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ARGONAUT AEC JOB NO. 92072
LEVEL I AND II ENVIRONMENTAL
SITE ASSESSMENT
UNIT FLOW-THRU TERMINAL
4002 JAMES P. COLE BOULEVARD
FLINT, MICHIGAN

FILE COPY

Prepared for:

General Motors Corporation/Argonaut AEC
485 West Milwaukee Avenue
Detroit, Michigan 48202

Prepared by:

GZA GeoEnvironmental, Inc.
38019 Schoolcraft Road
Livonia, Michigan 48150

May 21, 1992
Revised October 26, 1992
Project No. 60505

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GZA
GeoEnvironmental, Inc.

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Engineers and
Scientists
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May 21, 1992
Revised October 26, 1992
Project No. 60505

General Motors Corporation/Argonaut AEC
485 West Milwaukee Avenue
Detroit, Michigan 48202



Attention: Mr. Tom Arnold
Project Manager

Subject: Argonaut AEC Job No. 92072
Level I and II Environmental Site Assessment
Unit Flow-Thru Terminal
4002 James P. Cole Boulevard
Flint, Michigan

38019 Schoolcraft Road
Livonia, Michigan
48150
313-462-0207
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Dear Tom:

In accordance with our proposal dated September 20, 1991, File No. 91318, GM/AEC P.O. No. AG 337323 and GM/AEC Field Order dated March 26, 1992, GZA GeoEnvironmental, Inc. (GZA) is pleased to provide this Level I and II Environmental Site Assessment report for the above-referenced site ("Site") in Flint, Michigan. Following the Executive Summary are Sections 1.00 through 8.00, presenting the findings of Tasks 1 through 4, 8 and 9 pursuant to the GM/AEC Scope of Services included in Appendix A.

We have appreciated the opportunity to work for you on this project, and should you have any questions or need further information, please do not hesitate to contact the undersigned.

Very truly yours,

GZA GeoEnvironmental, Inc.

A Subsidiary of GZA
GeoEnvironmental
Technologies, Inc.

Susan M. Chase
Project Engineer

Walter Kosinski
Associate Principal

/sw/60505.TOC
Attachments

Rick P. Harding, Ph.D.
Project Reviewer

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The following is a summary of the major findings of the assessment. It is GZA GeoEnvironmental, Inc's (GZA) opinion that there are five areas of environmental concern at this Site, as follows:

- Diesel fuel underground storage tank (UST);
- Stained soils adjacent the diesel fuel UST and storm sewer catch basin ST-10;
- Storm sewer lines;
- Stained soils at southeastern end of south parking area; and,
- Miscellaneous drums at central portion of south parking area.

Issue 1 Diesel Fuel UST

A 10,000-gallon UST is present on Site and contains diesel fuel. Prior investigations have indicated leakage problems associated with the UST and have reported a leaking UST (LUST) to the State Fire Marshal and the Michigan Department of Natural Resources (MDNR). This issue has not been resolved based upon review of regulatory files.

Monitoring wells were installed by GZA in the vicinity of the UST, with groundwater samples collected. Groundwater samples were also collected from existing groundwater "pollution probes" that had been installed adjacent to the UST during UST installation. Free product (several inches) was observed to be present in all four "pollution probes" at the time of GZA's groundwater sampling activity. In addition, groundwater analytical results from the "pollution probe" sample indicate the presence of aromatic compounds benzene, toluene and xylenes. Analytical results from monitoring wells installed during this study did not indicate the presence of diesel fuel contamination or aromatic compounds.

Based on these findings, it is GZA's opinion that the UST be removed and permanently closed or replaced. Other alternatives, such as tightness testing and product removal from the "pollution probes", may be possible, but these alternatives do not directly address the issue identified, particularly the resolution of the UST regulatory status.

Contaminated soil associated with the UST removal or replacement should be disposed in an appropriate manner. Tank closure should be performed in accordance with applicable regulations with the State Fire Marshal and MDNR notified of tank closure activities. It is further recommended that the Site owner/operator confer with legal

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counsel to determine whether additional reporting requirements are needed although the Site is already listed as an unresolved LUST site.

Issue 2 Stained Soils Adjacent to Diesel Fuel UST

An approximately 4-foot by 20-foot stained area, with distressed vegetation, was observed on the grassy area west of the UST location. According to personnel interviewed, this area was the location of a diesel fuel spill. In addition, soil probes in this area indicated that diesel fuel may be present in the subsurface in an area between the diesel fuel UST and pump station and the observed stained area. A storm sewer catch basin (ST-10) was observed to be located in the center of the spill and contained free product floating on top of standing water. Therefore, it is GZA's opinion that the soil from this area be removed and disposed in an appropriate manner. GZA also recommends removal of the free product and standing water from the storm sewer in this area, with appropriate disposal methods employed.

Issue 3 Storm Sewers

Stormwater samples were collected from inside two storm sewer catch basins downgradient from the diesel-stained area (ST-14 and ST-22) and analyzed for volatile organic compounds (VOCs) and polynuclear aromatics (PNAs). While VOCs were not detected, low levels of PNA compounds, chrysene and fluorene, were detected in the sample collected from ST-14. PNA compounds, benzo(a)anthracene, chrysene, fluorene and phenanthrene, were detected at higher concentrations in the sample collected from ST-22. An oil sheen was also observed on top of the water in the ST-22 sewer catch basin.

Therefore, it is GZA's opinion that the storm sewer system be cleaned to reduce the possibility of organic vapor collection within these confined areas and to reduce the possibility of off-Site discharge. It appears the petroleum product observed is a direct result of seepage into the system at catch basin location ST-10 and the UST area. Cleaning of the system and monitoring may be advisable, following UST and soil removal; however, the Site owner/operator should recognize the inherent risks associated with this type of product being present within the storm sewer line.

Issue 4 Stained Surficial Soils at Southeast Corner of South Parking Area

An area of discolored soil was observed southeast of the south parking lot. The staining appeared to be the result of surface water runoff. A soil sample (S-2) collected from this area was analyzed for the presence of VOCs and PNAs. The analytical results did not indicate the presence of VOCs, but showed low levels of PNA compounds, chrysene, indeno(1,2,3-cd)pyrene and pyrene. The PNAs detected are believed to be associated with incidental leakage from vehicles and surface runoff to this area. Because the area appears relatively limited, it is GZA's opinion that the impacted soils be removed and properly disposed. It is also recommended that previous engineering plans be reviewed to evaluate whether the parking lot surface runoff could be redirected or channeled to the storm sewer such that impact to the surficial soil would not occur.

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Issue 5 Miscellaneous Drums at South End of South Parking Lot

Three 55-gallon drums, containing what appeared to be oil or an oil product, were observed on the south central parking lot. Limited staining was observed surrounding the drums on the asphalt pavement. These containers could potentially release product to the environment because of their un-secured position. Therefore, GZA recommends removal and proper disposal of the contents of these drums.



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1.00 INTRODUCTION



In accordance with our proposal dated September 20, 1991, File No. 91318, General Motors Corporation/Argonaut AEC (GM/AEC) P.O. No. AG-337323 and GM/AEC Field Order dated March 26, 1992, GZA GeoEnvironmental, Inc. (GZA) is pleased to submit this Level I and II Environmental Site Assessment report ("Report") for the Unit Flow-Thru Terminal in Flint, Michigan ("Site"). This work was completed for GM/AEC in accordance with the GM/AEC Scope of Work and Terms and Conditions contained in Appendix A and GZA's Limitations contained in Appendix B.

The scope of services, as outlined in the GM/AEC Scope of Work Tasks 1 through 5, 8 and 9, included: a Site reconnaissance; Site history review; contact with certain local, state and federal officials regarding possible environmental concerns at or near the Site; asbestos/PCB review; soil and groundwater sampling and testing; residue sampling and testing; and, preparation of this Report.

2.00 BACKGROUND

The following subsections provide a review of background information associated with the Site facility operations/ownership and hydrogeologic setting.

2.10 Site Description

The Site is located at 4002 James P. Cole Boulevard in an industrial area of Flint, Michigan (see Figure No. 1). The Site is an active terminal facility where automobile parts are stored and distributed.

The Site encompasses approximately 20 acres of land. The terminal building is 150,600 square feet in area, and is constructed of steel and concrete block. A 1,400 square foot building is also located on Site, housing a boiler and water pumps used in the facility's fire suppression system. Both buildings were constructed in 1985. The Site is predominantly asphalt- or concrete-paved, with limited landscaping through out the property (see Figure Nos. 2 and 3).

The Site is currently owned by the Wilmington Trust Company, located in Wilmington, Delaware. Unit FTT, a wholly owned subsidiary of the Unit Corporation, manages the facility operations. According to records on file at the City of Flint Assessor's office, the Site was previously owned by the City of Flint and was sold to the current owner in approximately 1985. Prior to that time, the Site was part of a residential neighborhood that was developed into an industrial park by the City of Flint.

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The Site is bounded to the north by Stewart Avenue, to the east by Interstate-475, to the south by a vacant strip of woods with Consolidated Freightways, Inc., located beyond, and to the west by James P. Cole Boulevard. The Auto Blankers Division of the Kastle Steel Corporation and PPG Coatings and Resins are located west of the Site, beyond James P. Cole Boulevard (see Figure No. 4).

2.20 Topography/Drainage



The local topography consists of gently sloping land varying in elevation from about 724 to 750 feet above mean sea level (MSL) based upon review of the U.S. Geological Survey (USGS) Topographic Map for the Site area ("Flint North, Michigan", 1969, photorevised 1975). The topography of the Site has a gradual slope downward to the east/southeast toward the Flint River, located 500 to 1,000 feet east of the Site. Surface water drainage at the Site generally flows off paved areas to the east/southeast, primarily into stormwater sewers that discharge into the Flint River. Surface water drainage from the south parking lot appears to collect in the southeast corner of the Site that is unpaved.

Based upon review of the topographic and hydrologic features observed on the USGS map for the Site area, it appears that groundwater flow may also be to the east and/or southeast with shallow flow likely discharging to the Flint River. Soil boring logs prepared by PSI, Inc. in 1985 for the Site indicate that the Site is generally underlain by shallow (1.3- to 9-foot) clays. These data suggest that shallow groundwaters may be perched and groundwater flow may be controlled by the clay surface elevation. Additionally, note that shallow groundwater flow will also be influenced by underground utilities/structures, recharge, heterogeneous conditions, among other factors.

2.30 Site History

A review of aerial photographs from 1966, 1977 and 1985 and Sanborn Fire Insurance Maps dated 1914, 1929, and 1967 show the Site to be part of a residential neighborhood up to and including 1977. Houses were razed to allow for the construction of Interstate 475 and the industrial park in which the Site is located. The Sanborn Maps show no commercial businesses previously located within the current Site boundaries. None of the Sanborn Maps showed indications of underground storage tanks (USTs) and/or landfilling historically present on Site.

Mr. Jim Rohen, Building Safety and Inspection, City of Flint, confirmed that the Site was an area of residential development with no commercial businesses located in the Site vicinity prior to Site development.

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3.00 SITE VISIT

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Ms. Susan Chase, GZA Project Engineer, visited the Site on April 3 and 4, 1992, for the purpose of reviewing existing surficial conditions for evidence of the presence of hazardous materials or oils. Messrs. Arby Mathers and Mike Millett of Unit FTT answered questions relevant to the Site operations and generalized Site history. Selected photographs obtained during the Site visit are contained in Appendix C and copies of materials from Site files are provided in Appendix D.

3.10 Exterior

The terminal is constructed of steel and concrete block with a concrete slab-on-grade. The roof is also constructed of steel. Two 200,000-gallon steel water tanks are located southeast of the terminal, with a 1,400 square foot pump house situated between the tanks.

Several trailers were observed parked on asphalt and concrete paved parking areas both north and south of the main facility. A concrete helicopter pad was observed to be located in the southwest corner of the Site. The pad is fenced with landing lights surrounding the area.

Three 55-gallon drums were observed to be located on the south central border of the south parking lot. The drums appeared to contain waste oil, with limited staining observed on the asphalt surrounding the drums.

Two electrical transformers are located outside the southwest corner of the terminal, and are owned by the Consumers Power Company. The transformers are situated on a concrete pad and are surrounded by a chain-link fence. Both transformers are labelled Non-Polychlorinated Biphenyl (Non-PCB) Containing.

Propane cylinders were observed stored along the northwest wall outside the terminal building. Three cylinders were stored in a locked metal cage; propane is reportedly used to power lift trucks and maintenance equipment.

A 10,000-gallon UST is located outside the northeast corner of the terminal. Fill, vent and monitoring points were readily visible. Mr. Arby Mathers indicated that the tank was a double-walled fiberglass tank which was confirmed by available Site construction drawings. An electronic control panel (apparently for interstitial leak detection) and pump station were located at the UST location.

Staining in a grassy area west of the UST location was observed during the Site walk-through. The staining was approximately 4 feet by 20 feet in area and was reportedly caused by an intentional release of diesel fuel from the pump in December, 1991. A storm sewer catch basin (ST-10) is located in the center of the stained area.

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Staining was also observed on the concrete and asphalt pavement south and east of the UST location. The staining is reportedly the result of the overfilling of a truck that occurred on April 2, 1992, the day before GZA's Site visit. The stain appeared to lead to a storm sewer catch basin (ST-14) located south and east of the fuel pump.

A discolored/stained area was also observed in the grassy area southeast of the south parking area, south of the water tanks. The discoloration of the soil appeared to be the result of surface water runoff from the parking lot, and was approximately 1.5 feet by 30 feet in area.



The majority of the remainder of the Site area was asphalt-paved and apparently used for parking of trailers.

3.20 Interior

The terminal is primarily a one-story building, with a second floor mezzanine located along the north and south walls of the building. A conference room and cafeteria are also located on the second floor. The east wall contains 26 loading docks and the west wall contains 25 loading docks. The north wall contains approximately 8 loading docks. All loading docks are equipped with mechanical spring-loaded lifts.

The building contains rows of metal shelving upon which parts are stored. Three freight elevators and a parts conveyor are located in the western half of the building. The elevators are electrically powered.

The majority of the lift trucks used in the facility are electrically powered. A battery charging room is located along the south wall of the building. A sump is located in the center of the room and contains lime ash to neutralize acid spills should the batteries leak. The sump reportedly drains to the sanitary sewer. There reportedly have been no spills to date. No visible evidence of spillage was noted at the time of the Site visit.

A 200-gallon above ground storage tank (AGST) is located along the north wall of the battery charge room. The tank contains hydraulic oil. Some oil staining was observed on the floor surrounding the tank, with absorbent material to contain the leakage/incidental spillage. A floor drain is located approximately 10 feet from the tank, however, it did not appear that oil had entered the drain. Two 55-gallon steel drums containing gear lubricant were also observed along the north wall.

A 30-gallon capacity parts washer containing petroleum naphtha was observed to be located outside of the battery charging room in the maintenance area. The parts washer is serviced by the Safety Kleen Corporation of Saginaw, Michigan. The parts washer was installed in May, 1991. The petroleum naphtha is recycled by Safety-Kleen. Based upon past records, the parts washer is serviced approximately 3-4 times a year. Because of this limited use, the facility is considered a small-quantity exempt generator of hazardous waste and is not required to notify the U.S. EPA of hazardous waste activities.

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Two flammable storage cabinets are located in the south central portion of the facility. The cabinets hold a variety of latex and enamel paints stored in 1 -gallon and 5-gallon cans.

A 200-gallon waste oil AGST is located along the south wall of the facility adjacent to an exterior doorway. The floor surrounding the AGST was observed to be clean. Sutter Waste Oil Company, located in Flint, Michigan disposes of the waste oil generated at the Site.



Several 55-gallon drums of products such as hydraulic oil, gear lubricants, detergent, mineral spirits, and antifreeze were observed stored in the southwest corner of the facility. Many of the products are kept on Site to maintain the trucks servicing the facility. Material Safety Data Sheets for these products are maintained on file at the Site; no incidents have been reported.

Several electrical transformers are located throughout the inside of the facility. The transformers are dry, meaning that they contain no dielectric fluids.

A "keg" washer was observed to be located on the second floor mezzanine along the north wall of the facility. Oily residue from plastic parts containers ("totes") is washed out using a detergent solution. The washer tanks are drained weekly to the sanitary sewer. The washer is equipped with an oil/water separator.

A hydraulic trash compactor is located along the northeast wall of the facility. Some oil leakage was observed beneath the motor of the trash compactor on the concrete floor of the facility. Facility refuse is disposed by Valley Rubbish Removal located in Flint, Michigan.

3.30 Interior - Pump House

The pump house consists of a one-story building constructed of sheet metal situated on a concrete slab-on-grade floor. This building houses the fire suppression pump system used to protect the terminal.

A gas-fired boiler is located in the pump house and is used to heat the water tanks located outside. The boiler pipes are wrapped with fiberglass insulation.

Two 250-gallon AGSTs are located in a separate room along the south wall of the pump house. Access to the room is gained from a locked door located outside the building. The AGSTs contain diesel fuel used to power the fire pumps. The room containing the diesel AGSTs is set 6-inches below grade with concrete floors and curbs. No floor drains or indications of spillage/leakage were observed in this room.

A 55-gallon drum of motor oil was observed stored along the north wall of the pump house. A floor drain was observed to be located approximately 10 feet from the oil storage area; however, no staining was observed on the floor.

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4.00 REGULATORY INFORMATION CONCERNING SITE AND VICINITY

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Certain local, state and federal officials were contacted as part of this review to assess whether hazardous materials or oil may have been released at or near the Site. Information was received via telephone contact and/or personal interviews. Information made available to GZA is summarized in the following subsections. Appendix E contains a list of regulatory contacts made.



4.10 City of Flint

The City of Flint Fire Department (FFD) was contacted by GZA on April 6 and April 7, 1992 to inquire about the existence of records concerning spills of oil or hazardous materials at the Site. Lieutenant Miller of the FFD indicated that a Freedom of Information Act (FOIA) request was necessary to obtain file information. A FOIA request was mailed April 14, 1992, with the reply received May 11, 1992. The documentation indicates that a tanker truck overturned southbound on the Interstate 475 on November 11, 1985. The truck overturned onto the northeast portion of the Site, according to Mr. Mike Millet, Plant Manager, Unit FTT. According to the FFD report and Mr. Millet, the tanker did not spill any product during the incident. Also contained in the Flint Fire Department file information was a copy of a notification letter dated October 17, 1989 sent to the Michigan Department of Natural Resources (MDNR) regarding a leaking UST at the Site. Details of the UST are discussed in Section 4.30.

An interview with Sergeant Cox of the FFD revealed that the fire department also responded to a diesel fuel spill on April 2, 1992. Approximately 3 gallons of fuel was released on the asphalt pavement as a result of the overfilling of a truck fuel tank. The spill was washed into the storm sewer (reportedly ST-14) at the direction of the FFD. This information was not contained in the FFD file received by GZA.

The City of Flint Building and Safety Inspection Department was visited on April 3, 1992 to review Site building drawings. Mr. Jim Rohen, Building Inspector, was present when the Site plans were reviewed. According to Mr. Rohen, the area was previously a residential neighborhood. Site plans were approved by the City of Flint in May, 1985, with a Certificate of Occupancy issued.

The City of Flint Water Pollution Control Department was contacted on April 7, 1992 to obtain information regarding reported contamination in the storm sewer discharge to the Flint River. Mr. Brad Hill stated that one 8-inch discharge pipe located south of the Utah Street Dam was found to contain contaminants as indicated by an oily sheen and a petroleum naphtha odor. Mr. Hill had no further information regarding the discharge, saying that while the source had not been confirmed, PPG Coatings and Resins located at 3601 James P. Cole Blvd., southwest of the Site, was the suspected source.

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4.20 Genesee County

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The Genesee County Health Department was contacted on April 3, 1992 to inquire about the existence of records concerning spills of oil or hazardous materials at or near the Site and concerning the existence of landfills and/or dumps. The Health Department, while previously involved in hazardous material inspections, no longer conducts such inspections. According to Mr. John Pedit, Sanitarian, there are no records on file for the Site and he was unaware of any specific problems associated with the Site. Additionally, Mr. Pedit was unaware of any landfilling or dumping at the Site and indicated that the City of Flint should have the best information concerning the demolition and removal of residences prior to Site construction.

4.30 State of Michigan

The MDNR District office, located in Lansing, Michigan was visited by GZA personnel on April 9, 1992 to review files maintained on the Site and abutting properties. Files from the Emergency Response Division (ERD) and the Hazardous Waste Management (HWM) Division were reviewed. One file, maintained by the ERD, was found to contain information regarding the UST present on Site. A release was reported to Mr. Ben Hall of the MDNR in an October 16, 1989 telephone conversation made by the Site plant manager. The reported release was confirmed in writing on October 17, 1989.

Subsequent correspondence from Site personnel to Mr. Hall discussed the performance of leak tests on the UST and a tank inspection. The UST was apparently leak tested by Hunter Environmental Services, Inc. on August 23, 1989 after an environmental site assessment was conducted at the Site. The UST failed the tightness test and soil borings installed in the vicinity of the tank showed total petroleum hydrocarbon contamination. Two subsequent leak tests were performed on the tank by Walter C. Brandt & Sons on January 5, 1990, and by Hawkins Equipment Company on January 23, 1990. These tests also indicated unsatisfactory results. The tank was drained, excavated, and subsequently inspected by the tank manufacturer for evidence of holes or signs of leakage. None were reportedly found. The UST was leak tested by the O/C Tank Corporation on March 16, 1990 and passed the leak test. The soil excavated with the tank was found to be contaminated with petroleum hydrocarbons, and was disposed. Records of disposal were not available at the Site. One groundwater "pollution probe" surrounding the UST was sampled on April 10, 1990 and was found to contain toluene (420 parts per billion [ppb]), ethylbenzene (25 ppb), p-xylene (41 ppb), o-xylene (130 ppb), and m-xylene (76 ppb). Subsequent sampling of the four "pollution probes" took place on May 7, 1990, with analytical results showing no contaminants present in the samples. The tank was placed back in service upon receipt of these results.

This information was apparently forwarded to Mr. Hall. No correspondence from the MDNR to Site personnel was contained in the file. No further information regarding the current status of the UST was contained on file.

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MDNR ERD files maintained on the General Motors BOC Facility located at 902 E. Hamilton Avenue were reviewed during the MDNR visit. Two tank farms located within about a one-quarter mile radius of the Site were reported to have leaking underground storage tanks (LUSTs). One of these tank farms, i.e., Building Number 37 Tank Farm, is located west to northwest of the Site. An environmental investigation is currently underway, with monitoring wells installed to determine the extent of groundwater contamination. Based upon current knowledge of area groundwater flow, it appears that the Building Number 37 Tank Farm may be hydraulically upgradient of the Site.



HWM files maintained on PPG Coatings and Resins, located at 3601 James P. Cole Boulevard were reviewed during the MDNR visit. Hazardous waste inspections performed at the facility resulted in written violations of hazardous waste storage regulations in 1988 and 1989. PPG Coatings and Resins is located west of the Site, potentially upgradient of groundwater flow beneath the Site.

GZA reviewed the Michigan Leaking Underground Storage Tank 1st Quarterly Report FY 91-92, dated December 12, 1991. The Site appears on this list. The General Motors BOC Tank Farm Numbers 32, 37, and 85 also appear on this list and are located within approximately a one-quarter mile radius of the Site.

GZA reviewed the Michigan UST Registration List dated June 22, 1990. The UST maintained at the Site was listed. Four additional locations within a one-quarter mile radius were listed as maintaining USTs on-site. These locations are summarized on Table 1.

A review of the Michigan Sites of Environmental Contamination Act 307 list dated March 1991 revealed no listed sites within a one-quarter mile radius of the Site.

4.40 Federal Lists

GZA reviewed the U.S. EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) dated May 29, 1991. The Site was not listed. Flint Industrial Plating, located at 1109 East Stewart Avenue, was listed and is located approximately one-quarter mile northwest of the Site. No further information regarding Flint Industrial Plating was available through the MDNR. Information is being sought through the U.S. EPA-Region V office concerning this facility, however, no specific information was available at the time of preparation of this report.

A review of the Resource Conservation and Recovery Act (RCRA) hazardous waste generators, transporters, and treatment/storage facilities provided by the U.S. EPA dated September 12, 1991, revealed that there are five hazardous waste generators and one treatment, storage, or disposal facility (TSDF), located within a one-quarter mile radius of the Site. The Site was not listed as a hazardous waste generator. Table 2 provides a listing of the RCRA facilities.

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A review of the National Pollutant Discharge Elimination System (NPDES) permits issued in Genesee County, Michigan, on a list dated September 13, 1991, revealed that two facilities located within one-quarter mile of the Site have NPDES permits. These include General Motors BOC located at 902 E. Hamilton Avenue, and the City of Flint Water Treatment Plant located at 4500 N. Dort Highway. Information concerning the specific discharge point was not readily available.



5.00 FIELD EXPLORATION, SAMPLING AND ANALYTICAL PROGRAM

A Level II assessment, including field explorations, soil and groundwater sampling and laboratory testing, was initiated to establish a general understanding of subsurface conditions at the Site and to address specific concerns raised by the Level I activities. In particular, subsurface explorations were located in areas of suspected/potential impact, including: the diesel UST; surficial staining near the UST and near the south parking area; and, for establishing potential upgradient/background conditions. The following subsections describe the activities performed; refer to the identified tables, figures and appendices for additional information.

5.10 Soil Borings

Six soil borings (designated W1 to W6) were completed at the Site on April 14 and April 15, 1992 at the approximate locations shown on Figure Nos. 2 and 3. Two soil borings (W-1 and W-2) were drilled in the vicinity of the diesel UST to evaluate subsurface soil and groundwater conditions in the UST vicinity; two soil borings (W-3 and W-4) were drilled near the western Site boundary to evaluate upgradient soil and groundwater conditions that could be impacted by off-Site sources; and two soil borings (W-5 and W-6) were drilled along the eastern Site boundary and south of the UST, to evaluate subsurface soil and groundwater conditions downgradient of the Site.

Test borings were drilled by American Drilling and Testing Company, Inc. of Melvindale, Michigan. A GZA engineer was on Site on a full-time basis to oversee this activity. Test borings ranged in depth from 10 to 20 feet.

Hollow-stem augers, 4-1/4 inch inside diameter (I.D.), were used to advance the borings to the respective sampling interval. Soil samples were collected to the bottom of each boring using a split-spoon sampler in general accordance with the American Society for Testing and Materials (ASTM) D-1586. Test boring logs prepared by GZA are contained in Appendix F.

Soil samples were transferred directly from the split-spoon sampler to new, laboratory-cleaned, 16-ounce glass jars equipped with a Teflon-lined cap. Following field screening, the samples were placed in an iced cooler and kept cool until delivery to the analytical laboratory.

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The drilling equipment (i.e., augers, rods, split-spoons), was steam-cleaned between each boring. The split-spoons were washed using an Alconox™ and water solution followed by a potable water rinse. The auger spoil materials were covered with plastic for disposal pending receipt of the analytical test results.

5.20 Monitoring Well Installations

Following soil boring completion, groundwater monitoring wells were installed in each of the test borings. The monitoring wells were constructed using flush-coupled, 2-inch I.D., Schedule 40, polyvinyl chloride (PVC) screen and riser pipe. The screen (No. 10 slot) was 5 feet long. The screened interval was positioned to span the groundwater table observed during test boring (or the apparent bottom of tank elevation) so that the presence of free product could be assessed, if present. Silica sand was used to backfill from the bottom of the boring to a minimum of 1 foot above the top of the wellscreen. A minimum of 1-foot bentonite pellet seal was placed on top of the sand filter pack. A cement/bentonite mix was used to seal the borehole/well above the bentonite pellet seal. The wellhead was completed with a cement/bentonite grout surface seal with locking, protective casing. Monitoring Well Installations Reports are presented in Appendix G.

5.30 Well Development and Groundwater Sampling

The wells were developed after installation using pre-cleaned, disposable bailers (SingleSample™) and bailing 3 to 5 well volumes from each well. Field monitoring of pH, specific conductance and temperature were performed during this activity. These results are summarized on the installation reports contained in Appendix G.

The six monitoring wells and one "pollution probe" surrounding the UST, were subsequently sampled approximately 72 hours after installation, development, and stabilization of the wells. Each well was purged of about 3 well volumes, using pre-cleaned, disposable bailers as described above. Groundwater samples were placed into new, laboratory-cleaned containers equipped with Teflon-lined caps. Groundwater samples for metals analyses were field filtered and preserved with a nitric acid solution in accordance with U.S. EPA protocol. A trip blank accompanied the sample containers during the sampling event.

5.40 Survey

Using optical methods, GZA surveyed the elevation at ground surface and top of casing at each monitoring well location on April 20, 1992. Please note that the top of monitoring well casing at W-1 was the established reference point with an assumed datum of 100.00 feet. Horizontal survey control was made by tape measurement, line-of-sight and pacing. The elevations for borings and monitoring wells are reported on the Test Boring Logs and Monitoring Well Installation Reports contained in Appendices F and G, respectively.

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5.50 Shallow Soil Probes

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Approximately 22 shallow soil probes (up to 2 feet in depth) were completed in the stained area west of the UST fuel pump. The probes were drilled using a 1-inch hand auger and were completed in order to evaluate the extent of the diesel fuel contamination. Each probe was monitored with a photoionization detector (HNU PI-101), with positive readings recorded. The soil probes continued in a direction away from the surficial stained area until low or non-detectable HNU results were recorded. One soil sample (S-1, identified as ST-10 on the analytical reports and on the chain-of-custody form) was collected at a depth of 0.5 to 1.0 feet in the center of the stained area and submitted for laboratory analysis.

Two additional shallow soil probes (S-2 and S-3) were completed in the southeast corner of the Site using a one-inch hand auger. The borings were drilled in the stained area located southeast of the south parking lot to evaluate the impact of surface water runoff in this area. Two surface (0.5 - 1.0 feet in depth) soil samples (S-2 and S-3) were collected; one sample (S-2) was submitted for laboratory analysis.

5.60 Storm Sewer Sampling

Three storm sewers catch basins (designated ST-10, ST-14, and ST-22 on Site drawings) were sampled. Water samples were collected from the storm sewer located in the center of the diesel fuel stained grass, west of the fuel pump (ST-10); from the storm sewer located southeast of the diesel UST (ST-14) where stained asphalt indicated that residue from the previous fuel spill was washed into that sewer; and from the storm sewer located along the southeast property border (ST-22). Samples from ST-14 and ST-22 were submitted for analytical testing. ST-10 was observed to have a layer of free product approximately 2 inches in thickness on top of the standing water and, therefore, not submitted for analytical testing due to the obvious diesel fuel content. ST-22 was observed to have an oil sheen on the water surface, with a petroleum odor emanating from the manhole. No odor or sheen was observed in ST-14.

5.70 Laboratory Analyses

A laboratory analyses program was set to evaluate specific soil, groundwater and storm sewer samples relative to the anticipated conditions. The laboratory testing included analyses for: volatile organic compounds (VOCs) using U.S. EPA Method 8010 and 8020; aromatic hydrocarbons (i.e., benzene, toluene, ethylbenzene and xylenes [BTEX]) using U.S. EPA Method 8020; polynuclear aromatics (PNAs) using U.S. EPA Method 8310; PCBs using U.S. EPA Method 8080; and metals analysis using U.S. EPA Methods 6000/7000 series.

The selection of specific samples and analyses was based on the specific condition encountered or suspected in the field. Samples selected for laboratory analyses are summarized below and on Table 3.

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Sample No.	Sample Type	Laboratory Analysis				
		VOCs	BTEX	PNAs	PCBs	Metals
W-1/SS-7	CLAY		X	X		
W-2/SS-2	FILL: SAND		X	X		
W-2/SS-6	CLAY		X	X		
W-3/SS-3	FILL: SAND	X		X		X
W-4/SS-4	CLAY	X		X		
W-5/SS-1	FILL: SAND	X		X		
W-6/SS-4	FILL: SAND AND DEBRIS	X		X	X	X
S-1 (ST-10)*	FILL/STAINED	X		X	X	X
S-2	FILL/STAINED	X		X	X	
W-1	GROUNDWATER	X				X
W-2	GROUNDWATER	X				X
W-3	GROUNDWATER	X				X
W-4	GROUNDWATER	X				X
W-5	GROUNDWATER	X				X
W-6	GROUNDWATER	X				X
PP-2	GROUNDWATER	X				X
ST-14	STORMWATER	X		X		
ST-22	STORMWATER	X		X		

* Note: Surface sample S-1 is identified on analytical reports and chain-of-custody form as ST-10.

6.00 SUBSURFACE CONDITIONS

The following subsections contain a description of the subsurface conditions encountered during test drilling and groundwater sampling. These conditions were generally consistent with background information obtained during the Site history review. Refer to the test boring logs and monitoring well installation reports in Appendices F and G for further detail.

6.10 Soils

The Site is overlain by varying types of fill ranging from loose/soft to dense/stiff, sand to clay. It appears that regrading of the Site occurred between the time of residence demolition and facility construction. Random demolition debris was encountered at test boring W-6; it is not clear whether other debris filled areas are present on Site. Surficial evidence (i.e., mounds/depressions) was not observed during GZA's Site visit or field activities which would suggest that no large areas of filled materials exist on Site. Additionally, GZA's discussions with City of Flint officials indicated that the former residence basements were excavated and backfilled with "clean" fill.

The fill encountered was approximately 3.0 to 5.1 feet thick and appeared to be consistent with the general topography of the Site. The fill was typically underlain by stiff to hard silty clay at the test boring locations. Sand lenses were also encountered at borings W-1, W-3, W-4, W-5 and W-6 near the fill/clay interface. It is presumed that the natural sand and clay deposits are associated with the glacial moraine deposits typical of the Site area. The six test borings were terminated in the natural clays at depths ranging from 10 to 20 feet.



6.20 Groundwater

Groundwater was encountered at each test boring location in an apparent perched condition above the clay and within natural sand lenses. In some instances (i.e., W-1 and W-2), groundwater did not appear to be encountered during test boring until depths of 13 to 14 feet. Subsequent groundwater measurements from within the monitoring wells indicated significantly higher water levels (i.e., 3- to 5-foot depth).

Groundwater elevations were reviewed and suggest groundwater flow is to the southeast and closely follows the clay elevation topography. Note that groundwater level fluctuations will likely occur due to changes in season, precipitation and/or other subsurface factors.

7.00 LABORATORY TEST RESULTS

The following subsections provide a summary of the analytical testing performed for this project. The laboratory testing was performed by Thermo Analytical, Inc. (TMA) of Ann Arbor, Michigan. Samples were delivered to TMA by GZA under chain-of-custody in accordance with U.S. EPA and MDNR protocol.

The laboratory results have been tabulated in a generally consistent format for ease of review. Refer to Tables 4 through 13 for specific matrix type and summary of results, as discussed below. Appendix H contains a copy of the laboratory test results prepared by TMA.

7.10 Soils

Laboratory test results for soils are summarized on Table 4 (Aromatic VOCs), Table 5 (Halogenated VOCs), Table 6 (polynuclear aromatics [PNAs]), Table 7 (PCBs) and Table 8 (metals including arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc). The following provides a brief summary of these laboratory results.

Aromatic VOCs - As summarized on Table 4, BTEX compounds were not detected above the detection limits in the soil samples analyzed. The elevated detection limit for surficial soil samples S-1 (ST-10) and S-2 were reported by TMA to be the result of matrix interference due to the presence of other hydrocarbons.



Halogenated VOCs - As summarized on Table 5, each of the four soil samples tested indicated the presence of 1,1,1-trichloroethane at concentrations ranging from 19 to 65 micrograms per kilogram ($\mu\text{g/Kg}$) or parts per billion (ppb). Although the compound may be ubiquitous to the general industrial Site area, it appears that this result may be due to sampling and/or laboratory inconsistency since the compound is detected in both fill and natural clay samples at varying Site locations. Methylene chloride was also detected in two fill samples at concentrations of 9.1 and 24 $\mu\text{g/Kg}$. This result may also be associated with the industrialized Site area or laboratory since this compound is commonly used in the laboratory. Note that no other halogenated compounds were identified and that the detected compound concentrations are well below the MDNR's Type B Cleanup Criteria for soils undergoing remedial activity. Therefore, these findings are not considered as a significant issue.

PNAs - As summarized on Table 6, PNAs detected in soil samples included benzo(a)anthracene, chrysene, fluorene, indeno(1,2,3-cd)pyrene and pyrene. Test boring sample W-1/SS-7 contained 0.87 milligrams per kilogram (mg/Kg) or parts per million (ppm) of fluorene. Sample S-1 (ST-10), collected from the center of the diesel fuel stained area, contained benzo(a)anthracene, chrysene, fluorene and pyrene at concentrations ranging from 5.8 to 38 mg/Kg. Sample S-2, collected from the southeast corner of property, contained chrysene, indeno(1,2,3-cd)pyrene and pyrene at concentrations ranging from 0.052 to 0.14 mg/Kg. The remaining six test boring samples did not indicate the presence of PNAs. In addition, only S-1 (ST-10) and S-2, from the obviously-stained areas, indicated the presence of PNAs at concentrations slightly above the MDNR Type B Cleanup Criteria for soils.

PCBs - As summarized on Table 7, PCBs were not detected in either the debris fill or stained soil samples; and, therefore, does not appear to be a Site issue.

Metals - As summarized on Table 8, the total metal concentrations appear to be typical of general background/Site conditions. Fill samples W-6/SS-4 and S-1 (ST-10) indicate slightly elevated concentrations of barium, lead and zinc as compared to the fill samples W-3/SS-3; however, the overall concentration ranges are generally consistent with typical background concentrations in Michigan.

7.20 Groundwater

Laboratory test results for groundwater samples are summarized on Table 9 (Aromatic VOCs, Table 10 (Halogenated VOCs) and Table 11 (Dissolved metals including arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc). These results are discussed below.

Aromatic VOCs - As summarized on Table 9, the recently-installed monitoring well samples did not indicate the presence of BTEX compounds. However, the monitoring point within the UST installation area (i.e., "pollution probe" PP-2) indicated detectable levels of benzene (7.8 micrograms per liter ($\mu\text{g/L}$) or ppb),

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toluene (12 $\mu\text{g/L}$) and total xylenes (75 $\mu\text{g/L}$). GZA field personnel indicated that measurable floating product (approximately 2 to 3 inches) was observed within the "pollution probes" surrounding the UST. In addition, the laboratory indicated that a few globules of petroleum product was observed within the sample submitted to the laboratory. While the groundwater surrounding the UST does not appear to have been impacted, the sample from PP-2 suggests that remnant diesel fuel contamination may be present from previous Site activities and/or that additional UST leakage or incidental spillage has occurred. When compared to previously-discussed soil probe samples from the west side of the UST location, it appears that the groundwater between the storm sewer (ST-10) and the UST may also have been impacted.

Halogenated VOCs - As summarized on Table 10, halogenated VOCs were not detected in any of the groundwater samples analyzed. As previously discussed, the elevated detection level for PP-2 was a result of matrix interference caused by the presence of other hydrocarbons.

Metals - As summarized on Table 11, barium was detected in all groundwater samples at concentrations ranging from 0.02 milligrams per liter (mg/L) or ppm to 0.28 mg/L. Arsenic (0.001 to 0.015 mg/L), chromium (0.01 and 0.03 mg/L), selenium (0.003 mg/L), and zinc (0.02 to 0.10 mg/L) were also detected in selected samples at generally low concentrations. The detected parameters do not appear to be an issue when compared to MDNR Type B Cleanup Criteria for groundwater in an aquifer and/or the U.S. EPA Primary/Secondary Drinking Water Standards. Additionally, based on these results, the previously-identified metals at test borings W-6 and S-1 (ST-10) do not appear to be impacting groundwater at these locations.

7.30 Stormwater

Laboratory test results for stormwater samples ST-14 and ST-22 are summarized on Table 12 (Aromatic and Halogenated VOCs) and Table 13 (PNAs). Note that a liquid sample from catch basin ST-10 was not submitted for analysis since it was obviously contaminated with diesel fuel. The following provides a brief summary of these results.

Aromatic VOCs - As summarized on Table 12, BTEX compounds were not detected in either sample analyzed.

Halogenated VOCs - Also, as summarized on Table 12, the halogenated VOCs were not detected in either sample analyzed.

PNAs - As summarized on Table 13, PNAs including chrysene and fluorene were detected in the stormwater sample collected from ST-14 at 0.34 $\mu\text{g/L}$ and 0.55 $\mu\text{g/L}$, respectively. Benzo(a)anthracene, chrysene, fluorene and phenanthrene were detected in ST-22 at concentrations ranging from 250 $\mu\text{g/L}$ to 2,200 $\mu\text{g/L}$. These data suggest that only remnant contamination from the incidental spillage which occurred on April 2, 1992 remains at catch basin ST-

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14. However, the data from catch basin ST-22 suggests that petroleum contamination, possibly from the diesel fuel UST area, is present within the storm sewer lines and appears to be discharging off Site. It is GZA's understanding that these stormwater lines discharge to the Flint River and that petroleum-related discharges have occurred at the river in the past. This condition may be traced back to the Site and the UST and appears to be an area of concern.



8.00 LIMITATIONS

GZA's site assessment was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and GZA observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. GZA's findings and conclusions must be considered not as scientific certainties, but rather as our professional opinion concerning the significance of the limited data gathered during the course of the Level I and II Environmental Site Assessment. No other warranty, express or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous materials, oil, or other latent conditions beyond that observed by GZA during its site assessment. This report is also subject to the specific Limitations contained in Appendix B.

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TABLES

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TABLES

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TABLE 1

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**UNIT FLOW-THRU TERMINAL
FLINT, MICHIGAN**

**REGISTERED UNDERGROUND STORAGE TANKS
WITHIN ONE-QUARTER MILE OF THE SITE¹**

Site Location	Capacity (gallons)	Contents	Age (years)	Material of Construction
Unit Flow-Thru Terminal 4002 James P. Cole Blvd.	10,000	Diesel Fuel	6	Fiberglass ²
Universal Electric Construction Company 1401 E. Stewart Avenue	3,000	Gasoline	10	Bare Steel
Kimes Corporation (Lockhart Chemical) 4701 Thetford Avenue	12,000	Used Oil	12	Unknown
	12,000	Tennecount	12	Unknown
	Unknown	Gasoline	Unknown	Unknown
	Unknown	Gasoline	Unknown	Unknown
Snak Shack 4115 N. Dort Highway	12,000	Gasoline	6	Bare Steel
	12,000	Gasoline	6	Bare Steel
	1,000	Used Oil	6	Bare Steel
General Motors Corporation BOC Flint Operations 902 E. Hamilton	500	Diesel Fuel	19	Bare Steel
	3,000	Gasoline	26	Bare Steel
	12,000	HAZ-064742490	40	Bare Steel
	12,000	Gasoline	40	Bare Steel
	12,000	Gasoline	40	Bare Steel
	12,000	HAZ-008002059	54	Bare Steel
	12,000	Hydraulic	40	Bare Steel
	12,000	Hydraulic	40	Bare Steel
	12,000	Motor Oil	40	Bare Steel
	12,000	Motor Oil	40	Bare Steel
	12,000	Motor Oil	40	Bare Steel
	12,000	HAZ-008002059	40	Bare Steel
	12,000	HAZ-008002059	40	Bare Steel
	12,000	Motor Oil	40	Bare Steel



TABLE 1

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UNIT FLOW-THRU TERMINAL
FLINT, MICHIGANREGISTERED UNDERGROUND STORAGE TANKS
WITHIN ONE-QUARTER MILE OF THE SITE¹

Site Location	Capacity (gallons)	Contents	Age (years)	Material of Construction
General Motors Corporation BOC Flint Operations 902 E. Hamilton	12,000	HAZ-989922372	40	Bare Steel
	200,000	Used Oil	48	Concrete
	200,000	Diesel Fuel	48	Concrete
	12,000	HAZ-989903244	34	Concrete
	12,000	HAZ-989903244	34	Concrete
	12,000	HAZ-989902678	34	Bare Steel
	12,000	HAZ-989902678	34	Bare Steel
	12,000	HAZ-989903244	34	Bare Steel
	12,000	HAZ-989903244	34	Bare Steel
	12,000	HAZ-008012951	34	Bare Steel
	12,000	HAZ-989903244	45	Bare Steel
	12,000	HAZ-989903244	45	Bare Steel
	12,000	HAZ-989903244	45	Bare Steel
	12,000	Gasoline	54	Bare Steel
	12,000	HAZ-989956720	54	Bare Steel
	12,000	HAZ-008008206	54	Bare Steel
	12,000	HAZ-989903244	54	Bare Steel
	12,000	HAZ-989903244	54	Bare Steel
	12,000	Used Oil	54	Bare Steel
	12,000	HAZ-008002059	54	Bare Steel
	12,000	HAZ-008002059	54	Bare Steel
	13,000	Gasoline	54	Bare Steel
	6,000	Gasoline	26	Bare Steel
	12,000	Gasoline	36	Bare Steel
	10,000	Transmission Oil	44	Unknown
	10,000	Waste Solvent	44	Unknown
	10,000	Waste Solvent	44	Bare Steel
	12,000	Unknown	44	Bare Steel
	12,000	Gasoline	30	Bare Steel
	12,000	Gasoline	30	Bare Steel
	12,000	Glycol	30	Bare Steel
	12,000	Glycol-2	30	Bare Steel
	12,000	HAZ-000108883	30	Bare Steel
	12,000	Gasoline	30	Bare Steel
	12,000	HAZ-008012951-007012951	30	Bare Steel

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**UNIT FLOW-THRU TERMINAL
FLINT, MICHIGAN**

**REGISTERED UNDERGROUND STORAGE TANKS
WITHIN ONE-QUARTER MILE OF THE SITE¹**

Site Location	Capacity (gallons)	Contents	Age (years)	Material of Construction
General Motors Corporation BOC Flint Operations 902 E. Hamilton	12,000	HAZ-000108883	30	Bare Steel
	12,000	HAZ-000112345	30	Bare Steel
	12,000	HAZ-000112345	30	Bare Steel
	12,000	HAZ-000108883	30	Bare Steel
	6,000	Gasoline	18	Bare Steel
	6,000	Gasoline	18	Bare Steel
	6,000	Gasoline	18	Bare Steel
	6,000	Gasoline	19	Bare Steel
	6,000	HAZ-989956720	19	Bare Steel
	15,000	Used Oil	19	Bare Steel
	Unknown	Gasoline	24	Bare Steel
	20,000	Used Oil	49	Bare Steel
	15,000	Gasoline	36	Bare Steel
	15,000	Gasoline	36	Bare Steel
	15,000	Gasoline	36	Bare Steel
	12,000	Gasoline	10	Bare Steel
	12,000	Gasoline	10	Bare Steel
	6,000	Gasoline	10	Bare Steel
	12,000	Diesel	11	Bare Steel
	12,000	Diesel	11	Bare Steel
	100,000	Used Oil	33	Bare Steel
	100,000	Used Oil	33	Bare Steel
	12,000	Soluble Oil	12	Concrete
	12,000	Soluble Oil	12	Concrete
	3,000	Wastewater	19	Concrete

Notes:

1. Information obtained from a listing provided by the Michigan State Police - Fire Marshal's Division titled "Michigan UST-DMS Facility and Tank Data Listing by County," dated June 22, 1990.
2. Unit Flow-Thru Terminal UST listed as bare steel in UST registration data.

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UNIT FLOW-THRU TERMINAL
FLINT, MICHIGANRCRA NOTIFIERS LOCATED WITHIN
ONE-QUARTER MILE OF THE SITE

Site Location	U.S. EPA ID Number	Generator Classification
Flint Coatings, Inc. 4221 James P. Cole Blvd.	MID981796527	Small Quantity
GMC BOC Flint Automotive Division 902 E. Hamilton	MID005356712	Generator TSD: Disposal
PPG Industries, Inc. 3601 James P. Cole Blvd.	MID980995096	Generator
Lockhart Chemical Company 4701 Thetford Avenue	MID033674730	Small Quantity

Notes:

Generator: Greater than 1,000 kilograms of hazardous waste per month or greater than 1 kilogram of acutely hazardous waste per month.

Small Quantity: Between 100 and 1,000 kilograms of hazardous waste per month and less than 1 kilogram of acutely hazardous waste per month.

TSD: Treatment, storage or disposal facility.

The above listing was compiled from the U.S. EPA's database titled "Michigan RCRA Notifiers," dated September 12, 1991.

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TABLE 3

UNIT FLOW-THRU TERMINAL
FLINT, MICHIGANPID SCREENING RESULTS AND
SELECTION OF SOIL BORING SAMPLES
FOR LABORATORY ANALYSES

Selection for Laboratory Analyses ⁴								
Sample No. ¹	Depth (feet)	Soil Type	Total Volatile Organic Vapor Levels ^{2,3}	VOCs	BTEX	PNAs	PCBs	Total Metals
W-1/SS-1	1 - 2.5	FILL: SAND/CLAY	0.5					
W-1/SS-2	3.5 - 5	FILL: SAND	<0.5					
W-1/SS-3	6 - 7.5	FILL: CLAY	<0.5					
W-1/SS-4	8.5 - 10	FILL: CLAY	1.0					
W-1/SS-5	11 - 12.5	CLAY	1.0					
W-1/SS-6	13.5 - 15	CLAY	1.0					
W-1/SS-7	16 - 17.5	CLAY	<0.5		X	X		
W-1/SS-8	18.5 - 20	CLAY	<0.5					
W-2/SS-1	1 - 2.5	FILL: SAND	1.5					
W-2/SS-2	3 - 5	FILL: SAND	3.0		X	X		
W-2/SS-3	6 - 7.5	FILL: CLAY	7.0					
W-2/SS-4	8.5 - 10	CLAY	3.0					
W-2/SS-5	11 - 12.5	CLAY	3.0					

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TABLE 3

UNIT FLOW-THRU TERMINAL
FLINT, MICHIGANPID SCREENING RESULTS AND
SELECTION OF SOIL BORING SAMPLES
FOR LABORATORY ANALYSES

Selection for Laboratory Analyses ⁴								
Sample No. ¹	Depth (feet)	Soil Type	Total Volatile Organic Vapor Levels ^{2,3}	VOCs	BTEX	PNAs	PCBs	Total Metals
W-2/SS-6	13.5 - 15	CLAY	12.0		X	X		
W-3/SS-1	1 - 2.5	FILL: SAND	<0.5					
W-3/SS-2	3.5 - 5	FILL: SAND	<0.5					
W-3/SS-3	6 - 7.5	FILL: SAND	<0.5	X		X		X
W-3/SS-4	8.5 - 10	FILL: SAND	0.5					
W-3/SS-5	11 - 12.5	FILL: SAND	<0.5					
W-3/SS-6	13.5 - 15	SAND	<0.5					
W-3/SS-7	16 - 17.5	SILT	<0.5					
W-3/SS-8	18.5 - 20	CLAY	<0.5					
W-4/SS-1	1 - 2.5	FILL: SAND	<0.5					
W-4/SS-2	3.5 - 5	FILL: SAND	<0.5					
W-4/SS-3	6 - 7.5	CLAY	2.0					
W-4/SS-4	8.5 - 10	CLAY	3.0	X		X		

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TABLE 3

UNIT FLOW-THRU TERMINAL
FLINT, MICHIGANPID SCREENING RESULTS AND
SELECTION OF SOIL BORING SAMPLES
FOR LABORATORY ANALYSES

Selection for Laboratory Analyses ⁴								
Sample No. ¹	Depth (feet)	Soil Type	Total Volatile Organic Vapor Levels ^{2,3}	VOCs	BTEX	PNAs	PCBs	Total Metals
W-5/SS-1	1 - 2.5	FILL: SAND	0.5	X		X		
W-5/SS-2	3.5 - 5	CLAY	1.0					
W-5/SS-3	6 - 7.5	CLAY	1.5					
W-5/SS-4	8.5 - 10	CLAY	5.0					
W-6/SS-1	1 - 2.5	FILL: SAND	<0.5					
W-6/SS-2	3.5 - 5	FILL: CLAY	<0.5					
W-6/SS-3	6.5 - 7.5	FILL: CONCRETE	10.0					
W-6/SS-4	8.5 - 10	FILL: SAND and CONCRETE	5.0	X		X	X	X
W-6/SS-5	11 - 12.5	SAND/CLAY	0.5					
W-6/SS-6	13.5 - 15	CLAY	4.0					
W-6/SS-7	16 - 17.5	CLAY	1.0					

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TABLE 3

UNIT FLOW-THRU TERMINAL
FLINT, MICHIGAN

PID SCREENING RESULTS AND
SELECTION OF SOIL BORING SAMPLES
FOR LABORATORY ANALYSES

Notes:

- 1 Sample locations shown on Figure No. 2. For more information see test boring logs contained in Appendix F.
 - 2 Screening results indicate concentrations of total volatile organic vapor levels, referenced to an isobutylene-in-air standard (54 parts per million [ppm]), in the headspace above the sample using an HNU PI-101 Photoionization Detector (PID) equipped with a 10.2 eV lamp.
 - 3 Results reported in ppm detected above background (<0.5 ppm).
 - 4 Laboratory analyses performed by TMA/ERG Laboratories, Inc. of Ann Arbor, Michigan. Laboratory analyses performed as indicated above include: volatile organic compounds (VOCs) using U.S. EPA Methods 8010/8020; benzene, toluene, ethylbenzene and xylenes (BTEX) using U.S. EPA Method 8020; polynuclear aromatic hydrocarbons (PNAHs) using U.S. EPA Method 8310, polychlorinated biphenyls (PCBs) using U.S. EPA Method 8080, and total metals (Michigan 10) using U.S. EPA Methods 6000/7000/8000. Refer to the report text and Appendix H for details.
- Additionally, note that laboratory analysis selection based on: visual characteristics of the sample; sample depth and relationship to condition being evaluated; HNU reading/level; and groundwater level.

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TABLE 4
SOIL ANALYTICAL TEST RESULTS¹
AROMATIC VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8020; Concentrations in $\mu\text{g/Kg}$)

Sample Location (Depth)										
Test Parameter	MDNR Type B Cleanup Criteria ²	W-1/ SS-7 (16-17.5 ft)	W-2/ SS-2 (3.5-5 ft)	W-2/ SS-6 (13.5-15 ft)	W-3/ SS-3 (5-7.5 ft)	W-4/ SS-4 (8.5-10 ft)	W-5/ SS-1 (1-2.5 ft)	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁴ (0.5-1 ft)	S-2 (0.5-1 ft)
Benzene	20	<10 ³	<10	<10	<10	<10	<10	<10	<1.0	<1.0
Toluene	16,000	<10	<10	<10	<10	<10	<10	<10	<250	<250
Ethylbenzene	1,400	<10	<10	<10	<10	<10	<10	<10	<250	<250
Xylenes	6,000	<10	<10	<10	<10	<10	<10	<10	<250	<250

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per kilogram ($\mu\text{g/Kg}$).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992).
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.
4. Note, surface sample S-1 identified on chain-of-custody and laboratory test results as ST-10.

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TABLE 5
SOIL ANALYTICAL TEST RESULTS¹
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8010; Concentrations in $\mu\text{g/Kg}$)

Test Parameter	MDNR Type B Cleanup Criteria ²	Sample Location (Depth)					S-2 (0.5-1 ft.)
		W-3/ SS-3 (6-7.5 ft)	W-4/ SS-4 (8.5-10 ft)	W-5/ SS-1 (1-2.5 ft)	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁵ (0.5-1 ft)	
Bromodichloromethane	6	<5 ³	<5	<5	<5	<5	<5
Bromoform	80	<10	<10	<10	<10	<10	<10
Bromomethane	200	<10	<10	<10	<10	<10	<10
Carbon Tetrachloride	6	<5	<5	<5	<5	<5	<5
Chlorobenzene	2,000	<5	<5	<5	<5	<5	<5
Chloroethane	180	<10	<10	<10	<10	<10	<10
2-Chloroethyl Vinyl Ether	ID ⁴	<10	<10	<10	<10	<10	<10
Chloroform	120	<5	<5	<5	<5	<5	<5
Chloromethane	60	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene	12,000	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	12,000	<5	<5	<5	<5	<5	<5
1,4-Dichlorobenzene	20	<5	<5	<5	<5	<5	<5
Dibromochloromethane	8	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane	20,000	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	14,000	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	8	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	140	<5	<5	<5	<5	<5	<5
Trans-1,2-Dichloroethene	2,000	<5	<5	<5	<5	<5	<5

TABLE 5
SOIL ANALYTICAL TEST RESULTS¹
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8010; Concentrations in $\mu\text{g/Kg}$)

Test Parameter	MDNR Type B Cleanup Criteria ²	Sample Location (Depth)					
		W-3/ SS-3 (6-7.5 ft)	W-4/ SS-4 (8.5-10 ft)	W-5/ SS-1 (1-2.5 ft)	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁵ (0.5-1 ft)	S-2 (0.5-1 ft.)
1,2-Dichloropropane	10	<5	<5	<5	<5	<5	<5
Cis-1,3-Dichloropropene	4	<5	<5	<5	<5	<5	<5
Trans-1,3-Dichloropropene	4	<5	<5	<5	<5	<5	<5
Methylene Chloride	100	<5	<5	9.1	24	<5	<5
1,1,2,2-Tetrachloroethane	4	<5	<5	<5	<5	<5	<5
Tetrachloroethene	14	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	4,000	20	65	53	19	<5	<5
1,1,2-Trichloroethane	12	<5	<5	<5	<5	<5	<5
Trichloroethene	60	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	40,000	<5	<5	<5	<5	<5	<5
Vinyl Chloride	0.4	<10	<10	<10	<10	<10	<10

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per kilogram ($\mu\text{g/Kg}$).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992).
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.
4. "ID" indicates insufficient data as reported by the MDNR for establishing Type B Cleanup Criteria.
5. Note, surface sample S-1 identified on chain-of-custody and laboratory test results as ST-10.



TABLE 6
SOIL ANALYTICAL TEST RESULTS¹
POLYNUCLEAR AROMATIC HYDROCARBONS
(U.S. EPA METHOD 8310; Concentrations in mg/Kg)

Sample Location (Depth)										
Test Parameter	MDNR Type B Cleanup Criteria ²	W-1/ SS-7 (16-17.5 ft)	W-2/ SS-2 (3.5-5 ft)	W-2/ SS-6 (13.5-15 ft)	W-3/ SS-3 (6-7.5 ft)	W-4/ SS-4 (8.5-10 ft)	W-5/ SS-1 (1-2.5 ft)	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁶ 0.5-1 ft)	S-2 (0.5-1 ft.)
Acenaphthene	8	<0.5 ³	<0.5	<1.0	<0.5	<0.5	<0.5	<1.0	<10	<0.5
Acenaphthylene	ID ⁴	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<1.0	<10	<0.5
Anthracene	40	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Benzo(a)anthracene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	6.9	<0.05
Benzo(a)pyrene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Benzo(b)fluoranthene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Benzo(g,h,i)perylene	ID ⁴	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Benzo(k)fluoranthene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Chrysene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	17	0.082
Dibenz(a,h)anthracene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	<0.05
Fluoranthene	6	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5
Fluorene	6	0.087	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	38	0.13
Indeno(1,2,3-c,d)pyrene	0.2 ⁵	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<5.0	0.082
Naphthalene	0.6	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<1.0	<10	<0.5
Phenanthrene	ID	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	<5.0	<0.2
Pyrene	4	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	5.8	0.14

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in milligrams per kilogram (mg/Kg).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992).
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.
4. "ID" indicates insufficient data as reported by MDNR for establishing Type B Cleanup Criteria.
5. Indicates no criteria established; soil direct contact value considered by MDNR to be appropriate. Refer to Operation Memorandum #8, Revision 1.
6. Note, surface sample S-1 identified on chain-of-custody and laboratory test results as ST-10.

TABLE 7

SOIL ANALYTICAL TEST RESULTS¹
POLYCHLORINATED BIPHENYLS
 (U.S. EPA METHOD 8080; Concentrations in mg/Kg)

Test Parameter	MDNR Type B Cleanup Criteria ²	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁴ (0.5-1 ft)	S-2 (0.5-1 ft)
Arochlor 1016	1	<0.05 ³	<0.05	<0.05
Arochlor 1221	1	<0.05	<0.05	<0.05
Arochlor 1232	1	<0.05	<0.05	<0.05
Arochlor 1242	1	<0.05	<0.05	<0.05
Arochlor 1248	1	<0.05	<0.05	<0.05
Arochlor 1254	1	<0.05	<0.05	<0.05
Arochlor 1260	1	<0.05	<0.05	<0.05

NOTES:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in milligrams per kilogram (mg/Kg).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Riles 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992). Soil direct contact value of 1 mg/Kg considered appropriate by MDNR.
3. "<" denotes that the compound was analyzed, but not detected. The value shown represents the detection limit.
4. Note, surface sample S-1 identified on chain-of-custody and analytical test results as ST-10.

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TABLE 8
SOIL ANALYTICAL TEST RESULTS¹
MICHIGAN 10 METALS
(U.S. EPA METHODS 6000/7000 SERIES; Concentrations in mg/Kg)

Test Parameter	MDNR Type B ² Cleanup Criteria	Sample Location (Depth)		
		W-3/ SS-3 (6-7.5 ft)	W-6/ SS-4 (8.5-10 ft)	S-1 ST-10 ⁶ (0.5-1 ft)
Arsenic	0.0004 (0.2-39.0)	4.0	7.5	5.4
Barium	40 (6.8-291.0)	8.6	45	47
Cadmium	0.08 (0.1-3.5)	<0.97	<0.79	<0.88
Chromium	Note 4 (2.5-53.0)	6.4	13	10
Copper	20 (4.9-52.0)	4.6	13	16
Lead	Note 5 (2.5-32.0)	<5.8	14	38
Mercury	0.04 (0.01-0.7)	<0.10	<0.09	<0.09
Selenium	0.8 (0.12-2.5)	<0.34	<0.78	<0.77
Silver	0.8 (0.1-3.1)	<0.97	<0.97	<0.88
Zinc	20 (19.0-140.0)	21	44	110

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in milligrams per kilogram (mg/Kg).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992). Concentrations range in parentheses represent the background levels for those metals found in clay as reported in the, "Michigan Background Soil Survey," dated April, 1991. These background concentrations may be used if they are higher than the Type B Criteria and are representative of background.
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.
4. MDNR Type B Cleanup Criteria for chromium (III) is 140 mg/Kg and chromium (VI) is 2 mg/Kg. Typically total chromium analysis is performed which will include both chromium (III) and (VI).
5. MDNR Type B Cleanup Criteria for lead is currently under review by the MDNR.
6. Note, surface sample S-1 identified on chain-of-custody and analytical test results as ST-10.

TABLE 9
GROUNDWATER ANALYTICAL TEST RESULTS¹
AROMATIC VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8020; Concentrations in µg/L)

Test Parameter	MDNR Type B ² Cleanup Criteria	Sample Location							Trip Blank
		W-1	W-2	W-3	W-4	W-5	W-6	PP-2	
Benzene	1	<1.0 ³	<1.0	<1.0	<1.0	<1.0	<1.0	7.8	<1.0
Toluene	800	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12	<1.0
Ethylbenzene	70	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
Xylenes	300	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	75	<1.0

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per liter (µg/L).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992).
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.

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TABLE 10
GROUNDWATER ANALYTICAL TEST RESULTS¹
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8010; Concentrations in µg/L)

Test Parameter	MDNR Type B Cleanup Criteria ²	Sample Location							Trip Blank
		W-1	W-2	W-3	W-4	W-5	W-6	PP-2	
Bromodichloromethane	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Bromoform	4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
Bromomethane	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
Carbon Tetrachloride	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Chlorobenzene	100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Chloroethane	9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
2-Chloroethyl Vinyl Ether	ID ⁴	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
Chloroform	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Chloromethane	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0
1,2-Dichlorobenzene	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,3-Dichlorobenzene	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,4-Dichlorobenzene	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Dibromochloromethane	0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Dichlorodifluoromethane	1,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1-Dichloroethane	700	<0.5	0.54	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,2-Dichloroethane	0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1-Dichloroethene	7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Trans-1,2-Dichloroethene	100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,2-Dichloropropane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5



TABLE 10
GROUNDWATER ANALYTICAL TEST RESULTS¹
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHOD 8010; Concentrations in µg/L)

Test Parameter	MDNR Type B Cleanup Criteria ²	Sample Location							
		W-1	W-2	W-3	W-4	W-5	W-6	PP-2	Trip Blank
Cis-1,3-Dichloropropene	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Trans-1,3-Dichloropropene	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Methylene Chloride	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1,2,2-Tetrachloroethane	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Tetrachloroethene	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1,1-Trichloroethane	200	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1,2-Trichloroethane	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Trichloroethene	3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Trichlorofluoromethane	2,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Vinyl Chloride	0.02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per liter (µg/L).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992). Note that the MDNR reports an "acceptable detection limit" of 1 µg/L for most compounds listed.
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit achieved for the analyses performed.
4. "ID" indicates insufficient data for MDNR Type B Cleanup Criteria to be established.

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TABLE 11
GROUNDWATER ANALYTICAL TEST RESULTS¹
MICHIGAN 10 DISSOLVED METALS
(U.S. EPA METHOD 6000/7000 SERIES; Concentrations in mg/L)

Test Parameter	MDNR Type B ² Cleanup Criteria	U.S. EPA Drinking Water Standard ⁶	Sample Location						
			W-1	W-2	W-3	W-4	W-5	W-6	PP-2
Arsenic	0.00002	0.05	0.002 ³	<0.001	0.003	0.015	0.011	0.004	0.001
Barium	2	1	0.19	0.06	0.27	0.08	0.28	0.07	0.02
Cadmium	0.004	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	Note 4	0.05	0.01	<0.01	<0.01	<0.03	<0.01	<0.01	<0.01
Copper	1	1*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	Note 5	0.05	<0.09	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03
Mercury	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002
Selenium	0.04	0.01	<0.002	<0.004	<0.004	<0.002	<0.002	0.003	<0.002
Silver	0.04	0.1*	<0.015	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
Zinc	1	5*	<0.06	0.02	0.05	0.04	0.10	<0.01	<0.01

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in milligrams per liter (mg/L).
2. MDNR, Environmental Response Division, Michigan Environmental Response Act, Operational Memorandum #8, Revision 1, Type B Criteria, Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713 (March 16, 1992).
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.
4. MDNR Type B Cleanup Criteria for chromium (III) is 7 mg/L and chromium (VI) is 0.1 mg/L. Typically, total chromium analysis is performed which will include both chromium (III) and (VI).
5. MDNR Type B Cleanup Criteria for lead is currently under review by the MDNR.
6. U.S. EPA Primary Drinking Water Standards, 40 CFR 141. ** concentrations Secondary Drinking Water Standards; 40 CFR 143.

TABLE 12
STORMWATER ANALYTICAL TEST RESULTS¹
VOLATILE ORGANIC COMPOUNDS
(U.S. EPA METHODS 8020 AND 8010; Concentrations in µg/L)

Test Parameter	Sample Location	
	ST-14	ST-22
Aromatic VOCs		
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Xylenes	<1.0	<1.0
Halogenated VOCs		
Bromodichloromethane	<0.5 ²	<0.5
Bromoform	<1.0	<1.0
Bromomethane	<1.0	<1.0
Carbon Tetrachloride	<0.5	<0.5
Chlorobenzene	<0.5	<0.5
Chloroethane	<1.0	<1.0
2-Chloroethyl Vinyl Ether	<1.0	<1.0
Chloroform	<0.5	<0.5
Chloromethane	<1.0	<1.0
1,2-Dichlorobenzene	<0.5	<0.5
1,3-Dichlorobenzene	<0.5	<0.5
1,4-Dichlorobenzene	<0.5	<0.5
Dibromochloromethane	<0.5	<0.5

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TABLE 12
STORMWATER ANALYTICAL TEST RESULTS¹
VOLATILE ORGANIC COMPOUNDS
U.S. EPA METHODS 8020 AND 8010; Concentrations in µg/L)

Test Parameter	Sample Location	
	ST-14	ST-22
Dichlorodifluoromethane	<0.5	<0.5
1,1-Dichloroethane	<0.5	<0.5
1,2-Dichloroethane	<0.5	<0.5
1,1-Dichloroethene	<0.5	<0.5
Trans-1,2-Dichloroethene	<0.5	<0.5
1,2-Dichloropropane	<0.5	<0.5
Cis-1,3-Dichloropropene	<0.5	<0.5
Trans-1,3-Dichloropropene	<0.5	<0.5
Methylene Chloride	<0.5	<0.5
1,1,2,2-Tetrachloroethane	<0.5	<0.5
Tetrachloroethene	<0.5	<0.5
1,1,1-Trichloroethane	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5
Trichloroethene	<0.5	<0.5
Trichlorofluoromethane	<0.5	<0.5
Vinyl Chloride	<0.5	<0.5

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per liter (µg/L).
2. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit.

/60505TB9

Page 2 of 2



STORMWATER ANALYTICAL TEST RESULTS
POLYNUCLEAR AROMATIC HYDROCARBONS
(U.S. EPA METHOD 8310; Concentrations in µg/L)

Test Parameter	Sample Location	
	ST-14	ST-22 ²
Acenaphthene	<1.0 ³	<500
Acenaphthylene	<1.0	<500
Anthracene	<0.10	<250
Benzo(a)anthracene	<0.10	390
Benzo(a)pyrene	<0.10	<250
Benzo(b)fluoranthene	<0.10	<250
Benzo(g,h,i)perylene	<0.10	<250
Benzo(k)fluoranthene	<0.10	<250
Chrysene	0.34	250
Dibenzo(a,h)anthracene	<0.10	<250
Fluoranthene	<1.0	<500
Fluorene	0.55	2200
Indeno(1,2,3-c,d)pyrene	<0.10	<250
Naphthalene	<1.0	<500
Phenanthrene	<0.50	1400
Pyrene	<0.10	<250

Notes:

1. Refer to Appendix H for the laboratory test results. Concentrations are reported in micrograms per liter (µg/L).
2. Note, stormwater sample ST-22 identified on chain-of-custody and analytical test results as ST-E.
3. "<" denotes that compound was analyzed, but not detected. The value shown represents the detection limit achieved for the analysis performed.

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FIGURES

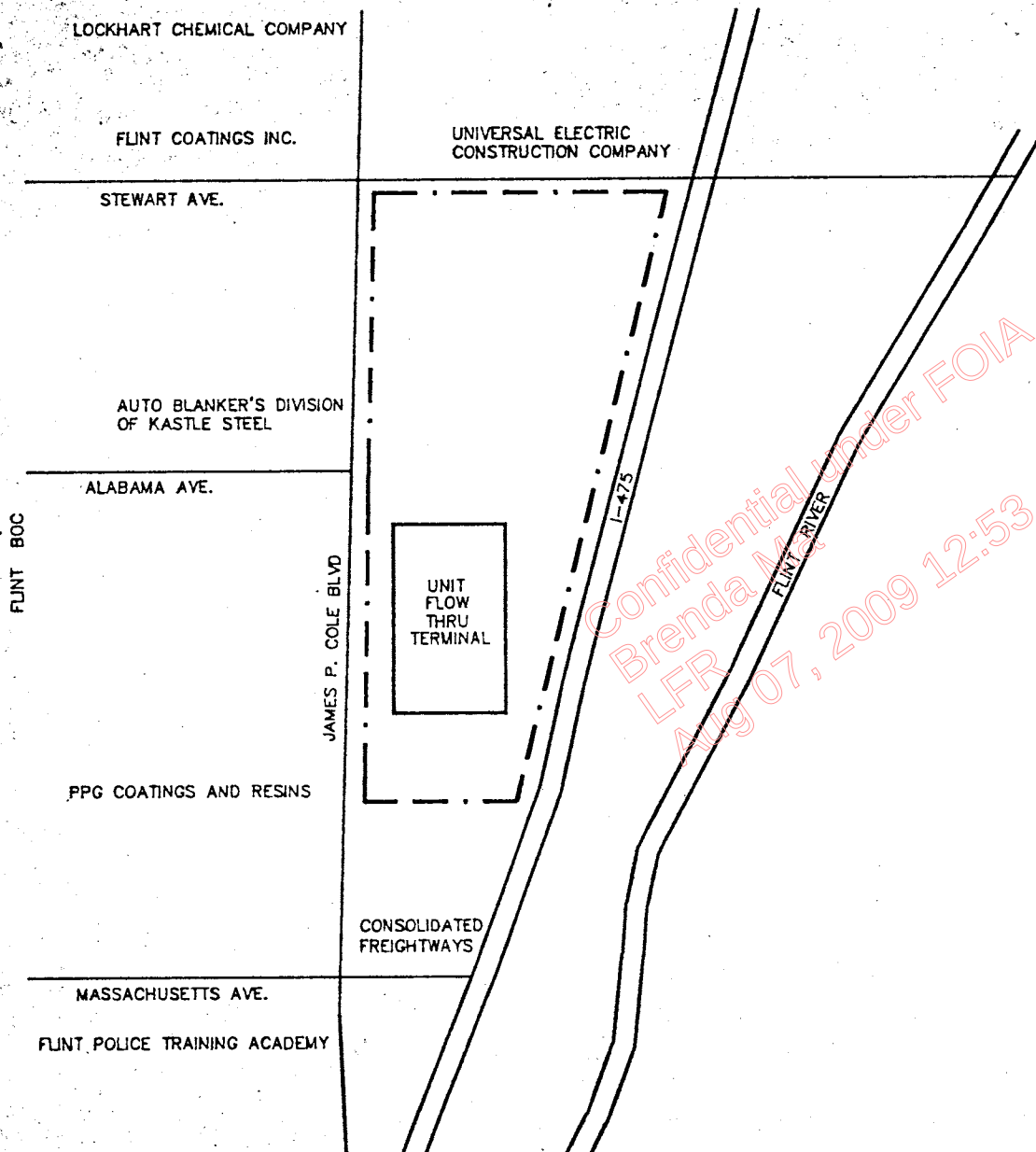


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LEGEND:

--- -- -- -- -- APPROXIMATE SITE BOUNDARY

NOTE:

1. LOCATION OF SITE ARE FEATURES WERE APPROXIMATED FROM EXISTING ROADWAYS AND STRUCTURES AND LOCATED ON THE SITE AREA SKETCH BY GZA. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

DESIGN BY: KJP
CHECKED BY: NONE
REVIEWED BY: DATE: 5/19/92



GZA
GeoEnvironmental, Inc.

NOT TO SCALE

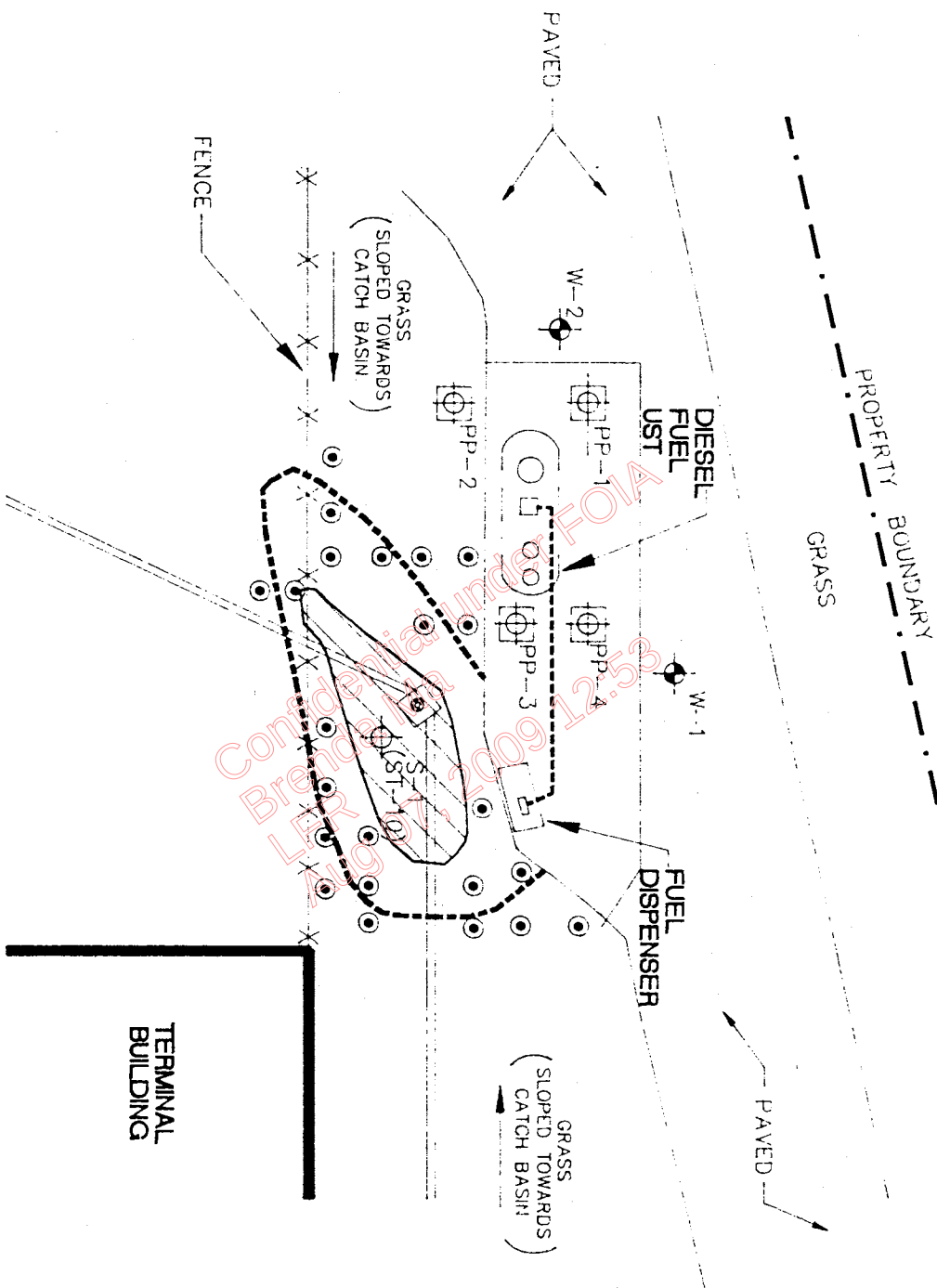
UNIT FLOW - THRU TERMINAL
FLINT, MICHIGAN

SITE AREA SKETCH

PROJECT NO.
60505

FIGURE NO.
4

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NOTES:

1. BASE MAP DEVELOPED FROM PLAN PROVIDED BY UNIT FTT AND DRAWN BY THE AUSTIN COMPANY ARCHITECTS AND ENGINEERS SHEET P11, ENTITLED "FILLING STATION PLAN & DETAILS," DATED MAY 30, 1985. ORIGINAL SCALE 1" = 8'.
2. EXTENT OF DIESEL STAINED GRASS WAS OBSERVED BY GZA PERSONNEL ON APRIL 20, 1992.
3. APPROXIMATE EXTENT OF NEAR SURFACE DIESEL FUEL CONTAMINATION IS BASED ON PHOTOIONIZATION DETECTION READINGS IN SHALLOW (0.5 TO 2 FEET) HAND AUGER PROBES ON APRIL 20, 1992. TYPICAL PID READINGS RANGED FROM 10 TO > 20 HNU UNITS OR PARTS PER MILLION. / REFER TO TEXT FOR ADDITIONAL DETAIL.

LEGEND:

- W-1 SOIL BORING/MONITORING WELL INSTALLED BY GZA.
- STORM SEWER CATCH BASIN
- STAINED GRASS APPARENTLY DIESEL FUEL - FREE PRODUCT ON GROUND SURFACE.
- APPROXIMATE EXTENT OF NEAR SURFACE DIESEL FUEL CONTAMINATION BASED ON SHALLOW HAND AUGER PROBES.
- PP-1 GROUNDWATER POLLUTION PROBE INSTALLED WITH UST IN 1985.
- FENCE
- SHALLOW (0.5 TO 2.0 FEET) HAND AUGER PROBE.
- S-1 SURFACE SAMPLE.

UNIT FLOW - THRU TERMINAL
FLINT, MICHIGAN

UST SITE AREA

REV. NO.

DESCRIPTION

BY

DATE

SCALE IN FEET



APPROXIMATE

DESIGNED BY:

CHECKED BY:

REVIEWED BY:

DRAWN BY: KJP
SCALE: 1" = 20'
DATE: 4/22/92



GZA
GeoEnvironmental, Inc.

PROJECT NO.

60505

FIGURE NO.

3

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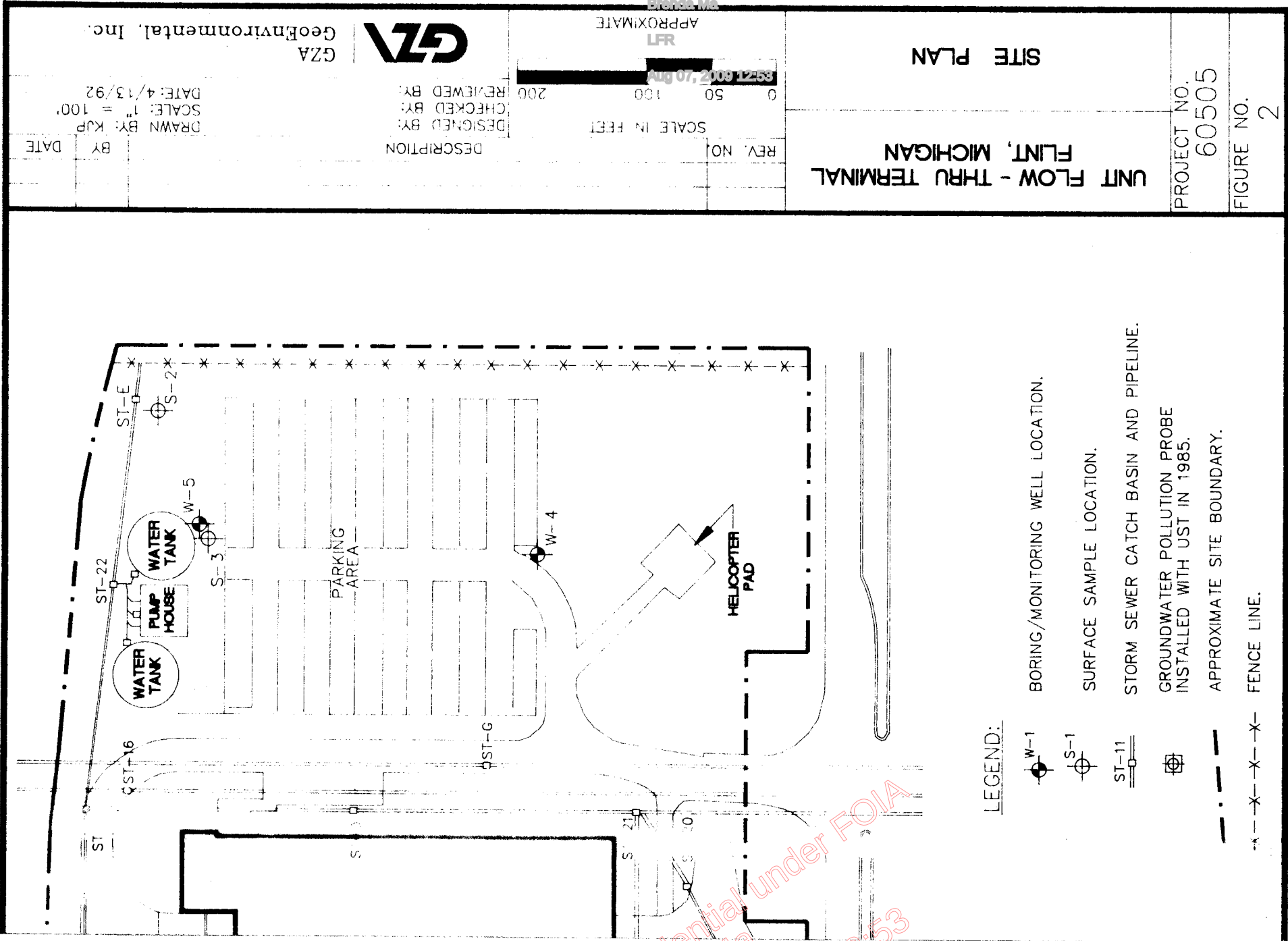
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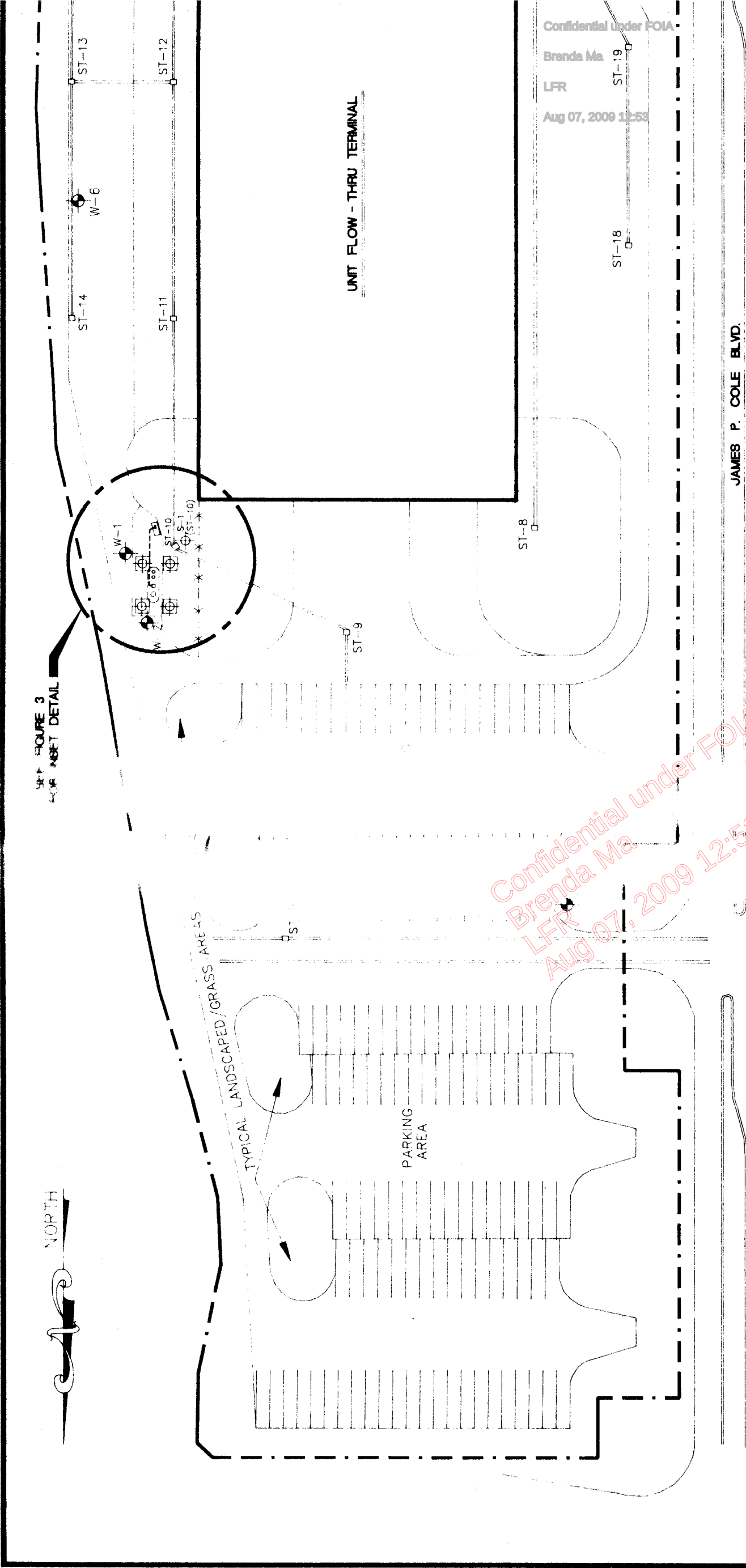


FIGURE 3
PARKING DETAIL

UNIT FLOW - THRU TERMINAL

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JAMES P. COLE BLVD.

NOTES:

1. BASE MAP DEVELOPED FROM PLAN PROVIDED BY GM - ARGONAUT AEC AND UNIT FTT AND DRAWN BY THE AUSTIN COMPANY, ARCHITECTS AND ENGINEERS SHEET NO. C1 ENTITLED "PLOT PLAN & GRADING PLAN," DATED MARCH 1, 1985. ORIGINAL SCALE 1" = 60'.
2. THE LOCATION AND ELEVATION OF THE BORINGS WERE APPROXIMATELY DETERMINED BY SURVEY AND TAPE MEASUREMENT FROM EXISTING TOPOGRAPHIC AND / OR SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. BORINGS PERFORMED BY AMERICAN DRILLING AND TESTING CO, INC. ON APRIL 14 AND 15, 1992, AND OBSERVED BY GZA PERSONNEL.

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FIGURES

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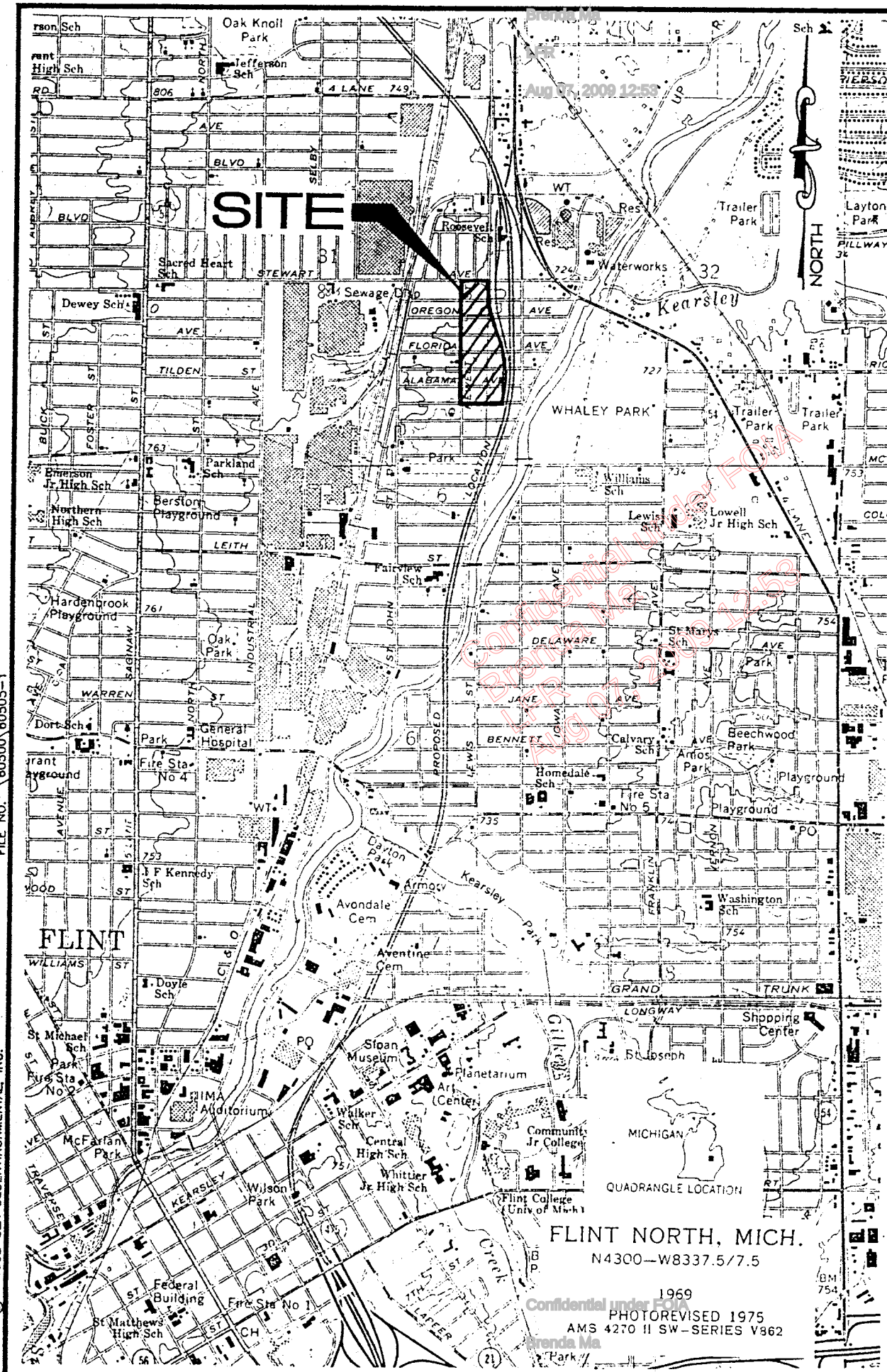
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FILE NO. \ 60500 60505-1

© 1992 GZA GEOTECHNICAL, INC.



DESIGN BY: KJP
CHECKED BY: JWC
REVIEWED BY: JWC
DRAWN BY: KJP
SCALE: 1" = 2000'
DATE: 4/13/92

SCALE IN FEET
0 1000 2000 4000
SOURCE: FLINT NORTH, MICHIGAN
TOPOGRAPHIC MAP
1969 PHOTOREVISED (1975)

UNIT FLOW - THRU TERMINAL
FLINT, MICHIGAN

LOCUS PLAN

PROJECT NO.
60505
FIGURE NO.
1

GZA
GeoEnvironmental, Inc.

FLINT NORTH, MICH.
N4300-W8337.5/7.5

1969
PHOTOREVISED 1975
AMS 4270 II SW-SERIES V862

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APPENDIX A

GM/AEC SCOPE OF SERVICES AND TERMS AND CONDITIONS

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Attachment A

September 9, 1991

SCOPE OF WORK

ENVIRONMENTAL SITE ASSESSMENT
ARGONAUT AEC PROJECT NO. 8858GENERAL

Argonaut AEC desires to retain, on a yearly basis, a qualified environmental consulting firm to assist in managing environmental risk exposure on properties which General Motors Corporation is considering. These properties will lie within the United States and Canada consist primarily of vacant land, commercial properties and/or light industrial properties with the potential for rehabilitation. The estimated average lead time available to perform the environmental site assessment work will be approximately 2 to 3 weeks.

ORGANIZATION

For administrative purposes, Argonaut AEC will identify each location where environmental site assessment services are required with a separate project number. The requests for environmental site assessment services will be directed to a designated lead consultant at a designated office. The lead consultant will appoint regional project managers at the various branch offices. The environmental consulting firm will provide a fee proposal along with the names, location and telephone numbers of the lead project manager. This individual will be responsible to coordinate and to implement the various services requested for each particular site. In addition, when the contact/P.O is released a list of all consultants and associated project managers will be required.

SCOPE OF SERVICES

The environmental consultant will provide qualified technical staff to perform environmental site assessment services for a presently unidentified number of sites during the year. A Level I Environmental Site Assessment is best defined by securing available information, necessary to decide if there is a reasonable basis to suspect the presense of an environmental risk. While the scope of services and level of effort will be site specific, it is anticipated that each site, with the exception of virgin land, at a minimum will include the following Level I tasks:

- TASK 1: Reconnaissance
- TASK 2: Site History Review
- TASK 3: State and Local Agency File Review
- TASK 4: Asbestos and PCB Review
- TASK 5: Documentation

Virgin land environmental site assessments will be primarily limited to Task 1, 2, 3 and 5 of the Level I review.

SCOPE OF SERVICES (Continued)

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In addition, depending on the site and results of Level I Site Assessment, supplemental Level II tasks may be deemed necessary:

- TASK 6: Initial Environmental Compliance Review
- TASK 7: Preliminary Radon Review
- TASK 8: Soil and Groundwater Testing
- TASK 9: Residue Sampling
- TASK 10: Asbestos and PCB Sampling

Each of the above tasks are described below:

TASK 1 - RECONNAISSANCE

An engineer, geologist, industrial hygienist or environmental technical specialist will inspect the property to:

- a) Observe and record the physical setting of the property.
- b) Observe and document the property and land use, including abutting and surrounding properties.
- c) Review available records on site (i.e., environmental file, reports, studies, etc.).
- d) Interview current property owners/tenants/maintenance chief to obtain information on current and past operations that may have led to a release of oil, gasoline, solvents or hazardous material(s) to the soil or groundwater.
- e) Observe and document with text and photographs the property interior and exterior conditions which may be indicative of past and present releases and practices.

TASK 2 - SITE HISTORY REVIEW

Additional information concerning the property history will also be obtained from other sources. These additional services include:

- a) Interviews with local officials from the fire marshall's office, town or city engineer, assessor's office, etc.
- b) Review of information from town or city historical societies.
- c) Review of historic aerial photos, if available.

TASK 3 - STATE AND LOCAL AGENCY FILE REVIEW

A review of governmental files may require investigation in order to establish the possible environmental and public health concerns at the property.

The state agency files to be reviewed will depend on the property location and past activities on site, but may include:

- a) Status of (RCRA) on site.
- b) Reported spills of oil or hazardous materials.
- c) Status of Toxic Substance Control Act (TSCA), which may include information on PCB's and PCB's containing materials and asbestos on site.
- d) Surface water discharge (NPDES) permits and discharge records.
- e) Municipality for sewer discharges.
- f) Air emission records.
- g) Underground storage tank files.

Local agencies contacted may include the fire marshal's office, the board of health, and the town engineer's and assessor's office.

TASK 4 - ASBESTOS AND PCB REVIEW

Based on observations during the site reconnaissance, the age of the buildings and building material, and discussions with the owner/tenant operator and the local utility company, a preliminary assessment of the potential for asbestos and PCB presence will be made. If the preliminary assessment suggests the presence of asbestos or PCB, Argonaut AEC shall be contacted immediately so that additional work may be authorized prior to demobilization.

TASK 5 - DOCUMENTATION

The environmental consultants Site Assessment Reports will be prepared utilizing a standard format including:

Executive Summary Transmittal Letter
Table of Contents and List of Figures

- Chapter 1 - Site Description, Development and Use
- 2 - Site Hydrogeological Characterization
 - 3 - Potential Contamination Sources
 - 4 - Environmental Compliance Review
 - 5 - Recommendations for Sampling and Remedial Work

- Appendix A - Site Assessment Methodology
- B - Field Sampling Data from past, when available
 - C - References and Regulatory Agency Correspondence

In addition, the environmental consultant shall supply Argonaut AEC with 6 copies of the final report.

Environmental Site Assessment
Page 4

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TASK 6 - INITIAL ENVIRONMENTAL COMPLIANCE REVIEW

If warranted by present and/or past operations, information obtained by the property owner/tenant will be reviewed which could result (in addition to Task 3) in performing a preliminary assessment, including field measurements using portable instruments, of current site compliance with key state and federal environmental regulations, pertaining to:

- a) Air emissions
- b) Groundwater and surface water discharges
- c) Solid waste disposal
- d) Hazardous waste storage and disposal (RCRA and/or other)
- e) Underground tanks
- f) PCB's stored in transformers and hydraulic oils
- g) Industrial discharges to sewers
- h) Pits, booths, trenches, etc.
- i) Soil gas analysis

TASK 7 - PRELIMINARY RADON REVIEW

Depending on the location of the property, it may be advisable to review the level of Radon present in the property. This preliminary review will be based strictly on the following considerations:

- a) Building construction
- b) Geologic setting of the site and/or building
- c) Conversations with state, local and federal public health officials on local data and conditions

If preliminary consideration of Radon indicates a potential for the presence of Radon, a specific site testing program will be proposed by the environmental consultant. In addition, Argonaut AEC shall be contacted immediately so that additional work may be authorized prior to demobilization.

TASK 8 - SOIL AND GROUNDWATER TESTING

If the work performed under Tasks 1 through 4 indicates a potential for the presence of oil or hazardous materials in the site soil and/or groundwater, implement a program for subsurface exploration and testing of soil and groundwater.

The scope of such a program would typically include the installation of approximately four (4) test borings over the site to below the groundwater table surface estimated to be approximately 30 feet. Collection of continuous soil samples composited at five (5) foot intervals will be made and one (1) water sample will be obtained at the completion of the boring. If monitoring of groundwater is not deemed necessary, the borings will be abandoned by filling them with grout.

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Environmental Site Assessment
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TASK 8 - SOIL AND GROUNDWATER TESTING (Continued)

The selected soil samples will be screened for volatile organic compounds (gasoline, fuel oil components and most common industrial solvents). Groundwater samples will be screened for ph, specific conductivity and VOC's. No other chemical analysis needs to be performed unless specifically warranted by the screening results and/or the history of the site use.

Appropriate laboratory and testing procedures must be utilized, such as but not limited to A.S.T.M. etc. All environmental samples shall be disposed of in a proper manner according to the applicable regulations for handling, storage, transport and disposal of such materials.

TASK 9 - RESIDUE SAMPLING

Depending on future use of the property, given the past data, practices and assessments, a sampling program for residues must be implemented. Typically, residue of pits, tanks, booths, ovens, hydraulic lifts, machinery and other building components should be sampled and analyzed as necessary. The analysis may include appropriate heavy metals, organics, base neutrals, solvents, etc.

TASK 10 - ASBESTOS & PCB SAMPLING

Depending on condition of asbestos (friable and/or possibly airborne), future use and demands of the lender, asbestos sampling and analysis from the pipe and other insulation, walls, ceilings, floors, roofs and air may be required. If any machinery and/or electrical equipment contained PCB, appropriate sampling and analysis from the liquids and surrounding area may be required. Argonaut AEC shall be notified prior to demobilization, so that additional sampling may be authorized if required.

mlo

misc2:A:GMC-PROP.WHH/1-5

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PURCHASE ORDER TERMS AND CONDITIONS

ACCEPTANCE: Seller has read and understands this order and agrees that Seller's written acceptance and commencement of any work or service under this order shall constitute Seller's acceptance of these terms and conditions only. All terms and conditions proposed by Seller which are different from or in addition to this order are unacceptable to Buyer, are expressly rejected by Buyer, and shall not become a part of this order. Any modifications to this order shall be made in accordance with Paragraph 31.

HIPPING, BILLING AND FLSA CERTIFICATION: Seller agrees: (a) to properly pack, mark and ship in accordance with the requirements of Buyer and involved carriers in a manner to secure lowest transportation cost; (b) to route shipments in accordance with instructions from Buyer's Traffic Department; (c) to make no charge for handling, packaging, storage, transportation or drayage of goods unless otherwise stated in this order; (d) to provide with each shipment packing slips with Buyer's order number marked thereon; (e) to properly mark each package with this order number, the factory, plant and dock number, and where multiple packages comprise a single shipment, to consecutively number each package; and (f) to promptly forward the original bill of lading or other shipping receipt for each shipment in accordance with Buyer's instructions. Seller will include on bills of lading or other shipping receipts a classification identification of the goods shipped in accordance with Buyer's instructions and carrier's requirements. The marks on each package and identification of the goods on packing slips, bills of lading and invoices shall be sufficient to enable Buyer to easily identify the goods purchased. Seller further agrees: (a) to promptly render, after delivery of goods or performance of services, correct and complete invoices to Buyer; and (b) to accept payment by check or, at Buyer's discretion, other cash method (including electronic transfer of funds). Seller's invoice must include a certification that all goods were produced in compliance with the applicable requirements of sections 6, 7, and 12 of the Fair Labor Standards Act, as amended, and of regulations and orders of the United States Department of Labor issued in connection therewith. The payment date is set forth on the face side of this order, or if not stated, shall be on the 25th day of the month following Buyer's receipt of a proper invoice (except as may otherwise be agreed upon by Buyer and Seller in connection with a program providing for electronic funds transfer). Time for payment shall not begin until correct and complete invoices are received, and Seller's discount privileges to Buyer shall be extended until such time as payment is due. Buyer may withhold payment pending receipt of evidence, in such form and detail as Buyer may direct, of the absence of any liens, encumbrances and claims on the goods or services under this order.

3. **DELIVERY SCHEDULES:** Deliveries shall be made both in quantities and at times specified in Buyer's schedules. Buyer shall not be required to make payment for goods delivered to Buyer which are in excess of quantities specified in Buyer's delivery schedules. Buyer may change the rate of scheduled shipments or direct temporary suspension of scheduled shipments, neither of which shall entitle Seller to modification of the price for goods or services covered by this order. For orders of goods where quantities and/or delivery schedules are not specified, Seller shall deliver goods in such quantities and times as Buyer may direct in subsequent releases.

4. **PREMIUM SHIPMENTS:** If Seller's acts or omissions result in Seller's failure to meet Buyer's delivery requirements and Buyer requires a more expeditious method of transportation for the goods than the transportation method originally specified by Buyer, Seller shall, at Buyer's option, (i) promptly reimburse Buyer for the difference in cost between the more expeditious method and the original method, (ii) allow Buyer to reduce its payment of Seller's invoices by such difference, or (iii) ship the goods as expeditiously as possible at Seller's expense and invoice Buyer for the amount which Buyer would have paid for normal shipment.

5 **CHANGES:** Buyer reserves the right at any time to direct changes, or cause Seller to make changes, drawings and specifications of the goods or to otherwise change the scope of the work covered by this Contract, including work with respect to such matters as inspection, testing or quality control, and Seller agrees to promptly make such changes; any difference in price or time for performance resulting from such changes shall be equitably adjusted by Buyer after receipt of documentation in such form and detail as Buyer may direct. Any changes to this order shall be made in accordance with Paragraph 31.

6. **INSPECTION:** Seller agrees that Buyer shall have the right to enter Seller's facility at reasonable times to inspect the facility, goods, materials and any property of Buyer covered by this order. Buyer's action of the goods, whether during manufacture, prior to delivery or within a reasonable time after delivery, shall not constitute acceptance of any work-in-process or finished goods.

NONCONFORMING GOODS: To the extent Buyer rejects goods as nonconforming, the quantities under this order will automatically be reduced unless Buyer otherwise notifies Seller. Seller will not replace quantities so reduced without a new order or schedule from Buyer. Nonconforming goods will be held by Buyer for disposition in accordance with Seller's instructions at Seller's risk. Seller's failure to provide instructions within ten (10) days, or such shorter period as may be commercially reasonable under the circumstances, after notice of nonconformity shall entitle Buyer, at Buyer's option, to charge Seller the contract price for the goods, to go forward with the order, or to cancel the order. Seller's failure to conforming goods shall not constitute an acceptance thereof, limit or impair Buyer's right to assert any legal or equitable remedy, or relieve Seller's responsibility for latent defects.

8 **FORCE MAJEURE:** Any delay or failure of either party to perform its obligations hereunder shall be set off, and to the extent that it is caused by an event or occurrence beyond the reasonable control of party and without its fault or negligence, such as, by way of example and not by way of limitation, acts of, actions by any governmental authority (whether valid or invalid), fires, floods, windstorms, explosions, riots, natural disasters, wars, sabotage, labor problems (including lockouts, strikes and slowdowns), inability to obtain power, material, labor, equipment or transportation, or court injunction or order; provided that written notice of such delay (including the anticipated duration of the delay) shall be given by the affected party to the other party within ten (10) days. During the period of such delay or failure to perform by Seller, Buyer, at its option, may purchase goods from other sources and reduce its schedules to reflect such quantities, without liability to Seller, or have Seller provide the goods from other sources in quantities and at times requested by Buyer and at the price set forth in this order. If requested by the Buyer, Seller shall, within ten (10) days of such request, provide adequate assurances that the delay shall not exceed thirty (30) days. If the delay lasts more than thirty (30) days or Seller does not provide adequate assurance that the delay will cease within thirty (30) days, Buyer may immediately cancel the order without liability.

WARRANTY: Seller expressly warrants that all goods or services covered by this order will conform to specifications, drawings, samples, or descriptions furnished to or by Buyer, and will be merchantable, good material and workmanship and free from defect. In addition, Seller acknowledges that Seller knows of Buyer's intended use and expressly warrants that all goods covered by this order which have been selected, designed, manufactured, or assembled by Seller, based upon Buyer's stated use, will be fit and sufficient for the particular purposes intended by Buyer.

INGREDIENTS DISCLOSURE AND SPECIAL WARNINGS AND INSTRUCTIONS: If requested by Buyer, Seller shall promptly furnish to Buyer in such form and detail as Buyer may direct: (a) a list of all ingredients in the goods purchased from Seller; (b) the amount of one or more ingredients; and (c) information concerning any and/or additions to such ingredients. Prior to and with the shipment of the goods purchased from Seller, Seller agrees to furnish to Buyer sufficient warning and notice in writing (including appropriate labels on goods, containers and packing) of any hazardous material which is an ingredient or a part of any of the goods, together with such special handling instructions as may be necessary to advise carriers, Buyer, and their respective employees of how to exercise that measure of care and precaution which will best prevent bodily injury or property damage in the handling, transportation, processing, use, or disposal of the goods, containers and packing shipped to Buyer.

11. **INSOLVENCY:** Buyer may immediately cancel this order without liability to Seller in the event of the happening of any of the following or any other comparable event: (a) insolvency of the Seller; (b) filing of a voluntary petition in bankruptcy by Seller; (c) filing of any involuntary petition in bankruptcy against Seller; (d) appointment of a receiver or trustee for Seller; (e) or execution of an assignment for the benefit of creditors by Seller, provided that such petition, appointment, or assignment is not vacated or nullified within fifteen (15) days of such event.

22. **CANCELLATION FOR BREACH:** Buyer reserves the right to cancel all or any part of this order, without liability to Seller, if Seller: (a) repudiates or breaches any of the terms of this order, including Seller's warranties; (b) fails to perform services or deliver goods as specified by Buyer; or (c) fails to make progress so as to endanger timely and proper completion of services or delivery of goods; and does not effect such failure or breach within ten (10) days (or such shorter period of time if commercially reasonable under the circumstances) after receipt of written notice from Buyer specifying such failure or breach.

3. **TERMINATION:** In addition to any other rights of Buyer to cancel or terminate this order, Buyer may at its option immediately terminate all or any part of this order at any time and for any reason, by giving written notice to Seller. Upon termination, Buyer shall pay to Seller the following amounts, without limitation: (a) the price for all goods or services which have been completed in accordance with this order and not previously paid for; and (b) the actual costs of work-in-process and raw materials incurred by Seller in furnishing the goods or services under this order to the extent such costs are reasonable in amount and are properly allocable or apportionable under generally accepted accounting principles to the terminated portion of this order; less, however, the reasonable value or cost (whichever is higher) of any goods or materials used or sold by Seller with Buyer's written consent, and the cost of any damaged or destroyed goods or material. Buyer will make no payments for finished goods, work-in-process or raw materials fabricated or procured by Seller in amounts in excess of those authorized in delivery orders nor for any undelivered goods which are in Seller's standard stock or which are readily marketable under the circumstances after receipt or withdrawal of this order.

Payments made under this Paragraph shall not exceed the aggregate price payable by Buyer for finished goods which would be produced by Seller under delivery or release schedules outstanding at the date of termination. Except as provided in this Paragraph, Buyer shall not be liable for and shall not be required to make payments to Seller, directly or on account of claims by Seller's subcontractors, for loss of anticipated profit, unperformed contract, injured claims, product development and engineering costs.

administrative burden changes from termination of this order. Within sixty (60) days from the effective date of termination, Seller shall submit a comprehensive termination claim to Buyer, with sufficient supporting data to permit Buyer's audit, and shall thereafter promptly furnish such supplemental and supporting information as Buyer shall request. Buyer, or its agents, shall have the right to audit and examine all books, records, facilities, work, material, inventories, and other items relating to any termination claim of Seller.

34. INTELLECTUAL PROPERTY: Seller agrees: (a) to defend, hold harmless and indemnify Buyer, its successors and assigns against all claims, demands, losses, suits, damages, liability and expenses (including reasonable attorney fees) arising out of any suit, claim or action for actual or alleged direct or contributory infringement of, or inducement to infringe, any United States or foreign patent, trademark, copyright or mask work right by reason of the manufacture, use or sale of the goods or services ordered, including infringement arising out of compliance with specifications furnished by Buyer, or for actual or alleged misuse or misappropriation of a trade secret resulting directly or indirectly from Seller's actions; (b) to waive any claim against Buyer under the Uniform Commercial Code or otherwise, including any hold harmless or similar claim, in any way related to a claim asserted against Seller or Buyer for patent, trademark, copyright or mask work right infringement or the like, including claims arising out of compliance with specifications furnished by Buyer; and (c) to grant to Buyer a worldwide, nonexclusive, royalty-free, irrevocable license to repair and have repaired, to reconstruct and have reconstructed the goods ordered hereunder. Seller assigns to Buyer all right, title and interest in and to all trademarks, copyrights and mask work rights in any material created for Buyer under this order.

15. **TECHNICAL INFORMATION DISCLOSED TO BUYER:** Seller agrees not to assert any claim (other than a claim for patent infringement) with respect to any technical information which Seller shall have disclosed or may hereafter disclose to Buyer in connection with the goods or services covered by this order.

16. **INDEMNIFICATION:** If Seller performs any work on Buyer's premises or utilizes the property of Buyer, whether on or off Buyer's premises, Seller shall indemnify and hold Buyer harmless from and against any liability, claims, demands or expenses (including reasonable attorney fees) for damages to the property of or injuries (including death) to Buyer, its employees or any other person arising from or in connection with Seller's performance of work or use of Buyer's property, except for such liability, claim, or demand arising out of the sole negligence of Buyer.

17. **INSURANCE:** Seller shall maintain insurance coverage in amounts not less than the following: (a) Workers' Compensation — Statutory Limits for the state or states in which this order is to be performed (or evidence of authority to self-insure); (b) Employer's Liability — \$250,000; (c) Comprehensive General Liability (including Products/Completed Operations and Blanket Contractual Liability) — \$1,000,000 per person, \$1,000,000 per occurrence Personal Injury, and \$1,000,000 per occurrence Property Damage, or \$1,000,000 per occurrence Personal Injury and Property Damage combined single limit; and (d) Automobile Liability (including owned, non-owned and hired vehicles) — \$1,000,000 per person, \$1,000,000 per occurrence Personal Injury and \$1,000,000 per occurrence Property Damage, or \$1,000,000 per occurrence Personal Injury and Property Damage combined single limit. At Buyer's request, Seller shall furnish to Buyer certificates of insurance setting forth the amount(s) of coverage, policy number(s) and date(s) of expiration for insurance maintained by Seller and, if further requested by Buyer, such certificates will provide that Buyer shall receive thirty (30) days' prior written notification from the insurer of any termination or reduction in the amount or scope of coverages. Seller's purchase of appropriate insurance coverage or the furnishing of certificates of insurance shall not release Seller of its obligations or liabilities under this order. In the event of Seller's breach of this provision, Buyer shall have the right to cancel the undelivered portion of any goods or services covered by this order and shall not be required to make further payments except for conforming goods delivered or services rendered prior to cancellation.

18. **TOOLS:** Unless otherwise agreed to by Buyer, Seller at its own expense shall furnish, keep in good condition, and replace when necessary all tools, jigs, dies, gauges, fixtures, molds and patterns ("Tools") necessary for the production of the goods. The cost of changes to the Tools necessary to make design and specification changes authorized by Buyer shall be paid for by Buyer. Seller shall insure the Tools with full fire and extended coverage insurance for the replacement value thereof. Seller grants Buyer an irrevocable option to take possession of and title to the Tools that are special for the production of the goods upon payment to Seller of the book value thereof less any amounts which Buyer has previously paid to Seller for the cost of such Tools; provided, however, that this option shall not apply if such Tools are used to produce goods that are the standard stock of Seller or if a substantial quantity of like goods are being sold by Seller to others.

19. **BAILED PROPERTY:** All supplies, materials, tools, jigs, dies, gauges, fixtures, molds, patterns, equipment and other items furnished by Buyer, either directly or indirectly, to Seller to perform this order, or for which Seller has been reimbursed by Buyer, shall be and remain the property of Buyer. Seller shall be responsible for loss of and damage to Buyer's property. Buyer's property shall at all times be properly housed and maintained by Seller, shall not be used by Seller for any purpose other than the performance of this order, shall be deemed to be personality, shall be conspicuously marked "Property of General Motors Corporation" by Seller, shall not be commingled with the property of Seller or with that of a third person, and shall not be moved from Seller's premises without Buyer's prior written approval. Upon the request of Buyer, such property shall be immediately released to Buyer or delivered to Buyer by Seller, either (i) F.O.B. transport equipment at Seller's plant, properly packed and marked in accordance with the requirements of the carrier selected by Buyer to transport such property, or (ii) to any location designated by Buyer, in which event Buyer shall pay to Seller the reasonable cost of delivering such property to such location. Buyer shall have the right to enter onto Seller's premises at all reasonable times to inspect such property and Seller's records with respect thereto.

20. REMEDIES: The rights and remedies reserved to Buyer in this order shall be cumulative, and additional to all other or further remedies provided in law or equity.

21. DUTY DRAWBACK RIGHTS: This order includes all related customs duty and import drawback rights, if any, (including rights developed by substitution and rights which may be acquired from Seller's suppliers) which Seller can transfer to Buyer. Seller agrees to inform Buyer of the existence of any such rights and upon request to supply such documents as may be required to obtain such drawback.

22. **SETOFF:** In addition to any right of setoff provided by law, all amounts due Seller shall be considered net of indebtedness of Seller to General Motors Corporation and its subsidiaries, and General Motors Corporation may deduct any amounts due or to become due from Seller to General Motors Corporation and its subsidiaries from any sums due or to become due from General Motors Corporation to Seller.

23. ADVERTISING: Seller shall not, without first obtaining the written consent of Buyer, in any manner advertise or publish the fact that Seller has contracted to furnish Buyer the goods or services herein ordered, or use any trademarks or tradenames of Buyer in Seller's advertising or promotional materials. In the event of Seller's breach of this provision, Buyer shall have the right to cancel the undelivered portion of any goods or services covered by this order and shall not be required to make further payments except for confirming goods delivered or services rendered prior to cancellation.

24. GOVERNMENT COMPLIANCE: Seller agrees to comply with all federal, state and local laws, executive orders, rules, regulations and ordinances which may be applicable to Seller's performance of its obligations under this order.

25. **EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION:** This order incorporates by reference, (a) all provisions of 41 C.F.R. 60-1.6, as amended, pertaining to the equal opportunity clause in government contracts; (b) all provisions of 41 C.F.R. 60-250, as amended, pertaining to affirmative action for disabled veterans of the Vietnam Era; and (c) all provisions of 41 C.F.R. 60-741, as amended, pertaining to affirmative action for handicapped workers. Seller certifies that it is in compliance with all applicable provisions of 41 C.F.R. 60-1, including but not limited to: (a) developing and presently having in full force and effect a written affirmative action compliance program for each of its establishments as required by 41 C.F.R. 60-1.40, as amended; (b) filing EEO-1 Reports as required by 41 C.F.R. 60-1.7, as amended; and (c) neither maintaining segregated facilities nor permitting its employees to perform services at segregated facilities as prohibited by 41 C.F.R. 60-1.8, as amended. Buyer requests that Seller adopt and implement a policy to extend employment opportunities to qualified applicants and employees on an equal basis, regardless of an individual's age, race, color, sex, religion or national origin.

26. NO IMPLIED WAIVER: The failure of either party at any time to require performance by the other party of any provision of this order shall in no way affect the right to require such performance at any time thereafter, nor shall the waiver of either party of a breach of any provision of this order constitute a waiver of any succeeding breach of the same or any other provision.

27. NON-ASSIGNMENT: Seller may not assign or delegate its obligations under this order without Buyer's prior written consent.

28. RELATIONSHIP OF PARTIES: Seller and Buyer are independent contracting parties and nothing in this contract shall constitute either party the agent or legal representative of the other for any purpose whatsoever, nor does it grant either party any authority to assume or to create any obligation on behalf of or in the name of the other.

23. GOVERNING LAW: This order is to be construed according to the laws of the state from which this order issues as shown by the address of Buyer on the face side of this order.

30. SEVERABILITY: If any term of this order is invalid or unenforceable under any statute, regulation, ordinance, executive order or other rule of law, such term shall be deemed reformed or deleted, but only to the extent necessary to comply with such statute, regulation, ordinance, order or rule, and the remaining provisions of this order shall remain in full force and effect.

3. **ENTIRE AGREEMENT:** This order, together with the attachments, exhibits, or supplements, specifically referenced in this order, constitutes the entire agreement between Seller and Buyer with respect to the matter contained herein and supercedes all prior oral or written representations and agreements. This

ADDITIONAL CONDITIONS TO PURCHASE ORDER TERMS & CONDITIONS FOR CONSTRUCTION PROFESSIONAL SERVICES

(NOT APPLICABLE FOR THE PURCHASE OF PROCESS EQUIPMENT)

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The Purchase Order Terms and Conditions shall be revised as specified in these Additional Conditions to Purchase Order Terms & Conditions for Construction Professional Services to delete paragraphs, to supersede deleted paragraphs, to amend paragraphs and add paragraphs as follows:

SHIPPING, BILLING & FLSA CERTIFICATION, Paragraph 2, delete the following sentence:

"Seller's invoice must include a certification...in connection therewith."

DELIVERY SCHEDULE, Paragraph 3, delete and substitute with the following:

The services shall be performed on a timely basis consistent with the Buyer's requirements outlined in the scope of work.

A completion schedule for key activities shall be mutually determined so actual progress can be compared with scheduled progress. Therefore additional time required to meet original schedule will not be performed at Buyer's expense unless the original scope of work is revised at Buyer's request.

INTELLECTUAL PROPERTY, Paragraph 14, amend by adding the following:

Proprietary Information

In order that Seller's employees may effectively provide the services to Buyer under this Purchase Order, it may be necessary or desirable for Buyer to disclose proprietary information pertaining to Buyer's past, present and future activities. All information furnished or made available by Buyer to Seller or to Seller's employees or subcontractors in connection with the work or services to be performed for Buyer hereunder, and all proprietary information generated or developed by Seller or its employees and subcontractor for Buyer shall be treated as confidential by Seller and its employees and subcontractors and shall not be disclosed by Seller, its employees, and subcontractors to anyone, either in whole or in part, except upon written authorization by Buyer.

Rights of Title

Seller agrees that all work products of Seller's employees, including drawings, designs, reports, manuals, programs, tapes and any other material prepared by Seller's employees under this Purchase Order shall belong exclusively to Buyer.

Seller agrees that all writing, discoveries, designs, mask works, inventions and improvements whether copyrightable, patentable or not which are written, conceived, discovered or made by the Seller's employees or subcontractors in the course of the work done under this Purchase Order shall be promptly disclosed to Buyer and shall become Buyer's sole property.

Seller agrees to sign and execute, and require Seller's employees to sign and execute, all assignments and other papers necessary to vest the entire right, title and interest in such writings, designs, drawings, mask works, inventions, processes, compositions of material, specifications, improvements or discoveries in Buyer, and do all lawful acts and sign all assignments and other papers Buyer may reasonably request relating to applications for patents, mask works registrations, trademarks, and copyrights, both United States and foreign, or relating to the conduct of any interference, litigation or other controversy in connection therewith, provided that all expenses incident to the filing of such applications, the prosecution thereof and the conduct of any interference, litigation or other controversy shall be borne by the Buyer.

Prior to the start of work, Seller agrees to require Seller's employees assigned to perform services for Buyer to sign the attached Intellectual Property Rights Agreement form (see exhibit A). Seller agrees to witness the signing of such agreements for Buyer and to preserve the executed Intellectual Property Right Agreement forms for a period of five (5) years.

License

The Seller agrees and grants to Buyer and its affiliates a non-exclusive, royalty-free license under any patents, domestic as well as foreign, which it may now own, control or hereafter acquire to make, have made, use and sell, including:

Product, process equipment or facilities designed and/or developed under this Purchase Order together with the corresponding right and license to use and have used processes and to make, have made and use equipment for the manufacture of such product or part thereof or the operation of such facilities.

For purposes of this Purchase Order, the term "affiliates" shall mean any company in which General Motors Corporation owns fifty percent (50%) or more of the voting shares of the company.

INDEMNIFICATION, Paragraph 16, delete and substitute with the following text:

Seller assumes all risks of damages and injuries, including death, to any property or person resulting from its error, omission or negligent act under this Purchase Order.

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Seller shall indemnify, hold harmless, and defend Buyer, its subsidiaries, affiliates and their employees, agents, servants, and representatives from and against any and all losses, damages, expenses, suits, and demands, including injury or death to persons or damage to property (hereinafter collectively "Claims") to the extent such Claims are caused by or arise from any error, omission, or negligence by Seller, including Seller's employees, agents, servants, and representatives, in connection with the performance of services under this Purchase Order.

Buyer shall indemnify, hold harmless, and defend Seller from and against any and all Claims against Seller by third parties to the extent such Claims result from conditions existing at the Property at the time of this Purchase Order and so long as such Claims are not due to Seller's errors, omissions, or negligence.

In no event shall either the Buyer and Seller be liable to the other in contract or in tort for consequential damages which for purposes of this Purchase Order shall be defined as loss of profits, downtime expense or increased cost of operation of equipment, lost production, loss of use of productive facilities, or increased expenses of operation.

INSURANCE, Paragraph 17, amend by adding the following:

The Seller shall also maintain insurance coverage for:

(e) Professional Liability insurance, including contractual liability coverage with minimum limits of \$1,000,000 annual aggregate plus any applicable deductibles disclosed prior to a claim being made by the Buyer.

Buyer shall be named as an additional insured under all Seller's policies except insurance for Workers Compensation or Professional Liability.

A Certificate of Insurance must be submitted to Buyer prior to the start of any work under this Purchase Order and must identify the Purchase Order number in "Description of Operation" section of the Certificate.

DELETE THE FOLLOWING PARAGRAPHS:

PREMIUM SHIPMENTS, Paragraph 4

NONCONFORMING GOODS, Paragraph 7

WARRANTY, Paragraph 9

INGREDIENTS DISCLOSURE AND SPECIAL WARNINGS AND INSTRUCTION, Paragraph 10

TOOLS, Paragraph 18

ADD THE FOLLOWING PARAGRAPHS:

AUDIT, Paragraph 32:

The Buyer reserves the right to audit and adjust the final Purchase Order price for discrepancies for any compensation amount included in Purchase Order which was based on methods other than lump sum or fixed price. Seller must segregate his records in such a manner as to facilitate a complete audit and agrees that such audit may be used as the basis for settlement of charges against this Purchase Order. Seller further agrees, for this purpose to preserve all such documents for a period of three (3) years after final payment or acceptance.

This right to audit will also apply to any charges resulting from cancellation for breach or termination. Cancellation or termination charges shall be submitted in sufficient detail, together with adequate supporting information, to facilitate checking by the Buyer.

STANDARD OF WORKMANSHIP, Paragraph 33:

Seller agrees to perform work timely, diligently and to the reasonable satisfaction of Buyer in an efficient and economical manner consistent with the best interests of Buyer. Seller shall use its best skills and judgment and shall perform all services in accordance with the highest engineering professional standards, codes and regulations. Seller agrees to reperform, at no charge to Buyer, any work which in the reasonable opinion of Buyer does not meet the foregoing standard.

SAMPLES; Paragraph 34:

In the event this purchase order requires environmental assessment samples, then such samples shall be returned to Buyer for final disposition or at buyer's direction shall be disposed of in a proper manner according to the applicable regulations for the handling, storage, transport and disposal of such materials. Seller shall be solely responsible for proper handling of samples while samples are in the possession of Seller. At the time samples are to be disposed of, Seller shall provide Buyer with a representation of their contents.

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APPENDIX B

LIMITATIONS

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APPENDIX 12
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LIMITATIONS



1. The observations described in this Report were made under the conditions stated therein. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by Client. The work described in this Report was carried out in accordance with GM/AEC's May 1986 Purchase Order Terms and Conditions including the October 1988 "Additional Conditions to Purchase Order Terms and Conditions for Construction Professional Services."
2. In preparing this Report, GZA has relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to GZA at the time of the Site assessment. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this Site assessment.
3. In the event that bank counsel or title examiner for Client obtains information on environmental or hazardous waste issues at the Site not contained in this Report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this Report.
4. Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, GZA renders no opinion as to the presence of hazardous material or oil, or to the presence of indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, GZA renders no opinion as to the presence of hazardous material or oil, or to the presence of indirect evidence relating to hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.
5. Unless otherwise specified in the Report, GZA did not perform testing or analyses to determine the presence or concentration of asbestos or polychlorinated biphenyls (PCBs) at the Site or in the environment at the Site.
6. The purpose of this Report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators of the Site with federal, state, or local laws and regulations, environmental or otherwise.

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7. The conclusions and recommendations contained in this Report are based in part upon the data obtained from a limited number of soil and/or groundwater samples obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further exploration or Site development. If variations or other latent conditions then appear evident, it will be necessary to re-evaluate the conclusions and recommendations of this Report.
8. Water level readings have been made in the test borings and/or monitoring wells at the times and under the conditions stated on the test boring logs. However, it must be noted that fluctuations in the level of groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time measurements were made.
9. Except as noted within the text of the Report, no quantitative laboratory testing was performed as part of the Site assessment. Where such analyses have been conducted by an outside laboratory, GZA has relied upon the data provided, and has not conducted an independent evaluation of the reliability of this data.
10. The conclusions and recommendations contained in this Report are based in part upon various types of chemical data and are contingent upon their validity. This data has been reviewed and interpretations made in the Report. As indicated within the Report, some of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by GZA, and the conclusions and recommendations presented herein modified accordingly.
11. Chemical analyses have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study may be present in soil and/or groundwater at the Site.

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APPENDIX C

PHOTOGRAPHS

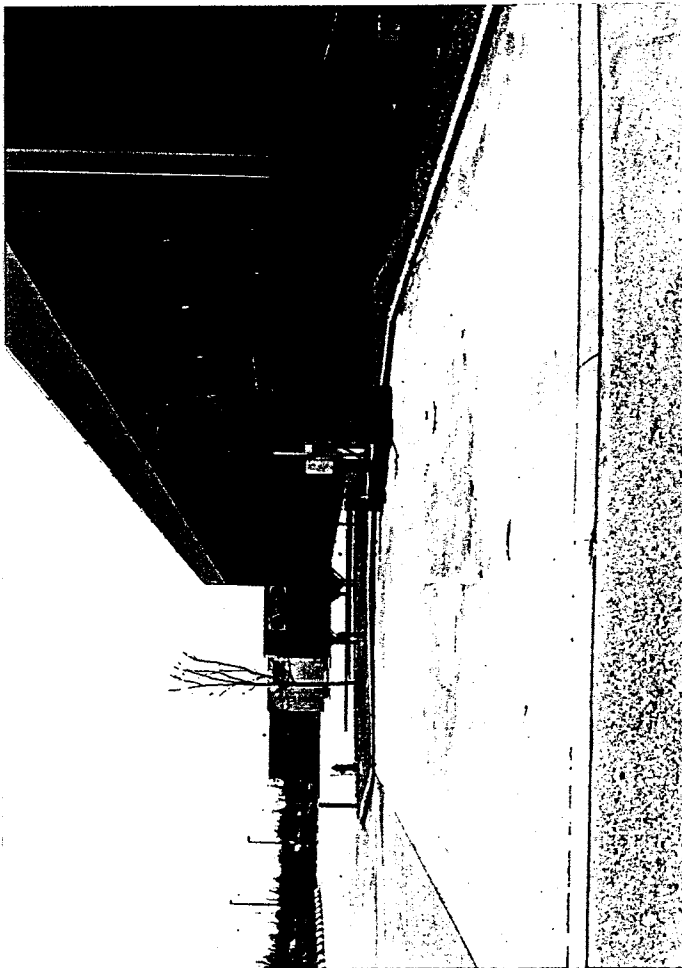
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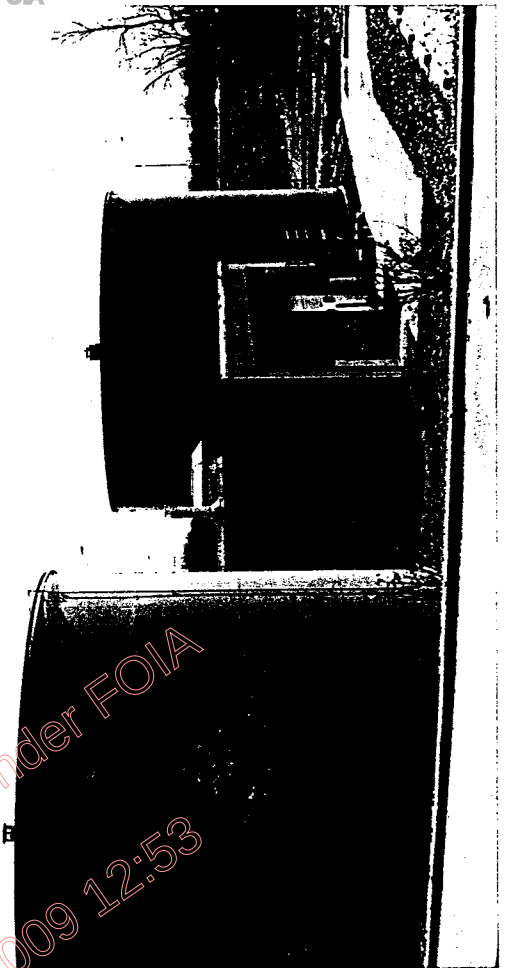
PHOTOGRAPH 1: Diesel UST location with fuel pump, east of terminal - facing south.



PHOTOGRAPH 2: Diesel stained area located west of fuel pump, northeast of terminal - facing northwest.



PHOTOGRAPH 3: UST pollution monitoring device and fuel pump with stained area to west - facing south.



PHOTOGRAPH 4: 200,000-gallon water tanks located on the southeast corner of the Site - facing southeast.

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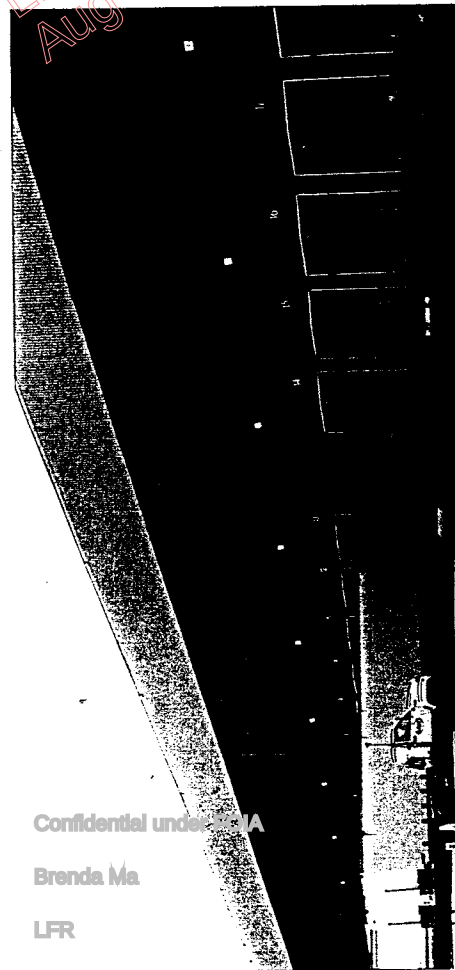
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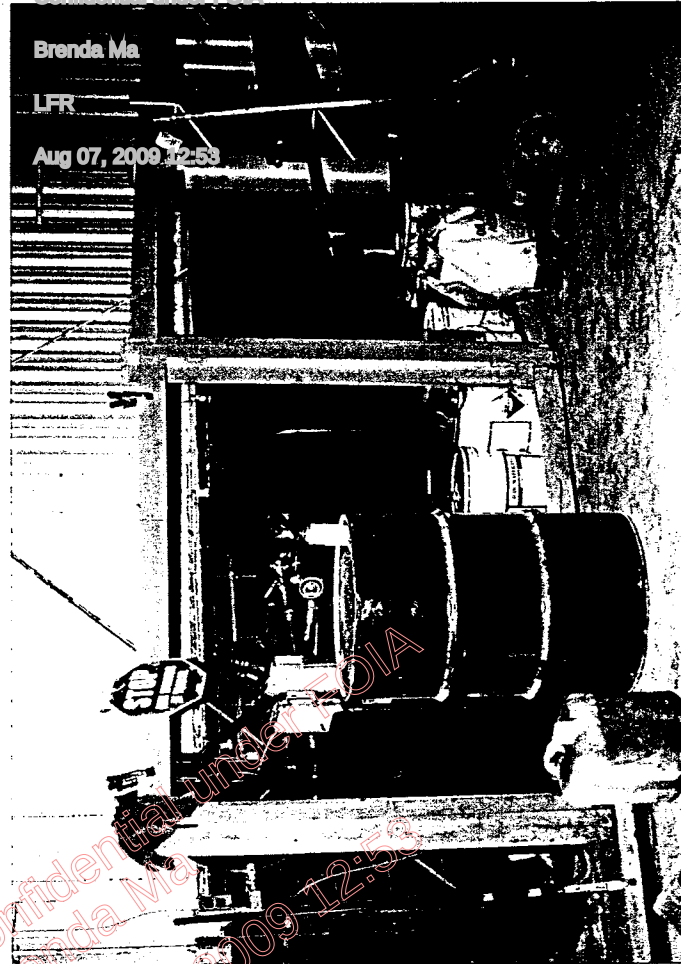
PHOTOGRAPH 5: Stained area in southeast corner of the Site, east of the south parking lot - facing southeast.



PHOTOGRAPH 6: Drums observed along southern edge of south parking lot - facing north.



PHOTOGRAPH 7: Loading docks located on east side of the terminal - facing southwest.



PHOTOGRAPH 8: Waste oil storage tank located inside the terminal along the south central wall - facing southwest.

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APPENDIX D

UST FILE INFORMATION

- Leak Testing Reports
- Groundwater Pollution Probe Sampling Results
- Unit FTT Correspondence with MDNR

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Leak Testing Reports

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8/23/89

VERIFICATION FORM

TEST SITE RESTORATION

LOCATION UNIT FT DATE: 8-23-89
4002 JAMES P. COLE RD TEAM#:
East, ME MANAGER:

This is to verify that upon completion of Leak Lokator testing all of the operating equipment and tank system hardware has been inspected and tested in its normal operating condition and is in proper operating order with the exceptions as noted.

EXCEPTIONS N/A

TANK TRUCK DRIVER SPILL FILLING TANK
AND SPILLER ALEXX STARS? DRIVER ON PII.
SPILL CONTAINED AND CLEANED BY DRIVER.

Team Manager signature [Signature] Associate
ROGER M KELCO
RMP

INSPECTION MADE BY:

Hunter Environmental Services, Inc.	Customer, Tank Owner or on site Operator
Signature: <u>[Signature]</u>	Signature: <u>[Signature]</u>
Name: <u>ROGER M KELCO</u>	Name: <u>Jerry Davis</u>
Title: <u>TEAM MANAGER</u>	Company or Relationship to Tank Owner: <u>Purchasing</u>
Date: <u>8-23-89</u>	Date: <u>8-23-89</u>

If form is not signed by customer, Team Manager, Associate, tank owner or on site operator, explain why.

Verbal Report to:

Name: _____

Company: _____

Date: _____

HUNTER ENVIRONMENTAL SERVICES INC.
INSPECTION FORM
TEST SITE RESTORATION

LOCATION: UNIT FTT Aug 07, 2009 12:53 DATE: 8-23-09
4002 JAMES P (OLE #1) TEAM #: LL-39
FRUIT, ME MANAGER R.M. Rev/0

PART 1

INSTRUCTIONS

- o A visual inspection is to be made of all the applicable equipment for leaks and operational condition.
- o All pumps and related equipment should be tested under normal operating pressure.
- o Identify all equipment to correlate with the location schematic on page 2 of test report.

A CHECK MARK NEXT TO YES INDICATES THE PART IS LEAKING

A CHECK MARK NEXT TO NO INDICATES THE PART WAS DRY DURING INSPECTION

A. PRE-EXISTING CONDITIONS

The following equipment was not in proper operating condition upon arrival at the test site. 2003 Pump for 1105 3" Dia. & 1200

System

Problem

B. SUCTION PUMPS

N/A ✓

Product I.D.	_____	_____	_____	_____	_____	_____	_____
Pump No.	_____	_____	_____	_____	_____	_____	_____
Under pump piping & couplings	(YES) _____ (NO) _____	_____	_____	_____	_____	_____	_____
Meter & Pump Body	(YES) _____ (NO) _____	_____	_____	_____	_____	_____	_____
Crash or Shear Valves	(YES) _____ (NO) _____	_____	_____	_____	_____	_____	_____
Strainers	(YES) _____ (NO) _____	_____	_____	_____	_____	_____	_____

Comments: _____

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HUNTER ENVIRONMENTAL SERVICES, INC.
CERTIFICATION
TEST SITE RESTORATION
PAGE TWO

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C. DISPENSERS N/A _____

Product I.D. TIDESEAL _____

Dispenser No. _____

Piping & Couplings (YES) _____
(NO) _____

Meter (YES) _____
(NO) OK _____

Crash or Shear Valves (YES) _____
(NO) _____

Strainers (YES) _____
(NO) _____

Comments: _____

D. SUBMERSIBLE OR REMOTE PUMP N/A _____

Product I.D. TIDESEAL _____

Check Valve Cover (YES) _____
(NO) _____
(N/A) _____

Functional Element Assembly (YES) _____
(NO) _____
(N/A) OK _____

Leak Detector (YES) _____
(NO) _____
(N/A) _____

Pump head (all areas) (YES) _____
(NO) _____

Comments: _____

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HUNTER ENVIRONMENTAL SERVICES, INC.
CERTIFICATION
TEST SITE RESTORATION
PAGE THREE

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E. TANK HARDWAREProduct I.D. Ti DresserAdaptors/ (YES) _____
Caps (NO) _____Grade Level (YES) _____
Covers (NO) _____V.R. Ball (YES) _____
Floats (NO) _____
(N/A) _____Check (YES) _____
Valve (NO) _____
Assembly (N/A) _____Vents (YES) _____
(NO) _____Abandoned (YES) _____
Lines (NO) _____
(N/A) _____

Comments: _____

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HUNTER ENVIRONMENTAL SERVICES, INC.
CERTIFICATION
TEST SITE RESTORATION
PAGE FOUR

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PART II

Was there any product spilled by Hunter Environmental Services, Inc. employees or others while Hunter Environmental Services, Inc. was on site? YES _____ NO ✓

If yes, explain:

PART III

Was there any transfer of product from one tank or container to another? YES _____ NO ✓

If yes, explain:

Person who authorized transfer:

Name: _____

Company: _____

Product

Amount

From

To

115 DEWALT AVENUE, N.W.
SUITE 400
CANTON, OH 44702
216-453-1800 800-523-4370

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TEST RESULTS

DATE OF TEST

६३५

CONTRACT NUMBER A

Aug 07, 2009 12:53

CUSTOMER

UNIT FIVE

LOCATION	IDENTIFICATION NUMBER
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
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83	83
84	84
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86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

NAME

ADDRESS

4/302 JANICE P. COLL RD

CITY

FLINT

STATE

Me

TEST RESULTS SUMMARY

[illegible]

OTHER INFORMATION

WATER TABLE UNKNOWN

PRODUCT LINES - HYDROSTATIC PRESSURE TEST RESULTS

[illegible]

NOTE: On suction systems, NEVER put more than 15 psi on any pump system.

OTHER CONTRACTORS, OFFICIALS, CUSTOMER REPRESENTATIVES PRESENT

DETAIL OF TEST RESULTS

[illegible]

• LEVEL - INCHES FROM TANK BOTTOM TO TEST LEVEL

ALB - ABSOLUTE LEAK RATE (MEASURED LEAK RATE - TEMPERATURE COMPENSATION) IN GALLONS PER HOUR

CONCLUSION - NFPA 329 CRITERION OF 2.06 GPH IS USED TO CERTIFY TIGHTNESS

CERTIFICATION

This is to certify that the above described tank systems were tested, using the HUNTER ENVIRONMENTAL SERVICES, INC. LEAK LOKATOR according to all standard operating procedures. Those indicated as tight at full system meet the criterion established by the National Fire Protection Association Pamphlet 329 for Precision Testing.

TESTS CONDUCTED BY

TEST VAN NO

TANK TESTING SPECIALIST

LL
39

1988. 11. 17
TANK TESTING SPECIALIST

CERTIFIED BY

SIGNATURE

Don't think.

DATE _____

1. 2. 3.

NAME **LFR**

TITLE

Team Mexico

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Page 2

TANK AND LOCATION DATA

LFR

DATE

8-23-87

CUSTOMER:

UNIT FTT

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ID. #

STATE

MIT

WEATHER	TIME	TEMPERATURE	COMMENTS
BEFORE TEST			
AFTER TEST			

SCHEMATIC.

(M) (P) (F) (G)

	PRODUCT/TANK NO.	71 DIESEL									
		Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge
BEFORE DELIVERY	LEVEL	FULL									
	GALLONS										
	WATER	4"									
	TOP OF RISER	157									
	GRADE	164									
	DROP TUBE	NO									
	CAPACITY, GALLONS	10,000									
	DIAMETER, INCHES	96									
	MATERIAL	STEEL									
	PUMP TYPE	SUB									
	TYPE OF COVER	CONCRETE									
	AGE OF TANK	4 yrs									
	SIPHON	NO									
	TANK OPENINGS	2-1"									
	EXTRACTORS	NO									
VAPOR RECOVERY	TYPE	NO									
	VENT CONFIGURATION	SINGLE									
	P-V VENT VALVE TYPE	OPW									

REPLACEMENT PARTS:

PART #

DESCRIPTION

QUANTITY

PRICE

OPW 6371 4" Fill

OPW 6371 4" Fill

ADDITIONAL CHARGES:

(pumpovers, overtime, etc.)

2.5 hrs oil spill 1.5 hr. pump

1/5/90

Underground Storage Tank Leak Test Results.

Testing conducted by WALTER E. BRANDT & SONSAddress G 5264 N. SAGINAW STCity, State FLINT MI

Operator Name _____

Phone Number _____

Customer Name UNIT FTTAddress JAMES P COLECity, State FLINT MI

Location Location _____

Address _____

City, State _____

	Product	Capacity	Diameter	Leak Rate Per Hour
#1	<u>Diesel</u>	<u>10000</u>	<u>96"</u>	<u>-18912 gallons,</u>
nk #2	_____	_____	_____	_____
#3	_____	_____	_____	_____
4	_____	_____	_____	_____

Remarks _____

01/23/90

11:56

HAWKINS EQUIP. CO.

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P.01

1/19/90

335-9285

Brenda Ma

547-4477

LFR

Hawkins Equipment Co.

Aug 07, 2009 12:53

Petroleum Equipment Specialists
SALES - SERVICE - INSTALLATION

747 ORCHARD LAKE AVENUE

PONTIAC, MICHIGAN 48053

DATE

1-23-90

DATA TRANSMITTAL FORM

TO:

JERRY DAVIS - RICK RADOMACHER

COMPANY:

UNIT F.T.T. CO.

FROM:

JACK BRAUCHAMP

SUBJECT:

TOST SHOOT

IF YOU HAVE ANY QUESTIONS REGARDING THIS TRANSMITTAL PLEASE CALL

JACK BRAUCHAMP

AT 313-335-9285.

THIS TRANSMITTAL CONSISTS OF

6

PAGES (INCLUDING COVER SHEET).

Mike ↑

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Data Chart for Tank System Tightness Test

Aug 07, 2009 12:53

OWNER	Property Tank(s)	Unit F.T.T. Co 4003 James P. Cole Blvd, Flint, Mich.					
		Name	Address	Representative	Telephone		
		Name	Address	Representative	Telephone		
OPERATOR		Name	Address	Telephone			
PERSON FOR TEST (Explain Fully)							
WHO REQUESTED TEST AND WHEN		Name	Title	Company or Affiliation	Date		
		Address	Telephone				
TANK INVOLVED	Identify by Direction	Capacity	Brand/Supplier	Grade	Approx. Age	Steel/Fiberglass	
additional lines manifolded tanks	1-Northeast of Building	10,000	UNKNOWN	DIESEL	5 YRS	FIBERGLASS	
TALLATION DATA	Location	Cover	Fills	Vents	Siphones	Pumps	
	Northeast Corner of Building North inside driveway Rear of station, etc.	CONCRETE 1/2 EXPOSED Concrete, Black Top, Earth, etc.	4" Size, Teflon make, Drop tubes, Remote Fills	3" Size, Manifolded	NO Which tanks?	REMOTE RED JACKET Suction, Remote, Make if known	
UNDERGROUND WATER	Depth to the Water table	60			Is the water over the tank? ☒ Yes ☐ No		
FILL-UP ARRANGEMENTS	Tanks to be filled	hr.	Date	Arranged by	Name	Telephone	
	Extra product to "top off" and run tank tester. How and who to provide? Consider NO Lead.						
	Terminal or other contact for notice of inquiry	Company	Name	Telephone			
CONTRACTOR, MECHANICS, any other contractor involved							
OTHER INFORMATION & REMARKS							
Additional information on any items above. Officials or others to be advised when testing is in progress or completed. Visitors or observers present during test, etc.							
TEST RESULTS	Tests were made on the above tank systems in accordance with test procedures prescribed for as detailed on attached test charts with results as follows:						
	Tank Identification	Tight	Leakage Indicated	Date Tested			
	1-Northeast of Building		1397 lost in last hour of test.	JAN. 19, 1990			
SENSOR CERTIFICATION	13. This is to certify that these tank systems were tested on the date(s) shown. Those indicated as "Tight" meet the criteria established by the National Fire Protection Association Pamphlet 323.						
7-89	Technicians						
123	1. William T. Morgan						
Serial No. of Thermal Sensor	Certification # 123310142						
	HAWKINS EQUIPMENT Co. Brenda Ma 747 ORCHARD LAKE RD, Pontiac, Mich. Aug 07, 2009 12:53						

15. TANK TO TEST

#1-North East of Building

Identity by position

DIESEL

Brand and Grade

15a. BRIEF DIAGRAM OF TANK FIELD

16. CAPACITY

Nominal Capacity 10,000 Gallons

By most accurate capacity chart available 9520 Gallons

17. FILL-UP FOR TEST

Stick Water Bottom before Fill-up 2 in. to N°

32. Gallons

92 Tank Diameter

Total Gallons ex. Flushing

9520

Gallons

WATER

-32

Top off

+10

9498

Transfer total to line 25a

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

☐ Water in tank ☐ Linets being tested with LVLLT
☐ High water table in tank excavation

See manual sections applicable. Check below and record procedure in log (27).

Use maximum allowable test pressure for all tests. Four pound rule does not apply to doublewalled tanks.

Complete section below:

1. Is four pound rule required? Yes ☒ No ☐

2. Height to 12" mark from bottom of tank 239 in.

3. Pressure at bottom of tank 7.42 P.S.I.

4. Pressure at top of tank 4.56 P.S.I.

Depth of burial 155 in.

Tank dia. 92 in.

Water table 60 in.

NOTES:

19. TANK MEASUREMENTS FOR TSIT ASSEMBLY

Bottom of tank to grade 155 in.
Add 30" for "T" probe assembly 30 in.
Total tubing to assemble - approximate 185 in.

20. EXTENSION HOSE SETTING

Tank top to grade 163 in.
Extend hose on suction tube 6" or more below tank top 10 in.22. Thermal-Sensor mixing after circulation 46.0
46.747 °F

23. Digits per °F in range of expected change 1000 digits

COEFFICIENT OF EXPANSION (Complete after circulation)

24a. Corrected A.P.I. Gravity

Observed A.P.I. Gravity

Hydrometer employed

Observed Sample Temperature

Corrected A.P.I. Gravity @ 60°F. from Table A

Coefficient of Expansion

Transfer COE to Line 25b

25. (a) N.A. × (b) Coefficient of expansion for fuel tank (16 or 17) involved product

26. (a) 4427972 Volume change per °F in test (16 or 17)

21. VAPOR RECOVERY SYSTEM

☐ Stage I ☐ Stage II

24b. COEFFICIENT OF EXPANSION RECIPROCAL METHOD

Type of Product DIESEL

Hydrometer Employed 4

Temperature in Tank After Circulation 46.0

Temperature of Sample 45

Difference (+/-) -1

Observed A.P.I. Gravity 36.0

Reciprocal 2145 Page 2 40

Total quantity in fuel tank (16 or 17) 9498

Volume change in this tank per °F 4427972

Transfer to Line 25a

24c. FOR TESTING WITH WATER

see Table C & D

Water Temperature after Circulation Table C

Coefficient of Water Table D

Added Surfactant? ☐ Yes ☐ No Transfer COE to Line 25b

25. (a) N.A. × (b) Coefficient of expansion for fuel tank (16 or 17) involved product

26. (a) 4427972 Volume change per °F in test (16 or 17)

The above calculations are to be used for dry-bulk conditions to establish a positive pressure advantage, or when using the four pound rule to compensate for the presence of subsurface water in the tank area.

Refer to N.E.P.A. 30. Sections 2-3.2.4 and 2-7.2 and the tank manufacturer regarding allowable system test pressures.

= (c) gallons

Volume change in this tank per °F

This is 0.00444

Volume change per digit (rounded in 4 decimal places) 0.0044

LOG OF TEST PROCEDURES		29. Reading No.		30. Standpipe Level in Inches		31. Product in Gratiolate		32. Product Replaced (-) / Product Recovered (+)		33. Thermal Sensor Pending		34. Change High/Low/Lcd		35. Computation Ict = (ai) = Expansion - Contraction -		36. Temperature Adjustment Volume minus Expansion (-) or Contraction (+) (KOP) - (KJH)		37. At Low Level compute Change per Hour (HFA criteria)	
DATE	TIME (24 hr.)	Record details of setting up and running test. (Use full length of line if needed)	Beginning of Reading	Level to which Restored	Before Reading	After Reading	Product Replaced (-)	Product Recovered (+)	Thermal Sensor Pending	Change High/Low/Lcd	Thermal Sensor Pending	Change High/Low/Lcd	Computation Ict = (ai) = Expansion - Contraction -	Temperature Adjustment Volume minus Expansion (-) or Contraction (+) (KOP) - (KJH)	At Low Level compute Change per Hour (HFA criteria)				
8:50		Arrived at job site																	
10:00		Tanker left after topping off tank																	
		Pump water table in tank hole down																	
		had 3 1/2" water. Found barrel to pump some of water out of tank.																	
		Tapped off tank from 500 gallon skid tank. Bled air out of manhole and sub.pump head. Turned down screen on sub.pump. to test product line.																	
		Installed Tank Testing Equipment - 2 circulating pumps.																	
		Added product to prime pumps																	
		Pumps primed and running																	
1:00		1st Sensor Reading																	
1:15		Start High Level Test																	
1:20		Con't. O.H.L.T																	
1:45																			
2:00		Tank is now being shaded by building.																	
2:15																			
2:30																			
2:45																			
3:00																			
3:15																			
3:17		Drop to 12"																	
3:30		Start Low Level Test																	
3:45		Con't. L.L.T																	
3:50		Start Precision Test																	
3:55		Con't. P.T.																	
4:00																			

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Time	CON V. P. I.	1	11.0	12	13.0	14	15.0	16	17	18	19	20	21	22	23	24	25	33	3	713	0.0	2
4:10		17	11.8	12	13.05	12	13.05	12	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	186	+3	+013	-.033	-.165
4:15		18	11.8	12	12.85	12	12.85	12	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	189	+3	+013	-.033	-.198
4:20		19	11.8	12	12.65	12	12.65	12	12.45	12.45	12.45	12.45	12.45	12.45	12.45	12.45	12.45	199	+4	+018	-.038	-.236
4:25		20	11.8	12	12.45	12	12.45	12	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	195	+2	+009	-.029	-.265
4:30		21	11.8	12	12.25	12	12.25	12	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	198	+3	+013	-.033	-.298
4:35		22	11.8	12	12.05	12	12.05	12	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	201	+3	+013	-.033	-.331
4:40		23	11.8	12	11.85	12	11.85	12	11.65	11.65	11.65	11.65	11.65	11.65	11.65	11.65	11.65	204	+3	+013	-.033	-.364
4:45		24	11.8	12	11.65	12	11.65	12	11.45	11.45	11.45	11.45	11.45	11.45	11.45	11.45	11.45	207	+3	+013	-.033	-.397
	Stop Test Tank Failed	25		12																		

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It is the responsibility of the owner and/or operator of this system to immediately advise state and local authorities of any implied hazard and the possibility of any reportable pollution to the environment as a result of the indicated failure of this system. Please contact the manufacturer for assistance in any responsibility or liability for any loss or product to the environment.

2. Statement:
☐ Tank and product handling system has been tested tight according to the Precision Test Criteria as established by N.E.P.A. publication 329. This is not intended to indicate permission of a test.

OR
☒ Tank and product handling system has failed the tank tightness test according to the Precision Test Criteria as established by N.E.P.A. publication 329.

P-T Tank Test Data Chart
Additional Info

1 Net Volume Change at Conclusion of Precision Test -397 gph
Signature of Tester: W. J. Miller
Date: JAN. 19, 1990

DATA CHART For Use With

petronite
in use

1 LOCATION: 4002 JAMES P. COLE BLVD, Flint, Mich.

Street No. and/or Corner

State

Telephone No.

2 OWNER: Unit F.T.T.

Name

Address

Representative

Position

Telephone No.

Name

Dealer, Mgr. or Other

Address (if different than Location)

Telephone No.

4 REASON FOR TEST

5 TEST REQUESTED BY: Rick Rademacher

Name

Position

Order No.

Billing Address

6 SPECIAL INSTRUCTIONS:

7 CONTRACTOR OR COMPANY MAKING TEST
MECHANIC(S) NAME

Hawkins Equipment Co. William T. Morgan

8 IS A P/TANK TEST TO BE
MADE WITH THIS LINE TEST?

☒ YES

☐ NO

9 MAKE AND TYPE OF
PUMP OR DISPENSERS

COVER OVER LINES Concrete Exposed

APPROXIMATE
BURIAL DEPTH

48"

10 WEATHER Sunny-line being checked TEMPERATURE IN TANKS 46 °F °C

11 IDENTIFY
EACH LINE
AS TESTED

13 LOG OF TEST PROCEDURES,
AMBIENT TEMPERATURE,
WEATHER, ETC.

14 PRESSURE
PS OR KPA

15 VOLUME
READING

NET
CHANGE

16 TEST RESULTS

CONCLUSIONS, REPAIRS AND COMMENTS

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HR

AUG 07 2009 12:53

- .0045 - LINE is 1/2 in.

⊕

Year	No.	City	State	Owner
90	1	FLINT	Mich	Unit F.T.T.

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HR

AUG 07 2009 12:53

01/23/90 12:00

P. 06

BLEEN
BACK



field agreement - type C
O/C Tanks Corporation

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O/C Tanks order no.
job no. G-11390
date of agreement 1-25-90
job name UNIT FLOW THRU TERR.
address 4002 James P. Cole BL FLINT MI.

original invoicee	final owner
address	address

product description, size, serial no. 10m OL # N/A	material being stored D. C. S. L
date shipped 1985	tank installation date 1985
	producing plant N/A

description of work required: inspect 10m TANK. Air tested ok.
No Damage inside

estimate	1
labor hrs. at \$ /hr.	
travel hrs. at \$ /hr.	
miles at \$ per mile	
per diem at \$ /night or	
\$ /day	
material at list price	1
subtotal	
plus 25%	
total	

will this repair be warranted for 1 year? yes no

if no, reason for no warranty:

O/C Tanks technician signature Dennis Pingel date 11-24-90

Customer agrees to pay O/C Tanks for this work at O/C Tanks Field Service rates net 10 upon receipt of invoice.

authorized representative of company to invoice:
customer signature Re Redmade title GENERAL MANAGER date 1-25-90

company to invoice for this work:
company 4002 J.P. Cole UNIT FTT Inc. P.O. no.
address 4002 J.P. Cole Flint MI zip code 48505



O/C TANKS CORPORATION
ONE LEVIS SQUARE, P.O. BOX 10025
TOLEDO, OHIO, U.S.A. 43699-0025

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1/24/90

JOB SITE

UNIT FLOW THRU TERMINAL
4002 JAMES P. COLE BOULEVARD
FLINT MI

Aug 07, 2009 12:53

ISSUING LOCATION Toledo	INVOICE NO. A14-4020
OUR NO. (P.O. or Credit Ref.)	MAILING DATE 01/31/90
STATE/COUNTY MI/	JOB. NO. G11390

TERMS - NET 10 DAYS

BILLED TO:

UNIT FLOW THRU TERMINAL
4002 JAMES P. COLE BOULEVARD
FLINT MI 48505
ATTN: RIC RADMACHER

REMIT TO:

O/C TANKS CORPORATION

P.O. Box 360732, Pittsburgh, PA 15251-6732

OC CUST. NO.

N21-007014

Description of Work Performed:

ON 1/25/90, ARRIVED AT SITE TO MAKE INTERNAL INSPECTION OF SUBJECT TANK SUSPECTED OF LEAKING. AFTER DELAYS CAUSED BY WATER, INTERNAL INSPECTION REVEALED NO PROBLEM WITH THE TANK. TANK WAS SUCCESSFULLY AIR TESTED.

AMOUNT

Tank Type/Model UL#
SWT 10M

Work Hours	9. @ \$ 55 /hr	\$495.00
Travel Hrs	2.5 @ \$ 55 /hr	\$137.50
Miles	117 @ \$.60 /mi	\$70.20
Compressor	@ \$.60 /mi	

O/C Tanks Technicians
D.PINGEL-VALPARAISO

SubTotal	\$702.70
Discount	\$175.68
Tax	\$0.00

Customer Signature

Title/Company

TOTAL \$527.02

We hereby certify that these goods were produced in compliance with all applicable requirements / sections 6, 7 and 12 of the Fair Labor Standard act, as amended, and of regulations and orders / the United States Department of Labor issued under section 14, thereof.

JCT-14959

Distribution: 1st copy, original invoice — 2nd & 3rd copy, invoice copy — 4th & 5th copy, accounts receivable — 6th copy, issuing location — 7th & 8th copy, other distribution.

Please refer to Invoice Number on your Check

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Groundwater Pollution Probe Sampling Results

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Aug 07, 2009 12:53

1ST WATER SAMPLE TAKEN BY BRANDT

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SEG

SEG LABORATORIES, INC.

4/10/90

SEG LABORATORIES, INC.
1120 MAY STREET
LANSING, MI 48906
PHONE - 517-374-6800

WALTER BRANDT & SONS
6 52-64 N SAGINAW
FLINT, MICHIGAN 48505
MR. KEN BRANDT

PROJECT NUMBER

Location	Lab No	Time Sampled	Date Sampled	Date Received
UNIT F.TT	14146	0	04/10/90	04/11/90

ANALYTICAL REPORT
DATE REPORTED 04/16/90

TEST	UNITS	LAB NO. 14146
Petroleum Hydrocarbons	ug/L	<2.0
BTEX Compounds		EPA 602
Benzene	ug/L	55
Toluene	ug/L	5,500
Ethylbenzene	ug/L	230
p-Xylene	ug/L	270
m-Xylene	ug/L	710
o-Xylene	ug/L	430

PROJECT MANAGER

Lori O'Hachen

APR 17 90

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2nd WATER SAMPLE TAKEN BY BRANDT FAIL

4/10/90

SEG LABORATORIES, INC.
 1120 MAY STREET
 LANSING, MI 48906
 PHONE - 517-374-6800

ALTER BRANDT & SONS
 52-64 N SAGINAW
 FLINT, MICHIGAN 48905
 R. KEN BRANDT

PROJECT NUMBER

Location	Lab No	Time Sampled	Date Sampled	Date Received
UNIT FT1	14534	0	04/10/90	04/19/90

ANALYTICAL REPORT
 DATE REPORTED 04/30/90

TEST	UNITS	LAB NO. 14534
Petroleum Hydrocarbons	ug/L	<1.0
PTX Compounds		EPA 602
Benzene	ug/L	<10
Toluene	ug/L	420
Ethylbenzene	ug/L	25
p-Xylene	ug/L	41
m-Xylene	ug/L	130
o-Xylene	ug/L	76

PROJECT MANAGER

Eric O. Hachon

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Aug 07, 2009 12:53

Unit FTT Correspondence with MDNR

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Aug 07, 2009 12:53

4002 JAMES P. COLE BLVD.
FLINT, MICHIGAN 48505
(313) 235-1500



Flow Thru Terminal

October 17, 1989

Mr. Ben Hall
Department of Natural Resources
Environmental Response Division
P.O. Box 30028
Lansing, Michigan 48909

Dear Mr. Hall:

This is the twenty day letter written as follow-up to our October 16th telephone conversation regarding the suspected inground fuel tank leak at our facility.

Our present company was purchased, and as part of the transaction, our fuel tank was tested for leakage. The tank is eight foot diameter, buried five feet below the surface. When the fuel level was raised to 195 inches from tank bottom, there was a failure of one half gallon per hour. When tested at 102 inches, the tank passed. We immediately shut down the tank upon notification.

These results lead us to believe that the piping coming from the tank is what leaked. The dispensing line was checked and passed; this indicates that either the vent pipe or manway is at fault.

Our plan is to expose the top of the tank, identify the exact cause of leakage and repair it. We have requested three quotes from local companies and, as of this writing, received one quote back.

Upon completion of the tank problem, we will identify what must be done to properly contain any ground contamination that may have occurred.

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Brenda Ma

LFR

Aug 07, 2009 12:53

Brenda Ma

LFR

Aug 07, 2009 12:53

Page 2 - Mr. Ben Hall

As phase one is completed, I will contact you with our new information. Our goal is to be completely finished before the snow flies.

Cordially,

UNIT FTT, Inc.



Ric Radmacher
General Manager

RR:j

cc: Sgt. Willie Miller
Flint Fire Prevention Office

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LFR
Aug 07, 2009 12:53

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Aug 07, 2009 12:53

Brenda Ma

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Aug 07, 2009 12:53

January 30, 1990

Mr. Ben Hall
Dept of Natural Resources
PO Box 30028
Lansing, Mi. 48909

Dear Ben,
I would like to bring you up to date with the efforts we are making to identify and resolve our diesel fuel tank failure.

We have had three tank tests to date, each a different type of test, each indicating tank failure. I am including copies of each test for your review. The O C Tank company has been working with us since early December to help us understand what is happening here.

We emptied the tank on January 26 and a field rep from O C Tanks inspected the interior. His report shows no sign of stress or damage. Apparently the fiberglass tank has translucent walls that would indicate a problem if a pinhole leak was present. The field rep performed an air test on the empty tank. It held five pounds pressure for two hours.

We have forwarded the results of the third test to the company that created the test to see if they can shed any light on our problem. I hope to have a response from them by February 2. My guess is they will request to have the test repeated, because there was a temperature change in the middle of the test.

I will keep you up to date on the situation as it develops.

Sincerely,

Ric Radmacher

cc: Jack MacKenzie
George Johnson



(313) 233-1500

UNIT FTT, INC.

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Aug 07, 2009 12:53

RIC RADMACHER
PLANT MANAGER

4002 JAMES P. COLE BLVD. • FLINT, MI 48505

TOTAL P 04

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Aug 07, 2009 12:53

4002 JAMES P. COLE BLVD.
FLINT, MICHIGAN 48505
(313) 235-1500

FTT Inc.

THIS TRANSMISSION CONSISTS OF 5
PAGES (INCLUDING COVER)TO: MR BEN HALL

COMPANY: _____

DEPT/EXTENSION: _____

FAX NUMBER: _____

SPECIAL INSTRUCTIONS: OUR TANK PASSED! THE RESULTS
FOLLOW. PLEASE ADVISE ON OUR NEXT STEP TO
GET BACK TO OPERATING CONDITIONFROM: RIC RADMACHER

DEPT/EXTENSION: _____

FAX NUMBER: _____

DATE OF TRANSMISSION: _____

TIME OF TRANSMISSION: _____

IF YOU HAVE ANY TROUBLE RECEIVING THE ABOVE SPECIFIED
PAGES PLEASE CALL (313) 235-1500.

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Attached was Tank Tight Test from 3/16/90

PASSING RESULTS MARCH 16 TEST

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Data Chart for Tank System Tightness Test

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SE PRINT

OWNER Property ☐ Tank(s) ☐	Unit F.T.V. Co. 4002 JAMES P. COLE, Flint, Mich.					
	Name	Address		Representative	Telephone	
ATOR	Name	Address		Representative	Telephone	
	Name	Address		Telephone		
REASON FOR						
WHO REQUESTED AND WHEN						
TANKS INVOLVED	Identify by Direction	Capacity	Brand/Supplier	Grade	Approx. Age	Steel/Fiberglass
	Northeast of Building	10,000	Amoco	DIESEL		FIBERGLASS
INSTALLATION DATA	Location	Cover	Fills	Vents	Siphones	Pumps
	Northeast of Building North Inside driveway, Rear of station, etc.	Exposed Concrete, Black Top, Earth, etc.	4" Size, Titlefill make, Drop tubes; Remote Fills	3" Disconnected Size, Manifolded	No Which tanks?	Remote RED JACKET DISCONNECTED Suction, Remote, Make if known
UNDERGROUND	Depth to the Water table: 74			Is the water over the tank? ☐ Yes ☒ No		
FILL-UP REQUIREMENTS	Tanks to be filled: _____ hr. _____ Date _____ Arranged by _____			Name _____ Telephone _____		
	Extra product to "top off" and run tank tester. How and who to provide? Consider NO Lead.			Name _____ Telephone _____		
OTHER INFORMATION REMARKS	Terminal or other contact for notice or inquiry _____			Company _____ Name _____ Telephone _____		
	Additional information on any items above. Officials or others to be advised when testing is in progress or completed. Visitors or observers present during test, etc.					
TEST RESULTS	Tests were made on the above tank systems in accordance with test procedures prescribed for as detailed on attached test charts with results as follows:					
	Tank Identification	Tight	Leakage Indicated		Date Tested	
	Northeast of Building	✓			March 16, 1990	

CERTIFICATION 7-89 13	13. This is to certify that these tank systems were tested on the date(s) shown. Those indicated as "Tight" meet the criteria established by the National Fire Protection Association Pamphlet 329.	
	Technicians 1. William T. Morgan Certification # 122310142 2. _____ Certification # _____	
Testing Contractor or Company: By: Signature Hawkins Equipment Co. 747 Orchard Lake Rd, Pontiac, Mich. Address		

Aug 07, 2009 12:53

PN6827

LOG OF TEST PROCEDURES

28. DATE TIME (24 hr.)	29. Reading No. Record details of setting up and running test. (Use full length of line if needed.)	32. Standpipe Level in Inches		33. Product in Graduate		35. Thermal Sensor Reading	36. Change Higher + Lower - (C)	37. Computation (C) = (A) + Expansion - Contraction -	IT VOLUME CHANGING EACH READING	9. ACCUMULATED CHANGE
		Beginning of Reading	Level to which Restored	Before Reading	After Reading					
8:40	ARRIVED AT JOB SITE. REMOVED TANK GAUGE ALARM FROM TANK. AND PLUGGED. REMOVED VENT FROM TANK AND INSTALLED 24" RISER FOR TESTING THROUGH. BLED AIR OUT MANHOLE, SUB. PUMP RISER AND PRODUCT LINE IN SUBPUMP. Sub. pumps disconnected and plugged at pump.									
10:45	INSTALLED TANK TESTING EQUIPMENT - ADDED PRODUCT TO PRIME PUMPS PUMPS PRIMED AND RUNNING									
12:00	1ST SENSOR READING	1	42			45,299				
12:15	START HIGH LEVEL TEST	2	45.7	1,060	1,305	1,384	+65	+2,280	-0.035	
12:30	CON'D. H.L.T	3	45.6	1,305	1,545	1,432	+68	+2,292	-0.052	
12:45		4	45.6	1,545	1,785	1,496	+64	+2,275	-0.035	
1:00		5	45.6	1,865	1,300	1,559	+63	+2,271	-0.036	
1:15		6	45.6	1,300	1,530	1,621	+62	+2,267	-0.037	
1:30		7	45.6	1,530	1,765	1,685	+64	+2,275	-0.040	
1:45		8	45.6	1,765	1,000	1,748	+63	+2,271	-0.036	
2:00		9	45.6	1,105	1,335	1,812	+64	+2,275	-0.045	
2:02	Drop to 12"		42							
2:15	START LOW LEVEL TEST	10	16.1	1,230	1,500	1,866	+64	+2,275		
2:30	CON'D. L.L.T	11	15.7	1,500	1,740	1,937	+61	+2,262		
2:35	START Precision TEST	12	13.2	1,740	1,820	1,946	+19	+2,082	-0.002	
2:40	CON'D. P.T.	13	13.2	1,820	1,900	1,964	+18	+2,077	+0.003	+0.001
2:45		14	13.1	1,920	1,195	1,982	+18	+2,077	-0.002	-0.001
2:50		15	13.1	1,195	1,270	1,000	+18	+2,077	-0.002	-0.003
2:55		16	13.1	1,270	1,345	1,018	+18	+2,077	-0.002	-0.005
3:00		17	13.1	1,345	1,425	1,037	+19	+2,082	-0.002	-0.007

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Aug 07, 2009 12:53

OR

Date: March 16, 1990

It is the responsibility of the owner and/or operator of this system to immediately advise state and local authorities of any implied hazard and the possibility of any reportable pollution to the environment as a result of the indicated failure of this system. Heath Consultants Incorporated does not assume any responsibility or liability for any loss of product to the environment.

Tank Owner/Operator

Date _____

Brenda Ma

15. TANK TO TEST
NorthEast of Building
Identity by position
DIESEL
Brand and Grade

15a. BRIEF DIAGRAM OF TANK FIELD
mk Building
N ← V.P. CASE

16. CAPACITY
Nominal Capacity 10,000 Gallons
By most accurate capacity chart available 9438 Gallons

17. FILL-UP FOR TEST
Sick Water Bottom before Fill-up 0 in.
to 1/4 in. Tank Diameter 92 in.

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK
☐ Water in tank ☐ Units being tested with LVLLT
☐ High water table in tank excavation

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY
Bottom of tank to grade* 164 in.
Add 30" for "T" probe assembly 30 in.
Total tubing to assemble — approximate 194 in.

20. EXTENSION HOSE SETTING
Tank top to grade* 72 in.
Extend hose on suction tube 6" or more below tank top 16 in.

21. VAPOR RECOVERY SYSTEM ☐ Stage 1 ☐ Stage II

24b. COEFFICIENT OF EXPANSION RECIPROCAL METHOD
Type of Product DIESEL
Hydrometer Employed 4 H
Temperature in Tank After Circulation 45.3 F
Temperature of Sample 48 F
Difference (1/-) 1.3 F
Observed A.P.I. Gravity 2198
Reciprocal 2198 Page #
Total quantity in full tank (16 or 17) 9448 Reciprocal 2198
Volume change in this tank per °F 4.2984531
Transfer to Line 25a.

24c. FOR TESTING WITH WATER see Table C & D
Water Temperature after Circulation Table C N/A F
Coefficient of Water Table D
Added Surfactant? ☐ Yes ☐ No Transfer COE to Line 25a.

25. (a) N/A × (b) 1000 = (c) 0.0042984 gallons
Total quantity in full tank (16 or 17) Coefficient of expansion for involved product
26. (a) 4.2984531 × (b) 1000 = (c) 0.0042984 gallons
Volume change per digit

27. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK
See manual sections applicable. Check below and record procedure in log (27).
Use maximum allowable test pressure for all tests. Four pound rule does not apply to doublewalled tanks.
Complete section below:
1. Is four pound rule required? Yes ☒ No ☐
2. Height to 12" mark from bottom of tank 233 in.
3. Pressure at bottom of tank 7.24 P.S.I.
4. Pressure at top of tank 4.38 P.S.I.
Depth of burial 164 in.
Tank dia. 92 in.
Water table 74 in.

NOTES:

The above calculations are to be used for dry soil conditions to establish a positive pressure advantage, or when using the four pound rule to compensate for the presence of subsurface water in the tank area.
Refer to N.F.P.A. 30, Sections 2-124 and 2-7.2 and the tank manufacturer regarding allowable system test pressures.

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4002 JAMES P. COLE BLVD.
FLINT, MICHIGAN 48505
(313) 235-1500

Flow Thru Terminal

THIS TRANSMISSION CONSISTS OF 6
PAGES (INCLUDING COVER)

TO:

COMPANY:

DEPT/EXTENSION:

FAX NUMBER:

SPECIAL INSTRUCTIONS:

WATER TEST RESULTS.
I'll call you to DETERMINE OUR NEXT STE.

FROM:

DEPT/EXTENSION:

FAX NUMBER:

DATE OF TRANSMISSION:

TIME OF TRANSMISSION:

IF YOU HAVE ANY TROUBLE RECEIVING THE ABOVE SPECIFIED PAGE
PLEASE CALL:

(313) 235-1500

Attached was BKG 6W Mon 11/16/90

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Aug 07, 2009 12:53

SEG ENGINEERS & CONSULTANTS, INC.
ENGINEERS • LANDSCAPE ARCHITECTS • SURVEYORS

May 16, 1990

Unit FTT, Inc.
4002 JP Cole Boulevard
Flint, MI 48505

Attn: Mr. Richard Radmacher

RE: Ground Water Sampling and Analyses

Dear Mr. Radmacher:

SEG Engineers & Consultants, Inc. has completed ground water sampling and analyses associated with an underground storage tank closure at Unit FTT, Inc., Flint, Michigan.

Methodology

Ground water sampling was performed on May 7, 1990. Samples were collected from three (3) flush-mount, 4-inch diameter monitoring wells constructed of PVC. The wells were located adjacent to an excavation which, according to representatives of Unit FTT, was the former location of an underground tank used for the storage of gasoline.

Prior to sampling, each well was purged to insure that a sample representative of the ground water within the aquifer was collected. Three times the volume of standing water within each well was evacuated using a teflon bailer. Prior to purging, the bailers were decontaminated by washing with trisodium phosphate and rinsing with deionized water.

Each well was sampled with the teflon bailer used for purging. The bailer was slowly lowered into the well and the sample collected from the top of the water column.

For quality control, a trip blank was collected to detect any potential contamination due to the sampling containers. The trip blank involved filling the appropriate sample containers with reagent grade water and transporting the containers with the containers used for field sampling. A field blank was also collected to detect any potential cross contamination from sampling equipment or airborne particles.

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Mr. Radmacher
May 16, 1990
Page Two

Collected samples were transported in an iced cooler to SEG Laboratories, Inc. for analyses. Chain of custody was maintained from sample collection to laboratory analyses. Samples were analyzed by U.S. EPA Method 602 (BTEX compounds). Analytical results are provided as Attachment A. For all samples, BTEX compounds were reported below the instrument detection level of 1.0 ug/l (parts per billion).

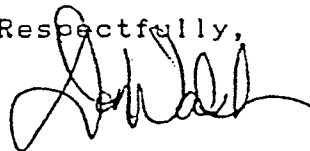
Summary

Ground water samples were collected from three monitoring wells adjacent to the former location of an underground gasoline storage tank. Trip and field blanks were also collected to ensure quality control. Sampling was performed in accordance with Michigan Department of Natural Resources sampling protocols.

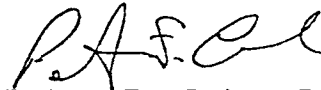
Collected samples were analyzed by U.S. EPA Method 602 (BTEX compounds). For all samples, BTEX compounds were reported below the instrument detection level of 1.0 ug/l.

Thank you for allowing SEG to perform this sampling and analyses. If you have any questions on this or other matter, please call our office at (517) 374-6800.

Respectfully,



Donald A. Walsh
Geologist



Peter F. Cole, P.E.
Environmental Services Manager

DAW/PFC/caf

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ATTACHMENT A
ANALYTICAL RESULTS

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Aug 07, 2009 12:53

SEG LABORATORIES, INC.

SEG LABORATORIES, INC.
1120 MAY STREET
LANSING, MI 48906
PHONE - 517-374-6800

SEG ENGINEERS & CONSULTANTS
1120 MAY STREET
LANSING, MICHIGAN 48906
MR. PETER F. COLE, P.E.

PROJECT NUMBER

Location	Lab No	Time Sampled	Date Sampled	Date Received
MW-1 UNIT FTT	15076	0	05/07/90	05/07/90
MW-2 UNIT FTT	15077	0	05/07/90	05/07/90
MW-3 UNIT FTT	15078	0	05/07/90	05/07/90
FIELD BLANK UNIT FTT	15079	0	05/07/90	05/07/90

ANALYTICAL REPORT
DATE REPORTED 05/15/90

TEST	UNITS	LAB NO. 15076	LAB NO. 15077	LAB NO. 15078	LAB NO. 15079
PURGEABLE AROMATICS		EPA 602	EPA 602	EPA 602	EPA 602
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0
p-Xylene	ug/L	<1.0	<1.0	<1.0	<1.0
m-Xylene	ug/L	<1.0	<1.0	<1.0	<1.0
o-Xylene	ug/L	<1.0	<1.0	<1.0	<1.0

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APPENDIX E

REGULATORY CONTACTS

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APPENDIX E
Aug 07, 2009 12:53

REGULATORY CONTACTS



Mr. Mark Pratt
Genesee County Health Department
310 West Oakley Street
Flint, Michigan 48503
(313) 257-3603

Sgt. Willie Miller
Flint Fire Department
310 East Fifth Street
Flint, Michigan 48502
(313) 762-7364

Mr. Jim Rohen
City of Flint - Building Safety and Inspection
121 East 7th Street
Flint, Michigan 48502
(313) 766-7284

Mr. Brad Hill
City of Flint - Water Pollution Control
G-4652 Beecher Road
Flint, Michigan 48505
(313) 766-7210

Ms. Cynthia King
Michigan Department of Natural Resources
Environmental Response Division
P.O. Box 30028
State Secondary Complex
Lansing, Michigan 48909
(517) 322-1300

Ms. Annette Weaver
Michigan Department of Natural Resources
Hazardous Waste Management Division
P.O. Box 30028
State Secondary Complex
Lansing, Michigan 48909
(517) 322-5104

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APPENDIX F

TEST BORING LOGS

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Aug 07, 2009 12:53

38019 Schoolcraft Road, Livonia, MI 48150

PROJECT
Unit Flint River Terminal
Flint, MichiganREPORT OF BORING No. W-1
SHEET 1 OF 1
FILE No. 60505
CHKD. BY WKBORING Co. American Drilling & Testing Co., Inc.
FOREMAN B. Patrick
GZA ENGINEER S. ChaseBORING LOCATION 15' SE of UST
GROUND SURFACE ELEVATION 100.5'
DATE START 4/14/92 DATE END 4/14/92
Top of Well Casing
DATUM at W-1 = 100.0'SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT
SPOON DRIVEN USING A 140 LB. HAMMER FALLING 30 IN.
METHOD: 4-1/4" I.D./8.0" O.D. HOLLOW-STEM AUGER
RIG TYPE: CME-75 TRUCK-MOUNTED

GROUNDWATER READINGS

DATE TIME DEPTH CASING STABILIZATION TIME

DEPTH H	SAMPLE					SAMPLE DESCRIPTION UNIFIED CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	REMARKS
	NO.	TYPE	PEN./ REC.	DEPTH (Ft.)	BLOWS/6"					
5							ASPHALT			1
							FILL: 0.7' SAND			
							2'			
	1	SS	18/6	1 - 2.5	3-2-4	FILL: Loose SAND, Little Gravel, Trace Silt, Brown, Damp (SP). Changing at 2' to: FILL: Very Stiff, Silty CLAY, Little Fine Sand, Grayish- Brown, Damp (CL).	FILL: CLAY		0.5 ppm	
	2	SS	18/18	3.5 - 5	12-15-18	FILL: Dense, Fine to Medium SAND, Trace Silt, Brown, Damp (SP).	FILL: SAND		BKG	
10							6'			
	3	SS	18/18	6 - 7.5	5-6-8	FILL: Very Stiff, Silty CLAY, Little Fine to Medium Sand, Brown, Gray and Black Variegated, Damp (CL).	FILL: CLAY		BKG	
	4	SS	18/18	8.5 - 10	6-8-10	Hard, Silty CLAY, Little Fine Sand, Brown and Gray Mottled, Damp, Possible Fill (CL).			1.0 ppm	
							11'			
15										
	5	SS	18/18	11 - 12.5	5-6-10	Hard, Silty CLAY, Little Fine Sand with Occasional Fine Sand Partings, Brown, Damp (Laminated) (CL).	CLAY		1.0 ppm	
	6	SS	18/18	13.5 - 15	5-11-18	Hard, Silty CLAY, Little Fine Sand, Brown-Gray, Damp (CL).			1.0 ppm	2
20							16.4'			
	7	SS	18/18	16 - 17.5	3-5-10	Hard, Silty CLAY, Little Fine Sand, Gray, Damp (CL). Changing at 16.4' to: Medium Dense, Fine to Medium SAND, Trace Clay, Gray, Moist (SP).	SAND		BKG	
							18.5'			
	8	SS	18/18	18.5 - 20	15-23-31	Hard, Silty, Sandy CLAY, Gray Damp (CL).	CLAY		BKG	3

REMARKS:

Bottom of Boring at 20 Feet

20'

- Field screening of samples for organic vapors was performed with an HNU PI-101 Photoionization Detector equipped with a 10.2 eV lamp. All readings are in parts per million (ppm) relative to an isobutylene standard. Background (BKG) was equal to readings below ambient air background of 0.5 ppm or less, including non-detectable (ND) meter deflections.
- Groundwater first encountered on drill rods at 14.3 feet.
- Monitoring well was installed within borehole upon completion. See monitoring well installation report for details.

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER
MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GZA

FILE:60505.W1

38019 Schoolcraft Road, Livonia, MI 48150

Unit Floor Thru Terminal
Flint, Michigan

REPORT OF BORING No. W-5
SHEET 1 OF 1
FILE No. 60505
CHKD. BY *WKE*

BORING Co.	American Drilling & Testing Co., Inc.
FOREMAN	B. Patrick
GZA ENGINEER	S. Chase

BORING LOCATION SE Corner of Site - South of Water Tank
 GROUND SURFACE ELEVATION 88.4' DATUM Top of Well Casing
 DATE START 4/15/92 DATE END 4/15/92 at W-1 = 100.0'

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.

Aug 07, 2009 12:53

GROUNDWATER READINGS

METHOD: 4-1/4" I.D./8.0" O.D. HOLLOW-STEM AUGER

RIG TYPE: CME-75 TRUCK-MOUNTED

DATE	TIME	DEPTH	CASING	STABILIZATION TIME

[illegible]

REMARKS:

1. Field screening of samples for organic vapors was performed with an HNU PI-101 Photoionization Detector equipped with a 10.2 eV lamp. All readings are in parts per million (ppm) relative to an isobutylene standard. Background (BKG) was equal to readings below ambient air background of 0.5 ppm or less, including non-detectable (ND) meter deflections.
2. Groundwater encountered on drill rods at 4 feet at 11:40 a.m.
3. Monitoring well was installed within borehole upon completion. See monitoring well installation report for details.

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GZA

FILE:60505.W5

GZA GEOENVIRONMENTAL, INC.
Engineers and Scientists

38019 Schoolcraft Road, Livonia, MI 48150

PROJECT

Unit Flow Meter Terminal
Flint, Michigan

REPORT OF BORING No. W-6
SHEET 1 OF 1
FILE No. 60505
CHKD. BY WIC

BORING Co. American Drilling & Testing Co., Inc.
FOREMAN B. Patrick
GZA ENGINEER S. Chase

BORING LOCATION 51' E at S-4 Sewer
GROUND SURFACE ELEVATION 98.0'
DATE START 4/15/92 DATE END 4/15/92
DATUM Top of Well Casing at W-1 = 100.0'

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT
SPOON DRIVEN USING A 140 LB. HAMMER FALLING 30 in.
METHOD: 4-1/4" I.D./8.0" O.D. HOLLOW-STEM AUGER
RIG TYPE: CME-75 TRUCK-MOUNTED

GROUNDWATER READINGS

DATE TIME DEPTH CASING STABILIZATION TIME

DEPTH H	SAMPLE					SAMPLE DESCRIPTION UNIFIED CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	REMARKS
	NO.	TYPE	PEN./ REC.	DEPTH (Ft.)	BLOWS/6"					
5							ASPHALT			1
							0.7'			
							FILL: SAND			
5	1	SS	18/18	1 - 2.5	10-6-7	FILL: Medium Dense SAND, Little Gravel, Trace Silt, Brown, Damp (SP). Changing at 1.5' to: FILL: Very Stiff, Sandy CLAY, Trace Gravel, Brown, Damp (CL).	1.5'		0.5 ppm	
							FILL: CLAY			
5	2	SS	18/12	3.5 - 5	15-12-22	FILL: Very Stiff, Silty CLAY, Little Sand, Trace Gravel, Concrete, Brown to Dark Gray at 3.9, Damp (CL).	4.7'		BKG	2
							FILL: MISCELLANEOUS DEBRIS			
10	3	SS	18/4	6 - 7.5	7-25-3	FILL: Miscellaneous Debris (Concrete and Asphalt Fragments).			10 ppm	
10	4	SS	18/12	8.5 - 10	4-7-12	FILL: Medium Dense SAND, Little Miscellaneous Debris (Asphalt Fragments), Gray, Damp (SP). Changing at 9' to: Stiff, Silty CLAY, Brown, Damp (CL).	9'		5 ppm	
							CLAY			
15	5	SS	18/18	11 - 12.5	7-46-75	Hard, Silty CLAY, Little Gravel, Trace Sand, Brown, Dry (CL).			0.5 ppm	
15	6	SS	18/18	13.5 - 15	25-50-52	Hard, Silty CLAY, Trace Sand, Brown, Dry (CL). Changing at 14' to: Hard, Silty CLAY, Trace Sand, Gray, Dry (CL). Changing at 14.7' to: Very Dense, Fine to Medium SAND, Trace Clay, Gray, Damp (SP-SC).	14.7'		4 ppm	
							SAND			
20	7	SS	18/18	16 - 17.5	21-36-51	Very Stiff, Silty CLAY, Gray, Damp (CL).	16'		1 ppm	3
							CLAY			4
						Bottom of Boring at 17.5 Feet	17.5'			

REMARKS:

- Field screening of samples for organic vapors was performed with an HNU PI-101 Photoionization Detector equipped with a 10.2 eV lamp. All readings are in parts per million (ppm) relative to an isobutylene standard. Background (BKG) was equal to readings below ambient air background of 0.5 ppm or less, including non-detectable (ND) meter deflections.
- Broken concrete was encountered at approximately 4.7 feet.
- No groundwater was observed during drilling or upon completion of borehole.
- Monitoring well was installed within borehole upon completion. See monitoring well installation report for details.

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GZA

FILE:60505.W6

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Aug 07, 2009 12:53



APPENDIX G

MONITORING WELL INSTALLATION REPORTS

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Aug 07, 2009 12:53

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Aug 07, 2009 12:53

WELL # W-1

GEA GEENVIRONMENT
Engineers and Scientists

PROJECT

LER

Aug 07, 2009 12:53

DATE: 4/14/92

SITE CONDITIONS: Flat, Asphalt Paved

DRILLING

DRILLING
CONTRACTOR: American Drilling & Testing
Co., Inc.

Top of Well Casing
ELEV DATUM: at W-1 = 100.0'

GROUND ELEV: 100.5'

TOP OF WELL ELEV: 100.00'

WEATHER CONDITIONS: Partly Cloudy, 40° F.

DRILLER: B. Patrick

INSTALLATION METHOD: 4-1/4" Hollow-Stem
Auger

DATE SURVEYED: 4/20/92

SURVEYED BY: GZA

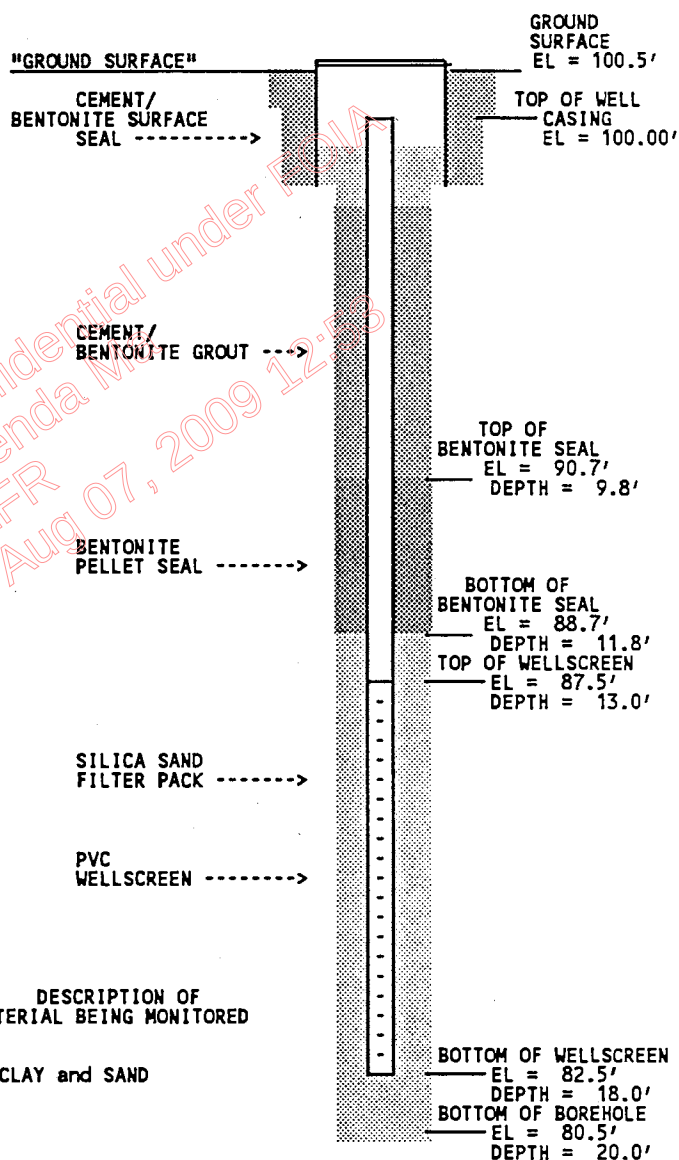
MONITORING WELL DRAWING

WELLSCREEN DIA: 2-inch	TYPE: PVC
SLOT SIZE: 0.010-inch	LENGTH: 5 feet
WELL RISER DIA: 2-inch	TYPE: PVC
PIPE CONNECTIONS: Threaded	LENGTH: 12.5 feet
FILTER SAND TYPE: Silica	OTHER: N/A
PROTECTIVE CASING: Yes - Flush-Mounted	
LOCKED CAP: Yes	LOCK NO: IG008
CASING DIA: 6-inches	LENGTH: 12-inches

GROUNDWATER MEASUREMENT DATA

[illegible]

PROTECTIVE ROADBOX
CASING AT GROUND SURFACE



MONITORING WELL DRAWING NOT TO SCALE.

REMARKS:

1. Groundwater depth measurement made from top of well casing.
2. Well developed on April 14, 1992 by bailing. Approximately 20 gallons of water removed. Specific conductance = 7,000 to 9,000 uS; pH = 7.2 to 7.7; temperature = 10.3 to 11.5° C.

WELL # W-3

PROJECT NO: 60505

DATE: 4/14/92

Top of Well Casing
ELEV DATUM: at W-1 = 100.0'

GROUND ELEV: 111.5'
TOP OF WELL ELEV: 110.99'

DATE SURVEYED: 4/20/92

SURVEYED BY: GZA

MONITORING WELL DRAWING

PROTECTIVE ROADBOX
CASING AT GROUND SURFACE

"GROUND SURFACE"

CEMENT/
BENTONITE SURFACE
SEAL -----

GROUND
SURFACE
EL = 111.5'

TOP OF WELL
— CASING
EL = 110.99'

CEMENT/
BENTONITE GROUT --->

BENTONITE
PELLET SEAL ----->

SILICA SAND
FILTER PACK ----->

PVC
WELLSCREEN ----->

DESCRIPTION OF
MATERIAL BEING MONITORED

SAND and SILT

BOTTOM OF
 BENTONITE SEAL
 EL = 99.5'
 DEPTH = 12.0'
 TOP OF WELLSCREEN
 EL = 97.5'
 DEPTH = 13.0'

BOTTOM OF WELLSCREEN
 EL = 92.5'
 DEPTH = 18.0'
 BOTTOM OF BOREHOLE
 EL = 90.5'
 DEPTH = 20.0'

GROUNDWATER MEASUREMENT DATA

[illegible]

1. Groundwater depth measurement made from top of well casing.
2. Well developed on April 15, 1992 by bailing. Approximately 7.5 gallons of water removed. The following measurements were collected:

Temperature

7.4° C.

8.30 C.

8-60 C-

Water removed was brown and cloudy to brown and silty.

FILE:60505MW.V3

7, 2009 12:53
REPRESENTATIVE INITIAL

DATE 5/21/67

MONITORING WELL INSTALLATION REPORT		WELL # W-5																																																																																																																								
GZA GEOENVIRONMENTAL, INC. Engineers and Scientists 38019 Schoolcraft Road, Livonia, MI 48150	PROJECT DESCRIPTION: Unit Flow-Thru Terminal LOCATION: Flint, Michigan DRILLING CONTRACTOR: American Drilling & Testing Co., Inc. DRILLER: B. Patrick INSTALLATION METHOD: 4-1/4" Hollow-Stem Auger	PROJECT NO: 60505 DATE: 4/15/92 Top of Well Casing ELEV DATUM: at W-1 = 100.0' GROUND ELEV: 88.4' TOP OF WELL ELEV: 87.97' DATE SURVEYED: 4/20/92 SURVEYED BY: GZA																																																																																																																								
GZA FIELD REP: S. Chase SITE CONDITIONS: Swale Off Parking Lot WEATHER CONDITIONS: Partly Cloudy, 45° F.																																																																																																																										
MONITORING WELL DETAILS WELLScreen DIA: 2-inch TYPE: PVC SLOT SIZE: 0.010-inch LENGTH: 5 feet WELL RISER DIA: 2-inch TYPE: PVC PIPE CONNECTIONS: Threaded LENGTH: 1.5 feet FILTER SAND TYPE: Silica OTHER: N/A PROTECTIVE CASING: Yes - Flush-Mounted LOCKED CAP: Yes LOCK NO: IG008 CASING DIA: 6-inches LENGTH: 12-inches	MONITORING WELL DRAWING PROTECTIVE ROADBOX CASING AT GROUND SURFACE DESCRIPTION OF MATERIAL BEING MONITORED FILL: SAND and SAND With Clay Lense Over Clay MONITORING WELL DRAWING NOT TO SCALE.																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;">GROUNDWATER MEASUREMENT DATA</th> </tr> <tr> <th>DATE</th> <th>TIME</th> <th>DEPTH¹</th> <th>METHOD</th> <th>ELEV.</th> </tr> </thead> <tbody> <tr> <td>4/15/92</td> <td>4:20</td> <td>2.53'</td> <td>Electronic Indicator</td> <td>85.44'</td> </tr> <tr> <td>4/20/92</td> <td>10:30</td> <td>0.87'</td> <td>Electronic Indicator</td> <td>87.10'</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			GROUNDWATER MEASUREMENT DATA					DATE	TIME	DEPTH ¹	METHOD	ELEV.	4/15/92	4:20	2.53'	Electronic Indicator	85.44'	4/20/92	10:30	0.87'	Electronic Indicator	87.10'																																																																																																				
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FILE: 60505MW.W5 GZA Aug 07, 2009 REPRESENTATIVE INITIAL <u>SC</u> DATE <u>5/21/92</u>																																																																																																																										

WELL # W-6

PROJECT NO: 60505

DATE: 4/15/92

DATE SURVEYED: 4/20/92

SURVEYED BY: GZA

DATE 5/21/92



APPENDIX H

ANALYTICAL TEST RESULTS AND LABORATORY QA/QC REPORTS

- Analytical Reports
- QA/QC Documents
- Chain-of-Custody Documents

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Aug 07, 2009 12:53

Analytical Reports

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Aug 07, 2009 12:53

Brenda Ma

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Aug 07, 2009 12:53

MA

Thermo Analytical Inc.

Analytical Report

THERMO ANALYTICAL, INC./ERG
525 Avis Drive, Suite 7
Ann Arbor, Michigan 48108

Phone: (313) 662-3104

GZA GEGENVIRONMENTAL
38019 SCHOOLCRAFT
LIVONIA, MI 48150

Attn: SUSAN CHASE

Order #: E2-04-104
Date: 06/17/92 12:40
Work ID: ARPIL 60503.00
Date Received: 04/17/92
Date Completed: 05/06/92

Purchase Order: 72507
Invoice Number: 81452

Client Code: GZA

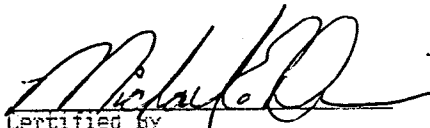
** = HIGHER DETECTION LIMIT DUE TO MATRIX INTERFERENCE.

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	W-1/SS-7
02	W-2/SS2
03	W-2/SS6
04	W-3/SS3

Sample Number	Sample Description
05	W-4/SS4
06	W-5/SS1
07	W-6/SS4

SR=See attached report ND=Nondetected, detection limit
is in () (=Compound or element was not detected at or above
specified detection limit in () N/A=Not applicable *=Average
of duplicate runs.


Certified By

Brenda Ma

LFR

Aug 07, 2009 12:53

Brenda Ma

TMA

Thermo Analytical Inc.

Analytical Report

Order # E2-04-104
06/17/92 12:40THERMO ANALYTICAL, INC./ERG
TEST RESULTS BY SAMPLE

Page 2

Sample: 01A W-1/SS-7

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Benzene in Solid	<10		ug/kg	04/28/92	PN
Ethylbenzene in Solid	<10		ug/kg	04/28/92	PN
Toluene in Solid	<10		ug/kg	04/28/92	PN
Xylene in Solid	<10		ug/kg	04/28/92	PN

Sample: 01B W-1/SS-7

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<0.50		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<0.50		mg/kg	05/01/92	GH
Anthracene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.05		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.05		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.05		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<0.05		mg/kg	05/01/92	GH
Chrysene in Solid	<0.05		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.05		mg/kg	05/01/92	GH
Fluoranthene in Solid	<0.50		mg/kg	05/01/92	GH
Fluorene in Solid	0.007		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.05		mg/kg	05/01/92	GH
Naphthalene in Solid	<0.50		mg/kg	05/01/92	GH
Phenathrene in Solid	<0.10		mg/kg	05/01/92	GH
Pyrene in Solid	<0.05		mg/kg	05/01/92	GH

Sample: 02A W-2/SS2

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Benzene in Solid	<10		ug/kg	04/28/92	PN
Ethylbenzene in Solid	<10		ug/kg	04/28/92	PN
Toluene in Solid	<10		ug/kg	04/28/92	PN
Xylene in Solid	<10		ug/kg	04/28/92	PN

Sample: 02B W-2/SS2

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<0.50		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<0.50		mg/kg	05/01/92	GH
Anthracene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.05		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.05		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.05		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<0.05		mg/kg	05/01/92	GH
Chrysene in Solid	<0.05		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.05		mg/kg	05/01/92	GH
Fluoranthene in Solid	<0.50		mg/kg	05/01/92	GH
Fluorene in Solid	<0.05		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.05		mg/kg	05/01/92	GH
Naphthalene in Solid	<0.50		mg/kg	05/01/92	GH
Phenathrene in Solid	<0.10		mg/kg	05/01/92	GH
Pyrene in Solid	<0.05		mg/kg	05/01/92	GH

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Aug 07, 2009 12:53

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MA

Thermo Analytical Inc.

Analytical Report

Order # E2-04-104
06/17/92 12:40THERMO ANALYTICAL, INC./ERB
TEST RESULTS BY SAMPLE
Aug 07, 2009 12:53

Page 3

Sample: 03A W-2/SS6

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Benzene in Solid	<10		ug/kg	04/28/92	PN
Ethylbenzene in Solid	<10		ug/kg	04/28/92	PN
Toluene in Solid	<10		ug/kg	04/28/92	PN
Xylene in Solid	<10		ug/kg	04/28/92	PN

Sample: 03B W-2/SS6

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<1.0		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<1.0		mg/kg	05/01/92	GH
Anthracene in Solid	<0.10		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.10		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.10		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.10		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.10		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<0.10		mg/kg	05/01/92	GH
Chrysene in Solid	<0.10		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.10		mg/kg	05/01/92	GH
Fluoranthene in Solid	<1.0		mg/kg	05/01/92	GH
Fluorene in Solid	<0.10		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.10		mg/kg	05/01/92	GH
Naphthalene in Solid	<1.0		mg/kg	05/01/92	GH
Phenathrene in Solid	<0.20		mg/kg	05/01/92	GH
Pyrene in Solid	<0.10		mg/kg	05/01/92	GH

Sample: 04A W-3/SS3

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Purgeable Aromatics					
Benzene	<10		ug/kg	04/28/92	PN
Toluene	<10		ug/kg	04/28/92	PN
Ethylbenzene	<10		ug/kg	04/28/92	PN



Thermo Analytical Inc.

Brenda Ma

Analytical Report

 Order # E2-04-104
 06/17/92 12:40

 THERMO ANALYTICAL, INC./EFG
 TEST RESULTS BY SAMPLE
 Aug 07, 2009 12:53

Page 4

Test Description	Result	Limit	Units	Analyzed	By
Purgeable Halocarbons					
Chloromethane	<10		ug/Kg	04/28/92	PN
Bromomethane	<10		ug/Kg	04/28/92	PN
Vinyl chloride	<10		ug/Kg	04/28/92	PN
Chloroethane	<10		ug/Kg	04/28/92	PN
Methylene chloride	<5		ug/Kg	04/28/92	PN
Trichlorofluoromethane	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethene	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethane	<5		ug/Kg	04/28/92	PN
trans-1,2-Dichloroethene	<5		ug/Kg	04/28/92	PN
Chloroform	<5		ug/Kg	04/28/92	PN
1,2-Dichloroethane	<5		ug/Kg	04/28/92	PN
1,1,1-Trichloroethane	20		ug/Kg	04/28/92	PN
Carbon tetrachloride	<5		ug/Kg	04/28/92	PN
Bromodichloromethane	<5		ug/Kg	04/28/92	PN
1,2-Dichloropropane	<5		ug/Kg	04/28/92	PN
trans-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
Trichloroethene	<5		ug/Kg	04/28/92	PN
Dibromochloromethane	<5		ug/Kg	04/28/92	PN
1,1,2-Trichloroethane	<5		ug/Kg	04/28/92	PN
cis-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
2-Chloroethylvinyl ether	<10		ug/Kg	04/28/92	PN
Bromoform	<10		ug/Kg	04/28/92	PN
1,1,2,2-Tetrachloroethane	<5		ug/Kg	04/28/92	PN
Tetrachloroethene	<5		ug/Kg	04/28/92	PN
Chlorobenzene	<5		ug/Kg	04/28/92	PN
1,3-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,2-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,4-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
Dichlorodifluoromethane	<5		ug/Kg	04/28/92	PN
Xylene in Solid	<10		ug/kg	04/28/92	PN

Sample: 04B W-3/SS3

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<0.50		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<0.50		mg/kg	05/01/92	GH
Anthracene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.05		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.05		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.05		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<0.05		mg/kg	05/01/92	GH
Chrysene in Solid	<0.05		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.05		mg/kg	05/01/92	GH
Fluoranthene in Solid	<0.50		mg/kg	05/01/92	GH
Fluorene in Solid	<0.05		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.05		mg/kg	05/01/92	GH
Naphthalene in Solid	<0.50		mg/kg	05/01/92	GH
Phenanthrene in Solid	<0.10		mg/kg	05/01/92	GH
Pyrene in Solid	<0.05		mg/kg	05/01/92	GH

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Sample: 04C W-3/SS3

Collected: 04/14/92

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Solid	4.0		mg/kg	04/30/92	EJS
Barium in Solid	8.6		mg/kg	04/30/92	MB
Cadmium in Solid	<0.97		mg/kg	04/30/92	MB
Chromium in Solid	6.4		mg/kg	04/30/92	MB
Copper in Solid	4.6		mg/kg	04/30/92	MB
Lead in Solid	<5.8		mg/kg	04/30/92	MB
Mercury in Solid	<0.10		mg/kg	04/30/92	RH
Prep for Furnace-Solids	04/28/92		date complete		RSH
Prep for ICP-Solid	04/28/92		date complete		RSH
Selenium in Solid	<0.34		mg/kg	04/30/92	EJS
Silver in Solid	<0.97		mg/kg	04/30/92	MB
Zinc in Solid	21		mg/kg	04/30/92	MB

Sample: 05A W-4/SS4

Collected: 04/15/92

Test Description	Result	Limit	Units	Analyzed	By
Purgeable Aromatics					
Benzene	<10		ug/Kg	04/28/92	PN
Toluene	<10		ug/Kg	04/28/92	PN
Ethylbenzene	<10		ug/Kg	04/28/92	PN

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Test Description	Result	Limit	Units	Analyzed	By
Purgeable Halocarbons					
Chloromethane	<10		ug/Kg	04/28/92	PN
Bromomethane	<10		ug/Kg	04/28/92	PN
Vinyl chloride	<10		ug/Kg	04/28/92	PN
Chloroethane	<10		ug/Kg	04/28/92	PN
Methylene chloride	<5		ug/Kg	04/28/92	PN
Trichlorofluoromethane	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethene	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethane	<5		ug/Kg	04/28/92	PN
trans-1,2-Dichloroethene	<5		ug/Kg	04/28/92	PN
Chloroform	<5		ug/Kg	04/28/92	PN
1,2-Dichloroethane	<5		ug/Kg	04/28/92	PN
1,1,1-Trichloroethane	65		ug/Kg	04/28/92	PN
Carbon tetrachloride	<5		ug/Kg	04/28/92	PN
Bromodichloromethane	<5		ug/Kg	04/28/92	PN
1,2-Dichloropropane	<5		ug/Kg	04/28/92	PN
trans-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
Trichloroethene	<5		ug/Kg	04/28/92	PN
Dibromochloromethane	<5		ug/Kg	04/28/92	PN
1,1,2-Trichloroethane	<5		ug/Kg	04/28/92	PN
cis-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
2-Chloroethylvinyl ether	<10		ug/Kg	04/28/92	PN
Bromoform	<10		ug/Kg	04/28/92	PN
1,1,2,2-Tetrachloroethane	<5		ug/Kg	04/28/92	PN
Tetrachloroethene	<5		ug/Kg	04/28/92	PN
Chlorobenzene	<5		ug/Kg	04/28/92	PN
1,3-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,2-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,4-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
Dichlorodifluoromethane	<5		ug/Kg	04/28/92	PN
Xylene in Solid	<10		ug/kg	04/28/92	PN

Sample: 05B W-4/SS4

Collected: 04/15/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<0.50		mg/kg		
Acenaphthylene in Solid	<0.50		mg/kg		
Anthracene in Solid	<0.05		mg/kg		
Benzo(a)anthracene	<0.05		mg/kg		
Benzo(a)pyrene in Solid	<0.05		mg/kg		
Benzo(b)fluoranthene	<0.05		mg/kg		
Benzo(ghi)perylene	<0.05		mg/kg		
Benzo(k)fluoranthene	<0.05		mg/kg		
Chrysene in Solid	<0.05		mg/kg		
Dibenzo(a,h)anthracene	<0.05		mg/kg		
Fluoranthene in Solid	<0.50		mg/kg		
Fluorene in Solid	<0.05		mg/kg		
Indeno(1,2,3-cd)pyrene	<0.05		mg/kg		
Naphthalene in Solid	<0.50		mg/kg		
Phenanthrene in Solid	<0.10		mg/kg		
Pyrene in Solid	<0.05		mg/kg		

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Sample: 06A W-5/SS1

Collected: 04/15/92

Test Description	Result	Limit	Units	Analyzed	By
Purgeable Aromatics					
Benzene	<10		ug/Kg	04/28/92	PN
Toluene	<10		ug/Kg	04/28/92	PN
Ethylbenzene	<10		ug/Kg	04/28/92	PN
Purgeable Halocarbons					
Chloromethane	<10		ug/Kg	04/28/92	PN
Bromomethane	<10		ug/Kg	04/28/92	PN
Vinyl chloride	<10		ug/Kg	04/28/92	PN
Chloroethane	<10		ug/Kg	04/28/92	PN
Methylene chloride	9.1		ug/Kg	04/28/92	PN
Trichlorofluoromethane	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethane	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethane	<5		ug/Kg	04/28/92	PN
trans-1,2-Dichloroethene	<5		ug/Kg	04/28/92	PN
Chloroform	<5		ug/Kg	04/28/92	PN
1,2-Dichloroethane	<5		ug/Kg	04/28/92	PN
1,1,1-Trichloroethane	53		ug/Kg	04/28/92	PN
Carbon tetrachloride	<5		ug/Kg	04/28/92	PN
Bromodichloromethane	<5		ug/Kg	04/28/92	PN
1,2-Dichloropropane	<5		ug/Kg	04/28/92	PN
trans-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
Trichloroethene	<5		ug/Kg	04/28/92	PN
Dibromochloromethane	<5		ug/Kg	04/28/92	PN
1,1,2-Trichloroethane	<5		ug/Kg	04/28/92	PN
cis-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
2-Chloroethylvinyl ether	<10		ug/Kg	04/28/92	PN
Bromoform	<10		ug/Kg	04/28/92	PN
1,1,2,2-Tetrachloroethane	<5		ug/Kg	04/28/92	PN
Tetrachloroethene	<5		ug/Kg	04/28/92	PN
Chlorobenzene	<5		ug/Kg	04/28/92	PN
1,3-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,2-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,4-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
Dichlorodifluoromethane	<5		ug/Kg	04/28/92	PN
Xylene in Solid	<10		ug/Kg	04/28/92	PN

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Test Description	Result	Limit	Units	Analyzed	By
Purgeable Halocarbons					
Chloromethane	<10		ug/Kg	04/28/92	PN
Bromomethane	<10		ug/Kg	04/28/92	PN
Vinyl chloride	<10		ug/Kg	04/28/92	PN
Chloroethane	<10		ug/Kg	04/28/92	PN
Methylene chloride	24		ug/Kg	04/28/92	PN
Trichlorofluoromethane	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethene	<5		ug/Kg	04/28/92	PN
1,1-Dichloroethane	<5		ug/Kg	04/28/92	PN
trans-1,2-Dichloroethene	<5		ug/Kg	04/28/92	PN
Chloroform	<5		ug/Kg	04/28/92	PN
1,2-Dichloroethane	<5		ug/Kg	04/28/92	PN
1,1,1-Trichloroethane	19		ug/Kg	04/28/92	PN
Carbon tetrachloride	<5		ug/Kg	04/28/92	PN
Bromodichloromethane	<5		ug/Kg	04/28/92	PN
1,2-Dichloropropane	<5		ug/Kg	04/28/92	PN
trans-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
Trichloroethene	<5		ug/Kg	04/28/92	PN
Dibromochloromethane	<5		ug/Kg	04/28/92	PN
1,1,2-Trichloroethane	<5		ug/Kg	04/28/92	PN
cis-1,3-Dichloropropene	<5		ug/Kg	04/28/92	PN
2-Chloroethylvinyl ether	<10		ug/Kg	04/28/92	PN
Bromoform	<10		ug/Kg	04/28/92	PN
1,1,2,2-Tetrachloroethane	<5		ug/Kg	04/28/92	PN
Tetrachloroethene	<5		ug/Kg	04/28/92	PN
Chlorobenzene	<5		ug/Kg	04/28/92	PN
1,3-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,2-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
1,4-Dichlorobenzene	<5		ug/Kg	04/28/92	PN
Dichlorodifluoromethane	<5		ug/Kg	04/28/92	PN
Xylene in Water	<10		ug/L	04/28/92	PN

Sample: 07B W-6/SS4

Collected: 04/15/92

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<1.0		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<1.0		mg/kg	05/01/92	GH
Anthracene in Solid	<0.10		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.10		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.10		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.10		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.10		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<0.10		mg/kg	05/01/92	GH
Chrysene in Solid	<0.10		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.10		mg/kg	05/01/92	GH
Fluoranthene in Solid	<1.0		mg/kg	05/01/92	GH
Fluorene in Solid	<0.10		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.10		mg/kg	05/01/92	GH
Naphthalene in Solid	<1.0		mg/kg	05/01/92	GH
Phenanthrene in Solid	<0.20		mg/kg	05/01/92	GH
Pyrene in Solid	<0.10		mg/kg	05/01/92	GH

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Benzene in Solid Method:

Minimum:

Maximum:

Samp Sample Description
01A W-1/SS-7
02A W-2/SS2
03A W-2/SS6

Result
<10
<10
<10

Units
ug/kg
ug/kg
ug/kg

Limit Prepared Analyzed By
04/28/92 PH
04/28/92 PH
04/28/92 PH

Benzo(a)anthracene Method:

Minimum:

Maximum:

Samp Sample Description
01B W-1/SS-7
02B W-2/SS2
03B W-2/SS6
04B W-3/SS3
05B W-4/SS4
06B W-5/SS1
07B W-6/SS4

Result
<0.05
<0.05
<0.10
<0.05
<0.05
<0.05
<0.10

Units
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg

Limit Prepared Analyzed By
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH

Benzo(a)pyrene in Solid Method:

Minimum:

Maximum:

Samp Sample Description
01B W-1/SS-7
02B W-2/SS2
03B W-2/SS6
04B W-3/SS3
05B W-4/SS4
06B W-5/SS1
07B W-6/SS4

Result
<0.05
<0.05
<0.10
<0.05
<0.05
<0.05
<0.10

Units
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg

Limit Prepared Analyzed By
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH

Benzo(b)fluoranthene Method:

Minimum:

Maximum:

Samp Sample Description
01B W-1/SS-7
02B W-2/SS2
03B W-2/SS6
04B W-3/SS3
05B W-4/SS4
06B W-5/SS1
07B W-6/SS4

Result
<0.05
<0.05
<0.10
<0.05
<0.05
<0.05
<0.10

Units
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg
mg/kg

Limit Prepared Analyzed By
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH
05/01/92 GH

Benzo(ghi)perylene Method:

Minimum:

Maximum:

Samp Sample Description
01B W-1/SS-7
02B W-2/SS2

Result
<0.05
<0.05

Units
mg/kg
mg/kg

Limit Prepared Analyzed By
05/01/92 GH
05/01/92 GH

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Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

 Benzo(k) fluoranthene
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.05	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

 Cadmium in Solid
 Method: ICAP

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	<0.97	mg/kg			04/30/92	MB
07C	W-6/SS4	<0.79	mg/kg			04/30/92	MB

 Chromium in Solid
 Method: ICAP

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	6.4	mg/kg			04/30/92	MB
07C	W-6/SS4	13	mg/kg			04/30/92	MB

 Chrysene in Solid
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.05	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

 Copper in Solid
 Method: ICAP

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	4.6	mg/kg			04/30/92	MB

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Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
07C	W-6/SS4	13	mg/kg			04/30/92	MB

 Dibenzo(a,h)anthracene
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.05	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

 Ethylbenzene in Solid
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	W-1/SS-7	<10	ug/kg			04/28/92	PN
02A	W-2/SS2	<10	ug/kg			04/28/92	PN
03A	W-2/SS6	<10	ug/kg			04/28/92	PN

 Fluoranthene in Solid
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.50	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.50	mg/kg			05/01/92	GH
03B	W-2/SS6	<1.0	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.50	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.50	mg/kg				
06B	W-5/SS1	<0.50	mg/kg			05/01/92	GH
07B	W-6/SS4	<1.0	mg/kg			05/01/92	GH

 Fluorene in Solid
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.057	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

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Indeno(1,2,3-cd)pyrene
Method:

Minimum:

Maximum:

Sample	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.05	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

Lead in Solid
Method: ICAP

Minimum:

Maximum:

Sample	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	<5.8	mg/kg			04/30/92	MB
07C	W-6/SS4	14	mg/kg			04/30/92	MB

Mercury in Solid
Method:

Minimum:

Maximum:

Sample	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	<0.10	mg/kg			04/30/92	RH
07C	W-6/SS4	<0.05	mg/kg			04/30/92	RH

Naphthalene in Solid
Method:

Minimum:

Maximum:

Sample	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.50	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.50	mg/kg			05/01/92	GH
03B	W-2/SS6	<1.0	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.50	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.50	mg/kg				
06B	W-5/SS1	<0.50	mg/kg			05/01/92	GH
07B	W-6/SS4	<1.0	mg/kg			05/01/92	GH

Phenathrene in Solid
Method:

Minimum:

Maximum:

Sample	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.10	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.10	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.20	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.10	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.10	mg/kg				
06B	W-5/SS1	<0.10	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.20	mg/kg			05/01/92	GH



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**Prep for Furnace-Solids
Method:**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	04/28/92	date complete				RSH
07C	W-6/SS4	04/28/92	date complete				RSH

**Prep for ICAP-Solid
Method:**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	04/28/92	date complete				RSH
07C	W-6/SS4	04/28/92	date complete				RSH

**Pyrene in Solid
Method:**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01B	W-1/SS-7	<0.05	mg/kg			05/01/92	GH
02B	W-2/SS2	<0.05	mg/kg			05/01/92	GH
03B	W-2/SS6	<0.10	mg/kg			05/01/92	GH
04B	W-3/SS3	<0.05	mg/kg			05/01/92	GH
05B	W-4/SS4	<0.05	mg/kg				
06B	W-5/SS1	<0.05	mg/kg			05/01/92	GH
07B	W-6/SS4	<0.10	mg/kg			05/01/92	GH

**Selenium in Solid
Method: Furnace**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	<0.34	mg/kg			04/30/92	BJS
07C	W-6/SS4	<0.78**	mg/kg			04/30/92	BJS

**Silver in Solid
Method: ICAP**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	<0.97	mg/kg			04/30/92	ME
07C	W-6/SS4	<0.79	mg/kg			04/30/92	ME

**Toluene in Solid
Method:**

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	W-1/SS-7	<10	ug/kg			04/28/92	PN
02A	W-2/SS2	<10	ug/kg			04/28/92	PN
03A	W-2/SS6	<10	ug/kg			04/28/92	PN

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Xylene in Solid
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	W-1/SS-7	<10	ug/kg			04/28/92	PN
02A	W-2/SS2	<10	ug/kg			04/28/92	PN
03A	W-2/SS6	<10	ug/kg			04/28/92	PN
04A	W-3/SS3	<10	ug/kg			04/28/92	PN
05A	W-4/SS4	<10	ug/kg			04/28/92	PN
06A	W-5/SS1	<10	ug/kg			04/28/92	PN

Xylene in Water
 Method:

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
07A	W-6/SS4	<10	ug/L			04/28/92	PN

Zinc in Solid
 Method: ICAP

Minimum:

Maximum:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
04C	W-3/SS3	21	mg/kg			04/30/92	MB
07C	W-6/SS4	44	mg/kg			04/30/92	MB

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Analytical Report

Aug 07, 2009 12:53

THERMO ANALYTICAL, INC./ERG
525 Avis Drive, Suite 7
Ann Arbor, Michigan 48108

Phone: (313) 662-3104

GZA GEGENVIRONMENTAL
38019 SCHOOLCRAFT
LIVONIA, MI 48150

Attn: SUSAN CHASE

Purchase Order: 72507
Invoice Number: 81454

Order #: E2-04-106
Date: 06/17/92 15:58
Work ID: APRIL 62505.00
Date Received: 04/21/92
Date Completed: 05/06/92

Client Code: GZA

** = HIGHER DETECTION LIMIT DUE TO MARTIX INTERFERENCE.

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	W-1
02	W-2
03	W-3
04	W-4
05	W-5
06	W-6

Sample Number	Sample Description
07	PT-2
08	ST-14
09	ST-E (ST-22) SC
10	ST-10 (S-1) SC
11	ST-2 (S-2) SC
12	TRIP BLANK

SR=See attached report ND=Non Detected, detection limit is in () (=Compound or element was not detected at or above specified detection limit in () N/A=Not applicable *=Average of duplicate runs.


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Sample: 01A W-1

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PN

Sample: 01B W-1

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.002		mg/L	04/30/92	EJS
Dis. Chromium in Water	0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	<0.002		mg/L	04/30/92	EJS
Dissolved Barium in Water	0.19		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.09**		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	05/06/92	RSH
Dissolved Silver in Water	<0.015**		mg/L	04/29/92	MB
Dissolved Zinc in Water	0.06		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		date complete		RSH
Prep for ICAP-Water	04/27/92		date complete		RSH

Sample: 02A W-2

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PN

Sample: 02B W-2

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	<0.001		mg/L	04/30/92	EJS
Dis. Chromium in Water	<0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	** <0.004		mg/L	04/30/92	EJS
Dissolved Barium in Water	0.06		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.03		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	04/30/92	RH
Dissolved Silver in Water	<0.005		mg/L	04/29/92	MB
Dissolved Zinc in Water	0.02		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		date complete		RSH
Prep for ICAP-Water	04/27/92		date complete		RSH

Sample: 03A W-3

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PN

Sample: 03B W-3

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.003		mg/L	04/30/92	EJS

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Test Description	Result	Limit	Units	Analyzed	By
Dis. Chromium in Water	<0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	** <0.004		mg/L	04/30/92	BJS
Dissolved Barium in Water	0.27		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.00**		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	05/06/92	RSH
Dissolved Silver in Water	<0.01**		mg/L	04/29/92	MB
Dissolved Zinc in Water	0.05		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		data complete		RSH
Prep for ICAP-Water	04/27/92		data complete		RSH

Sample: 04A W-4

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	FM

Sample: 04B W-4

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.015		mg/L	04/30/92	BJS
Dis. Chromium in Water	0.03		mg/L	04/29/92	MB
Dis. Selenium in Water	<0.002		mg/L	04/30/92	BJS
Dissolved Barium in Water	0.08		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.03		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	04/30/92	BJS
Dissolved Silver in Water	<0.005		mg/L	04/29/92	MB
Dissolved Zinc in Water	0.04		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		data complete		RSH
Prep for ICAP-Water	04/27/92		data complete		RSH

Sample: 05A W-5

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	FM

Sample: 05B W-5

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.011		mg/L	04/30/92	BJS
Dis. Chromium in Water	<0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	<0.002		mg/L	04/30/92	BJS
Dissolved Barium in Water	0.23		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.03		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	05/06/92	RSH
Dissolved Silver in Water	<0.005		mg/L	04/29/92	MB
Dissolved Zinc in Water	0.10		mg/L	04/29/92	MB

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Test Description	Result	Limit	Units	Analyzed	By
Prep for Furnace-Water	04/29/92		date complete		RCH
Prep for ICAP-Water	04/27/92		date complete		RCH

Sample: 06A W-6

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PN

Sample: 06B W-6

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.004		mg/L	04/30/92	RJS
Dis. Chromium in Water	<0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	0.003		mg/L	04/30/92	RJS
Dissolved Barium in Water	0.07		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.03		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	04/30/92	RJS
Dissolved Silver in Water	<0.005		mg/L	04/29/92	MB
Dissolved Zinc in Water	<0.01		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		date complete		RCH
Prep for ICAP-Water	04/27/92		date complete		RCH

Sample: 07A PP-2

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	75		ug/L	04/29/92	PN

Sample: 07B PP-2

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Dis. Arsenic in Water	0.001		mg/L	04/30/92	RJS
Dis. Chromium in Water	<0.01		mg/L	04/29/92	MB
Dis. Selenium in Water	<0.002		mg/L	04/30/92	RJS
Dissolved Barium in Water	0.02		mg/L	04/29/92	MB
Dissolved Cadmium in Water	<0.005		mg/L	04/29/92	MB
Dissolved Copper in Water	<0.01		mg/L	04/29/92	MB
Dissolved Lead in Water	<0.03		mg/L	04/29/92	MB
Dissolved Mercury in Water	<0.0002		mg/L	04/30/92	RJS
Dissolved Silver in Water	<0.005		mg/L	04/29/92	MB
Dissolved Zinc in Water	<0.01		mg/L	04/29/92	MB
Prep for Furnace-Water	04/29/92		date complete		RCH
Prep for ICAP-Water	04/27/92		date complete		RCH

Sample: 08A ST-14

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PN

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Sample: 08B ST-14

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Water	<1.0		ug/L	05/01/92	GH
Acenaphthylene in Water	<1.0		ug/L	05/01/92	GH
Anthracene in Water	<0.10		ug/L	05/01/92	GH
Benzo(a)anthracene	<0.10		ug/L	05/01/92	GH
Benzo(a)pyrene in Water	<0.10		ug/L	05/01/92	GH
Benzo(b)fluoranthene	<0.10		ug/L	05/01/92	GH
Benzo(ghi)perylene	<0.10		ug/L	05/01/92	GH
Benzo(k)fluoranthene	<0.10		ug/L	05/01/92	GH
Chrysene in Water	0.34		ug/L	05/01/92	GH
Dibenzo(a,h)anthracene	<0.10		ug/L	05/01/92	GH
Fluoranthene in Water	<1.0		ug/L	05/01/92	GH
Fluorene in Water	0.55		ug/L	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<0.10		ug/L	05/01/92	GH
Naphthalene in Water	<1.0		ug/L	05/01/92	GH
Phenanthrene in Water	<0.50		ug/L	05/01/92	GH
Pyrene in Water	<0.10		ug/L	05/01/92	GH

Sample: 09A ST-E (ST-22)_{SC}

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Water	<1.0		ug/L	04/29/92	PH

Sample: 09B ST-E (ST-22)_{SC}

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Water	<500		ug/L	05/01/92	GH
Acenaphthylene in Water	<500		ug/L	05/01/92	GH
Anthracene in Water	<250		ug/L	05/01/92	GH
Benzo(a)anthracene	390		ug/L	05/01/92	GH
Benzo(a)pyrene in Water	<250		ug/L	05/01/92	GH
Benzo(b)fluoranthene	<250		ug/L	05/01/92	GH
Benzo(ghi)perylene	<250		ug/L	05/01/92	GH
Benzo(k)fluoranthene	<250		ug/L	05/01/92	GH
Chrysene in Water	250		ug/L	05/01/92	GH
Dibenzo(a,h)anthracene	<250		ug/L	05/01/92	GH
Fluoranthene in Water	<500		ug/L	05/01/92	GH
Fluorene in Water	2200		ug/L	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<250		ug/L	05/01/92	GH
Naphthalene in Water	<500		ug/L	05/01/92	GH
Phenanthrene in Water	1400		ug/L	05/01/92	GH
Pyrene in Water	<250		ug/L	05/01/92	GH

Sample: 10A ST-10 (S-1)_{SC}

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Solid	<250		ug/kg	05/04/92	PH

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Sample: 10B ST-10 (9-1) SC

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<10		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<10		mg/kg	05/01/92	GH
Anthracene in Solid	<5.0		mg/kg	05/01/92	GH
Benzo(a)anthracene	6.9		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<5.0		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<5.0		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<5.0		mg/kg	05/01/92	GH
Benzo(k)fluoranthene	<5.0		mg/kg	05/01/92	GH
Chrysene in Solid	17		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<5.0		mg/kg	05/01/92	GH
Fluoranthene in Solid	<5.0		mg/kg	05/01/92	GH
Fluorene in Solid	38		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	<5.0		mg/kg	05/01/92	GH
Naphthalene in Solid	<10		mg/kg	05/01/92	GH
Phenanthrene in Solid	<5.0		mg/kg	05/01/92	GH
Pyrene in Solid	5.8		mg/kg	05/01/92	GH

Sample: 10D ST-10 (9-1) SC

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Solid	5.4		mg/kg	04/20/92	RJS
Barium in Solid	47		mg/kg	04/30/92	MB
Cadmium in Solid	<0.08		mg/kg	04/30/92	MB
Chromium in Solid	10		mg/kg	04/30/92	MB
Copper in Solid	16		mg/kg	04/30/92	MB
Lead in Solid	38		mg/kg	04/30/92	MB
Mercury in Solid	<0.05		mg/kg	04/30/92	RJS
Prep for Furnace-Solids	04/28/92		date complete		RSH
Prep for ICAP-Solid	04/28/92		date complete		RSH
Selenium in Solid	** <0.77		mg/kg	04/20/92	RJS
Silver in Solid	<0.08		mg/kg	04/30/92	MB
Zinc in Solid	110		mg/kg	04/30/92	MB

Sample: 11A ST-2 SC

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Xylene in Solid	<250		ug/kg	05/04/92	FR

Sample: 11B ST-2 SC

Collected:

Test Description	Result	Limit	Units	Analyzed	By
Acenaphthene in Solid	<0.50		mg/kg	05/01/92	GH
Acenaphthylene in Solid	<0.50		mg/kg	05/01/92	GH
Anthracene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(a)anthracene	<0.05		mg/kg	05/01/92	GH
Benzo(a)pyrene in Solid	<0.05		mg/kg	05/01/92	GH
Benzo(b)fluoranthene	<0.05		mg/kg	05/01/92	GH
Benzo(ghi)perylene	<0.05		mg/kg	05/01/92	GH

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<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
benzo(k)fluoranthene	<0.05		mg/kg	05/01/92	GH
Chrysene in Solid	0.052		mg/kg	05/01/92	GH
Dibenzo(a,h)anthracene	<0.05		mg/kg	05/01/92	GH
Fluoranthene in Solid	<0.50		mg/kg	05/01/92	GH
Fluorene in Solid	0.13		mg/kg	05/01/92	GH
Indeno(1,2,3-cd)pyrene	0.032		mg/kg	05/01/92	GH
Naphthalene in Solid	<0.50		mg/kg	05/01/92	GH
Phenathrene in Solid	<0.80		mg/kg	05/01/92	GH
Pyrene in Solid	0.14		mg/kg	05/01/92	GH

Sample: 12A TRIP BLANK

Collected:

<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Xylene in Water	<1.0		ug/L	04/03/92	PR7

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Sample Description: W-1
Test Description: Purgeable AromaticsLab No: 01A
Method:

Test Code: 602_W

PARAMETER

RESULT

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/27/92
ANALYST PN
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Sample Description: W-1
Test Description: Purgeable HalocarbonsLab No: 01A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethene	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethene	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 06/24/92
ANALYST FR
UNITS ug/LSample Description: W-2
Test Description: Purgeable AromaticsLab No: 02A
Method:

Test Code: 602_W

PARAMETER	RESULT
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JMA

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Analytical ReportOrder # E2-04-106
06/17/92 15:58THERMO ANALYTICAL, INC./ERD
TEST RESULTS BY SAMPLE

Page 10

Sample Description: W-2
Test Description: Purgeable AromaticsLab No: 02A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST PN
UNITS ug/LConfidential under FOIA
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LFR
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Analytical Report

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TEST RESULTS BY SAMPLE

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Sample Description: W-2
Test Description: Purgeable HalocarbonsLab No: 02A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethene	<0.5
1,1-Dichloroethane	0.54
trans-1,2-Dichloroethene	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST FW
UNITS ug/LSample Description: W-3
Test Description: Purgeable AromaticsLab No: 03A
Method:

Test Code: 602_W

PARAMETER	RESULT
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TEST RESULTS BY SAMPLE
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Sample Description: W-3
Test Description: Purgeable AromaticsLab No: 03A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST FR
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TEST RESULTS BY SAMPLE Aug 07, 2009 12:53

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Sample Description: W-3
Test Description: Purgeable HalocarbonsLab No: 03A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethene	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethene	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST FN
UNITS ug/LSample Description: W-4
Test Description: Purgeable AromaticsLab No: 04A
Method:

Test Code: 602_W

PARAMETER	RESULT
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Order # E2-04-106
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TEST RESULTS BY SAMPLE Aug 07, 2009 12:53Sample Description: W-4
Test Description: Purgeable AromaticsLab No: 04A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST PK
UNITS ug/LConfidential under FOIA
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Order # E2-04-106
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Sample Description: W-4
Test Description: Purgeable HalocarbonsLab No: 04A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethene	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethene	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST FN
UNITS ug/LSample Description: W-5
Test Description: Purgeable AromaticsLab No: 05A
Method:

Test Code: 602_W

PARAMETER	RESULT
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Sample Description: W-5
Test Description: Purgeable AromaticsLab No: 05A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST FR
UNITS ug/LConfidential under FOIA
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Sample Description: W-5
Test Description: Purgeable Halocarbons

Lab No: 05A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethane	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethane	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST PH
UNITS ug/L

Sample Description: W-6
Test Description: Purgeable Aromatics

Lab No: 06A
Method:

Test Code: 602_W

PARAMETER RESULT

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TEST RESULTS BY SAMPLE

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Sample Description: W-6
Test Description: Purgeable AromaticsLab No: 06A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST PM
UNITS ug/LConfidential under FOIA
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TEST RESULTS BY SAMPLE

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Sample Description: W-6
Test Description: Purgeable HalocarbonsLab No: 06A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethane	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethane	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN 04/29/92
 ANALYST FM
 UNITS ug/L

Sample Description: PP-2
Test Description: Purgeable AromaticsLab No: 07A
Method:

Test Code: 602_W

PARAMETER RESULT

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TEST RESULTS BY SAMPLE Aug 07, 2009 12:53

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Sample Description: PP-2

Lab No: 07A

Test Description: Purgeable Aromatics

Method:

Test Code: 602_W

Benzene

7.8

Toluene

12

Ethylbenzene

13

Notes and Definitions for this Report:

EXTRACTED

DATE RUN

04/29/92

ANALYST

PB

UNITS

ug/L

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TEST RESULTS BY SAMPLE
Aug 07, 2009 12:53

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Sample Description: PP-2

Test Description: Purgeable Halocarbons

Lab No: 07A

Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<5.0
Bromomethane	<5.0
Vinyl chloride	<5.0
Chloroethane	<5.0
Methylene chloride	<2.5
Trichlorofluoromethane	<2.5
1,1-Dichloroethene	<2.5
1,1-Dichloroethane	<2.5
trans-1,2-Dichloroethane	<2.5
Chloroform	<2.5
1,2-Dichloroethane	<2.5
1,1,1-Trichloroethane	<2.5
Carbon tetrachloride	<2.5
Bromodichloromethane	<2.5
1,2-Dichloropropane	<2.5
trans-1,3-Dichloropropene	<2.5
Trichloroethene	<2.5
Dibromochloromethane	<2.5
1,1,2-Trichloroethane	<2.5
cis-1,3-Dichloropropene	<2.5
2-Chloroethylvinyl ether	<5.0
Bromoform	<5.0
1,1,2,2-Tetrachloroethane	<2.5
Tetrachloroethane	<2.5
Chlorobenzene	<2.5
1,3-Dichlorobenzene	<2.5
1,2-Dichlorobenzene	<2.5
1,4-Dichlorobenzene	<2.5
Dichlorodifluoromethane	<2.5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/23/92
ANALYST PH
UNITS ug/L

Sample Description: ST-14

Test Description: Purgeable Aromatics

Lab No: 08A

Method:

Test Code: 602_W

PARAMETER	RESULT
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Analytical Report

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TEST RESULTS BY SAMPLE

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Sample Description: ST-14
Test Description: Purgeable AromaticsLab No: 08A
Method:

Test Code: 602_W

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 04/29/92
ANALYST PN
UNITS ug/LConfidential under FOIA
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 TEST RESULTS BY SAMPLE

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Sample Description: ST-14
 Test Description: Purgeable Halocarbons

Lab No: 08A
 Method:

Test Code: 681_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethane	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethane	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethane	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN 06/29/92
 ANALYST PM
 UNITS ug/L

Sample Description: ST-E
 Test Description: Purgeable Aromatics

Lab No: 09A
 Method:

Test Code: 682_W

PARAMETER RESULT

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Sample Description: ST-~~E~~ Z Z S C
Test Description: Purgeable AromaticsLab No: 09A
Method:

Test Code: 602_W

Benzene	<u><1.0</u>
Toluene	<u><1.0</u>
Ethylbenzene	<u><1.0</u>

Notes and Definitions for this Report:

EXTRACTED	_____
DATE RUN	<u>04/29/92</u>
ANALYST	<u>FM</u>
UNITS	<u>ug/L</u>

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 TEST RESULTS BY SAMPLE

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Sample Description: ST-229C
 Test Description: Purgeable Halocarbons

Lab No: 09A
 Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethene	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethene	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<1.0
Dichlorodifluoromethane	<1.0

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN 04/29/92
 ANALYST PW
 UNITS ug/L

Sample Description: ST-10
 Test Description: Purgeable Aromatics

Lab No: 10A
 Method:

Test Code: 602_S

PARAMETER RESULT

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Sample Description: ST-10 (5-1) SC
Test Description: Purgeable AromaticsLab No: 10A
Method:

Test Code: 602_S

Benzene
Toluene
Ethylbenzene(1.0
(250
(250

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 05/04/92
ANALYST DN
UNITS ug/KgConfidential under FOIA
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Sample Description: ST-10 (5-1)
Test Description: Purgeable HalocarbonsLab No: 10A
Method:

Test Code: 601_S

PARAMETER	RESULT
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5
Trichlorofluoromethane	<5
1,1-Dichloroethane	<5
1,1-Dichloroethane	<10
trans-1,2-Dichloroethane	<5
Chloroform	<5
1,2-Dichloroethane	<5
1,1,1-Trichloroethane	<5
Carbon tetrachloride	<5
Bromodichloromethane	<5
1,2-Dichloropropane	<5
trans-1,3-Dichloropropene	<5
Trichloroethene	<5
Dibromochloromethane	<5
1,1,2-Trichloroethane	<5
cis-1,3-Dichloropropene	<5
2-Chloroethylvinyl ether	<10
Bromoform	<10
1,1,2,2-Tetrachloroethane	<5
Tetrachloroethene	<5
Chlorobenzene	<5
1,3-Dichlorobenzene	<5
1,2-Dichlorobenzene	<5
1,4-Dichlorobenzene	<5
Dichlorodifluoromethane	<5

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN 05/02/92
 ANALYST FR
 UNITS ug/Kg

Sample Description: ST-10
Test Description: PCB's in SolidLab No: 10C
Method:

Test Code: PCB_S

PARAMETER	RESULT
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 TEST RESULTS BY SAMPLE
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Sample Description: ST-10 (5-1) SC
 Test Description: PCB's in Solid

Lab No: 10C
 Method:

Test Code: PCB_S

Arochlor 1016	<0.05
Arochlor 1221	<0.05
Arochlor 1232	<0.05
Arochlor 1242	<0.05
Arochlor 1248	<0.05
Arochlor 1254	<0.05
Arochlor 1260	<0.05

Notes and Definitions for this Report:

EXTRACTED _____ 04/24/92
 DATE RUN _____ 05/01/92
 ANALYST GH
 UNITS _____ ug/Kg

Sample Description: ST-2
 Test Description: Purgeable Aromatics

Lab No: 11A
 Method:

Test Code: 602_S

PARAMETER	RESULT
Benzene	<1.0
Toluene	<0.5
Ethylbenzene	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN _____ 05/04/92
 ANALYST GH
 UNITS _____ ug/Kg

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Sample Description: ST-2 SC
Test Description: Purgeable Halocarbons

Lab No: 11A
Method:

Test Code: 601_S

PARAMETER	RESULT
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5
Trichlorofluoromethane	<5
1,1-Dichloroethene	<5
1,1-Dichloroethane	<5
trans-1,2-Dichloroethene	<5
Chloroform	<5
1,2-Dichloroethane	<5
1,1,1-Trichloroethane	<5
Carbon tetrachloride	<5
Bromodichloromethane	<5
1,2-Dichloropropane	<5
trans-1,3-Dichloropropene	<5
Trichloroethane	<5
Dibromochloromethane	<5
1,1,2-Trichloroethane	<5
cis-1,3-Dichloropropene	<5
2-Chloroethylvinyl ether	<10
Bromoform	<10
1,1,2,2-Tetrachloroethane	<5
Tetrachloroethene	<5
Chlorobenzene	<5
1,3-Dichlorobenzene	<5
1,2-Dichlorobenzene	<5
1,4-Dichlorobenzene	<5
Dichlorodifluoromethane	<5

Notes and Definitions for this Report:

EXTRACTED _____
DATE RUN 05/02/92
ANALYST PN
UNITS ug/Kg

Sample Description: ST-2
Test Description: PCB's in Solid

Lab No: 11C
Method:

Test Code: PCB_S

PARAMETER RESULT

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TMA

Thermo Analytical Inc.

Analytical Report

Order # E2-04-106
06/17/92 15:58THERMO ANALYTICAL, INC./EPG
TEST RESULTS BY SAMPLE
Aug 07, 2009 12:53

Page 30

Sample Description: SX-2 SC
Test Description: PCB's in SolidLab No: 11C
Method:

Test Code: PCB_S

Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1242
Arochlor 1248
Arochlor 1254
Arochlor 1260<0.05
<0.05
<0.05
<0.05
<0.05
<0.05
<0.05

Notes and Definitions for this Report:

EXTRACTED 04/24/92
DATE RUN 05/01/92
ANALYST GR
UNITS mg/KgSample Description: TRIP BLANK
Test Description: Purgeable AromaticsLab No: 12A
Method:

Test Code: 602_W

PARAMETER

RESULT

Benzene
Toluene
Ethylbenzene<1.0
<1.0
<1.0

Notes and Definitions for this Report:

EXTRACTED
DATE RUN 04/29/92
ANALYST FN
UNITS ug/L

Brenda Ma

.MA

Thermo Analytical Inc.

Analytical Report

Order # E2-04-106
06/17/92 15:58THERMO ANALYTICAL, INC./ENG
TEST RESULTS BY SAMPLE

Page 31

Sample Description: TRIP BLANK
Test Description: Purgeable HalocarbonsLab No: 12A
Method:

Test Code: 601_W

PARAMETER	RESULT
Chloromethane	<1.0
Bromomethane	<1.0
Vinyl chloride	<1.0
Chloroethane	<1.0
Methylene chloride	<0.5
Trichlorofluoromethane	<0.5
1,1-Dichloroethane	<0.5
1,1-Dichloroethane	<0.5
trans-1,2-Dichloroethane	<0.5
Chloroform	<0.5
1,2-Dichloroethane	<0.5
1,1,1-Trichloroethane	<0.5
Carbon tetrachloride	<0.5
Bromodichloromethane	<0.5
1,2-Dichloropropane	<0.5
trans-1,3-Dichloropropene	<0.5
Trichloroethene	<0.5
Dibromochloromethane	<0.5
1,1,2-Trichloroethane	<0.5
cis-1,3-Dichloropropene	<0.5
2-Chloroethylvinyl ether	<1.0
Bromoform	<1.0
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethene	<0.5
Chlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,2-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5

Notes and Definitions for this Report:

EXTRACTED _____
 DATE RUN 04/29/92
 ANALYST FN
 UNITS ug/L

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QA/QC Documents

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ANALYTICAL NARRATIVE

Aug 07, 2009 12:53

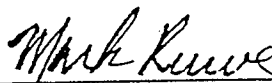
PROJECT: E2-04-016
 LABORATORY: Thermo Analytical/ERG
 ADDRESS: 525 Avis Dr. Ste. 7
 Ann Arbor, MI. 48108
 CONTACT: Mark Tennant
 PHONE: (313) 662-3104
 DATE RECEIVED: 21-Apr-92
 RECEIVED BY: Christine Pardo

CLIENT: GZA GeoEnvironmental
 ADDRESS: 38019 Schoolcraft
 Livonia, MI. 48150
 CONTACT: Susan Chase
 CLIENT P.O.: 72507
 REPORT DATE: 08-May-92
 Sample I.D : ST-10, ST-2

ANALYSIS	ANALYTICAL METHOD	ANALYSIS DATE	ANALYST
Arsenic in Solid	USEPA 7060	28-Apr-92	BS
Barium in Solid	USEPA 6010	30-Apr-92	MB
Bismuth in Solid	USEPA 6010	30-Apr-92	MB
Bromine in Solid	USEPA 6010	30-Apr-92	MB
Copper in Solid	USEPA 6010	30-Apr-92	MB
Cad in Solid	USEPA 6010	30-Apr-92	MB
Mercury in Solid	USEPA 7471	30-Apr-92	RH
Prep for Furnace-Solid	USEPA 3050	28-Apr-92	RH
Prep for ICP-Solid	USEPA 3050	28-Apr-92	RH
Selenium in Solid	USEPA 7740	28-Apr-92	BS
Silver in Solid	USEPA 6010	30-Apr-92	MB
Zinc in Solid	USEPA 6010	30-Apr-92	MB
Surgeable Halocarbons	USEPA 8010	02-May-92	PN
Surgeable Aromatics	USEPA 8020	02-May-92	PN
PNA'S in Solid	USEPA 8310	01-May-92	GH
QA Sample Prep.	USEPA 3540	23-Apr-92	AG
PCB in Soil	USEPA 3540	24-Apr-92	AG
PCB Sample prep.	USEPA 8080	01-May-92	GH

certify that quality control measures were incorporated for these analyses in accordance with the quality assurance manual submitted to GZA GeoEnvironmental.

Signature of Laboratory Representative



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Mark B. Ruwe

Brenda Ma QA Manager

LFR

Aug 07, 2009 12:53

Brenda Ma

LFR

Aug 07, 2009 12:53

QUALITY CONTROL REPORT
BLANK AND CHECK STANDARD ANALYSIS

Client: GZA GeoEnvironmental
38019 Schoolcraft
Livonia, MI. 48150

Date: May 07, 1992
Project: E2-04-106
Sample ID: ST-10, ST-2

Attn: Susan Chase

Approved: Mark Ruwe

QA Manager

PARAMETER	BLANK RESULT	REFERENCE SAMPLE RESULTS		
		TRUE VALUE	SAMPLE RESULT	PERCENT RECOVERY
	mg/L	mg/kg	mg/kg	
Arsenic	<0.005	917	1329	145%
Barium	<0.01	4.8	4.4	92%
Cadmium	<0.005	45.5	58.4	128%
Chromium	<0.01	99.6	90	90%
Copper	<0.01	6910	6989	101%
Lead	<0.03	236	224	95%
Mercury	<0.0002	12.7	10.4	82%
Molybdenum	<0.003	39.2	40.1	102%
Nickel	<0.005	22.2	19	86%
Zinc	<0.01	187	185	99%

COMMENTS: CHECK STANDARD RESULTS FOR ARSENIC AND CADMIUM ABOVE CONTROL LIMITS

Brenda Ma

LFR

QUALITY CONTROL REPORT
 DUPLICATE AND MATRIX SPIKE ANALYSIS

Client: GZA GeoEnvironmental
 38019 Schoolcraft
 Livonia, MI. 48150

Date: May 07, 1992
 Project: E2-04-106
 Sample ID: ST-10, ST-2

Attn: Susan Chase

Approved: Mark Kewer

QA Manager

PARAMETER	SAMPLE NUMBER	DUPLICATES				MATRIX SPIKE		
		SAMPLE A	SAMPLE B	RPD		SPIKE ADDED	SPIKED SAMPLE	PERCENT RECOVERY
		MG/KG	MG/KG	%		MG/KG	MG/KG	%
Asenic	W-3/SS3*	4.0	4.2	4.9%		6.7	12	118%
Barium	W-3/SS3*	8.6	8.2	4.8%		325	326	98%
Cadmium	W-3/SS3*	<0.97	<0.97	0.0%		8.1	7.8	96%
Chromium	W-3/SS3*	6.5	5.6	14.9%		33	39	100%
Copper	W-3/SS3*	4.6	4.9	6.3%		41	44	95%
Lead	W-3/SS3*	<5.8	<5.8	0.0%		81	83	102%
Mercury	W-3/SS3*	<0.10	<0.09	0.0%		0.43	0.42	98%
Molybdenum	W-3/SS3*	<0.34	<0.34	0.0%		1.7	0.58	34%
Silver	W-3/SS3*	<0.97	<0.97	0.0%		8.1	5.7	70%
Zinc	W-3/SS3*	21	19	10.0%		81	100	99%

COMMENTS:

DUPLICATE AND MATRIX SPIKE DONE ON ANOTHER SAMPLE IN SAME ANALYTICAL BATCH.
 Result for selenium below control limits.

SAMPLE A - SAMPLE B

RELATIVE % DIFFERENCE(RPD) = $\frac{\text{SAMPLE A} - \text{SAMPLE B}}{(\text{SAMPLE A} + \text{SAMPLE B})/2} \times 100$

SPIKED SAMPLE - [SAMPLE A + SAMPLE B]/2

PERCENT RECOVERY = $\frac{\text{SPIKED SAMPLE} - [\text{SAMPLE A} + \text{SAMPLE B}]/2}{\text{SPIKE ADDED}} \times 100$

SPIKE ADDED

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QUALITY CONTROL REPORT
MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc. Date: May 8, 1992
38019 Schoolcraft Work Order: E2-04-106
Livonia, MI. 48150 Sample ID: SI-2

Attn: Susan Chase

Approved: Mark Lowe

QA MANAGER

COMPOUND	SAMPLE CONC.	MS			MSD			RPD
		CONC.	MS %	CONC.	MSD %	CONC.	MSD %	
		ADDED CONC.	REC.	ADDED CONC.	REC.	ADDED CONC.	REC.	
		ug/kg	ug/kg	ug/kg		ug/kg	ug/kg	
Benzene	<250	893	860	96%	893	1103	124%	24.8%
Toluene	<250	893	823	92%	893	1032	116%	22.5%
Ethyl Benzene	<250	893	1660	186%	893	1057	118%	44.4%
Styrene	<250	893	860	96%	893	1050	118%	19.9%
Methyl Xylenes	<250	893	966	108%	893	1239	139%	24.8%

COMMENTS:

MS AND MSD DONE ON ANOTHER SAMPLE IN SAME ANALYTICAL BATCH.

MS % REC. - MSD % REC.

RELATIVE % DIFFERENCE(RPD) = $\frac{\text{MS \% REC.} - \text{MSD \% REC.}}{\text{MS \% REC.} + \text{MSD \% REC.}} \times 100$

MS CONC. - SAMPLE CONC.

MATRIX SPIKE % RECOVERY = $\frac{\text{MS CONC.} - \text{SAMPLE CONC.}}{\text{CONC. ADDED}} \times 100$

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QUALITY CONTROL REPORT

Aug 07, 2009 12:53

MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc.
38019 Schoolcraft
Livonia, MI. 48150

Date: MAY 8, 1992
Work Order: E2-04-106
Sample ID: ST-2

Attn: Susan Chase

Approved: Mark Ruwe

QA MANAGER

COMPOUND	SAMPLE	MS			MSD			RPD
		CONC.	MS	%	CONC.	MSD	%	
		CONC.	ADDED CONC.	REC.	ADDED CONC.	CONC.	REC.	
		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		
Chloromethane	<10	893	1116	125%	893	1132	127%	1.4%
Bromomethane	<10	893	421	47%	893	234	26%	57.1%
Vinyl Chloride	<10	893	173	19%	893	19	2%	159.7%
Chloroethane	<10	893	932	104%	893	773	87%	18.7%
Ethylene Chloride	<5	893	1093	122%	893	976	109%	11.3%
Trichlorofluoromethane	<5	893	559	63%	893	534	60%	4.6%
1,1-Dichloroethylene	<5	893	979	110%	893	979	110%	0.0%
1,1-Dichloroethane	<5	893	987	111%	893	1035	116%	4.7%
trans-1,2-Dichloroethylene	<5	893	1035	116%	893	964	108%	7.1%
Chloroform	<5	893	975	109%	893	953	107%	2.3%
1,2-Dichloroethane	<5	893	864	97%	893	984	110%	13.0%
1,1,1-Trichloroethane	20	893	919	101%	893	976	107%	6.1%
Carbon Tetrachloride	<5	893	934	105%	893	892	100%	4.6%
1,1-Dibromodichloromethane	<5	893	1001	112%	893	870	97%	14.0%
1,2-Dichloropropane	<5	893	925	104%	893	1126	126%	19.6%
trans-1,3-dichloropropene	<5	893	1262	141%	893	1483	166%	16.1%
1,1-Dichloroethylene	<5	893	1098	123%	893	1366	153%	21.8%
Dibromochloromethane	<5	893	987	111%	893	1148	129%	15.1%
2,2-Dichloroethylvinyl Ether	<10	893	1414	158%	893	1517	170%	7.0%
Bromoform	<10	893	719	81%	893	930	104%	25.6%
1,1,2,2-Tetrachloroethane	<5	893	821	92%	893	812	91%	1.1%
Chlorobenzene	<5	893	984	110%	893	1277	143%	25.9%
1,2-Dichlorobenzene	<5	893	1083	121%	893	1320	148%	19.7%
1,3-Dichlorobenzene	<5	893	1033	116%	893	1073	120%	3.9%
1,4-Dichlorobenzene	<5	893	1212	136%	893	1188	133%	2.0%

Comments:

LFR

Aug 07, 2009 12:53

QUALITY CONTROL REPORT
MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Aug 07, 2009 12:53

Client: GZA GeoEnvironmental Inc. Date: May 8, 1992
38019 Schoolcraft Work Order: E2-04-106
Livonia, MI. 48150 Sample ID: *

Attn: Susan Chase

Approved: Mark Lowe

QA MANAGER

COMPOUND	SAMPLE CONC.	CONC. ADDED	MS CONC.	MS %	CONC. ADDED	MSD CONC.	MSD %	RPD
	MG/KG	MG/KG	MG/KG		MG/KG	MG/KG		
Naphthalene	<0.50	0.350	0.503	144%	0.330	0.383	116%	21.3%
Acenaphthalene	<0.50	0.700	0.620	89%	0.670	0.542	81%	9.1%
Acenaphthene	<0.50	0.350	0.280	80%	0.330	0.309	94%	15.7%
Fluorene	<0.50	0.070	0.074	106%	0.067	0.061	91%	14.9%
Phenanthrene	<0.10	0.035	0.040	114%	0.034	0.024	71%	47.3%
Anthracene	<0.05	0.035	0.032	91%	0.034	0.029	85%	6.9%
Fluoranthene	<0.50	0.070	0.074	106%	0.067	0.066	99%	7.1%
Pyrene	<0.05	0.035	0.046	131%	0.034	0.044	129%	1.5%
Benzo(a)anthracene	<0.05	0.035	0.038	109%	0.034	0.035	103%	5.3%
Chrysene	<0.05	0.035	0.010	29%	0.034	0.011	32%	12.4%
Benzo(b)fluoranthene	<0.05	0.070	0.066	94%	0.067	0.059	88%	6.8%
Benzo(k)fluoranthene	<0.05	0.035	0.033	94%	0.034	0.030	88%	6.6%
Benzo(a)pyrene	<0.05	0.035	0.030	86%	0.034	0.023	68%	23.6%
Benzo(a,h)Anthracene	<0.05	0.070	0.030	43%	0.067	0.023	34%	22.1%
Benzo(ghi)perylene	<0.05	0.070	0.051	73%	0.067	0.044	66%	10.4%
Benzo(123-cd)pyrene	<0.05	0.035	0.027	77%	0.034	0.019	56%	32.0%
BB-1248(W-6/SS4)	<0.05	0.330	0.300	91%	0.330	0.360	109%	18.2%

COMMENTS:

MS % REC. - MSD % REC.

RELATIVE % DIFFERENCE(RPD) = ----- X 100

(MS % REC. + MSD % REC.) / 2

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MS CONC. - SAMPLE CONC.

MATRIX SPIKE % RECOVERY = ----- X 100

CONC. ADDED

Aug 07, 2009 12:53

Brenda Ma

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 QUALITY CONTROL REPORT
 MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc.
 38019 Schoolcraft
 Livonia, MI. 48150

Date: May 8, 1992
 Work Order: E2-04-106
 Sample ID: *

Attn: Susan Chase

Approved: Mark Ruwe

QA MANAGER

COMPOUND	SAMPLE		MS		MSD		MSD		RPD
	CONC.	CONC.	MS CONC.	% REC.	CONC. ADDED	MSD CONC.	% REC.		
	MG/KG	MG/KG	MG/KG		MG/KG	MG/KG			
Naphthalene	<0.50	0.350	0.503	144%	0.330	0.383	116%	21.3%	
1-methyl-naphthalene	<0.50	0.700	0.620	89%	0.670	0.542	81%	9.1%	
Acenaphthene	<0.50	0.350	0.280	80%	0.330	0.309	94%	15.7%	
Fluorene	<0.50	0.070	0.074	106%	0.067	0.061	91%	14.9%	
1-methyl-fluorene	<0.10	0.035	0.040	114%	0.034	0.024	71%	47.3%	
Anthracene	<0.05	0.035	0.032	91%	0.034	0.029	85%	6.9%	
1-methyl-anthracene	<0.50	0.070	0.074	106%	0.067	0.066	99%	7.1%	
Pyrene	<0.05	0.035	0.046	131%	0.034	0.044	129%	1.5%	
1-methyl-benzo(a)anthracene	<0.05	0.035	0.038	109%	0.034	0.035	103%	5.3%	
Chrysene	<0.05	0.035	0.010	29%	0.034	0.011	32%	12.4%	
Benzo(b)fluoranthene	<0.05	0.070	0.066	94%	0.067	0.059	88%	6.8%	
1-methyl-benzo(k)fluoranthene	<0.05	0.035	0.033	94%	0.034	0.030	88%	6.6%	
Benzo(a)pyrene	<0.05	0.035	0.030	86%	0.034	0.023	68%	23.6%	
1-methyl-benzo(a,h)Anthracene	<0.05	0.070	0.030	43%	0.067	0.023	34%	22.1%	
Benzo(ghi)perylene	<0.05	0.070	0.051	73%	0.067	0.044	66%	10.4%	
Indeno(123-cd)pyrene	<0.05	0.035	0.027	77%	0.034	0.019	56%	32.0%	
PCB-1248(W-6/SS4)	<0.05	0.330	0.300	91%	0.330	0.360	109%	18.2%	

COMMENTS:

RELATIVE % DIFFERENCE(RPD) =

MS % REC. - MSD % REC.

(MS % REC. + MSD % REC.) / 2

X 100

MS CONC. - SAMPLE CONC.

MATRIX SPIKE % RECOVERY =

X 100

Brenda Ma

LFR

QUALITY CONTROL REPORT
 Aug 07, 2009 12:53
 BLANK AND CHECK STANDARD ANALYSIS

Client: GZA GeoEnvironmental
 38019 Schoolcraft
 Livonia, MI. 48150

Date: May 07, 1992

Project: E2-04-106

Sample ID: ST-10, ST-2

Attn: Susan Chase

Approved: Mark Kuse

QA Manager

PARAMETER	BLANK RESULT	REFERENCE SAMPLE RESULTS		
		TRUE VALUE	SAMPLE RESULT	PERCENT RECOVERY
	mg/kg	mg/kg	mg/kg	
Naphthalene	<0.50	0.50	0.49	98%
Benaphthalene	<0.50	1.00	0.78	78%
Acenaphthene	<0.50	0.50	0.39	78%
Fluorene	<0.50	0.10	0.084	84%
Fluoranthrene	<0.10	0.050	0.054	108%
Anthracene	<0.05	0.050	0.040	80%
Fluoranthene	<0.50	0.10	0.078	78%
Pyrene	<0.05	0.050	0.039	78%
Benzo(a)anthracene	<0.05	0.050	0.045	90%
Chrysene	<0.05	0.050	0.071	142%
Benzo(b)fluoranthene	<0.05	0.10	0.087	87%
Benzo(k)fluoranthene	<0.05	0.050	0.044	88%
Benzo(a)pyrene	<0.05	0.050	0.037	74%
Benzo(a,h)Anthracene	<0.05	0.10	0.074	74%
Benzo(ghi)perylene	<0.05	0.10	0.083	83%
Indeno(123-cd)pyrene	<0.05	0.050	0.052	104%
PCB-1248	<0.05	0.15	0.15	94%

COMMENTS: All percent recoveries are within EPA control limits.

Brenda Ma

LFR

Aug 07, 2009 12:53

ANALYTICAL NARRATIVE

PROJECT: E2-04-104 GZA CLIENT: GZA GeoEnvironmental
LABORATORY: Thermo Analytical/ERG ADDRESS: 38019 Schoolcraft
ADDRESS: 525 Avis Dr. Ste. 7 Livonia, MI. 48150
Ann Arbor, MI. 48108
CONTACT: Mark Tennant CONTACT: Susan Chase
PHONE: (313) 662-3104 CLIENT P.O.: 72507
DATE RECEIVED: 17-Apr-92 REPORT DATE: 07-May-92
RECEIVED BY: Christine Pardo

ANALYSIS	ANALYTICAL METHOD	ANALYSIS DATE	ANALYST
Arsenic in Solid	USEPA 7060	30-Apr-92	BS
Barium in Solid	USEPA 6010	30-Apr-92	MB
Cadmium in Solid	USEPA 6010	30-Apr-92	MB
Chromium in Solid	USEPA 6010	30-Apr-92	MB
Copper in Solid	USEPA 6010	30-Apr-92	MB
Lead in Solid	USEPA 6010	30-Apr-92	MB
Mercury in Solid	USEPA 7471	30-Apr-92	RH
Prep for Furnace-Solid	USEPA 3050	28-Apr-92	RH
Prep for ICP-Solid	USEPA 3050	28-Apr-92	RH
Selenium in Solid	USEPA 7740	30-Apr-92	BS
Silver in Solid	USEPA 6010	30-Apr-92	MB
Zinc in Solid	USEPA 6010	30-Apr-92	MB
Purgeable Halocarbons	USEPA 8010	28-Apr-92	PN
Purgeable Aromatics	USEPA 8020	28-Apr-92	PN
PNA'S in Solid	USEPA 8310	01-May-92	GH
PNA Sample Prep.	USEPA 3540	23-Apr-92	AG
PCB in Soil	USEPA 3540	24-Apr-92	AG
PCB Sample prep.	USEPA 8080	01-May-92	GH

I certify that quality control measures were incorporated for these analyses in accordance with the quality assurance manual submitted to GZA GeoEnvironmental.

Signature of Laboratory Representative

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Brenda Mark B. Ruwe

LFR QA Manager

Aug 07, 2009 12:53

Brenda Ma

LFR

Aug 07, 2009 12:53

QUALITY CONTROL REPORT DUPLICATE AND MATRIX SPIKE ANALYSIS

Client: GZA GeoEnvironmental
38019 Schoolcraft
Livonia, MI. 48150

Date: May 07, 1992
Project: E2-04-104
Sample ID: W-1/SS7, W-2/SS2, W-2SS6,
W-3/SS3, W-4/SS4, W-5/SS1,
W-6/SS4

Attn: Susan Chase

Approved: Mark Ruwe
QA Manager

PARAMETER	SAMPLE NUMBER	DUPLICATES			MATRIX SPIKE SPIKE ADDED	MATRIX SPIKE	
		SAMPLE A	SAMPLE B	RPD		SPIKED	PERCENT
		mg/kg	mg/kg	%		mg/kg	%
Arsenic	W-3/SS3	4.0	4.2	4.8%	6.7	12	118%
Bismuth	W-3/SS3	8.6	8.2	4.8%	325	326	98%
Cadmium	W-3/SS3	<0.97	<0.97	0.0%	8.1	7.8	96%
Chromium	W-3/SS3	6.5	5.6	14.9%	33	39	100%
Copper	W-3/SS3	4.6	4.9	6.3%	41	44	96%
Lead	W-3/SS3	<5.8	<5.8	0.0%	81	83	102%
Mercury	W-3/SS3	<0.10	<0.09	0.0%	0.43	0.42	98%
Selenium	W-3/SS3	<0.34	<0.34	0.0%	1.7	0.58	34%
Silver	W-3/SS3	<0.97	<0.97	0.0%	8.1	5.7	70%
Zinc	W-3/SS3	21	19	10.0%	81	100	99%

COMMENTS:

Result for selenium below control limits.

RELATIVE % DIFFERENCE (RPD) = $\frac{\text{SAMPLE A} - \text{SAMPLE B}}{(\text{SAMPLE A} + \text{SAMPLE B})/2} \times 100$

PERCENT RECOVERY = $\frac{\text{SPIKED SAMPLE} - [\text{SAMPLE A} + \text{SAMPLE B}]/2}{\text{SPIKE ADDED}} \times 100$

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QUALITY CONTROL REPORT
BLANK AND CHECK STANDARD ANALYSIS

Client: GZA GeoEnvironmental
38019 Schoolcraft
Livonia, MI. 48150

Date: May 07, 1992
Project: E2-04-104
Sample ID: W-1/SS7, W-2/SS2, W-2SS6,
W-3/SS3, W-4/SS4, W-5/SS1,
W-6/SS4

Attn: Susan Chase

Approved: Mark Luwe

QA Manager

PARAMETER	BLANK RESULT	REFERENCE SAMPLE RESULTS		
		TRUE VALUE	SAMPLE RESULT	PERCENT RECOVERY
	mg/L	mg/kg	mg/kg	
Arsenic	<0.005	917	1329	145%
Barium	<0.01	4.8	4.4	92%
Cadmium	<0.005	45.5	58.4	128%
Chromium	<0.01	99.6	90	90%
Copper	<0.01	6910	6989	101%
Lead	<0.03	236	224	95%
Mercury	<0.0002	12.7	10.4	82%
Selenium	<0.003	39.2	40.1	102%
Silver	<0.005	22.2	19	86%
Zinc	<0.01	187	185	99%

COMMENTS: CHECK STANDARD RESULTS FOR ARSENIC AND CADMIUM ABOVE CONTROL LIMIT

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QUALITY CONTROL REPORT
 BLANK AND CHECK STANDARD ANALYSIS

Client: GZA GeoEnvironmental
 38019 Schoolcraft
 Livonia, MI. 48150

Date: May 07, 1992
 Project: E2-04-104
 Sample ID: W-1/SS7, W-2/SS2, W-2SS6,
 W-3/SS3, W-4/SS4, W-5/SS1,
 W-6/SS4

Attn: Susan Chase

Approved:

Mark Ruvo
 QA Manager

PARAMETER	BLANK RESULT	REFERENCE SAMPLE RESULTS		
		TRUE VALUE	SAMPLE RESULT	PERCENT RECOVERY
	mg/kg	mg/kg	mg/kg	
Naphthalene	<0.50	0.50	0.49	98%
1-methyl-naphthalene	<0.50	1.00	0.78	78%
Acenaphthene	<0.50	0.50	0.39	78%
Fluorene	<0.50	0.10	0.084	84%
1-methyl-anthrene	<0.10	0.050	0.054	108%
Anthracene	<0.05	0.050	0.040	80%
Fluoranthene	<0.50	0.10	0.078	78%
Pyrene	<0.05	0.050	0.039	78%
Benzo(a)anthracene	<0.05	0.050	0.045	90%
Benzofluoranthene	<0.05	0.050	0.071	142%
Benzo(b)fluoranthene	<0.05	0.10	0.087	87%
Benzo(k)fluoranthene	<0.05	0.050	0.044	88%
Benzo(a)pyrene	<0.05	0.050	0.037	74%
Benzo(a,h)Anthracene	<0.05	0.10	0.074	74%
Benzo(ghi)perylene	<0.05	0.10	0.083	83%
Indeno(123-cd)pyrene	<0.05	0.050	0.052	104%
PCB-1248	<0.05	0.15	0.15	94%

COMMENTS: All percent recoveries are within EPA control limits.

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QUALITY CONTROL REPORT MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc. Date: April 29, 1992
38019 Schoolcraft Work Order: E2-04-104
Livonia, MI. 48150 Sample ID: 04A

Attn: Susan Chase

Approved: Mark Rowe

QA MANAGER

COMPOUND	SAMPLE CONC.	CONC. ADDED	MS CONC. ug/kg	MS % REC.	CONC. ADDED ug/kg	MSD CONC. ug/kg	MSD % REC.	RPD
Chloromethane	<10	38	59	155%	33	64	194%	22.2%
omomethane	<10	38	68	179%	33	31	94%	62.3%
Vinyl Chloride	<10	38	42	111%	33	59	179%	47.2%
loroethane	<10	38	117	308%	33	138	418%	30.4%
ethylene Chloride	<5	38	55	145%	33	54	164%	12.3%
Trichlorofluoromethane	<5	38	34	89%	33	58	176%	65.1%
chloroethylene, 1,1-	<5	38	38	100%	33	33	100%	0.0%
Dichloroethane, 1,1-	<5	38	37	97%	33	34	103%	5.7%
ans-1,2-Dichloroethylene	<5	38	35	92%	33	35	106%	14.1%
Chloroform	<5	38	35	92%	33	32	97%	5.1%
Dichloroethane, 1,2-	<5	38	34	89%	33	36	109%	19.8%
ichloroethane, 1,1,1-	20	38	72	137%	33	60	121%	12.1%
Carbon Tetrachloride	<5	38	40	105%	33	37	112%	6.3%
omodichloromethane	<5	38	47	124%	33	39	118%	4.5%
Dichloropropane, 1,2-	<5	38	51	134%	33	66	200%	39.4%
Trans-1,3-dichloropropene	<5	38	33	87%	33	58	176%	67.7%
richloroethylene	<5	38	48	126%	33	79	239%	61.8%
Dibromochloromethane	<5	38	45	118%	33	64	194%	48.4%
loroethylvinyl Ether, 2-	<10	38	41	108%	33	51	155%	35.6%
Bromoform	<10	38	22	58%	33	58	176%	100.9%
Tetrachloroethane, 1,1,2,2-	<5	38	36	95%	33	47	142%	40.2%
Chlorobenzene	<5	38	38	100%	33	60	182%	58.1%
Dichlorobenzene, 1,2-	<5	38	42	111%	33	26	79%	33.5%
ichlorobenzene, 1,3-	<5	38	38	100%	33	31	94%	6.3%
Dichlorobenzene, 1,4-	<5	38	53	139%	33	37	112%	21.7%

Comments: Recoveries for Chloroethane, Chloromethane, 1,2-Dichloropropane, Trichloroethulene, and Chlorobenzene are above control limits.

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QUALITY CONTROL REPORT
MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Aug 07, 2009 12:53

Client: GZA GeoEnvironmental Inc.
38019 Schoolcraft
Livonia, MI. 48150

Date: April 29, 1992
Work Order: E2-04-104
Sample ID: 04A

Attn: Susan Chase

Approved: Mark Luwe

QA MANAGER

COMPOUND	SAMPLE CONC.	MS		MSD		MSD		RPD
		CONC.	MS	%	CONC.	MSD	%	
		ADDED CONC.	CONC.	REC.	ADDED CONC.	CONC.	REC.	
	MG/KG	MG/KG	MG/KG		MG/KG	MG/KG		
Naphthalene	<0.50	0.350	0.503	144%	0.330	0.383	116%	21.3%
Acenaphthalene	<0.50	0.700	0.620	89%	0.670	0.542	81%	9.1%
Acenaphthene	<0.50	0.350	0.280	80%	0.330	0.309	94%	15.7%
Fluorene	<0.50	0.070	0.074	106%	0.067	0.061	91%	14.9%
Fluoranthrene	<0.10	0.035	0.040	114%	0.034	0.024	71%	47.3%
Anthracene	<0.05	0.035	0.032	91%	0.034	0.029	85%	6.9%
Fluoranthene	<0.50	0.070	0.074	106%	0.067	0.066	99%	7.1%
Pyrene	<0.05	0.035	0.046	131%	0.034	0.044	129%	1.5%
Benzo(a)anthracene	<0.05	0.035	0.038	109%	0.034	0.035	103%	5.3%
Chrysene	<0.05	0.035	0.010	29%	0.034	0.011	32%	12.4%
Benzo(b)fluoranthene	<0.05	0.070	0.066	94%	0.067	0.059	88%	6.8%
Benzo(k)fluoranthene	<0.05	0.035	0.033	94%	0.034	0.030	88%	6.6%
Benzo(a)pyrene	<0.05	0.035	0.030	86%	0.034	0.023	68%	23.6%
Dibenzo(a,h)Anthracene	<0.05	0.070	0.030	43%	0.067	0.023	34%	22.1%
Benzo(ghi)perylene	<0.05	0.070	0.051	73%	0.067	0.044	66%	10.4%
Indeno(123-cd)pyrene	<0.05	0.035	0.027	77%	0.034	0.019	56%	32.0%

COMMENTS:

MS % REC. - MSD % REC.

RELATIVE % DIFFERENCE(RPD) =

X 100

(MS % REC. + MSD % REC.) / 2

MS CONC. - SAMPLE CONC.

MATRIX SPIKE % RECOVERY =

X 100

CONC. ADDED

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QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc.
38019 Schoolcraft
Livonia, MI. 48150

Date: April 29, 1992
Work Order: E2-04-104
Sample ID: 04A

Attn: Susan Chase

Approved: Mark Burr

QA MANAGER

COMPOUND	SAMPLE CONC.	CONC. ADDED	MS CONC.	MS %	CONC. ADDED	MSD CONC.	MSD %	RPD
	ug/kg	ug/kg	ug/kg		ug/kg	ug/kg		
Benzene	<10	38	37	97%	33	23	70%	33.1%
Toluene	<10	38	38	100%	33	31	94%	6.3%
Ethyl Benzene	<10	38	38	100%	33	30	91%	9.5%
Styrene	<10	38	36	95%	33	27	82%	14.6%
o-xylene	<10	38	39	103%	33	28	85%	19.0%

$$\text{RELATIVE \% DIFFERENCE(RPD)} = \frac{\text{MS \% REC.} - \text{MSD \% REC.}}{(\text{MS \% REC.} + \text{MSD \% REC.})/2} \times 100$$

$$\text{MATRIX SPIKE \% RECOVERY} = \frac{\text{MS CONC.} - \text{SAMPLE CONC.}}{\text{CONC. ADDED}} \times 100$$

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ANALYTICAL NARRATIVE

Aug 07, 2009 12:53

PROJECT: E2-04-106 GZA
 LABORATORY: Thermo Analytical/ERG
 ADDRESS: 525 Avis Dr. Ste. 7
 Ann Arbor, MI. 48108
 CONTACT: Mark Tennant
 PHONE: (313) 662-3104
 DATE RECEIVED: 21-Apr-92
 RECEIVED BY: Christine Pardo

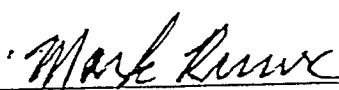
CLIENT: GZA GeoEnvironmental
 ADDRESS: 38019 Schoolcraft
 Livonia, MI. 48150

CONTACT: Susan Chase
 CLIENT P.O.: 72507
 REPORT DATE: 08-May-92
 Sample I.D.D: W-1, W-2, W-3, W-4, W-5,
 W-6, PP-2, ST-14, ST-E

ANALYSIS	ANALYTICAL METHOD	ANALYSIS DATE	ANALYST
Dissolved Arsenic in Water	USEPA 7060	30-Apr-92	BS
Dissolved Barium in Water	USEPA 6010	29-Apr-92	MB
Dissolved Cadmium in Water	USEPA 6010	29-Apr-92	MB
Dissolved Chromium in Water	USEPA 6010	29-Apr-92	MB
Dissolved Copper in Water	USEPA 6010	29-Apr-92	MB
Dissolved Lead in Water	USEPA 6010	29-Apr-92	MB
Dissolved Mercury in Water	USEPA 7471	30-Apr-92	RH
Prep for Furnace-Water	USEPA 3050	28-Apr-92	RH
Prep for ICP-Water	USEPA 3050	28-Apr-92	RH
Dissolved Selenium in Water	USEPA 7740	30-Apr-92	BS
Dissolved Silver in Water	USEPA 6010	29-Apr-92	MB
Dissolved Zinc in Water	USEPA 6010	29-Apr-92	MB
Surgeable Halocarbons	USEPA 8010	29-Apr-92	PN
Surgeable Aromatics	USEPA 8020	29-Apr-92	PN
PAH'S in Water	USEPA 8310	01-May-92	GH
PNA Sample Prep.	USEPA 3540	24-Apr-92	AG

I certify that quality control measures were incorporated for these analyses in accordance with the quality assurance manual submitted to GZA GeoEnvironmental.

Signature of Laboratory Representative



Mark B. Ruwe

QA Manager

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QUALITY CONTROL REPORT DUPLICATE AND MATRIX SPIKE ANALYSIS

Client: GZA GeoEnvironmental
38019 Schoolcraft
Livonia, MI. 48150

Date: May 07, 1992
Project: E2-04-106
Sample ID: W-1, W-2, W-3, W-4, W-5,
W-6, PP-2, ST-14, ST-E

Attn: Susan Chase

Approved: Mark Kuwe

QA Manager

PARAMETER	SAMPLE NUMBER	DUPLICATES				MATRIX SPIKE		
		SAMPLE A	SAMPLE B	RPD		SPIKE ADDED	SPIKED SAMPLE	PERCENT RECOVERY
		MG/L	MG/L	%		MG/L	MG/L	%
Arsenic	*	0.001	<0.001	0.0%		0.040	0.035	89%
Barium	W-1	0.19	0.18	5.4%		4.00	3.62	86%
Cadmium	W-1	<0.005	<0.005	0.0%		0.10	0.11	110%
Chromium	W-1	0.01	0.01	0.0%		0.40	0.35	85%
Copper	W-1	<0.01	<0.01	0.0%		0.50	0.45	90%
Lead	W-1	<0.09	NA	NA		1.00	0.93	93%
Mercury	*	<0.0002	<0.0002	0.0%		0.0010	0.0011	110%
Selenium	*	<0.002	0.002	0.0%		0.010	0.0078	68%
Silver	W-1	<0.015	NA	NA		0.10	0.11	110%
Zinc	W-1	0.06	NA	NA		1.00	1.00	94%

REMARKS: NA- NOT APPLICABLE

* DUPLICATE AND MATRIX SPIKE DONE ON ANOTHER SAMPLE IN SAME ANALYTICAL BATCH.
Result for selenium below control limits.

RELATIVE % DIFFERENCE(RPD) = $\frac{\text{SAMPLE A} - \text{SAMPLE B}}{(\text{SAMPLE A} + \text{SAMPLE B})/2} \times 100$

PERCENT RECOVERY = $\frac{\text{SPIKED SAMPLE} - [\text{SAMPLE A} + \text{SAMPLE B}]/2}{\text{SPIKE ADDED}} \times 100$

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QUALITY CONTROL REPORT MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc. Date: May 8, 1992
38019 Schoolcraft Work Order: E2-04-106
Livonia, MI. 48150 Sample ID: ST-14

Attn: Susan Chase

Approved: Mark Lowe

QA MANAGER

COMPOUND	SAMPLE CONC.	CONC. ADDED	MS CONC.	MS % REC.	CONC. ADDED	MSD CONC.	MSD % REC.	RPD
	ug/L	ug/L	ug/L		ug/L	ug/L		
Benzene	<1.0	5.00	5.82	116%	5.00	5.83	117%	0.2%
Toluene	<1.0	5.00	5.16	103%	5.00	4.57	91%	12.1%
Ethyl Benzene	<1.0	5.00	4.51	90%	5.00	4.84	97%	7.1%
Xyrene	<1.0	5.00	4.32	86%	5.00	4.64	93%	7.1%
Total Xylenes	<1.0	5.00	4.16	83%	5.00	4.85	97%	15.3%

COMMENTS:

MS % REC. - MSD % REC.

X 100

RELATIVE % DIFFERENCE(RPD) =

(MS % REC. + MSD % REC.) / 2

MS CONC. - SAMPLE CONC.

X 100

MATRIX SPIKE % RECOVERY =

CONC. ADDED

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QUALITY CONTROL REPORT
MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Client: GZA GeoEnvironmental Inc.
38019 Schoolcraft
Livonia, MI. 48150

Date: MAY 8, 1992
Work Order: E2-04-106
Sample ID: ST-14

Attn: Susan Chase

Approved: Mark Luwe

QA MANAGER

COMPOUND	SAMPLE CONC.	CONC. ADDED	MS CONC.	MS %	CONC. ADDED	MSD CONC.	MSD %	RPD
	ug/L	ug/L	ug/L		ug/L	ug/L		
Chloromethane	<1.0	5.00	<1.0	0%	5.00	12.25	245%	200.0%
Bromomethane	<1.0	5.00	8.09	162%	5.00	7.61	152%	6.1%
Vinyl Chloride	<1.0	5.00	5.86	117%	5.00	7.37	147%	22.8%
Chloroethane	<1.0	5.00	2.94	59%	5.00	7.78	156%	90.3%
Ethylene Chloride	<0.50	5.00	5.07	101%	5.00	5.44	109%	7.0%
Trichlorofluoromethane	<0.50	5.00	4.92	98%	5.00	6.17	123%	22.5%
1,1-Dichloroethylene	<0.50	5.00	4.87	97%	5.00	6.11	122%	22.6%
1,1-Dichloroethane	<0.50	5.00	5.15	103%	5.00	5.80	116%	11.9%
Trans-1,2-Dichloroethylene	<0.50	5.00	4.31	86%	5.00	4.73	95%	9.3%
Chloroform	<0.50	5.00	5.27	105%	5.00	5.92	118%	11.6%
Dichloroethane, 1,2-	<0.50	5.00	4.62	92%	5.00	4.94	99%	6.7%
Trichloroethane, 1,1,1-	<0.50	5.00	4.41	88%	5.00	4.92	98%	10.9%
Carbon Tetrachloride	<0.50	5.00	5.16	103%	5.00	5.82	116%	12.0%
Bromodichloromethane	<0.50	5.00	4.47	89%	5.00	4.25	85%	5.0%
1,2-Dichloropropane	<0.50	5.00	4.75	95%	5.00	6.17	123%	26.0%
Trans-1,3-dichloropropene	<0.50	5.00	4.81	96%	5.00	5.26	105%	8.9%
1,1-Dichloroethylene	<0.50	5.00	6.02	120%	5.00	6.24	125%	3.6%
Dibromochloromethane	<0.50	5.00	6.87	137%	5.00	5.72	114%	18.3%
Chloroethylvinyl Ether, 2-	<1.0	5.00	11.33	227%	5.00	7.99	160%	34.6%
Bromoform	<1.0	5.00	8.35	167%	5.00	7.87	157%	5.9%
Tetrachloroethane, 1,1,2,2-	<0.50	5.00	6.75	135%	5.00	7.00	140%	3.6%
Chlorobenzene	<0.50	5.00	7.50	150%	5.00	7.23	145%	3.7%
Dichlorobenzene, 1,2-	<0.50	5.00	4.20	84%	5.00	5.26	105%	22.4%
1,3-Dichlorobenzene	<0.50	5.00	5.01	100%	5.00	5.60	112%	11.1%
1,4-Dichlorobenzene	<0.50	5.00	5.23	105%	5.00	4.47	89%	15.7%

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Comments:

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QUALITY CONTROL REPORT
 BLANK AND CHECK STANDARD ANALYSIS

Client: GZA GeoEnvironmental
 38019 Schoolcraft
 Livonia, MI. 48150

Date: May 07, 1992
 Project: E2-04-106
 Sample ID: W-1, W-2, W-3, W-4, W-5,
 W-6, PP-2, ST-14, ST-E

Attn: Susan Chase

Approved: Mark Ruwe

QA Manager

PARAMETER	BLANK RESULT	REFERENCE SAMPLE RESULTS		
		TRUE VALUE	SAMPLE RESULT	PERCENT RECOVERY
	ug/L	ug/L	ug/L	
Phthalene	<0.50	0.50	0.49	98%
acenaphthalene	<0.50	1.00	0.78	78%
enaphthene	<0.50	0.50	0.39	78%
luorene	<0.50	0.10	0.084	84%
enanthrene	<0.10	0.050	0.054	108%
anthracene	<0.05	0.050	0.040	80%
fluoranthene	<0.50	0.10	0.078	78%
rene	<0.05	0.050	0.039	78%
Benzo(a)anthracene	<0.05	0.050	0.045	90%
rysene	<0.05	0.050	0.071	142%
benzo(b)fluoranthene	<0.05	0.10	0.087	87%
benzo(k)fluoranthene	<0.05	0.050	0.044	88%
benzo(a)pyrene	<0.05	0.050	0.037	74%
Dibenzo(a,h)Anthracene	<0.05	0.10	0.074	74%
benzo(ghi)perylene	<0.05	0.10	0.083	83%
Indeno(123-cd)pyrene	<0.05	0.050	0.052	104%

COMMENTS: All percent recoveries are within EPA control limits.

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Chain-of-Custody Documents

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CHAIN-OF-CUSTODY RECORD

[illegible]

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WHITE COPY - Original (accompanies Samples) YELLOW - (GZA Laboratory) PINK - (Accounting)