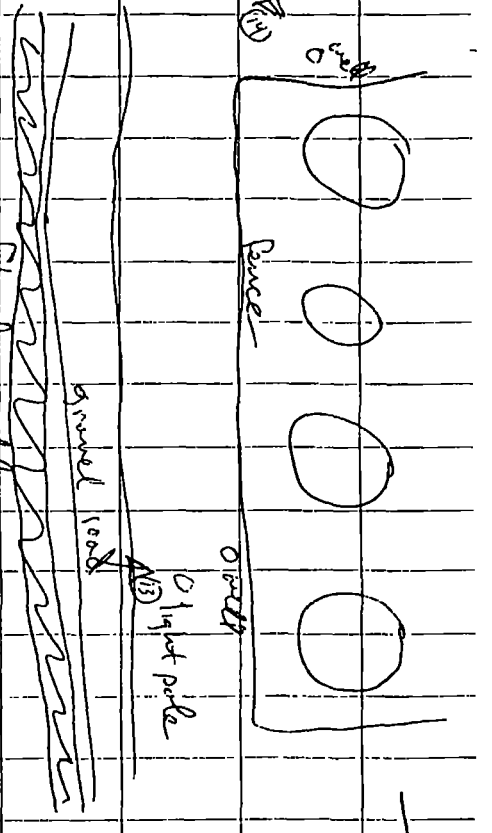
noted a dog in the Petroleum Fuel & Terminal main yard

Michael W McCurdy
12/6/95

12:58 (13) looking west at well

12:59 (14) looking NNW at well

Map C (9)



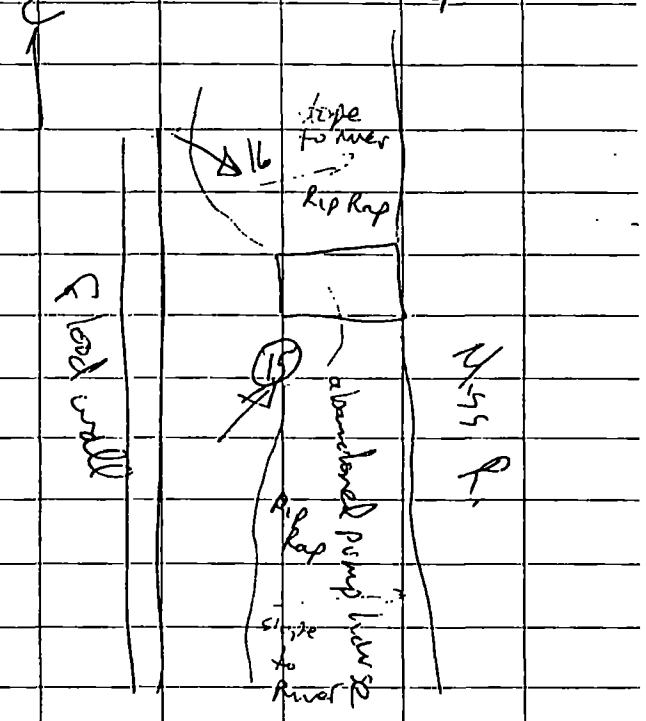
Michael W McCurdy
12/6/95

(10)

Michael W McCurdy
12/6/95

(11)

Map D



13:07 (15) looking ne at abandoned pump house

13:09 (16) looking sse at abandoned pump house

Michael W McCurdy
12/6/95

13:20 leave site

13:55 arrive SvE St Louis Office
drop off Kevin Harris

14:00 leave SvE St Louis Office

18:30 arrive SvE Overland Park, KS
office

Michael W McCurdy
12/6/95

Michael W McCurdy
4/1/96

Reference 23

REMEDIAL PLANNING ACTIVITIES AT SELECTED UNCONTROLLED HAZARDOUS SUBSTANCE DISPOSAL SITES IN THE ZONE OF REGIONS VI, VII, AND VIII

U. S. EPA CONTRACT NO. 68-W9-0032

FIELD SAMPLING PLAN

MOUND STREET PCB SITE
ST. LOUIS, MISSOURI

Revision 1

Work Assignment No.: 37-7JZZ

March 4, 1996

Prepared for:
U.S. Environmental Protection Agency

Prepared by:
Sverdrup Corporation, Inc.
4400 College Boulevard, Suite 160
Overland Park, Kansas 66211

Reference 24

SOKKIA™

LEVEL BOOK

MOUND STREET PCB

ST LOUIS, MO

CERCLIS ID NO. MO0000093682

No. 8152-50

(14)

Michael W McCurdy
4/1/96

(15)

Site visit - sample collection

April 1, 1996

1100 leave SVE Overland Park, KS

1600 arrive SVE St Louis
pick up equipment

April 2, 1996

0700 leave Riverport for site

0730 arrive site

Sunny day, 70°
windy

Michael W McCurdy 4/2/96

(16)

Michael W. McCurdy
4/2/96

(17)

0730 M. May calibrate HnU

M. McCurdy calibrate air samplers - see forms

E&E personnel on-site
Scott Hayes
Andy Mazzeo
Randy Schadenmann

Air sampling pumps
M. May - PCB (low flow)
R. Schadenmann - metals (yellow)
A. Mazzeo - VOC

Michael W. McCurdy
4/2/96

(18)

E&E personnel will be operating the geoprobe and decon of equipment

M. May to log holes see boring logs

M. May & M. McCurdy to collect samples

Photo 1 - Probe Point 1

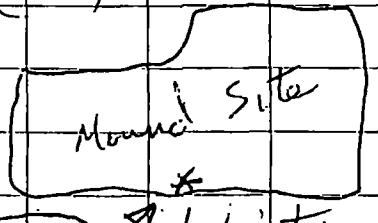
Michael W. McCurdy
4/2/96

(19)

850 water level measurement at south well - depth at 29.85' * casing height 3.25' depth = 26.60'

* top of casing - west side

915 Geoprobe setup dummy probe to see what to expect - hammering required water in last section depth at 18'

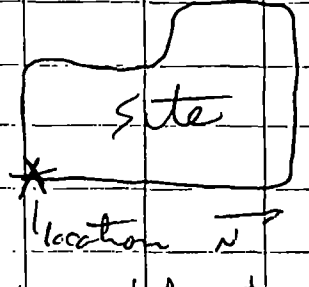


(20)

(21)

930 Sampling tube pushing
hit solid at 18.5'
water in sample tube
- concrete, brick in tube
- no reading on HNu
no sample
move to corner - South
hole backfilled with grout
not enough water to collect

955



solid at 19.5'
possibly old asphalt
road layer in 0-3'

Michael W. McCurdy
4/2/96

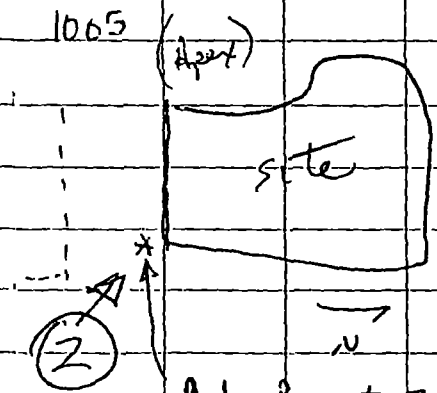
Michael W. McCurdy
4/2/96

(22)

Photo 2 – Sample 101

Michael W McCurdy
4/2/96

(23)



Probe Point 2 Hnu

sample at 17'-19' 101 None

~~Sample at~~ [illegible]

hit solid at 20'

moved over 1½' for

second aliquot at

17-19 feet

Sample 101

Michael W McCurdy
4/2/96

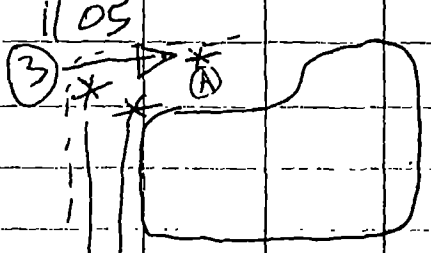
(24)

Photo 3 - abandoned area
debris rock & concrete
encountered -
no sample collected

Michael W McCurdy
4/2/96

(25)

1105



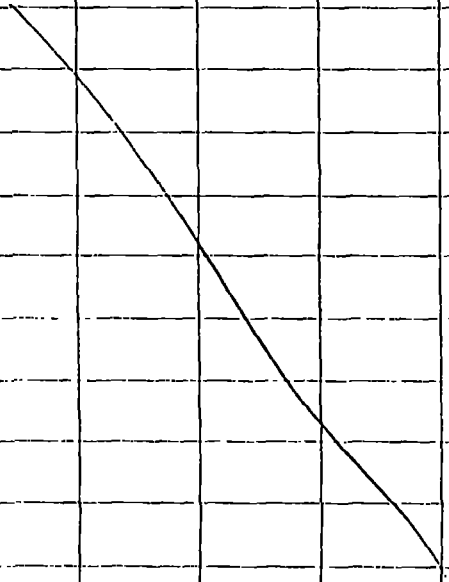
refusal at ~4'
refusal at ~1'
refusal at ~1'
A refusal at 16'
refusal at 14'
attempt sample 10-12
sample collected 2-3"
retrieval - concrete core
no soil

no sample collected

Michael W McCurdy
4/2/96

(26)

Photo 4 – abandoned area
no sample collected
rock & debris



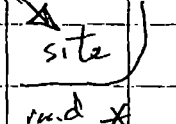
Michael W. McCurdy
4/2/96

(27)

1215

refusal at 15'
refusal 12-14 sample
bricks, gravel
~6" sample retrieval
moved east to middle of
road

(4) → site



mud *
~6" sample
rock gravel
minor sand
no sample

(28)

** Stated only one sample was collected at the former building location. We were going to move to the vacant area between the flood wall & site to collect the remaining samples. Requested Dave leave a message on my voice mail at 663-2108.

Michael W McCurdy
4/2/96

(29)

1307 pack trucks for lunch

1330 leave for lunch
Message with Dave Crawford at EPA *

14:10 arrive site
calibrate sampling pumps

* Stated we had attempted sample collection at the former building location & were having difficulty collecting samples due to concrete, brick & rock in the subsurface.
** (previous page)

Michael W McCurdy
4/2/96

(30)

14:20

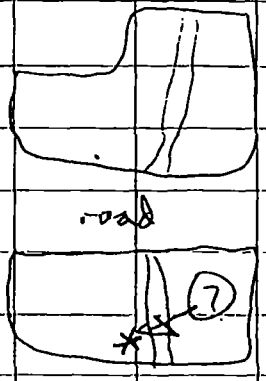
Photo 5 – Sample 103

Photo 6 – Sample 103

Photo 7 – location of geoprobe boring for 102/103

Michael W McCurdy
4/2/96

(31)



sample 16-18' attempt rock

	sample #	Hnu
sample 18-20'	102	none
sample 25'-27'	103	none

refusal at 27'

both samples submitted

Michael W McCurdy
4/2/96

(32)

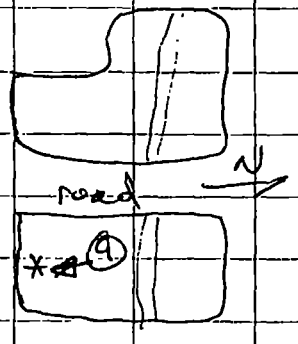
Photo 8 - sample 100

Photo 9 - location of 100 & 100D

Michael W McCurdy
4/2/96

(33)

1530

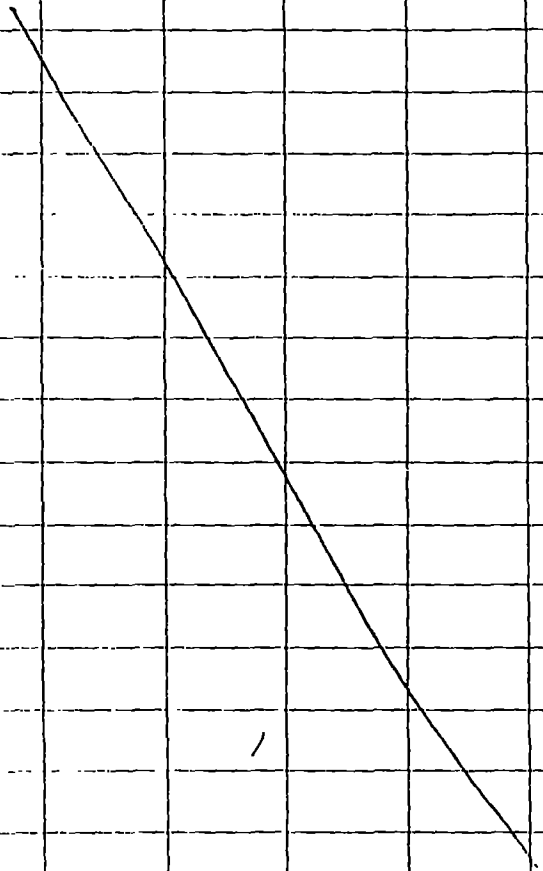


	Sample #	Hrs
Sample 25-27	100	none
Sample 25-27	100D	none

did not go beyond 27'

1610 Equipment rinsate from decontaminated sample tube after 100 soil - sample No. 008

Michael W McCurdy
4/2/96



1700 E&E personnel leave site

1715 S&E personnel leave site

1930 Message from Dave Crawford that there is not much else to do except move to the vacant area for the samples. No need to call in morning, but he will be in if needed.

Michael W. McCurdy
4/2/96

Michael W. McCurdy
4/2/96

(36)

(37)

April 3, 1996

0700 Equipment pickup
peristaltic pump works on AC when plugged in

0830 Arrive site
E&E already present

Randy Schademann
Scott Hayes
Andy Mazzeo
} E&E already on-site

Sunny day, 70°F
windy

Michael W McCurdy
4/3/96

Michael W McCurdy
4/3/96

(38)

Photo 10 - South of site

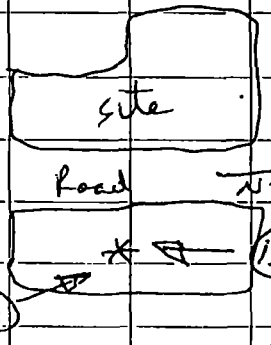
Photo 11 - Sample 104 location

Photo 12 - Sample 104 location

Michael W McCurdy
4/5/96

(39)

840

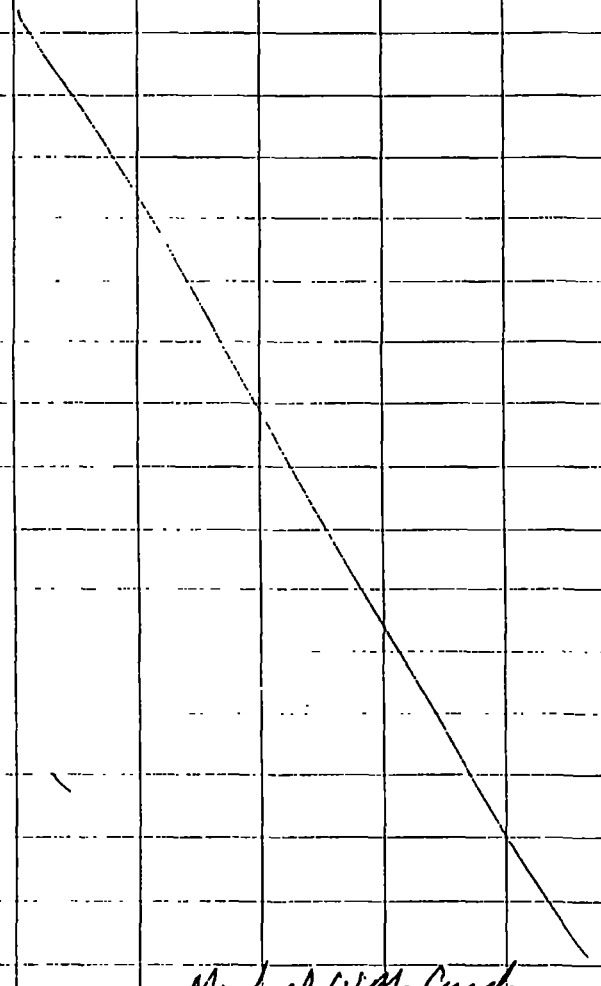


Sample	HRU
Sample 25'-27' 104	none

930 Randy to hotel to pick up shipped pump Mike May to call Wally to deliver another pump

Michael W McCurdy
4/5/96

(40)



Michael W McCurdy
4/8/96

(41)

845 Water sample From south well

plug in pump to battery on truck - pump does not work

E&E pump to arrive this morning

915 Field Blank 003

calibrate YSI meter pH only

Michael W McCurdy
4/3/96

(42)

Photo 13 - Equipment for well sampling water level meter, YSI & pump at North well

Photo 14 - Sampling of north well

Note:

pumping nearing the maximum range of the peristaltic type pump

south well pump

TAT Engineering

Model 410-660B

Series A-93

(43)

1010 Randy & Mike return with E&E pump

1020 South well

top of casing 29.32'

casing height 3.25'

water level 26.07 bgs

well depth 49.31

casing height 3.25

bottom of well 46.06 bgs

37' Tubing

1040 pumping began south well

	T°C	Conductivity	pH	
1044	~~20~~ 19.2	0.948	6.84	initial
1055	19.5	0.830	6.98	retro south well
1106	19.8	0.936	6.95	"
1122	19.9	0.935	6.98	"

pump rate is approximately 0.03 gpm

Michael W. McCurdy 4/3/96

(44)

Photo 15 - South well

Photo 16 - South well

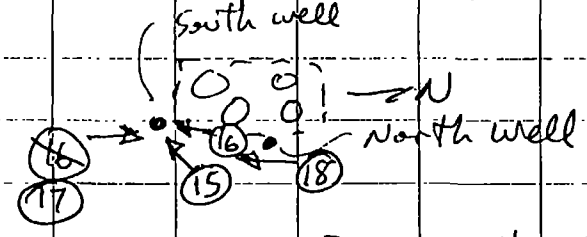


Photo 17 - From south well looking toward north well

Photo 18 - From north well looking toward south well

Michael W McCurdy
4/3/96

(45)

1128 South well

top of casing 29.58 ft

sample began 001

001D

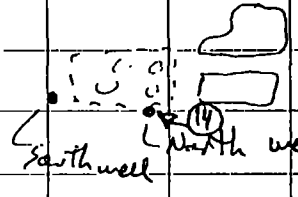
approximately 1.4 gallons removed during purging

water appears clear, no visible sediment or suspended matter. slight petroleum odor

Michael W McCurdy
4/3/96

(46)

Photo 13 - Pump & YSI setup at North well



Note: purging near the limit of the peristaltic type pump

Photo 14 - North well0

Michael W McCurdy
4/3/96

(47)

1130 North well

top of casing 28.43 north side
casing height 3.75
water level 24.68 bgs

well depth 51.02
casing height 3.75
well bottom 47.27 bgs
39' tubing

1148 pumping at north well

	T °C	conductivity	PH	
1152	18.6	.963	6.75	muted
1203	18.8	.958	6.80	clear, no solids
1214	19.7	.963	6.78	"

pumping rate is approx. 0.06 gpm

Michael W McCurdy 4/3/96

(48)

North well water -
appears clear
no visible suspended
matter or sediment
slight petroleum odor

Michael W McCurdy
4/3/96

(49)

1215 to north well
top of casing 28.54

sample began 002
approx. 1.4 gallons removed by purge

1245 sample north well
completed

1310 switch pumps at ~~north~~ south well

1335 sampling 001/0010
completed

Michael W McCurdy
4/3/96

(50)

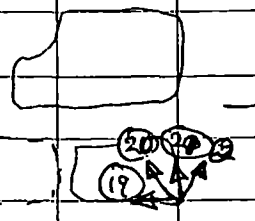


Photo 19 - Sampled area
Photo 20 - Sampled area
Photo 21 - Sampled area
Photo 22 - Sampled area

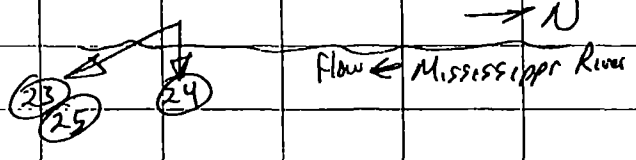


Photo 23 - Mississippi River
Photo 24 - Water intake on IL
Photo 25 - Mississippi River

Michael W McCurdy
4/3/96

(51)

1345	leave site
1445	arrive SVE St Louis office drop off equipment
1515	leave SVE St Louis Office
2015	arrive SVE overland park

Michael W McCurdy
4/3/96

(52)

Michael W McCurdy
4/4/96

(53)

April 4, 1996

10:30 Deliver samples to EPA at Funston Rd in Kansas City, KS

11:30 Arrive EPA

End of Log Book

Michael W McCurdy
4/4/96

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

27 November 1995

REPLY TO
ATTENTION OF:
Engineering Division
Geotechnical Branch

Reference 25

Mr. Mike May
Sverdrup Environmental, Inc.
4400 College Blvd., Suite 160
Overland Park, KS 66211

RE: Request for monitoring well maps, analytical data, well installation data, Mound Street PCB site, St. Louis, MO; Sverdrup Project No. 010865-37303

Dear Mr. May:

As you requested, please find enclosed maps of the construction of the St. Louis Floodwall, Reach 3, which contains Mound Street PCB site.

Please note that there are no relief wells indicated parallel with your site, the nearest wells are located to the north of Mound Street. I have not been able to locate any additional relief well information for the site area. Also, please note that there are a few manholes parallel with your site. These might be mistaken for relief wells. I have enclosed construction details of these manholes.

The sponsor, St. Louis Metropolitan Sewer District, has maintenance responsibility for the relief wells and manholes along the floodwall.

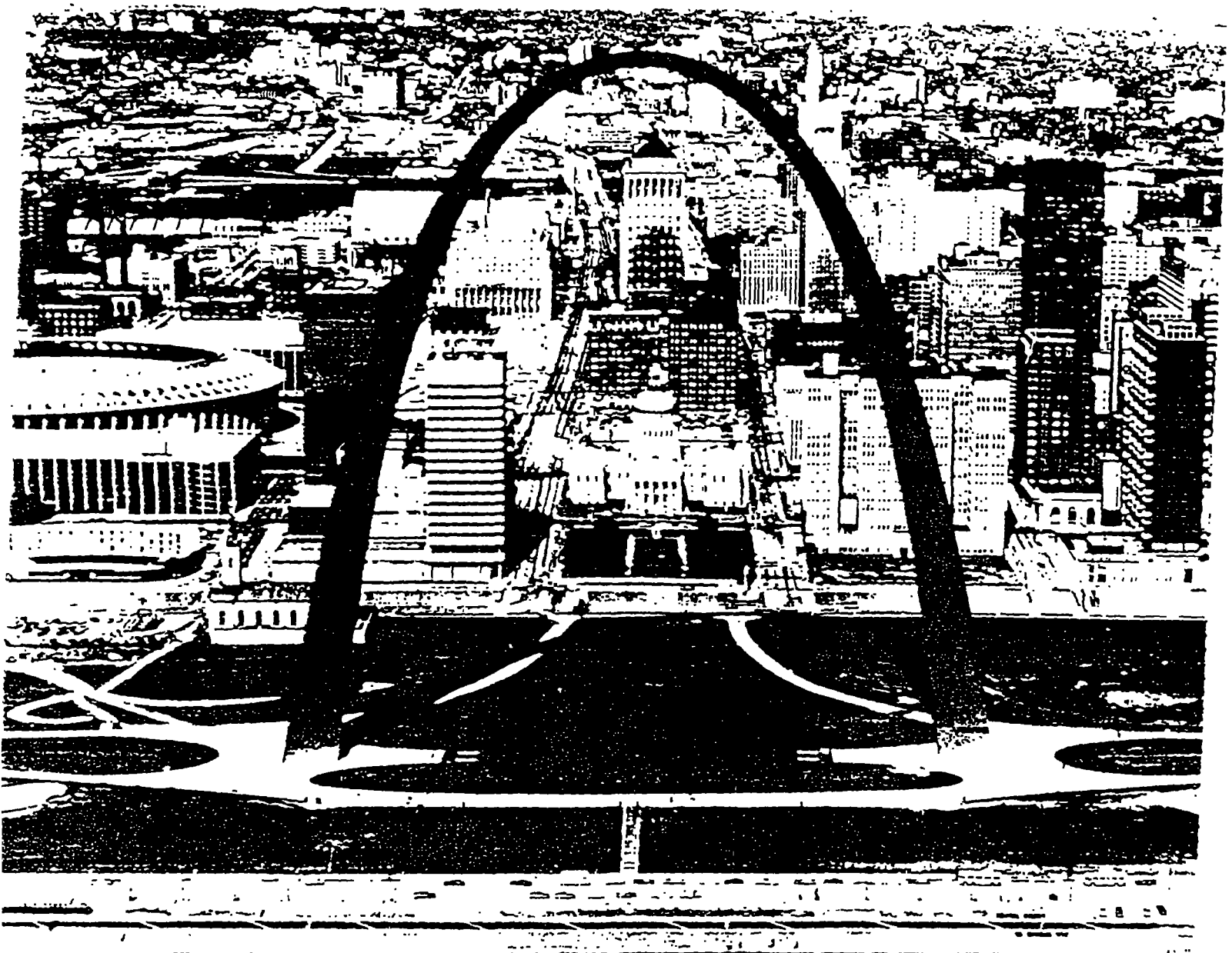
If you require additional information of the St. Louis Floodwall, please call me at (314) 331-8444.

Catherine W. Fox
Geology Section

Soil survey of

St. Louis County and St. Louis City, Missouri

Reference 26



United States Department of Agric
Soil Conservation Service
In cooperation with
Missouri Agricultural Experiment S

U.S. Department of Commerce
Economics and Statistics Administration
BUREAU OF THE CENSUS

1990 CPH-1-27

CENSUS '90

1990 Census of Population and Housing

Summary Population and Housing Characteristics

Missouri

Reference 27

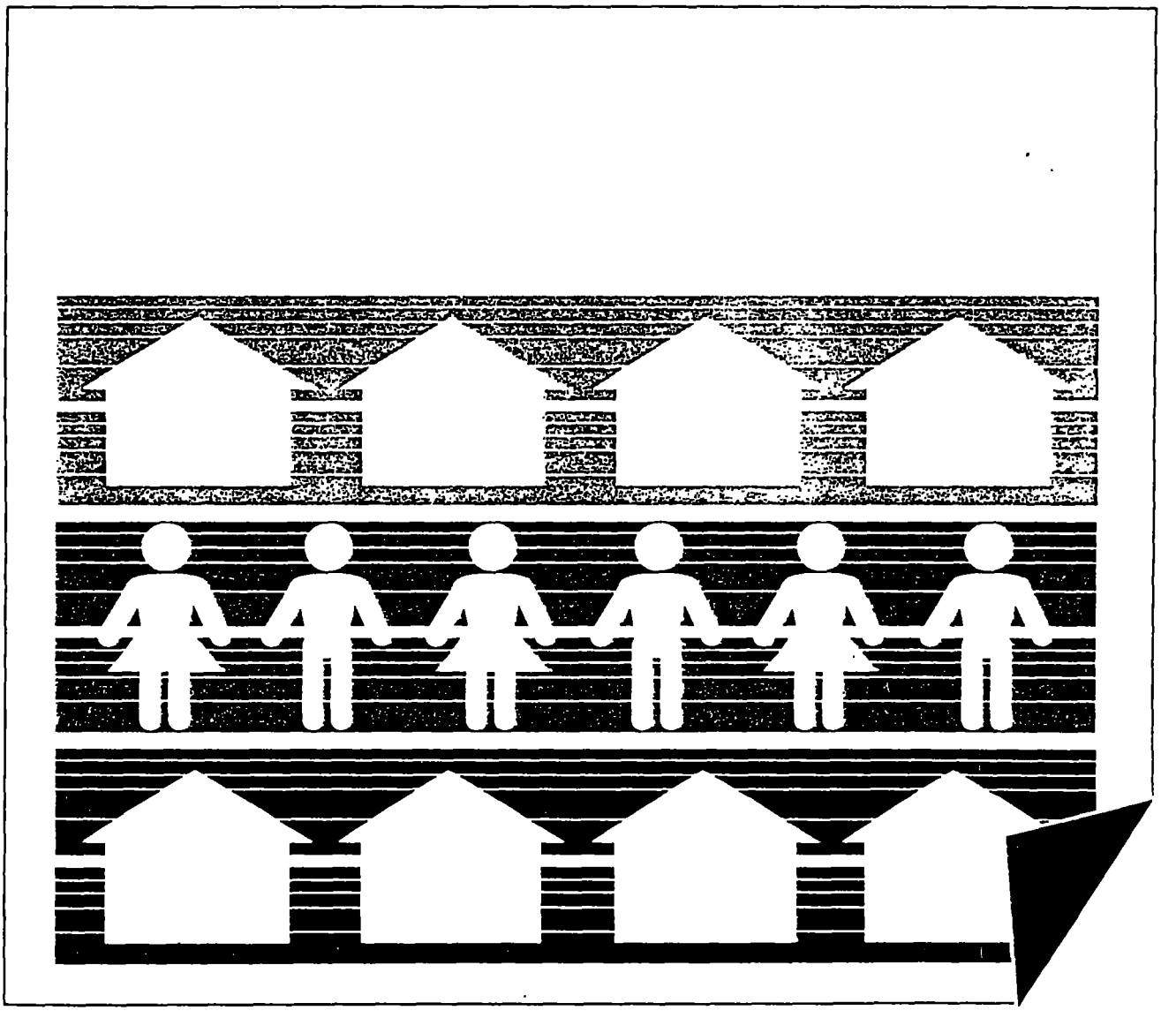


Table 5. Household, Family, and Group Quarters Characteristics: 1990—Con.

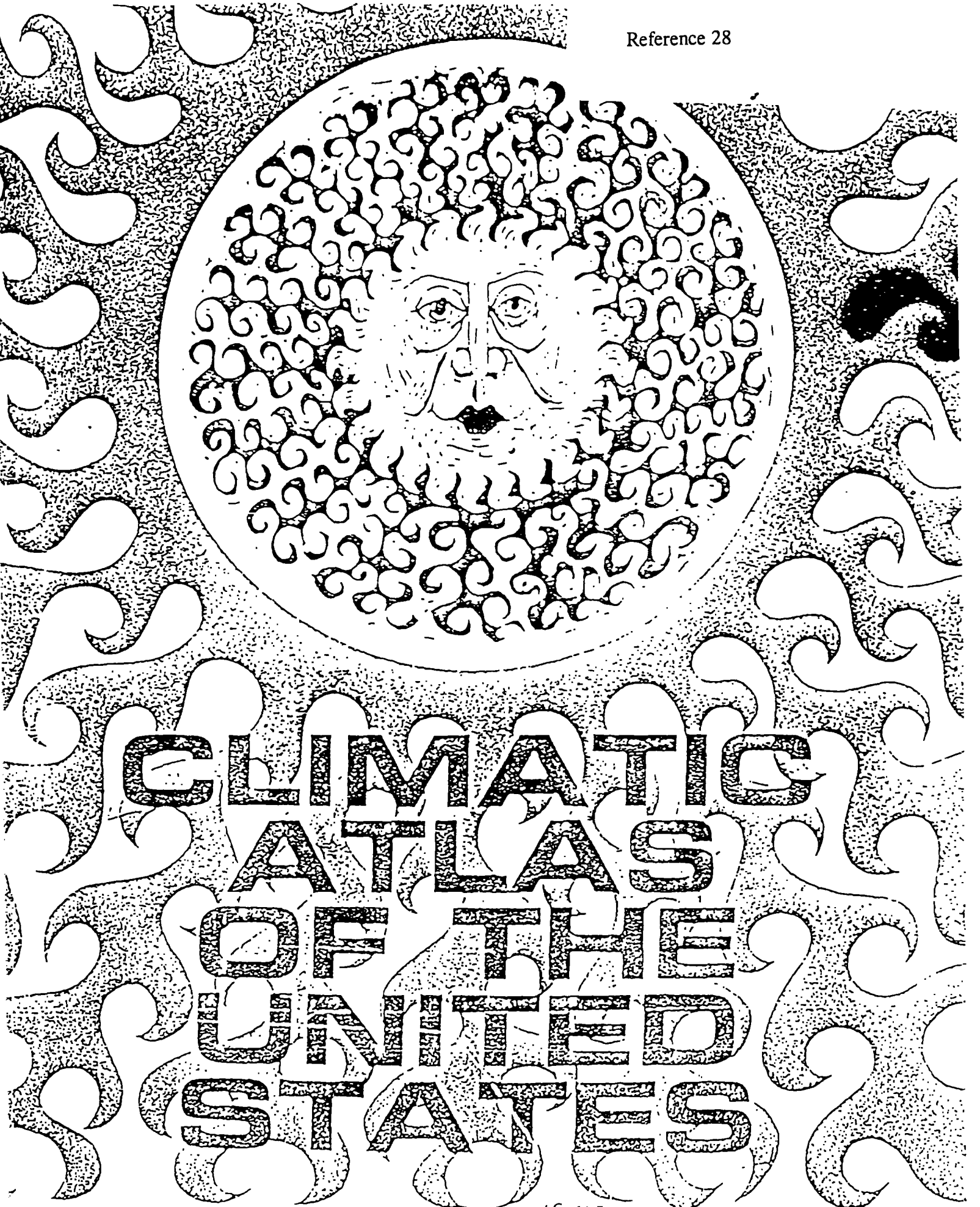
[For definitions of terms and meanings of symbols, see text]

State County County Subdivision Place	Persons in households	All households	Family households			Nonfamily households				Persons per—		Persons in group quarters		
							Householder living alone							
								65 years and over						
			Total	Married-couple family	Female householder, no husband present	Total	Total	Total	Female	Household	Family	Total	Institutionalized persons	Other persons in group quarters
St Charles County—Con														
Zumbehl township	11 415	4 480	3 000	2 489	382	1 480	1 219	232	185	2.55	3.17	181	170	11
St. Charles city (pt.)	7 947	3 359	2 048	1 679	271	1 311	1 092	203	160	2.37	3.08	181	170	11
St Peters city (pt)	4	1	1	1	–	–	–	–	–	4.00	4.00	–	–	–
St Clair County	8 267	3 499	2 441	2 148	222	1 058	986	608	478	2 36	2.88	190	190	–
Appleton township	1 516	666	419	364	49	247	232	155	130	2.28	2.96	68	68	–
Appleton City city	1 212	562	331	281	44	231	218	147	124	2 16	2.89	68	68	–
Butler township	1 249	547	363	306	41	184	167	114	93	2 28	2.81	96	96	–
Lowry City city	627	297	172	132	32	125	115	93	79	2.11	2.75	96	96	–
Center township	203	77	60	51	3	17	15	7	3	2 64	2.98	–	–	–
Chalk Level township	150	58	44	38	4	14	12	6	5	2 59	3.02	–	–	–
Collins township	604	236	182	156	22	54	50	28	25	2 56	2 98	–	–	–
Collins village	144	60	39	30	9	21	21	17	16	2.40	3.13	–	–	–
Dallas township	326	129	102	94	4	27	25	12	10	2.53	2.88	–	–	–
Gerster town	40	16	10	9	–	6	6	2	2	2 50	3.30	–	–	–
Doyal township	496	203	149	139	8	54	52	28	18	2 44	2.94	–	–	–
Vista village	50	24	17	17	–	7	7	4	3	2.08	2 53	–	–	–
Jackson township	260	114	80	76	3	34	30	17	11	2 28	2.75	–	–	–
Monegaw township	285	106	85	80	3	21	19	11	10	2.69	3 07	–	–	–
Osage township	204	80	62	56	4	18	16	6	5	2 55	2.94	–	–	–
Osceola township	1 403	650	403	335	57	247	238	153	118	2 16	2.81	26	26	–
Osceola city	729	387	197	155	40	190	187	127	101	1 88	2.68	26	26	–
Polk township	179	76	59	52	4	17	17	9	7	2.36	2.73	–	–	–
Roscoe township	503	211	162	147	10	49	47	27	18	2 38	2.75	–	–	–
Roscoe village	100	46	32	28	3	14	14	7	6	2 17	2.56	–	–	–
Speedwell township	437	177	137	127	7	40	35	18	13	2.47	2.80	–	–	–
Taber township	212	78	59	56	2	19	19	11	7	2 72	3 27	–	–	–
Washington township	240	91	75	71	1	16	12	6	5	2 64	2.87	–	–	–
Ste. Genevieve County	15 792	5 707	4 416	3 878	374	1 291	1 153	625	476	2 77	3.21	245	181	64
Beauvois township	1 723	600	465	405	39	135	119	69	50	2.87	3.35	49	–	49
St. Mary city	412	174	111	80	20	63	58	34	25	2.37	3 02	49	–	49
Jackson township	2 629	936	747	672	50	189	166	85	60	2 81	3 19	–	–	–
Bloomsdale city	353	142	102	92	5	40	39	28	23	2 49	3.04	–	–	–
Ste Genevieve township	8 524	3 154	2 375	2 064	230	779	707	392	317	2 70	3.19	183	181	2
Rocky Ridge village (pt)	56	29	19	19	–	10	9	4	2	1.93	2.37	–	–	–
Ste Genevieve city	4 364	1 793	1 212	989	183	581	536	308	260	2 43	3 04	47	47	–
Saline township	887	311	252	230	14	59	54	30	19	2.85	3.21	–	–	–
Union township	2 029	706	577	507	41	129	107	49	30	2 87	3 18	13	–	13
Rocky Ridge village (pt.)	306	127	93	83	6	34	26	9	4	2 41	2 76	–	–	–
St. Francois County	45 725	17 670	13 101	10 871	1 788	4 569	4 084	2 225	1 809	2.59	3 04	3 179	2 832	347
Big River township	1 435	550	433	379	36	117	88	45	34	2.61	2.90	–	–	–
Iron township	2 899	1 105	830	686	117	275	252	161	123	2 62	3 06	22	11	11
Bismarck city	1 557	604	441	355	69	163	152	104	83	2 58	3 06	22	11	11
Iron Mountain Lake city	632	240	174	141	28	66	60	35	23	2 63	3 11	–	–	–
Liberty township	1 482	546	450	409	27	96	93	50	30	2 71	3.04	–	–	–
Marion township	1 495	537	443	403	27	94	70	23	12	2 78	3 03	–	–	–
Pendleton township	2 255	823	654	565	64	169	150	84	47	2 74	3.10	83	59	24
Perry township	7 499	2 882	2 193	1 865	251	689	621	379	310	2 60	3 02	111	100	11
Bonne Terre city	3 819	1 474	1 037	819	180	437	405	264	228	2 59	3.17	52	41	11
Flat River city (pt.)	–	–	–	–	–	–	–	–	–	–	–	59	59	–
Leadwood city (pt)	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Randolph township	8 841	3 297	2 536	2 092	361	761	669	375	310	2 68	3 10	–	–	–
Desloge city (pt.)	3 714	1 461	1 074	881	155	387	340	185	153	2 54	3 01	–	–	–
Elvins city (pt)	1 137	417	324	262	56	93	85	49	39	2 73	3 13	–	–	–
Flat River city (pt.)	32	13	12	11	1	1	1	1	1	2 46	2 58	–	–	–
Leadwood city (pt)	1 247	448	358	282	62	90	84	52	45	2 78	3 17	–	–	–
Rivermines village (pt)	62	24	20	16	2	4	3	2	2	2 58	2 80	–	–	–
St Francois township	19 819	7 930	5 562	4 472	905	2 368	2 141	1 108	943	2 50	3 03	2 963	2 662	301
Desloge city (pt.)	331	130	101	85	13	29	27	8	7	2.55	2 95	105	105	–
Elvins city (pt.)	254	94	68	52	12	26	18	10	8	2.70	3 21	–	–	–
Esther city	1 071	422	294	210	69	128	116	63	58	2.54	3 07	–	–	–
Farmington city	8 927	3 749	2 522	2 079	378	1 227	1 136	610	522	2 38	2 98	2 671	2 557	114
Flat River city (pt)	4 717	1 871	1 286	961	278	585	530	297	258	2 52	3.08	15	–	15
Leadington city	201	90	60	44	15	30	29	10	7	2 23	2 73	–	–	–
Rivermines village (pt)	345	120	90	71	12	30	24	14	10	2 88	3 31	52	–	52
St. Louis County	975 815	380 110	270 421	219 468	40 657	109 689	93 532	35 078	28 674	2.57	3 10	17 714	12 586	5 128
Airport township	33 097	13 211	8 751	5 797	2 407	4 460	3 804	1 319	1 046	2.51	3 11	182	151	31
Bel-Ridge village (pt)	215	58	51	25	19	7	5	1	1	3.71	3 80	–	–	–
Berkeley city (pt.)	10 213	3 596	2 701	1 608	910	895	769	247	190	2.84	3 31	27	16	11
Breckenridge Hills village (pt)	701	281	203	110	83	78	55	13	7	2 49	2 84	–	–	–
Bridgeton city (pt.)	883	487	207	130	57	280	218	31	23	1.81	2.52	–	–	–
Cool Valley city (pt)	6	2	1	–	1	1	1	1	1	3 00	5 00	100	100	–
Edmundson village	1 111	429	288	205	65	141	112	43	33	2.59	3.18	–	–	–
Kinloch city (pt)	2 451	788	554	167	348	234	216	123	92	3.11	3 89	–	–	–
St. Ann city (pt)	11 525	5 213	3 044	2 237	628	2 169	1 868	632	508	2.21	2.89	55	35	20
St John city (pt)	1 591	616	451	350	77	165	138	58	47	2 58	3.04	–	–	–
Woodson Terrace city	4 362	1 728	1 243	960	218	485	418	168	143	2.52	2.99	–	–	–
Bonhomme township	37 258	14 934	10 452	8 788	1 330	4 482	3 976	2 053	1 710	2 49	3.06	638	582	56
Des Peres city (pt.)	508	152	142	136	2	10	8	2	–	3.34	3.46	–	–	–
Fenton city (pt)	3 290	1 103	955	849	74	148	128	47	32	2 98	3.23	56	56	–
Glendale city (pt)	1	1	–	–	–	1	1	–	–	1 00	–	–	–	–
Kirkwood city	27 002	11 212	7 583	6 355	987	3 629	3 205	1 572	1 320	2 41	3.00	289	239	50
Sappington CDP (pt)	572	184	170	159	8	14	11	5	4	3 11	3 20	–	–	–
Sunset Hills city (pt)	4 207	1 744	1 188	1 062	100	556	514	367	313	2.41	3 01	132	126	6
Clayton township	33 996	13 708	9 848	8 601	968	3 860	3 400	1 499	1 223	2 48	2 99	891	735	156
Clayton city (pt)	7 776	3 987	1 945	1 571	290	2 042	1 741	622	523	1 95	2 75	304	304	–
Creve Coeur city (pt)	1 666	601	513	480	21	88	74	28	22	2 77	3 03	309	218	91
Crystal Lake Park city	506	209	158	139	18	51	43	22	20	2 42	2 82	–	–	–
Des Peres city (pt)	4 676	1 671	1 412	1 278	108	259	229	121	91	2 80	3 09	102	102	–
Frontenac city	3 266	1 226	1 033	953	56	193	176	85	67	2 66	2 94	108	70	38
Glendale city (pt)	117	52	32	26	5	20	15	10	7	2.25	2.81	–	–	–
Huntleigh city	392	132	118	109	7	14	14	10	10	2.97	3 16	–	–	–
Ladue city (pt)	6 990	2 651	2 166	1 987	136	485	452	249	209	2.64	2.97	–	–	–
Rock Hill city (pt)	4 260	1 606	1 167	901	205	439	406	190	150	2 65	3 21	–	–	–
Town and Country city (pt)	1 548	515	440	415	17	75	72	46	28	3 01	3 33	68	41	27
Warson Woods city (pt)	2 049	773	646	592	47	127	120	86	72	2 65	2 96	–	–	–
Webster Groves city (pt)	433	154	114	52	56	40	36	22	17	2 81	3 36	–	–	–
Westwood village	309	129	103	97	2	26	22	8	7	2 40	2 66	–	–	–

Table 5. Household, Family, and Group Quarters Characteristics: 1990—Con.

(For definitions of terms and meanings of symbols, see text)

State County County Subdivision Place	Persons in households	All households	Family households			Nonfamily households				Persons per—		Persons in group quarters		
							Householder living alone							
								65 years and over						
			Total	Married-couple family	Female householder, no husband present	Total	Total	Total	Female	Household	Family	Total	Institutionalized persons	Other persons in group quarters
Worth County—Con.														
Muddlefork township	229	89	66	59	5	23	18	13	13	2 57	3 03	–	–	–
Worth town	103	37	27	24	2	10	7	5	5	2 78	3 33	–	–	–
Smith township	183	81	57	50	6	24	22	14	7	2 26	2 70	–	–	–
Allendale town	58	32	16	14	2	16	15	11	5	1 81	2 44	–	–	–
Union township	485	215	146	131	7	69	65	46	37	2.26	2 80	–	–	–
Sheridan town	174	91	49	44	4	42	42	34	28	1.91	2.67	–	–	–
Wright County	16 558	6 510	4 725	4 059	518	1 785	1 679	998	780	2 54	3 06	200	199	1
Boone township	893	321	255	227	21	66	58	26	21	2 78	3.20	–	–	–
Brush Creek township	510	177	143	127	12	34	32	13	10	2 88	3 26	–	–	–
Clark township	1 061	400	310	261	34	90	86	56	44	2.65	3.09	–	–	–
Norwood city (pt)	389	151	106	86	18	45	43	30	26	2 58	3 19	–	–	–
Elk Creek township	382	155	122	106	9	33	29	14	11	2.46	2 80	–	–	–
Gasconade township	1 051	381	292	256	26	89	81	46	32	2 76	3 22	–	–	–
Hartville city (pt.)	108	48	29	23	5	19	17	12	9	2.25	3 00	–	–	–
Hart township	1 061	452	292	256	28	160	154	111	87	2 35	3 03	7	7	–
Hartville city (pt.)	380	206	93	70	18	113	112	86	68	1 84	2.83	7	7	–
Montgomery township	533	189	154	134	15	35	34	16	12	2 82	3 14	–	–	–
Mountain Grove township	5 569	2 382	1 575	1 292	236	807	767	466	376	2 34	2 95	129	129	–
Mountain Grove city (pt)	4 141	1 860	1 158	916	208	702	667	416	341	2.23	2 89	27	27	–
Norwood city (pt)	60	26	17	15	1	9	9	4	3	2.31	3 00	–	–	–
Pleasant Valley township	2 638	1 011	730	619	94	281	258	156	120	2.61	3 15	64	63	1
Mansfield city	1 428	587	376	298	70	211	194	125	103	2 43	3 14	1	–	1
Union township	1 045	393	314	285	19	79	77	46	36	2 66	3 04	–	–	–
Van Buren township	550	194	154	144	5	40	37	16	12	2.84	3 25	–	–	–
Wood township	1 265	455	384	352	19	71	66	32	19	2.78	3 03	–	–	–
Mountain Grove city (pt)	7	1	1	1	–	–	–	–	–	7 00	7 00	–	–	–
St Louis city	385 916	164 931	90 945	50 557	33 864	73 986	64 677	26 519	20 788	2.34	3 21	10 769	5 900	4 869

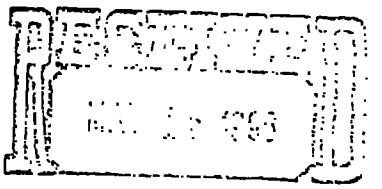


CLIMATIC ATLAS OF THE UNITED STATES

ntal Science Services Administration Environmental Data S

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
25 FUNSTON ROAD
KANSAS CITY, KANSAS 66115



DATE: May 3 1996

SUBJECT: Data Transmittal for Activity #: DC1CY
Site Description: Mound Street PCBs

FROM: Andrea Jirka, Program Manager
Regional Laboratory, Environmental Services Division

TO: Dave Crawford
SUPR

Attached is the data transmittal for the above-referenced site. The data contained in this transmittal have been approved by the Regional Laboratory. This should be considered a _____ Partial or _X_ Complete data transmittal (completes transmittal of _____). The Project Leader should notify the Regional Laboratory with 14 days of any changes in the LAST analytical database. If you have any questions, comments, or data changes, please contact Dee Simmons at 551-5129.

Attachment

cc: Analytical Data File

RECYCLE

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington DC 20460

EPA 540-R-92-021
Directive 9345.1-05
September 1992

Superfund

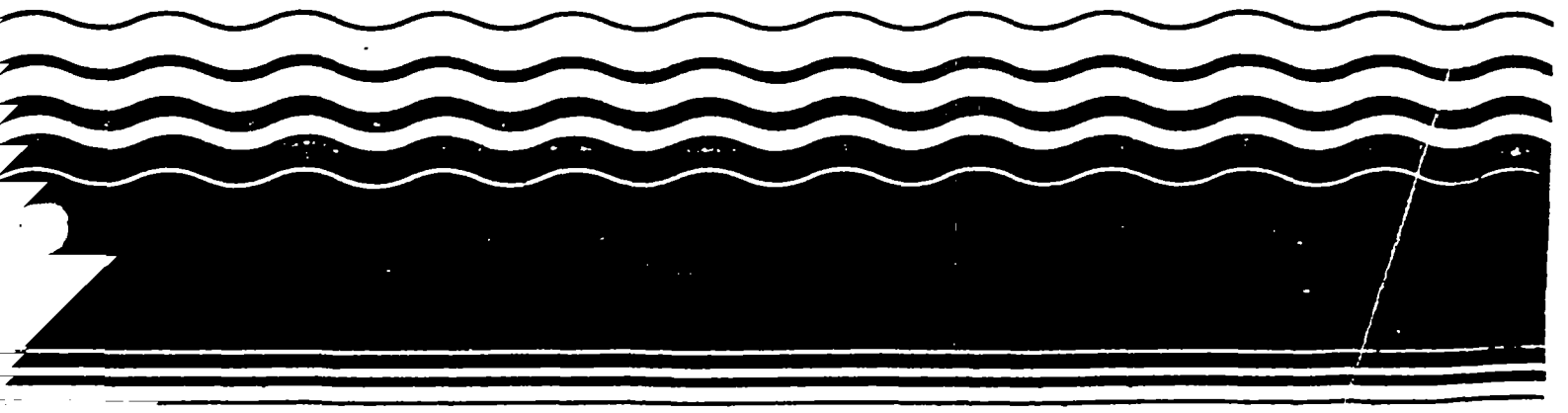
EPA

Guidance for Performing Site Inspections Under CERCLA

Reference 30

includes revised
C-33
C-44

Interim Final



United States Environmental Protection Agency
Office of Emergency and Remedial Response Washington, DC 20460
Publication September 1995
Superfund

EPA

Superfund Chemical Data Matrix

Reference 31

EPA540-R-92-026
OSWER Directive 9345.1-07
November 1992

Reference 32

The Hazard Ranking System Guidance Manual

Interim Final

Hazardous Site Evaluation Division
Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency
Washington, DC 20460

Friday
December 14, 1990

Reference 34

Part II

Environmental Protection Agency

40 CFR Part 300

Hazard Ranking System; Final Rule

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USCB, 2011

St. Louis (city), Missouri

People QuickFacts	St. Louis	Missouri
Population, 2012 estimate	318,172	6,024,522
Population, 2010 (April 1) estimates base	319,294	5,988,923
Population, percent change, April 1, 2010 to July 1, 2012	-0.4%	0.6%
Population, 2010	319,294	5,988,927
Persons under 5 years, percent, 2010	6.6%	6.5%
Persons under 18 years, percent, 2010	21.2%	23.8%
Persons 65 years and over, percent, 2010	11.0%	14.0%
Female persons, percent, 2010	51.7%	51.0%
White alone, percent, 2010 (a)	43.9%	82.8%
Black or African American alone, percent, 2010 (a)	49.2%	11.6%
American Indian and Alaska Native alone, percent, 2010 (a)	0.3%	0.5%
Asian alone, percent, 2010 (a)	2.9%	1.6%
Native Hawaiian and Other Pacific Islander alone, percent, 2010 (a)	Z	0.1%
Two or More Races, percent, 2010	2.4%	2.1%
Hispanic or Latino, percent, 2010 (b)	3.5%	3.5%
White alone, not Hispanic or Latino, percent, 2010	42.2%	81.0%
Living in same house 1 year & over, percent, 2008-2012	78.0%	83.6%
Foreign born persons, percent, 2008-2012	6.8%	3.9%
Language other than English spoken at home, pct age 5+, 2008-2012	9.3%	6.1%
High school graduate or higher, percent of persons age 25+, 2008-2012	82.3%	87.2%
Bachelor's degree or higher, percent of persons age 25+, 2008-2012	28.5%	25.8%
Veterans, 2008-2012	20,432	494,876
Mean travel time to work (minutes), workers age 16+, 2008 -2012	24.2	23.2
Housing units, 2010	176,002	2,712,729
Homeownership rate, 2008-2012	45.6%	69.0%
Housing units in multi-unit structures, percent, 2008-2012	52.9%	19.7%
Median value of owner-occupied housing units, 2008-2012	$121,700	$138,400
Households, 2008-2012	139,840	2,358,270
Persons per household, 2008-2012	2.20	2.46
Per capita money income in past 12 months (2012 dollars), 2008-2012	$22,551	$25,546
Median household income, 2008-2012	$34,384	$47,333
Persons below poverty level, percent, 2008-2012	27.0%	15.0%

Business QuickFacts	St. Louis	Missouri
Total number of firms, 2007	23,637	501,064
Black-owned firms, percent, 2007	21.4%	4.9%
American Indian- and Alaska Native-owned firms, percent, 2007	0.6%	0.6%
Asian-owned firms, percent, 2007	5.1%	1.9%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	S	0.1%
Hispanic-owned firms, percent, 2007	1.4%	1.2%
Women-owned firms, percent, 2007	28.3%	26.1%
Manufacturers shipments, 2007 ($1000)	10,920,629	110,907,604
Merchant wholesaler sales, 2007 ($1000)	5,042,147	81,032,913
Retail sales, 2007 ($1000)	2,496,672	76,575,216
Retail sales per capita, 2007	$7,020	$12,957
Accommodation and food services sales, 2007 ($1000)	1,059,295	11,070,634

Geography QuickFacts	St. Louis	Missouri
Land area in square miles, 2010	61.91	68,741.52
Persons per square mile, 2010	5,157.5	87.1
FIPS Code	65000	29
Counties		

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

D: Suppressed to avoid disclosure of confidential information
F: Fewer than 25 firms
FN: Footnote on this item for this area in place of data
NA: Not available
S: Suppressed; does not meet publication standards
X: Not applicable
Z: Value greater than zero but less than half unit of measure shown

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, County Business Patterns, Economic Census, Survey of Business Owners, Building Permits, Census of Governments
Last Revised: Thursday, 27-Mar-2014 09:56:08 EDT

Laclede Coal Gas,
St. Louis City, Missouri
Site Reassessment, USEPA, 1996

Tim Lacy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

OCT 02 1996

RECEIVED
OCT 04 1996
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Mr. Robert Zeman
Metropolitan Sewer District (MSD)
Department of Environmental Compliance
10 East Grand
St. Louis, Missouri 63147

Dear Mr. Zeman:

RE: Mound Street PCB Site
St. Louis, Missouri

Several months ago your department became aware that the U.S. Environmental Protection Agency (EPA) was investigating the Mound Street PCB (Polychlorinated Biphenyls) Site in St. Louis under our Superfund program. I was asked to provide a copy of EPA's investigation report once it was completed.

Your department wanted this report in order to know what types of contamination might be encountered should your department need to dig into the subsurface in order to repair or replace sewer lines at or near the site. Unfortunately my notes do not indicate to whom I was to send this report.

A copy of our June 6, 1996 Screening Site Inspection Report on the Mound Street PCB Site is enclosed for your department's information. Included in this report is a summary of the levels of contamination that were found at the site in this investigation. Please see to it that this report is shared with the appropriate personnel in your department.

The levels of contamination found, the setting of the site, and the potential for human exposures were such that the EPA Superfund program does not intend to undertake additional actions at this time on this site. We would reassess this decision should we receive additional information relevant to this determination.

Nonetheless, there remains the potential that digging into the subsurface of portions of the site that EPA could not sample might encounter potentially significant levels of contamination. Therefore, we would recommend that your department consider the need for additional testing should you need to dig into the subsurface at this site in areas of potential contamination.

RECYCLE
PAPER CONTAINS RECYCLED FIBERS

Please contact me at (913) 551-7702 if there area any questions about this site.

Sincerely

David V. Crawford
Site Assessment Manager
Site Assessment and Cost Recovery
Superfund Division

Enclosure: June 6, 1996 Screening Site Inspection Report Mount Street PCB Site

cc: Julie Warren, Missouri Department of Natural Resources
Tim Lacy, Missouri Department of Natural Resources
Mike McCurdy, Sverdrup Environmental

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USEPA, 2012

Tim Bishop
Terminal Manager
Center Point Terminal Company – St. Louis Terminal
Foot of Mullanphy Street
St. Louis, Missouri 63102

Dear Mr. Bishop:

Re: Facility Response Plan Inspection – FRP07A0079

On May 23, 2012, representatives of the U.S. Environmental Protection Agency conducted an inspection at your facility. The inspection was conducted in accordance with the requirements of the Clean Water Act, as amended by the Oil Pollution Act of 1990 and codified at 40 CFR part 112. A copy of the completed FRP Field Inspection Checklist is enclosed for your information.

The EPA is presently reviewing the findings of the report to determine your facility's compliance with the applicable statutes and regulations. If it is determined that violations exist, the EPA reserves all rights it may have to take appropriate enforcement action.

The EPA would like to thank Center Point Terminal Company – St. Louis Terminal for the effort expended and cooperation with the interview conducted during the inspection.

If there are any questions regarding this report, please contact me at (913) 551-7630.

Sincerely,

Megan Schuette
Federal On-Scene Coordinator
Planning and Preparedness South Section

Enclosure

SUPR\ERSB\Schuette\Krell H:\SUPR\ERNB\Schuette\2012\ center point STL – FRP inspection letter 06.20.12.doc

PPSS	PPSS	PPSS
Schuette	Doherty	Peterson
MS 6/28/2012	6/29/12	MPP 7/2/12

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

JUL 2 2012

Tim Bishop
Terminal Manager
Center Point Terminal Company – St. Louis Terminal
Foot of Mullanphy Street
St. Louis, Missouri 63102

Dear Mr. Bishop:

Re: Facility Response Plan Inspection – FRP07A0079

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Sincerely,

Megan Schuette

Megan Schuette
Federal On-Scene Coordinator
Planning and Preparedness South Section

Enclosure

RECYCLE
PAPER CONTAINS RECYCLED FIBERS

REGION 7 FACILITY RESPONSE PLAN (FRP)

FIELD INSPECTION CHECKLIST

FRP ID	FRP07A0079	INSPECTION #	MS2012-FRP-02
DATE	5/23/2012		
INSPECTOR'S NAME	Megan Schuette		
SIGNATURE	Megan Schuette		

FACILITY INFORMATION			
FACILITY NAME	Center Point Terminal Company – St. Louis Terminal		
ADDRESS	Foot of Mullanphy Street		
CITY	St. Louis	COUNTY	St. Louis City
STATE	Missouri	ZIP	63102
LATITUDE	38.64306	LONGITUDE	-90.18306
SOURCE COORDINATES INFORMATION	FRP		
FACILITY CONTACT NAME	Tim Bishop	TITLE	Terminal Manager
TELEPHONE #	314-621-0522		
NAME OF OWNER/OPERATOR	Center Point Terminal Co. (operator – Petroleum Fuel & Terminal Co.)		
ADDRESS	8235 Forsyth Boulevard, Suite 400		
CITY	Clayton		
STATE	Missouri	ZIP	63105
TELEPHONE #	314-889-0214		
DATE FACILITY STARTED OPERATIONS	1903	DATE FIRST REQUIRED FRP	1994
		LAST PLAN REVISION DATE	6/2011
AST CAPACITY	14,668,000 gals	UST CAPACITY	n/a
CAPACITY OF LARGEST AST	3,403,176 gals	WORST CASE DISCHARGE (WCD)	3,403,176 gals (asphalt)

DESCRIPTION OF BUSINESS OPERATIONS:
Bulk storage tank facility (asphalt)

TYPE OF FACILITY (check all that apply):

- ☒ Onshore
- ☐ Offshore
- ☐ Oil well drilling
- ☐ Oil production
- ☐ Oil refining
- ☒ Oil storage
- ☐ Industrial
- ☐ Transformers/oil-filled equipment
- ☒ Commercial
- ☐ Agricultural
- ☐ Public
- ☐ Waste treatment
- ☒ Loading racks
- ☒ Vehicles/rail cars (in facility)
- ☐ Pipelines (in facility)
- ☐ Oil drum storage areas

COMPLEX FACILITY	☒ USCG ☐ OPS	PERSONNEL	# Employees: 7 ☐ Facility is unmanned

ESTIMATED DISTANCE TO WATERWAY AND ROUTE OF ENTRY:
Mississippi River - adjacent

*NOTES/COMMENTS:

CERTIFICATION OF APPLICABILITY		
	YES	NO*
Facility is subject to FRP requirements, as per applicability of Substantial Harm Sheet (Section 2.2).	☒	☐
If "NO", a copy of Attachment C-II form is filled out and maintained at the facility.	☐	☐
Applicable self-determination harm factors *(check all that apply)*: ☒ Facility transfers oil over water to/from vessels and has a total oil storage capacity greater than or equal to 42,000 gallons. ☐ Facility has total oil storage capacity greater than or equal to one million gallons and lacks adequate secondary containment. ☒ Facility has total oil storage capacity greater than or equal to one million gallons and is located such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments. ☐ Facility has total oil storage capacity greater than or equal to one million gallons and is located such that a discharge from the facility could cause shut down a public drinking water intake. ☐ Facility has total oil storage capacity greater than or equal to one million gallons and experienced a reportable discharge in an amount greater than or equal to 10,000 gallons within the last five years.		
	YES	NO*
The EPA Regional Administrator (RA) has determined that this facility has the potential to cause "significant and substantial harm".	☒	☐
If "YES", the FRP has been approved by the EPA RA.	☒	☐
*NOTES/COMMENTS:		

PLAN		
	YES	NO*
Spill notification call-down list in the FRP contains the correct telephone number for all federal, state, and local agencies, as well as spill notification hotlines.	☒	☐
Copy of FRP is **available at the facility**.	☒	☐
Copy of ERAP is **available at the facility**.	☒	☐
Emergency contact information **has been verified as current**.	☒	☐
Evacuation plan is readily accessible.	☒	☐
*NOTES/COMMENTS: - Emergency contact information is verified at least once a year; last verification in March 2012		

VERIFICATION OF HAZARD EVALUATION AND DISCHARGE SCENARIOS		
	YES	NO*
Facility total oil storage capacity corresponds to storage capacity reported in the Plan.	☒	☐
Secondary containment is adequate for all aboveground storage tanks. *If "NO", note tank(s) that lack adequate secondary containment in the notes/comments section below.*	☒	☐
Site plan diagram appears to accurately represent the facility.	☒	☐
Site drainage plan appears to accurately represent the site drainage conditions.	☒	☐
Following factors affecting response efforts are properly addressed/characterized:		
Discharge volume	☒	☐
Proximity to downgradient water	☒	☐
Proximity to fish and wildlife and sensitive environments	☒	☐
Proximity to public drinking water intakes	☒	☐
Likelihood that discharge will travel off-site	☒	☐
Location of material spilled (i.e., on concrete pad or soil)	☒	☐
Type of material discharged	☒	☐
Weather or aquatic conditions anticipated during adverse conditions	☒	☐

Available remediation equipment	☒	☐
Probability of a chain reaction or failures	☒	☐
Direction of spill	☒	☐
WCD scenario described in Plan is accurate (e.g., source and impacts)	☒	☐
Medium discharge scenario described in Plan is accurate (e.g., source and impacts)	☒	☐
Small discharge scenario described in Plan is accurate (e.g., source and impacts)	☒	☐
History of all reportable discharges at the facility is maintained with the FRP. *Spill history should describe the date of the spill, discharge cause, material discharged, amount discharged, amount that reached waters, effectiveness and capacity of secondary containment, cleanup actions taken, steps taken to reduce possibility of recurrence, total oil storage capacity of tanks from which material was discharged, enforcement actions, effectiveness of monitoring equipment, spill detection.*	☒	☐
*NOTES/COMMENTS:		

RESPONSE PERSONNEL

	YES	NO*
Qualified Individual (QI) information (name, title, telephone #s) is current.	☒	☐
QI is aware of, and prepared to fulfill, responsibilities:		
Activate internal alarms and hazard communication systems	☒	☐
Notify response personnel	☒	☐
Identify character, exact source, amount, and extent of the release	☒	☐
Notify and provide information to appropriate federal, state, and local authorities	☒	☐
Assess interaction of spilled substances with water and/or other substances stored at the facility and notify on-scene response personnel of assessment	☒	☐
Assess possible hazards to human health and the environment	☒	☐
Assess and implement prompt removal actions	☒	☐
Coordinate rescue and response actions	☒	☐
Access company funding to initiate cleanup activities	☒	☐
Direct cleanup activities	☒	☐
QI has specific response training experience.	☒	☐
Facility personnel are familiar with procedures for detecting a discharge.	☒	☐
*NOTES/COMMENTS: - QI has had 40-hour HAZWOPER training and takes an 8-hour HAZWOPER refresher annually		

RESPONSE EQUIPMENT

Required response resources for a **small discharge** are provided (identify whether responsibility of the facility or response contractor/co-op). *Note any missing equipment in the "notes/comments" section below.*

☒ **1,000 ft of boom** or, if a marine transfer facility, boom equal to twice the length of the largest vessel.
☒ Facility ☐ Contractor/Co-op

☒ Capacity of deploying boom **within one hour** of a small discharge.
☒ Facility ☐ Contractor/Co-op

☒ **Response equipment capable of being deployed within two hours** of a small discharge.
☐ Facility ☒ Contractor/Co-op

☒ Response equipment **daily recovery capacity equal to the total volume of the small discharge**.
☐ Facility ☒ Contractor/Co-op

☒ Temporary **storage capacity equal to TWICE the volume of the small discharge**.
☒ Facility ☐ Contractor/Co-op

Required response resources for a **medium discharge** are provided (identify whether responsibility of the facility or response contractor/co-op). *Note any missing equipment in the "notes/comments" section below.*

☒ Sufficient quantities of boom for containment and collection and for protection
☒ Facility ☐ Contractor/Co-op

☒ Response equipment daily recovery capacity equal to 50% of the total volume of the small discharge.
☐ Facility ☒ Contractor/Co-op

	YES	NO*
Facility has a **current** signed contract with a response contractor and/or evidence of membership in a cleanup cooperative in which the facility has a signed letter of membership. **Records should include the name of contractor/co-op, contract expiration date, monetary limits (if any), and nearest location(s) of contractor/co-op equipment and personnel (city and state).* CONTRACTOR NAME: Heritage Environmental CONTRACT/AGREEMENT EXPIRATION DATE: open → pay annual fee	☒	☐
If "YES", facility has evidence of the contractor's equipment deployment exercises (annually).	☒	☐
Facility has its own response equipment.	☒	☐
If "YES", facility response equipment is regularly inspected. **Check facility equipment inventory and inspection logs. Logs should provide the equipment inventory, inspection frequency, and date of last inspection or equipment test.*	☒	☐
The following equipment is provided and, if so, is **operational, accessible, and has adequate capacity:** *Note any deficiency in the notes/comments section below.*	YES	NO*
Skimmers	☐	☒
Pumps	☒	☐
Containment booms	☒	☐
Sorbents	☒	☐
Chemical countermeasures	☐	☒
Communications equipment	☒	☐
Firefighting equipment	☒	☐
Personal protective equipment	☒	☐
Other equipment, boats, motors, etc. *Specify: boat, tractor*	☒	☐
Facility has established procedures for recovering, reusing, decontaminating, or disposing of materials.	☒	☐
*NOTES/COMMENTS: - Facility has a procedure for recycling materials – if material is unable to be recycled, it will be hauled to the landfill as a special waste.		

SELF-INSPECTION, TRAINING AND MEETING LOGS

	YES	NO*
Records of tank inspections are maintained. **Check last 5 years of records.*	☒	☐

The following industry standard(s) are used to inspect aboveground bulk storage containers at this facility *(check all that apply)*:

☐ Steel Tank Institute (STI) SP-001
☒ American Petroleum Institute (API) Standard 653
☐ Hybrid program developed by Professional Engineer
☐ Other (*specify in the notes/comments section below)*

	YES	NO*
Records of secondary containment inspections are maintained. **Check last five years of records.*	☒	☐

Automatic discharge detection/prevention systems are inspected/tested regularly (overfill alarms, high-level alarms, etc.)	☒	☐
Discharge prevention meetings are held periodically. **Check last five years of records. Verify that logs include the topics discussed and the list and signatures of attendees.*	☒	☐
*NOTES/COMMENTS: - No automatic discharge/prevention systems – visual only - Discharge prevention is addressed at monthly safety meetings		

FACILITY DRILLS/EXERCISES		
	YES	NO*
Facility drills/exercises program is based on PREP.	☒	☐
If "NO", has the alternate program been approved by the EPA RA? *(Describe alternate program in the notes/comments section below)*	☐	☐
QI Notification Drills (quarterly) **Check last five years of records. Records should contain the relevant information (date, company, QI, signature, emergency scenario, evaluation).*	☒	☐
Spill Management Team Tabletop Exercises (annually) **Check last five years of records. Records should contain the relevant information (date, company, QI, emergency scenario, evaluation, changes to be implemented, and time table for implementation).*	☒	☐
Facility Equipment Deployment Exercises (semi-annually)	☒	☐
Unannounced Exercise (annually)	☒	☐
Area Exercises	☐	☒
*NOTES/COMMENTS: - Two boom deployments are conducted annually, one of which is unannounced		

ADDITIONAL COMMENTS AND OVERALL EVALUATION
Provide additional comments and/or an overall evaluation of the facility's capacity to implement the FRP. (e.g., considering familiarity with the FRP, training and capacity of personnel on-site, availability of equipment, both on-site and provided by OSRO, and likely response time)
COMMENTS:

Attachment #1
Site Photos

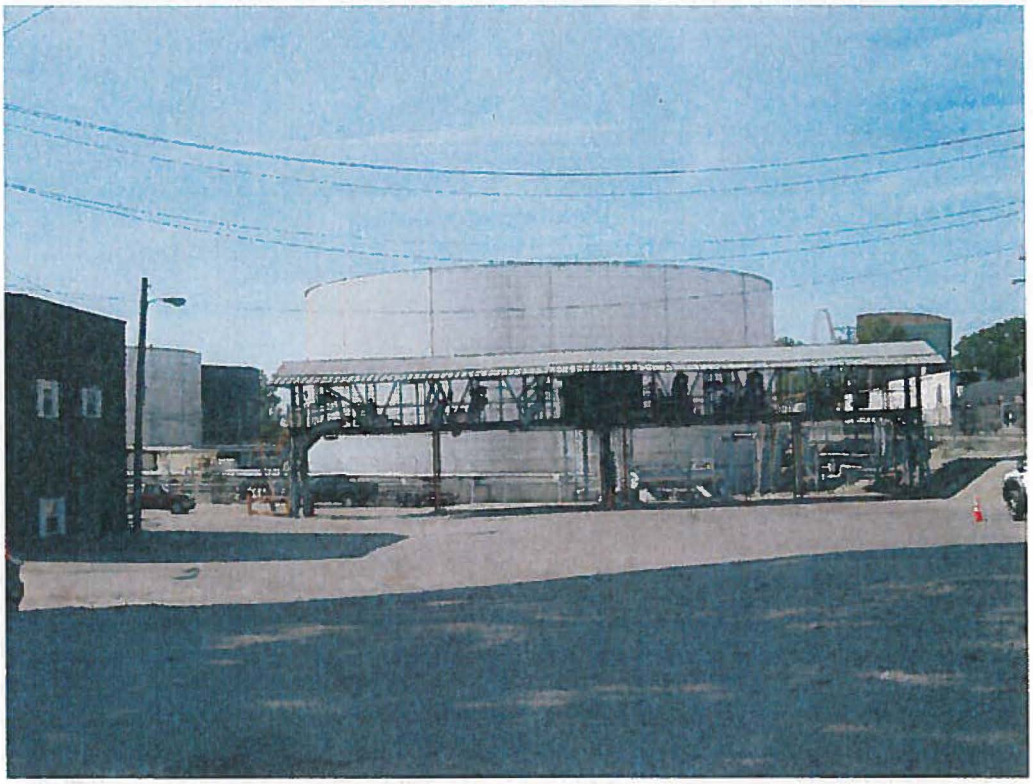


Photo #1 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0901
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Truck loading rack

Photo #2 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0906
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Storage tank inside containment

Photo #3 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0910
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Facility piping

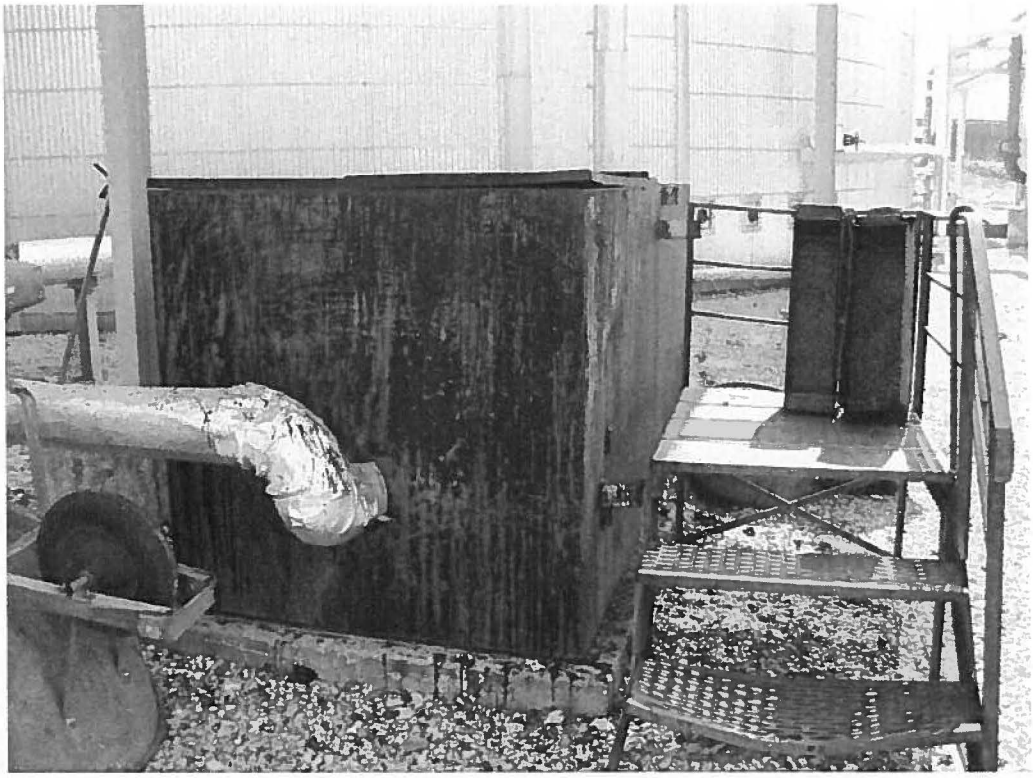


Photo #4 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0914
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Asphalt recovery tank

Photo #5 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0915
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Facility-owned boat for river boom deployment

Photo #6 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0917
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Label on tank

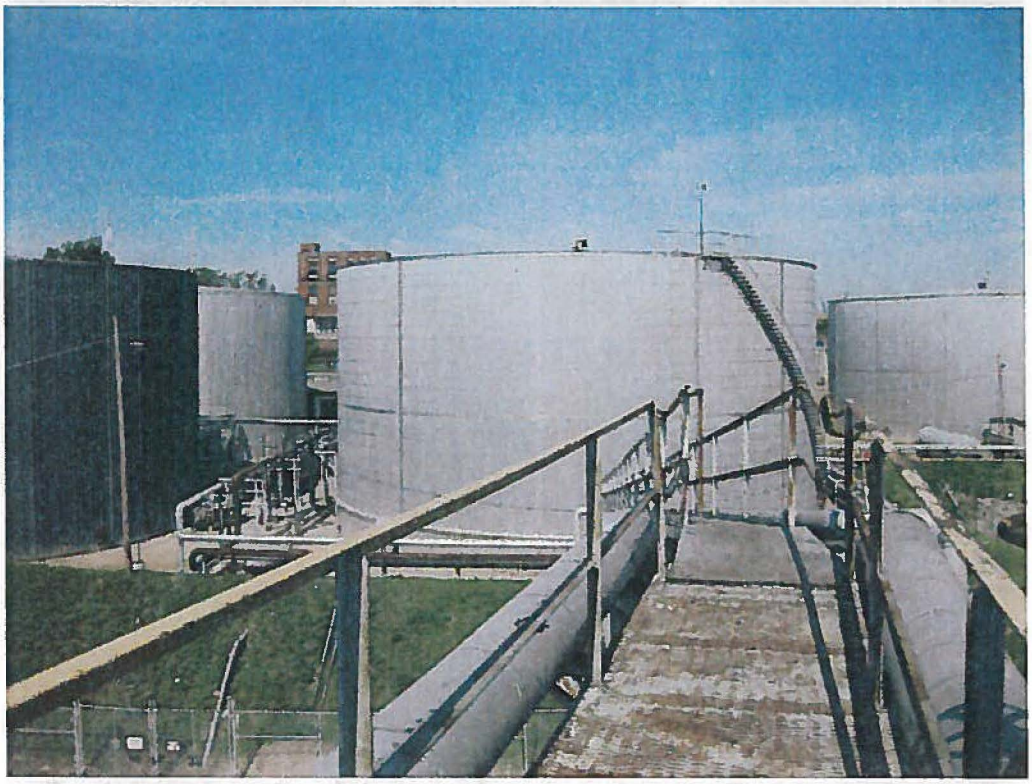
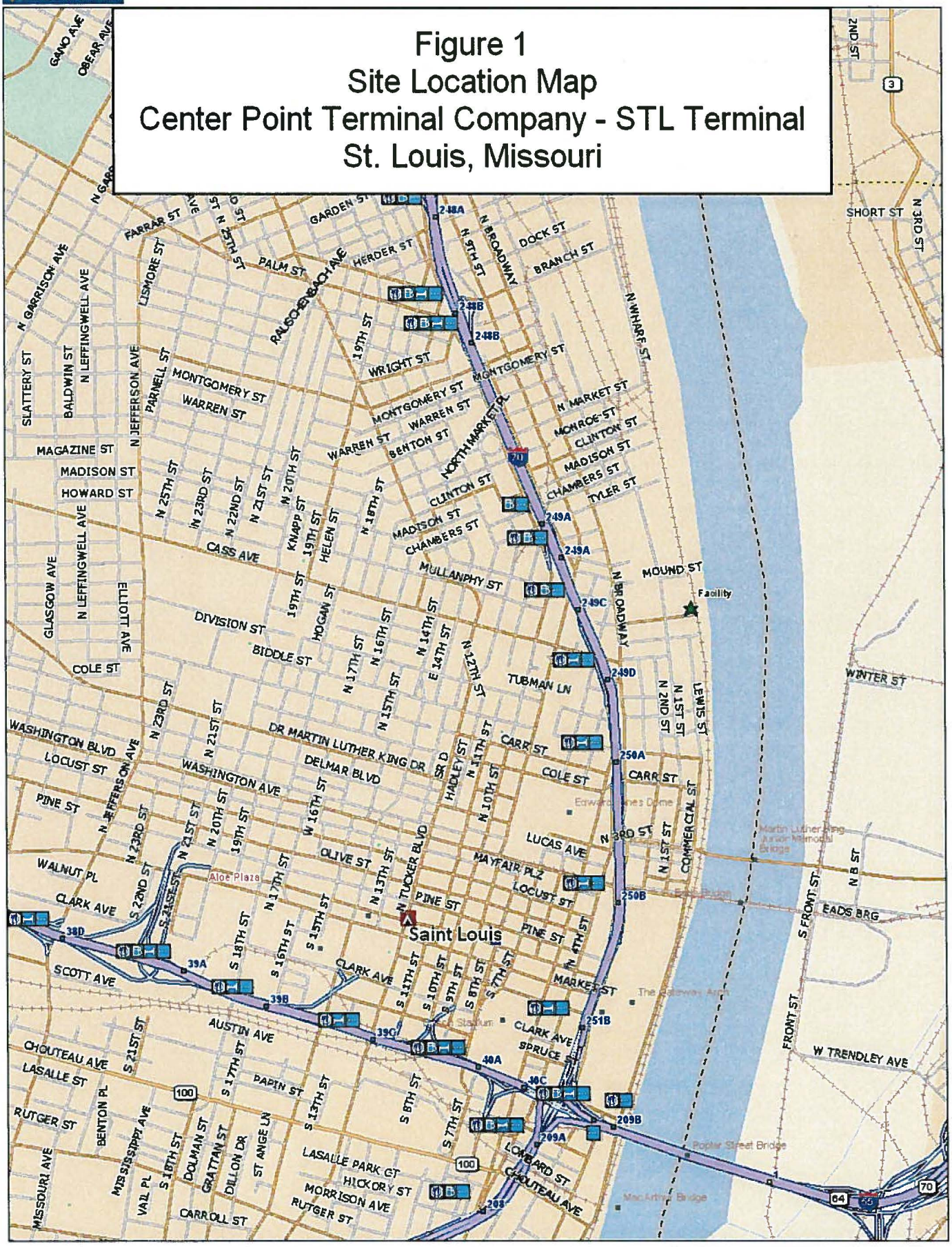


Photo #7 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0923
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Overview of storage tanks

Photo #8 Facility: Center Point Terminal Company – St. Louis, MO Date: 5/23/2012 Time: 0925
Photographer: Megan Schuette, EPA Witnesses: Jason Heitman, EPA; Tim Bishop, Center Point
Description: Storage unit containing emergency response equipment (facility-owned boom to the left)

Attachment #2
Figures

Figure 1
Site Location Map
Center Point Terminal Company - STL Terminal
St. Louis, Missouri



Data use subject to license.

© DeLorme. DeLorme Street Atlas USA® 2010.

www.delorme.com

MN (1.1° W)

0 800 1600 2400 3200 4000 ft

Data Zoom 13-0

Figure 2

Aerial Photo

Center Point Terminal Company – STL Terminal – St. Louis, Missouri

Figure 3

Flow Map

Center Point Terminal Company – STL Terminal – St. Louis, Missouri

Attachment #3
Facility Contacts

Tim Bishop
Terminal Manager
Center Point Terminal Company – St. Louis Terminal
Foot of Mullanphy Street
St. Louis, Missouri 63102
314-621-0522

Attachment #4
FRP Forms & Facility Documentation

Petroleum Fuel Terminal Monthly Oil Inspection Form

(Note: Inspector must sign and date last page of checklist.)

SPCC REGULATED OIL EQUIPMENT									
Place a checkmark for each piece of equipment, if acceptable; if unacceptable mark space with * and explain in comments section at bottom of form		Upper Tank Farm Area		Lower Tank Farm Area		Asphalt Loading Rack		Miscellaneous Small Tanks	
1	**Tank/Containers**- Check for:								
a.	Drip Marks	✓				✓		✓	
b.	Discoloration of tanks	N/A				N/A		✓	
c.	Puddles containing oil	✓				✓		✓	
d.	Corrosion	✓				✓		✓	
e.	Cracks	✓				✓		✓	
f.	Localized dead vegetation	✓				✓		✓	
g.	Vegetation obstructing inspection	✓				✓		✓	
h.	Oil at Release Prevention Barrier (RPB) or in leak detection system	N/A				N/A		N/A	
2	**Foundations/Supports** - Check for:								
a.	Cracking or deterioration of support								
b.	Discoloration or corrosion								
c.	Puddles containing oil N/A								
d.	Settlement								
e.	Gaps between tank & foundation/support								
f.	Damage caused by vegetation roots								
g.	Vegetation obstructing inspection								
3	**Piping** - Check for:								
a.	Droplets of oil	✓				✓		✓	
b.	Discoloration	✓				✓		✓	
c.	Corrosion	✓				✓		✓	
d.	Pipes bowing between supports	✓				✓		✓	
e.	Evidence of oil seepage from valve stems, flanges, seals	✓				✓		✓	
f.	Localized dead vegetation near piping	✓				✓		✓	
4	**Secondary Containment - Dike, Berm or Containment Structure**								
a.	Standing water (does area need to be drained to maintain capacity?)	✓				✓		✓	
b.	If yes, indicate the date the valve is opened	Opened	Closed	Opened	Closed	Opened	Closed	Opened	Closed
c.	and the date the valve is closed:								
d.	Status of dike drain valve and valve lock (where appropriate)	✓				N/A		N/A	
e.	Permeability of dike (holes)	✓				✓		✓	
f.	Debris/containers inside containment area	✓				✓		✓	
g.	Erosion of dike if earthen	✓				✓		✓	
h.	Permeability of floor of area (cracks, holes)	N/A				N/A		N/A	
i.	Status of pipes, inlets, drainage beneath tanks, etc.	✓				✓		✓	
5	**Secondary Containment - Other**								
a.	Cracks	✓				✓		✓	
b.	Discoloration	✓				✓		✓	
c.	Standing water or oil	✓				✓		✓	
d.	Corrosion	✓				✓		✓	
e.	Valve conditions	✓				✓		✓	
6	**Retention Areas or Cooling Ponds**								
a.	Erosion								
b.	Available capacity N/A								
c.	Presence of oil								
d.	Debris inside containment area								
e.	Stressed vegetation								
Date: May 2012		Signature: ARB							
Comments:									

Secondary Containment Testing:

The two types of products stored at the terminal are asphalts and industrial fuel oils. Asphalts solidify when they cool and most industrial fuel oils are fairly viscous. Therefore, they pose little or no threat as far as permeating secondary recovery dikes. This means that the primary concern is with the structural integrity and compactness of the dikes. These are tested by driving and/or walking directly on the dikes and determining that they are able to support a minimum of 200 pounds, and that any shifting or settling has been minimal and does not threaten the integrity of a dike.

Although dikes are inspected daily and certain areas are tested frequently, all dikes, and every section thereof in the entire secondary containment system, are tested semi-annually. Such testing is either performed by or supervised by the terminal manager/"Qualified Individual" and is certified to as follows:

Date Tested: 5/24/07

Comments: All secondary containment dikes were tested and found to be sound. The dike adjacent to tank #5 continues to slowly erode. However, since tank #5 is currently out of service this does not pose a problem.

Signed: ~~Jamie K. Bailey~~ G. L.

Date Tested: _____

Comments: _____

_____

_____

Signed: _____

PETROLEUM FUEL & TERMINAL COMPANY

PREPAREDNESS FOR RESPONSE EXERCISE PROGRAM
(PREP)

FACILITY: Mullanphy Street

TYPE OF DRILL: Notification DRILL

DATE OF DRILL: 4/28/12

PERSONS PARTICIPATING IN DRILL EXERCISE:

1.	Ron Colvin	8.	
2.	Jim Busby	9.	
3.		10.	
4.		11.	
5.		12.	
6.		13.	
7.		14.	

DISCUSSION AND DETAILS:

Notification - Ron called to tell me what Bill had done regarding the malfunctioning loading computer system - called about 9:00 pm. I told him I had already spoken to Bill earlier that day. I could have been at the terminal by 10:00 pm if necessary.

Keep original for your records.
Send copy to Belinda Meador, GCI

J Busby
Q.I.

Attachment #5
ICIS Form

REGION 7 – FRP – EPA INSPECTION CONCLUSION DATA SHEET (ICDS) 2006 Form

* **Data elements required to be completed for ICIS system data entry**
Data elements that do not have asterisks are *optional*

Inspector's Name: Megan Schuette **Phone Number:** 913-551-7630

1. ***Compliance Activity Type:** Compliance Inspection ***Date Report Sent to Facility:** 07/02/2012

2. ***Compliance Monitoring Activity Name:** Center Point Terminal Company – St. Louis Terminal FRP Inspection

3. ***Compliance Monitoring Type:** CWA Section 311 FRP Inspection/Exercise

4. ***Region** 7 **ID Number:** FRP07A0079

5. ***Facility Name:** Center Point Terminal Company – St. Louis Terminal
***Street Address:** Foot of Mullanphy Street
***City, State, Zip:** St. Louis, MO 63102

6.-9. ***Date of Inspection:** Begin: 05/23/2012 End: 05/23/2012

10. ***Federal Statutes:** ☒CWA

11. ***Sections:** ☒CWA 311 Oil and Hazardous Substance Liability SPCC/FRP

12. ***Citations:** *Check citation of **40 CFR** that was inspected:* ☒Part 112

13. ***Programs:** No entry needed. This data element is automatically populated by the ICIS data system based on the information provided in items #10 and #11.

14. ***SIC or NAICS Code:** 493190 (NAICS)

15. ***Facility Capacity (gallons):** 14,668,000

16. **Media Monitored:** *Check one of the following:* ☒Water (surface) ☐Water (stormwater)

17. ***Compliance Monitoring Action Reason:** *(Check one of the following)*
☐Agency Priority ☐Citizen Complaint/Tip ☒Core Program
☐Selected Monitoring Action ☐Random Evaluation or Inspection

17. ***Compliance Monitoring Agency Type:** EPA

18.-20. Does not apply.

21. ***Compliance Monitoring Action Outcome:** *Check one (if known at the time of the activity):*
☐Administrative ☐Immediately corrected ☐Judicial ☒No violation
☐No compliance monitoring (access denied) ☐No compliance monitoring (facility shutdown)
☐Not immediately corrected ☐Notice of determination ☐Under review ☐Withdrawn

22.-23. Does not apply to this program.

24. ****Did you observe deficiencies (potential violations) during the on-site inspection?** ☐Yes ☒No
(N/A cannot be a response. If the answer is no, go straight to #28.)

25. ****If you observed deficiencies, did you communicate them to the facility during the inspection?** ☐Yes ☐No
(N/A cannot be a response.)

26. ****Deficiencies Observed:**
Check one or more of the following:
☐Potential violation of a compliance schedule in an enforceable order
☐Potential failure to maintain a record or failure to disclose a document **(Inadequate records)**
☐Potential failure to maintain/inspect/repair equipment including meters, sensors, and recording equipment
☐Potential failure to complete or submit a notification, report, certification, or manifest
☐Potential failure to obtain a permit, product approval, or certification **(No FRP Plan)**
☐Potential failure to follow a required sampling or monitoring procedure or laboratory procedure
☐Potential failure to follow or develop a required management practice or procedure **(Deficient Plan, inadequate Plan implementation, inadequate or no training, no response equipment, no exercise program, inadequate or no documentation, out-of-date Plan)**
☐Potential failure to identify and manage a regulated waste or pollutant in any media
☐Potential failure to report regulated events such as spills, accidents, etc.
☐Potential incorrect used of a material (e.g., pesticide, waste, product, or use of improper/unapproved material) **(Incompatible tank materials)**
☐Potential failure to follow a permit condition(s) **(Inadequate or no security, unsecured valves)**
☐Potential excess emission in violation of a regulation **(Inadequate or no containment)**

27. ****Did you observe or see the facility take any actions during the inspection to address the deficiencies communicated to the facility?** ☐Yes ☐No
If YES, check only the action(s) actually observed/seen or write a short description of the action in the optional Section. *(Check all that apply.)*
Action(s) Taken
☐Complete(d) a notification or report
☐Correct(ed) monitoring deficiencies
☐Correct(ed) recordkeeping deficiencies
☐Implemented new or improved management practices or procedures
☐Improved pollutant identification (e.g., labeling, manifesting, storage, etc.)
☐Reduced pollution (e.g., use reduction, industrial process change, emissions or discharge change, etc.)
☐Request(ed) a Permit Application or applied for a Permit
☐Verify(ied) compliance with a previously issued enforcement action – Part or all conditions

28. **Did you provide general compliance assistance in accordance with the policy on the Role of the EPA Inspector in Providing Compliance Assistance During Inspections?** ☐Yes ☒No

29. **Did you provide site-specific compliance assistance in accordance with the policy on the Role of the EPA Inspector in Providing Compliance Assistance During Inspections?** ☐Yes ☒No
Note: This form does not require EPA inspectors to provide compliance assistance.

Optional Information: Describe action taken by the facility or assistance provided to the facility.

_____

_____

_____

For Data Entry Staff Use Only:
30. Date and initials of person entering data into ICIS: _____

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USEPA, 2014a

Detailed Facility Report

Facility Summary

CENTER POINT TERMINALS CO
FOOT OF MULLANPHY ST, ST LOUIS, MO 63102

Facility Information (FRS)

FRS ID: 110015853138
EPA Region: 07
Latitude: 38.64306
Longitude: -90.18306
Industry:
Indian Country: N

Regulatory Interests

Clean Air Act:
Clean Water Act:
Resource Conservation and Recovery Act: Active CESQG (MOD000690040)
Safe Drinking Water Act:

Also Reports

Air Emissions Inventory (EIS):
Greenhouse Gas Emissions (eGGRT):
Toxic Releases (TRI):

Enforcement and Compliance Summary

Statute	Insp (5 Years)	Date of Last Inspection	Current Compliance Status	Qtrs in NC (of 12)	Qtrs in Significant Violation	Informal Enforcement Actions (5 years)	Formal Enforcement Actions (5 years)	EPA Cases	Penalties (5 years)
RCRA	1	08/25/2010	No Violation	0	0	1	--	--	--

Facility/System Characteristics

Facility/System Characteristics

Statute	Identifier	Universe	Status	Areas	Permit Expiration Date	Indian Country	Latitude	Longitude
–	110015853138	–	–	–	–	N	38.64306	-90.18306
RCRA	MOD000690040	CESQG	Active	–	–	–	–	–

Facility Contact Information

System	Identifier	Facility Name	Facility Address	Contact Name	Contact Telephone
FRS	110015853138	CENTER POINT TERMINALS CO	FOOT OF MULLANPHY ST, ST LOUIS, MO 63102	x	x
RCR	MOD000690040	CENTER POINT TERMINALS CO	1 MULLANPHY ST, ST LOUIS, MO 63102-2321	x	x

Facility SIC Codes

System	Identifier	SIC Code	SIC Desc
No data records returned			

Facility NAICS Codes

System	Identifier	NAICS Code	NAICS Desc
RCR	MOD000690040	42472	–

Enforcement and Compliance

Compliance Monitoring History (5 years)

Statute	Source ID	System	Inspection Type	Lead Agency	Date	Finding
RCRA	MOD000690040	RCR	COMPLIANCE EVALUATION INSPECTION ON-SITE	EPA	08/25/2010	Violations Or Compliance Issues Were Found

Entries in italics are not considered inspections in official counts.

Compliance Summary Data

Statute	Source ID	Current SNC/HPV	Description	Current As Of	Qtrs in NC (of 12)
RCRA	MOD000690040	No	–	02/15/2014	0

Three Year Compliance Status by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12
RCRA (Source ID: MOD000690040)		04/01-06/30 2011	07/01-09/30 2011	10/01-12/31 2011	01/01-03/31 2012	04/01-06/30 2012	07/01-09/30 2012	10/01-12/31 2012	01/01-03/31 2013	04/01-06/30 2013	07/01-09/30 2013	10/01-12/31 2013	01/01-03/31 2014
RCRA	Facility-Level Status	–	–	–	–	–	–	–	–	–	–	–	–

Informal Enforcement Actions (5 Years)

Statute	Source ID	Type of Action	Lead Agency	Date
RCRA	MOD000690040	WRITTEN INFORMAL	EPA	08/25/2010

Formal Enforcement Actions (5 Years)

Statute	Source ID	Type of Action	Lead Agency	Date	Penalty	Penalty Description
No data records returned						

ICIS Case History (5 years)

Primary Law/Section	Case No.	Case Type	Lead Agency	Case Name	Issued/Filed Date	Settlement Date	Federal Penalty	State/Local Penalty	SEP Cost	Comp Action Cost
No data records returned										

Environmental Conditions

Water Quality

Permit ID	Watershed (HUC 8)	Watershed Name (HUC 8)	Watershed (HUC 12)	Watershed Name (HUC 12)	Receiving Waters	Impaired Waters	Combined Sewer System?
11001585313807140101	CAHOKIA-JOACHIM	071401010403	Schoenberger Creek-Mississippi River	–	No	–	

Air Quality

Non-Attainment Area?	Pollutant(s)
Yes	Ozone
No	Lead
Yes	Particulate Matter

Pollutants

TRI History of Reported Chemicals Released in Pounds per Year at Site

Year	Total Air Emissions	Surface Water Discharges	Underground Injections	Releases to Land	Total On-site Releases	Total Off-site Releases
No data records returned						

TRI Total Releases and Transfers by Chemical and Year

Chemical Name
No data records returned

Demographic Profile

Demographic Profile of Surrounding Area (5 Miles)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 US Census and American Community Survey data, and are accurate to the extent that the facility latitude and longitude listed below are correct. The latitude and longitude are obtained from the EPA Locational Reference Table (LRT) when available.

Radius of Area:	5	Land Area:	92%	Households in Area:	84,883
Center latitude:	38.64306	Water Area:	8%	Housing Units in Area:	109,429
Center Longitude:	-90.18306	Population Density:	2,762/sq.mi.	Households on Public Assistance:	3,762

Total Persons:	199,982	Percent Minority:	72%	Persons Below Poverty Level:	113,762

Race Breakdown	Persons (%)	Age Breakdown	Persons (%)
White:	56,053 (28.03%)	Child 5 years and younger:	13,779 (6.89%)
African-American:	132,130 (66.07%)	Minors 17 years and younger:	46,498 (23.25%)
Hispanic-Origin:	6,417 (3.21%)	Adults 18 years and older:	153,483 (76.75%)
Asian/Pacific Islander:	4,512 (2.26%)	Seniors 65 years and older:	20,964 (10.48%)
American Indian:	470 (.24%)		
Other/Multiracial:	6,817 (3.41%)		

Education Level (Persons 25 & older)	Persons (%)	Income Breakdown	Households (%)
Less than 9th Grade:	8,505 (6.78%)	Less than $15,000:	25,709 (30.01%)
9th through 12th Grade:	19,536 (15.57%)	$15,000 - $25,000:	13,988 (16.33%)
High School Diploma:	35,250 (28.1%)	$25,000 - $50,000:	21,884 (25.54%)
Some College/2-yr:	32,400 (25.83%)	$50,000 - $75,000:	11,437 (13.35%)
B.S./B.A. or More:	29,760 (23.72%)	Greater than $75,000:	12,664 (14.78%)

Civil Enforcement Case

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USEPA, 2014b

Basic Information

Case Number: 07-200041030
Case Name: CENTER POINT TERMINALS COMPANY - NOV
Case Type: Administrative - Informal
Case Status (as of 08/25/2010): Achieved
Case Lead: EPA
Court Docket Number: --
DOJ Docket Number: --

Relief Sought: --
Enforcement Outcome: --
Headquarters Division: --
Branch: --
Result of Voluntary Disclosure? --
Multi-media Case? --
Enforcement Type: Notice of Violation
Violations: --

Penalties – Case Level

Total Federal Penalty Assessed or Agreed To: --
Total State/Local Penalty Assessed: --
Total SEP Cost: --
Total Compliance Action Cost: --
Total Cost Recovery: --

Case Summary

--

Laws and Sections

Law	Sections	Programs
RCRA	3002, 3010	Notification of Hazardous Waste Activity, Standards Applicable to Generators of Hazardous Waste

Citations

Title	Part	Section
40 CFR	262	11
40 CFR	279	22(c)

Facilities

FRS Number	Facility Name	Address	City Name	State	Zip	SIC Codes	NAIC Codes
110015853138	CENTER POINT TERMINALS CO	FOOT OF MULLANPHY ST	ST LOUIS	MO	63102	–	–

Defendants

Defendants and Settlements	In Complaint	In Settlement
No data records returned		

Case Milestones

Event	Actual Date
Pipeline Closed	10/15/2010

Pollutants

Pollutant Name	Chemical Abstract Number
No data records returned	

Related Activities

Description	Actual Date
Inspection/Evaluation	08/25/2010

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USEPA, 2014c

Envirofacts

Search Results

RCRAInfo

Data Disclaimer

Only RCRAInfo facility information was searched to select facilities

<< Return

RCRAInfo Links

- Overview
- Search
- Model
- Law
- RCRAInfo Search User Guide
- Contact Us
- Office of Resource Conservation and Recovery Home

Report an Error

Location Address: mullanphy
State Abbreviation: MO

Results are based on data extracted on MAR-12-2014
Note: Click on the CORPORATE LINK value for links to that company's environmental web pages.
Click on the MAPPING INFO value to obtain mapping information for the facility.

The facility information data within the output below can be downloaded in a comma-seperated value file for use in Excel by clicking here:

Go To Bottom Of The Page

HANDLER NAME:	CENTER POINT TERMINALS CO	HANDLER ID:	MOD000690040
STREET:	1 MULLANPHY ST	FACILITY INFORMATION:	View Facility Information
CITY:	ST LOUIS	CORPORATE LINK:	No
STATE:	MO	COUNTY:	ST LOUIS CITY
ZIP CODE:	63102-2321	MAPPING INFO:	MAP
EPA REGION:	7		
LATITUDE	38.64306	LONGITUDE	-90.18306

CONTACT INFORMATION

NAME	STREET	CITY	STATE	ZIP CODE	PHONE	TYPE OF CONTACT
TIM BISHOP	1 MULLANPHY ST	ST LOUIS	MO	63102-2321	(314) 621-0522	Public
TIM BISHOP	FOOT OF MULLANPHY ST	ST LOUIS	MO	63102	3146210522	Permit
TIM BISHOP	1 MULLANPHY ST	ST LOUIS	MO	63102-2321	(314) 621-0522	Permit

LIST OF NAICS CODES AND DESCRIPTIONS

NAICS CODE	NAICS DESCRIPTION
42472	PETROLEUM AND PETROLEUM PRODUCTS MERCHANT WHOLESALERS (EXCEPT BULK STATIONS AND TERMINALS)

HANDLER NAME:	INLAND REALTY	HANDLER ID:	MOD006331318
STREET:	1107 MULLANPHY ST	FACILITY INFORMATION:	View Facility Information
CITY:	ST LOUIS	CORPORATE LINK:	No
STATE:	MO	COUNTY:	ST LOUIS CITY
ZIP CODE:	63106-4334	MAPPING INFO:	MAP
EPA REGION:	7		
LATITUDE	38.642182	LONGITUDE	-90.191377

CONTACT INFORMATION

NAME	STREET	CITY	STATE	ZIP CODE	PHONE	TYPE OF CONTACT
WALTER SHIFRIN	230 S BEMISTON STE 305	ST LOUIS	MO	63105	3147212249	Public
NA NA	1107 MULLANPHY ST	ST LOUIS	MO	63106		Permit
WALTER SHIFRIN	230 S BEMISTON STE 305	ST LOUIS	MO	63105	3147212249	Permit
HUGH MURRELL	S BEMISTON STE 305	ST LOUIS	MO	63105	3147212249	Permit

LIST OF NAICS CODES AND DESCRIPTIONS

NAICS CODE	NAICS DESCRIPTION
56291	REMEDIATION SERVICES
44719	OTHER GASOLINE STATIONS

HANDLER NAME: MULLANPHY CLEANERS
HANDLER ID: MOD071955348
STREET: 5 MULLANPHY GARDEN SHOPPING CT
FACILITY INFORMATION: View Facility Information
CITY: FLORISSANT
CORPORATE LINK: No
STATE: MO
COUNTY: ST LOUIS
ZIP CODE: 63031-3412
MAPPING INFO: MAP
EPA REGION: 7
LATITUDE 38.804865
LONGITUDE -90.33201

CONTACT INFORMATION

NAME	STREET	CITY	STATE	ZIP CODE	PHONE	TYPE OF CONTACT
SUNG SOOK SHIN	5 MULLANPHY GARDEN SHOPPING CT	FLORISSANT	MO	63031-3412	3148371034	Public
SUNG SOOK SHIN	5 MULLANPHY GARDENS	FLORISSANT	MO	63031	3148371034	Permit
SUNG SOOK SHIN	5 MULLANPHY GARDEN SHOPPING CT	FLORISSANT	MO	63031-3412	3148371034	Permit

LIST OF NAICS CODES AND DESCRIPTIONS

NAICS CODE	NAICS DESCRIPTION
81232	DRYCLEANING AND LAUNDRY SERVICES (EXCEPT COIN-OPERATED)

HANDLER NAME: REICHHOLD CHEMICALS INC
HANDLER ID: MOP000000739
STREET: 108 MULLANPHY ST
FACILITY INFORMATION: View Facility Information
CITY: ST LOUIS
CORPORATE LINK: No
STATE: MO
COUNTY: ST LOUIS CITY
ZIP CODE: 63102-2327
MAPPING INFO: MAP
EPA REGION: 7
LATITUDE 38.64138
LONGITUDE -90.18359

CONTACT INFORMATION

NAME	STREET	CITY	STATE	ZIP CODE	PHONE	TYPE OF CONTACT
BRADFORD S CRAWFORD	PO BOX 13582	RESEARCH TRIANGLE PK	NC	27709	(714) 252-8450	Public
BRADFORD S CRAWFORD	PO BOX 13582	RESEARCH TRIANGLE PK	NC	27709	(714) 252-8450	Permit
BRADFORD CRAWFORD	PO BOX 13582	RESEARCH TRIANGLE PARK	NC	27709	7142528450	Permit

LIST OF NAICS CODES AND DESCRIPTIONS

NAICS CODE	NAICS DESCRIPTION
49311	GENERAL WAREHOUSING AND STORAGE
32411	PETROLEUM REFINERIES

HANDLER NAME: WOODS & DOWN BOX CO
HANDLER ID: MOP000503706

STREET:	1301 MULLANPHY ST	FACILITY INFORMATION:	View Facility Information
CITY:	ST LOUIS	CORPORATE LINK:	No
STATE:	MO	COUNTY:	ST LOUIS CITY
ZIP CODE:	63106-4416	MAPPING INFO:	MAP
EPA REGION:	7		
LATITUDE	38.64257	LONGITUDE	-90.19379

to=&univ_search=0&univA=FULL_ENFORCEMENT&univB=LOG&LIBS=&proc_group=0&procname=&program_search=2&report=1&page_no=1&output_sql_switch=TRUE&database_type=RCRAINFO

CONTACT INFORMATION

NAME	STREET	CITY	STATE	ZIP CODE	PHONE	TYPE OF CONTACT
LAWRENCE CHAPMAN	13397 LAKEFRONT DR STE 200	EARTH CITY	MO	63045	(314) 291-9999	Public
CAROL SURTIN	NATURAL BRIDGE	ST LOUIS	MO	63121	3144261700	Permit
LAWRENCE CHAPMAN	13397 LAKEFRONT DR STE 200	EARTH CITY	MO	63045	(314) 291-9999	Permit

LIST OF NAICS CODES AND DESCRIPTIONS

NAICS CODE	NAICS DESCRIPTION
56291	REMEDIATION SERVICES
322211	CORRUGATED AND SOLID FIBER BOX MANUFACTURING

Go To Top Of The Page

Total Number of Facilities Displayed: 5

Last updated on Tuesday, March 18, 2014

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
USEPA, 2014d

EPA United States Environmental Protection Agency

Envirofacts

FRS Facility Detail Report

FRS

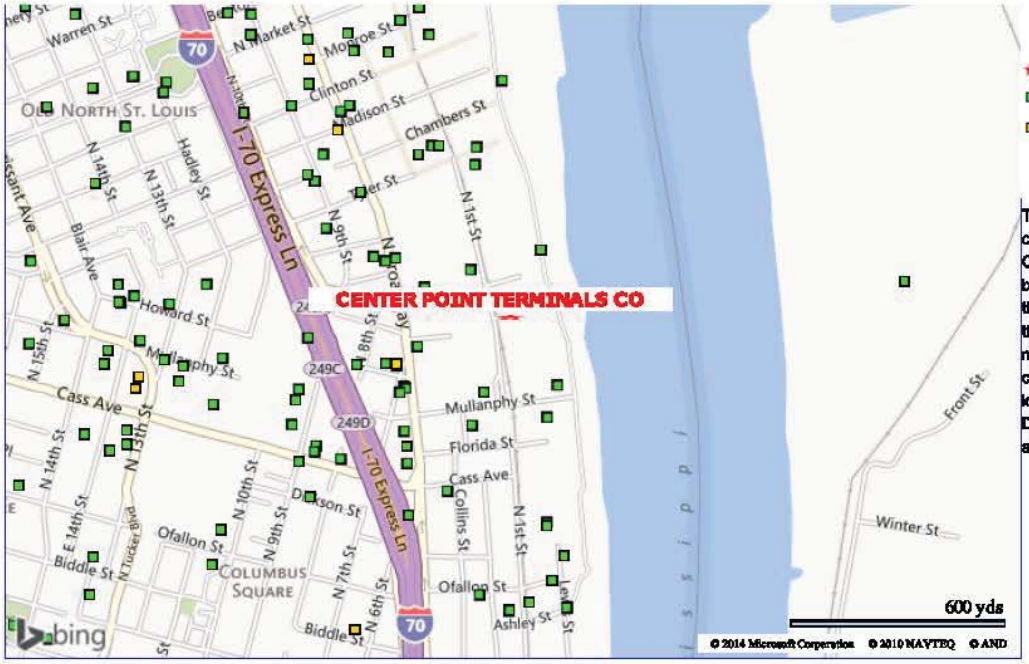
CENTER POINT TERMINALS CO

FOOT OF MULLANPHY ST
ST LOUIS, MO 63102
EPA Registry Id: 110015853138

Facility Registry Service Links

- Search
  - FRS Facility Query
  - FRS EZ Search
  - Organization Search
- FRS Physical Data Model
- FRS Geospatial Model
- Contact Us
- Facility Registry Service (FRS) Home

Report an Error



Legend

- Selected Facility
- EPA Facility of Interest
- State/Tribe Facility of Interest

The facility locations displayed come from the FRS Spatial Coordinates tables. They are the best representative locations for the displayed facilities based on the accuracy of the collection method and quality assurance checks performed against each location. The North American Datum of 1983 is used to display all coordinates.

Environmental Interests

Information System	Information System ID	Environmental Interest Type	Data Source	Last Updated Date	Supplemental Environmental Interests:
OIL DATABASE	R7-MO-00026	FRP	OIL	05/24/2012	
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM	MOD000690040	CESQG (Y)	RCRAINFO	08/04/2012	ICIS-ENFORCEMENT/COMPLIANCE ACTIVIT
MISSOURI DEPARTMENT OF NATURAL RESOURCES	26687	STATE MASTER	MO-DNR		

Additional EPA Reports: MyEnvironment | Enforcement and Compliance | Site Demographics | Facility Coordinates Viewer | Environmental Justice Map Viewer | Watershed Report

Standard Industrial Classification Codes (SIC)

No SIC Codes returned.

National Industry Classification System Codes (NAICS)

Data Source	NAICS Code	Description	Prin
RCRAINFO	42472	PETROLEUM AND PETROLEUM PRODUCTS MERCHANT WHOLESALERS (EXCEPT BULK STATIONS AND TERMINALS)	
OIL	1394		

Facility Codes and Flags

EPA Region:	07
Duns Number:	
Congressional District Number:	01
Legislative District Number:	04
HUC Code/Watershed:	07140101 / CAHOKIA-JOACHIM
US Mexico Border Indicator:	
Federal Facility:	NO
Tribal Land:	NO

Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
OPERATOR	FOOT OF MULLANPHY STREET	ST. LOUIS		63102	OIL
OWNER	8235 FORSYTH BLVD., SUITE 400	CLAYTON		63105	OIL
FACILITY MAILING ADDRESS	1 MULLANPHY ST	ST LOUIS	MO	63102-2321	RCRAINFO
REGULATORY CONTACT	1 MULLANPHY ST	ST LOUIS	MO	63102-2321	RCRAINFO
OWNER	2210 CHOUTEAU AVE	ST LOUIS	MO	63103	RCRAINFO

Alternative Names

Alternative Name	Source of Data
CENTER POINT TERMINALS CO	MO-DNR
CENTER POINT TERMINAL COMPANY - ST. LOUIS TERMINAL	OIL

Organizations

Affiliation Type	Name	DUNS Number	Information System	Mailing Address
OWNER	CENTER POINT TERMINALS CO		RCRAINFO	View

Contacts

Affiliation Type	Full Name	Office Phone	Information System	Mailing Address

OWNER	CENTER POINT TERMINAL CO.		OIL	View	REGULATORY CONTACT	TIM BISHOP	(314) 621-0522	RCRAINFO	View
OPERATOR	CENTER POINT TERMINALS CO		RCRAINFO						
OPERATOR	PETROLEUM FUEL & TERMINAL CO.		OIL	View					

Query executed on: MAR-19-2014

Laclede Coal Gas
St. Louis City, Missouri
Site Reassessment
WPT, 2013

St. Louis, MO ×

Center Point Terminal Company, LLC
Foot of Mullanphy St., St. Louis, Missouri, 63102

Available products	Liquid Asphalt
Total storage capacity	**351,000 bbls**
Supply method	**Barge**
Outloading method	**Truck, Barge**

Tim Bishop
314-621-0522
tim.pftstl@sbcglobal.net
(mailto:tim.pftstl@sbcglobal.net)

View Larger (http://www.worldpointlp.com/location/st-louis-mo/)

Terminal Locations (http://www.worldpointlp.com/locations)

View All (http://www.worldpointlp.com/locations)

St. Louis, MO (http://www.worldpointlp.com/location/st-louis-mo/)

Foot of Mullanphy St.,
St. Louis, Missouri, 63102

Products:	Liquid Asphalt
Total storage capacity:	351,000 bbls
Supply method:	Barge
Outloading method:	Truck, Barge

Contact

Tim Bishop
314-621-0522
tim.pftstl@sbcglobal.net (mailto:tim.pftstl@sbcglobal.net)