TECHNICAL REPORT

Supplemental Phase II Environmental Site Investigation, Former Building 9, Delphi-Flint West Facility, Flint, Michigan

General Motors Corporation,
Worldwide Facilities Group -
Environmental Remediation & International Environmental Support,
Detroit, Michigan

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List of Abbreviations

BBL	Blasland, Bouck & Lee, Inc.
BLS	Below Land Surface
CFR	Code of Federal Regulations
COC	Chain-of-Custody
DCV	Direct Contact Values
DQO	Data Quality Objectives
ECT	Environmental Consulting & Technology, Inc.
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
GCC	Groundwater Contact Criteria
gpm	Gallons per Minute
GSI	Groundwater/Surface Water Interface
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IWWPTP	Industrial Wastewater Pre-Treatment Plant
MDEQ	Michigan Department of Environmental Quality
MERA	Michigan Environmental Response Act
MTBE	Methyl-Tert-Butyl Ether
NREPA	Natural Resources and Environmental Protection Act
OM	Operational Memorandum
PA	Public Act
PAOC	Potential Area of Environmental Concern
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
SIC	Soil Inhalation Criteria
SVOCs	Semi-Volatile Organic Compounds
TCE	Trichloroethylene
μg/L	Micrograms per Liter
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

Section 1

1. Introduction

1.1 Purpose of the Investigation

Blasland, Bouck & Lee, Inc. (BBL) performed a Supplemental Phase II Environmental Site Investigation (ESI) in October 1997 at the former Building 9 (Property) at the Delphi - Flint West Facility (Flint West). The Property is located on the northwest corner of Stevenson Street and Glenwood Avenue, Flint, Michigan (Figure 1). The purpose of the Supplemental Phase II ESI investigation was to verify the presence or absence of subsurface contamination at levels that pose an unacceptable risk to human health and the environment at potential areas of environmental concern (PAOCs). The PAOCs were identified in the Phase I Environmental Site Assessment (ESA) and initially investigated in the Phase II ESI:

- PAOC #3 - Gravel Area, Northwest Side of Building.
- PAOC #4 - Fire Protection Trench Excavation Area.
- PAOC #5 - Former Trichloroethylene Degreasing Unit and Sump.

The initial Phase II ESI completed by BBL indicated that contamination may be present at aforementioned PAOCs (BBL, 1997a). These PAOCs required further investigation based on the findings of the initial Phase II ESI investigation

A PAOC is defined as an area with a documented release of hazardous substances or petroleum products that could pose an unacceptable risk to human health or the environment. The work was performed in accordance with Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 of Public Act (PA) 451 (Formerly Michigan Environmental Response Act [MERA], PA 307) and appropriate Michigan Department of Environmental Quality (MDEQ) operational memoranda and technical support documents. These amendments are reflected in the generic industrial and commercial land use criteria listed in Operational Memorandum #14, Revision 2 (OM #14), and subsequent addenda to OM #14.

The criteria contained in OM #14 are generic risk-based criteria. Generic risk-based cleanup criteria are exposure threshold values that indicate a potential threat to human health or the environment. These criteria include groundwater/surface water interface (GSI) values for groundwater. The generic cleanup values in OM #14 were used to evaluate Property conditions in monitoring wells between the specific PAOCs and the Flint River, located hydraulically down gradient. Analytical data generated for this report were compared to OM #14 criteria because the current and intended land use at the Property is consistent with exposure scenarios developed for industrial and/or commercial (subcategory II) sites. Groundwater contaminant concentrations were also compared to groundwater contact criteria (GCC) in the technical support document "Generic Groundwater Contact Criteria" (MDEQ, 1997).

1.2 Scope of Work

The Supplemental Phase II ESI field investigation included the installation of permanent monitoring wells and groundwater sampling to verify if contamination is present at the Property. During the initial Phase II ESI field investigation, groundwater samples were collected with a hydraulic probe. In addition to the samples collected with the hydraulic probe, groundwater samples would be collected from permanent monitoring wells installed during the Supplemental Phase II ESI. Groundwater samples would be collected from the permanent monitoring because of potential colloidal interference with sampling.

The Supplemental Phase II ESI investigation focused on the following:

- Areas where volatile organic compounds (VOCs) were detected during the initial Phase II ESI (PAOC #3 and PAOC #5).

- The area where free oil was detected during the installation of the fire protection trench (PAOC #4).

- Reviewing and incorporating State of Michigan statutes, rules, and guidance to ensure that proper and acceptable analysis protocols were used.

1.3 Report Organization

This report is organized into six sections. Section 1 discusses the purpose of the Supplemental Phase II ESI and outlines the scope of work. Section 2 summarizes the Property background, history, subsurface lithology, hydrogeology, previous investigations, and current investigations. Section 3 describes the technical approach for the Supplemental Phase II ESI, including a detailed description of the work performed and a summary of the sampling and analysis methodology used. Section 4 presents a discussion of the applicable regulatory standards, and a discussion of the sampling and analysis results from each PAOC. Section 5 presents the conclusions of the Supplemental Phase II ESI. Section 6 is a listing of reference material.

Section 2

2. Site Background and History

2.1 Property Description

Building 9 at Flint West was constructed in 1929 and was initially used as a machine shop. The machine shop evolved into an assembly line manufacturing plant. The major products manufactured at this plant were intake and exhaust engine valves. The plant processes associated with intake and exhaust engine valve manufacturing included forming, forging, grinding, plating, and heat treating. The former chrome plating area (Figure 2) was operational from 1982 to 1991. An addition was made to the building in 1971 and an overhang roof was added to the north storage area in 1986. The total area of the building was approximately 80,897 square feet. In 1996 the building was demolished. Before demolition, the manufacturing process machines had been removed from the plant.

Deactivation activities at Building 9 included removal of the machinery and wooden floor blocks, cleaning, filling, and concrete capping of trenches and sumps, and demolition of the plant building. There are no immediate plans for use of the land and the parcel is currently intended for industrial/commercial land use.

Building 9 is bordered by industrial automotive manufacturing facilities to the east, southeast, north and west. To the immediate south is a parking lot. Residential homes are located beyond the parking lot to the south and southwest. Plant 38, a 326,000-square foot manufacturing facility, is located to the southeast of the Property.

2.2 Surrounding Land Use

Buildings associated with Flint West are situated along a one mile stretch of the Flint River. Flint West formerly consisted of approximately 40 buildings, however, eleven buildings have been demolished and others have been sold. Buildings at Flint West range from a few hundred-square feet to more than 700,000-square feet in size. The surrounding properties associated with Flint West were developed for the manufacture and assembly of automobiles and automobile parts as early as 1915.

The Property is bordered to the east by Stevenson Street, which has a stormwater runoff gradient to the north towards the Flint river. Beyond Stevenson street is a large automobile parking lot. To the south side of Building 9 is an asphalt parking lot with stormwater runoff controlled by drains. The west side of Building 9 consists of railroad tracks and an asphalt/cobblestone road proceeding down a gradient towards the west.

The Flint River, in the vicinity of the Property, is controlled and contained within a concrete trench constructed in 1966 and 1967 by the United States Army Corp of Engineers. The trench is bordered by parking areas and Facility support roads.

2.3 Environmental Setting

This section is a discussion of local and regional environmental conditions that impact surface and groundwater conditions at the Property.

2.3.1 Topography

Property topography is affected by the proximity of Building 9 to the Flint River. The Property is located approximately one-tenth of a mile south of the river and is approximately 756 feet above mean sea level. The Property was approximately 10 to 13 feet above the water level of the river at the time of this investigation. The

topography on the Property is generally flat, but the surrounding land is sloped towards the Flint River. The Property is overlain with concrete and asphalt. A pumping and trenching system, designed to intercept stormwater generated from the north storage yard, pumps stormwater to the industrial wastewater pretreatment plant (IWWPTP) for the Flint West Facility.

2.3.2 Geology and Hydrogeology

Pleistocene glacial drift overlays Paleozoic sedimentary rocks in the Flint area (Wiitala *et al.*, 1963). Pre-Cambrian igneous and metamorphic rocks of the Canadian shield form the bedrock upon which several thousand feet of sandstone, limestone, shale, and evaporites of the Michigan Basin have been deposited. The Flint area is located in the southeast portion of the basin.

Glacial drift of generally low hydraulic conductivity mantles the bedrock in nearly all parts of Genesee County. These deposits consist of clay, silty sand, gravel, and boulders. Hydraulic conductivity is highly variable in both the horizontal and vertical planes. Glacial deposits, in general, are an important source of water in Michigan. However, outwash plains and buried stream valleys are the most productive facies. The lacustrine deposits that are predominant in the vicinity of Flint have low permeabilities due to the abundance of clay (Wiitala *et al.*, 1963). Thin lenses of permeable sand and gravel yield adequate water for domestic use, but the primary source of groundwater in communities surrounding the Flint area is the Pennsylvanian Saginaw aquifer (Wiitala *et al.*, 1963). The City of Flint purchases water from the City of Detroit, which obtains water from Lake Huron (City of Flint Water Services, personal communication). The glacial deposits are approximately 50 feet thick in the vicinity of Flint (Genessee County Department of Public Health, personal communication). The top of the Saginaw formation lies between 600 and 700 feet above mean sea level MSL. The Property is approximately 756 feet above MSL.

In the vicinity of Flint, sandstones of the Pennsylvanian Grand River and Saginaw formations form the uppermost bedrock aquifer. Fractures greatly enhance the permeability of the sandstone beds. The thickness of the Grand River-Saginaw aquifer varies from 200 feet to 400 feet (Mandle and Westjohn, 1989).

Shale, siltstone, and thin-bedded sandstone intercalated with shale of the lower Saginaw formation serve as a regional confining unit separating the Grand River-Saginaw aquifer from the Parma-Bayport aquifer (Wiitala *et al.*, 1963). The Late Mississippian Bayport Limestone and the Early Pennsylvanian Parma Sandstone Member of the Saginaw formation make up the Parma-Bayport aquifer. The Bayport Parma aquifer is not used as a source of water in the vicinity of Flint (Westjohn and Weaver, 1996).

The Mississippian Michigan formation lies beneath the Saginaw formation. The upper portion is composed of shale, thin-bedded limestone, dolomite, gypsum, and anhydrite, and separates the Parma-Bayport aquifer from the Marshall aquifer (Mandle and Westjohn, 1989). Sandstones in the lower portion are hydraulically connected to the Early Mississippian Marshall Sandstone below and compose the Marshall aquifer. The thickness of the Michigan formation averages around 100 feet in the vicinity of Flint (Wiitala *et al.*, 1963).

The Marshall formation is present in most of Genesee County. It consists primarily of sandstone, with some beds of conglomerate, shale, and dolomite. Thickness varies from over 200 feet in the northern part of the county to 70 feet in the south. In some places, the Marshall, Michigan, and Saginaw formations form a single aquifer (Wiitala *et al.*, 1963).

The Early Mississippian Coldwater Shale forms the base of the aquifer system and ranges in thickness from 500 to 1,100 feet.

2.3.3 Site-Specific Geology

The geology beneath the Property was characterized during the initial Phase II ESI investigation (BBL, 1997b). Sands, silty sands, and clayey sands were present beneath a layer of fill that included coal (in PAOC #5) and metal shavings (in PAOC #3). The water-table in this area lies approximately 10 to 20 feet below land surface (BLS), depending on the distance from the Flint River. During the Phase II ESI investigation, the depth to the water table ranged from 12 to 20 feet BLS.

The State of Michigan Act 451 Part 201 Administrative Rules (R299.5101(c)) and the Code of Federal Regulation (CFR, Part 40, Section 149.2) define an aquifer as *"... a geological formation, group of formations, or part (portion) of a formation that is capable of yielding a significant amount of ground water to wells or springs."* The thin surficial water bearing unit at the site has a very low transmissivity (10^{-4} to 10^{-5} cm/sec) and does not meet the definition of an aquifer for the following reasons:

1. The unit does not yield enough water for it to be considered an economically viable water source; and,

2. The natural water quality of the surficial water-bearing unit is highly mineralized and is such that extensive treatment would be required prior to use.

The practical definition of an aquifer is further clarified in the book *Groundwater and Wells* as "a saturated bed, formation, or group of formations which yields water in sufficient quantity to be economically useful (Driscoll, 1986)." From an economical standpoint, wells that yield less than approximately 2 gpm are not useful for water supply. Site-specific data collected from the Flint West facility was input into the Cooper-Jacob equation to estimate sustainable flow from the surficial water-bearing unit, as follows:

$$Q = \frac{s\ T}{264\ \log\ 0.3\ \frac{Tt}{r^2 S}}$$

Where Q = pumping rate, gpm
T = transmissivity, gpm/ft = K*b
K = conductivity, gpm/ft^2 = 4.2
(site data, BBL, June 1997)
s = drawdown, ft = 5
r = distance from pumping well, ft = 5
t = time since pumping started, days = 365
b = saturated thickness, ft = 5
S = storage coefficient, dimension less = 0.15

$$Q = \frac{5\ x\ 21}{264\ \log\ 0.3\ (\frac{21\ x\ 365}{5^2\ x\ 0.15})} = 0.14 gpm$$

This projection was verified by data from short-term pumping at monitoring wells installed for LUST investigation at the nearby Building 2A, which yielded less than one gpm (ES&E, January 8, 1992). This information further supports the determination that the surficial water-bearing unit cannot be considered an aquifer.

A review of well completion records from Genesee County indicated that any wells in the area are screened in the lower confined unit below the impermeable clay layer.

In addition, and as added emphasis, there are several institutional reasons that this water unit could not be used as a potable aquifer, namely:

1. Other much more productive and economically viable aquifer sources are readily available in the area:

2. The surficial unit is not thick enough to support the amount of casing required by the State of Michigan Department of Health for potable wells (25 feet);

3. The Genesee County Health Department prohibits placement of potable wells within the Flint City limits; and,

4. Potable water is readily available throughout the Flint area from the municipal utility and hookup is mandatory.

As previously stated, representatives of the Genesee County Health Department (personal communication) stated there were no potable water wells drilled to tap the glacial drift since 1967, when records were first required. The glacial deposits are less than 25 feet thick, whereas state regulations (Michigan Drinking Water Regulations, R 325.10818) require that casings for potable water supply wells extend at least 25 feet BLS. Personnel from the City of Flint Water Services stated that hookup to the municipal water supply is mandatory within City limits (Flint City Code, Section 46-25). Therefore, the surficial unit is not an aquifer.

2.3.4 Hydrology

Historically, stormwater runoff was collected in catch basins from the parking areas and roof drains and was transferred by storm sewer lines through stormwater outfalls to the Flint River. According to Facility personnel, previous operations involved the collection of stormwater runoff from the western portion of the roof and other areas in which oil and other contaminants accumulated. This stormwater was transferred by a separate industrial process water sewer system to the IWWPTP.

2.3.5 Surface Water

The Flint River lies to the north of the Property and is controlled and contained within a concrete trench. The United States Army Corps of Engineers built the controlling structure in 1966 and 1967. Schwartz Creek lies to the east and south (approximately 800 feet) of the Property and is a tributary to the Flint River.

2.3.6 Underground Utilities

According to site plans reviewed by BBL personnel during the Phase II ESI field investigation, the only underground utilities beneath the Property are storm sewer lines, waste water lines, and process sewer lines. The lines are located approximately 8 feet BLS and are above the water table. It is unlikely that the utility lines will

influence the migration of groundwater contamination because they lie above the water table. The locations of underground utility lines are shown on Figure 3.

2.4 Phase II ESI Findings

The initial Phase II ESI completed by BBL indicated that contamination may be present at several PAOCs identified in the Phase I ESA (BBL, 1997a). The following PAOCs required further investigation based on the findings of the initial Phase II ESI investigation:

- PAOC #3 - Gravel Area, Northwest Side of Building;
- PAOC #4 - Fire Protection Trench Excavation Area; and
- PAOC #5 - Former Trichloroethylene Degreasing Unit and Sump.

The locations of these PAOCs are shown on Figure 2.

2.4.1 PAOC #3 - Gravel Area, Northwest Side of Building

During the Phase I ESA (BBL, 1997a) the stairs leading down to the gravel area from the former building were heavily stained with oils. Rainwater on the stairs had a petroleum sheen. The Phase I ESA (BBL, 1997a) also noted that oil staining was observed throughout the gravel area. During the initial Phase II ESI field investigation soil and groundwater samples from PAOC #3 were collected and analyzed for semi-volatile organic compounds (SVOCs). Additionally, soil samples were analyzed for metals. SVOCs were not detected above appropriate regulatory comparison values in soil or groundwater, and the metals concentrations in the soil were below soil inhalation criteria (SIC) and direct contact values (DCV). An obvious solvent odor was noted in this area during soil boring installation. A soil and groundwater sample were collected and analyzed for VOCs. VOCs were not detected above applicable regulatory values in soil. Groundwater samples contained cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride. These concentrations were below the respective GSI and GCC values. However, a problem with the laboratory containers may have compromised the groundwater sampling results. VOC concentrations will be evaluated during the Supplemental Phase II ESI with additional groundwater samples to verify the VOC concentrations.

2.4.2 PAOC #4 - Fire Protection Trench Excavation Area

On November 26, 1996, during excavation of a trench for a fire protection system, an oil-like substance was observed seeping into the trench at approximately five feet below land surface (BLS) in the vicinity of Column B-9. Soil and groundwater samples collected in this area were analyzed for SVOCs and metals. SVOCs and metals were not detected in soil above SIC and DCV, the appropriate regulatory comparison values. SVOCs compounds were detected in the groundwater samples from this PAOC above GSI and GCC values. The dissolved copper concentration in the groundwater sample, field filtered with a 1-micron filter, was also above GSI criteria. A permanent monitoring well will be installed in this PAOC to determine whether free oil is present. The groundwater will be resampled for SVOCs and copper to more accurately determine contaminant levels.

2.4.3 PAOC #5 - Former Trichloroethylene Degreasing Unit and Sump

The Phase I ESA reported that there was a documented spill of trichloroethylene (TCE) in the degreasing unit, and concentrations of TCE had been detected in a downgradient monitoring well. Soil and groundwater samples were collected from three locations along the property boundary during the initial Phase II ESI for soil screening and

laboratory analysis for VOCs. When a sheen was observed on the original soil samples, additional soil and groundwater samples were collected and analyzed for SVOCs . SVOCs and VOCs were not detected in soil. Of the SVOCs and VOCs analyzed in the groundwater samples, only cis-1,2-dichloroethene was detected. However, a problem with the laboratory containers may have compromised VOC data for the groundwater samples. The VOC concentrations will be confirmed with an additional groundwater sample. Also, the presence of TCE in groundwater samples from PAOC #3 suggested that releases from the former TCE degreasing units may have impacted the groundwater across the Property, in contrast to reports that the releases were contained. A groundwater sample will be collected in the location of the former TCE degreasing unit.

Section 3

3. Technical Approach

3.1 Overview

The Supplemental Phase II field investigation was performed in accordance with the sampling and analysis (SAP) and the site-specific Quality Assurance Project Plan (QAPP) developed for Flint West investigations. Permanent monitoring wells were installed in the area adjacent to the sampling locations of the initial Phase II ESI field investigation.

3.2 Monitoring Well Installations

A hydraulic probe rig installed 1-inch diameter monitoring wells at PAOC #3 and PAOC #5. A total of three 1-inch diameter wells were installed during this field investigation. One well was installed at PAOC #3, adjacent to the location of temporary monitoring well TW-P9-3-2. Two wells were installed at PAOC #5. One well was installed in the North Storage Area adjacent to the location of temporary monitoring well TW-P9-5-4. The other well was installed in the location of he former TCE degreasing units.

A conventional drilling rig installed a 2-inch diameter monitoring well at PAOC #4. A 2-inch diameter well was used at this PAOC to provide a greater area for free oil to migrate into the well. The well was installed using a truck-mounted drilling rig and hollow-stem augers. This monitoring well was constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) and consisted of 5 feet of 0.010-inch slot well screen and 15 feet of solid riser. This well design was based on the depth to the water table at the time of installation. The well design ensured that the well screen intersected the water table, allowing free oil to enter the well. A 6/12 silica sand pack was placed around the well screen to two feet above the well screen. A 1-foot thick bentonite seal was placed above the silica sand pack. The remaining annular space was filled with a bentonite cement slurry.

The wells installed during this investigation have locking caps and flush-mount bolt-down protective covers embedded in concrete. Development of the wells was intended to include overpumping until the water ran clear. Low hydraulic conductivities in the native soil hampered well development. In several cases the wells were purged dry before this the water was clear. The wells were developed before collecting groundwater samples. Monitoring well construction diagrams are included in Appendix A.

3.3 Groundwater Investigation

Groundwater samples from PAOC #3 and PAOC #5 were sent to a laboratory and analyzed for VOCs by EPA Method 8260. The groundwater sample collected from PAOC #4 was sent to a laboratory and analyzed for SVOCs and copper by EPA Methods 8270 and 200.8, respectively. The groundwater sample for copper was filtered in the field through a 0.45-micron filter. A 0.45-micron filter was considered a reasonable choice for discriminating between suspended and dissolved particulate matter, as discussed in Section 3.3.1.1.

The pH of the copper sample was checked in the field. If the pH was greater than 2, 10 percent nitric acid solution was added to adjust the pH accordingly. The samples were placed on ice in coolers prior to shipping to the laboratory. Once the coolers were packed, they were sealed with packing tape and a custody seal was placed across the lid of the cooler. The purpose of the custody seal was to indicate whether tampering or substitution occurred en route to the laboratory.

Laboratory chain-of-custody (COC) forms were used to record the samples collected for each sampling event. The COC lists the sample collection location, the medium sampled, the date and time of sampling, and the parameters for analysis. The COC also records the personnel who have handled the samples from the point of origin to receipt at the laboratory.

3.3.1 Use of Field-Filter Samples in Determining Metals Concentrations in Groundwater

Historically, contaminant concentrations in groundwater venting to surface water from unfiltered samples must be compared to GSI criteria. However, monitoring wells that are completed in materials of low hydraulic conductivity or with a high clay content are difficult to develop properly. It is equally difficult to obtain a water sample that is free of sediment from these wells. When water flows within unconsolidated sediments, the majority of particulates settle out because of the tortuosity of the flow path around the intergrannular porosity and gravitational effects. Although substantial research has documented that colloidal particles can travel notable distances in unconsolidated formations (Gschwend and Reynolds, 1987; Eicholtz et al, 1982; Enfield and Bengtsson 1988), many researchers conclude that sediment produced from monitor wells in unconsolidated formations is due to sloughing of particulate material from the borehole under the turbulent flow conditions induced by well development and pumping, and only minimal colloidal matter in groundwater samples is from natural groundwater flow. In a Superfund Ground Water Issue Paper, Puls and Barcelona (1989) recommended using a 0.1-micron filter when collecting samples for estimates of the dissolved fraction; for estimates of contaminant mobility, filters with a pore size greater than or equal to 2 microns should be used. In practice, 0.45-micron filters are commonly used to balance between the objectives of isolating dissolved constituents and permitting reasonable use in the field. Hem (1989) concluded that there is good evidence that particulate metal hydroxides exist in most surface streams in the form of particulates smaller than 0.45 microns. Further, MDEQ toxicologist Chris Flaga stated that data from groundwater samples obtained using a low-flow pump should be comparable to that from groundwater samples field-filtered using a 0.45-micron filter. MDEQ toxicologist Jeff Crum provided formulae for determining GSI values for comparison to groundwater samples collected using a 0.45-micron filter. Because low-flow pumps were not used when sampling monitoring wells at Building 9, data from field-filtered samples were compared to GSI criteria.

3.4 Quality Assurance/Quality Control

A site-specific QAPP was developed and integrated into the site-specific project plan. The purpose was to ensure that appropriate data collection and analysis procedures were implemented, resulting in data of an acceptable accuracy and precision. The QAPP identifies data quality objectives (DQO) appropriate for the laboratory data collection and analysis procedures.

Quality assurance/quality control (QA/QC) samples to determine the accuracy and precision of field sampling methods were collected and analyzed as follows:

- One equipment rinse blank for VOCs. To achieve the target method detection limits specified in OM #6 (MDNR 1995b), EPA Method 8260 was used.

- One duplicate for VOCs. To achieve target method detection limits specified in OM #6 (MDNR, 1995b), EPA Method 8260 was used.

QA/QC procedures and reporting requirements for laboratory analyses are specified in the Flint West QAPP developed by BBL for projects at Flint West. Laboratory data validation procedures for this project were developed in accordance with BBL's Quality Assurance Plan for environmental data collection and analysis, and

followed practices specified by the United States Environmental Protection Agency in "Laboratory Data Validation Functional Guidelines (USEPA, 1991," "Contract Laboratory Program National Functional Guidelines for Organic Data Review," (USEPA, 1993), and "Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," (USEPA, 1994). The objectives of the data validation procedures were to review the laboratory data, note deviances from the procedures and limits defined in the QAPP, and discuss the effects of these deviances on the data reported.

3.5 Health and Safety Plan

A Health and Safety Plan (HASP) (BBL, 1995) was prepared to ensure that field personnel were adequately protected from injury due to physical hazards and exposure to hazardous substances above acceptable levels. The HASP was prepared in accordance with Title 29 of the Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER). Personnel entering the Property as part of the Supplemental Phase II ESI were required to read the HASP and sign the HASP sign-off sheet. Air monitoring was conducted to evaluate potential exposure levels in accordance with procedures described in the HASP.

Section 4

4. Summary of Results

4.1 Overview

This section summarizes the results of field screening and laboratory analyses. Copies of the laboratory reports and COC records are included in Appendix B.

4.2 Applicable Regulatory Standards

Data generated by the Supplemental Phase II ESI field investigation were compared to generic industrial and commercial cleanup criteria contained in OM #14 (MDNR, 1995a) and the criteria contained in the technical support document, "Generic Groundwater Contact Criteria" (MDEQ, 1997). OM #14 soil and groundwater criteria are risk-based cleanup criteria for sites which can be appropriately determined to maintain the designated land use. Current and expected future land use at former Building 9 at Flint West is consistent with the criteria established for the industrial and commercial (subcategory II) exposure scenarios outlined in OM #14. Also institutional and engineering controls will be implemented under the due care provisions of Part 201. Groundwater analytical data from downgradient sampling locations will be compared to GSI values, while all other groundwater analytical data will be compared to GCC.

Groundwater data were not compared to health -based or drinking water criteria because the surficial unit is not a usable aquifer. As stated in Section 2.2.3, the State of Michigan Act 451 Part 201 Administrative Rules (R299.5101(c)) and the Code of Federal Regulation (CFR, Part 40, Section 149.2) define an aquifer as *"... a geological formation, group of formations, or part (portion) of a formation that is capable of yielding a significant amount of ground water to wells or springs."* The thin surficial water bearing unit at the site has a very low transmissivity (10^{-4} to 10^{-5} cm/sec) and does not meet the definition of an aquifer for the following reasons:

1. The unit does not yield enough water for it to be considered an economically viable water source; and,

2. The natural water quality of the surficial water-bearing unit is highly mineralized and is such that extensive treatment would be required prior to use.

The practical definition of an aquifer is further clarified in the book *Groundwater and Wells* as "a saturated bed, formation, or group of formations which yields water in sufficient quantity to be economically useful (Driscoll, 1986)." From an economical standpoint, wells that yield less than approximately 2 gpm are not useful for water supply. Site-specific data collected from the Flint West facility was input into the Cooper-Jacob equation to estimate sustainable flow from the surficial water-bearing unit, as follows:

$$Q = \frac{s\,T}{264\,\log\,0.3\,\frac{Tt}{r^2 S}}$$

Where Q = pumping rate, gpm
T = transmissivity, gpm/ft = K*b
K = conductivity, gpm/ft^2 = 4.2
(site data, BBL, June 1997)
s = drawdown, ft = 5
r = distance from pumping well, ft = 5
t = time since pumping started, days = 365
b = saturated thickness, ft = 5
S = storage coefficient, dimension less = 0.15

recently published by MDEQ in a technical support document (MDEQ, 1997). Because this is a potential exposure pathway at Flint West, groundwater concentrations have been compared to these values.

Groundwater venting to surface water is a viable pathway to consider for groundwater. If the groundwater samples collected from down-gradient wells on-site contain contaminant concentrations above GSI criteria, additional groundwater samples can be collected from monitoring wells closer to or adjacent to the Flint River to determine if concentrations meet GSI values.

4.2.2 Potential Exposure Pathways for Soil

No potential exposure pathways for soil were considered during this investigation. Soil exposure pathways were evaluated during the initial Phase II ESI (BBL, 1997b).

4.3 PAOC #3 - Gravel Area, Northwest Side of Building

The groundwater sample from monitoring well MW-P9-3-3 was analyzed for VOCs by EPA Method 8260. The laboratory analytical data reported 1,1-dichloroethane, cis-1,2-dichloroethene, methyl-tert-butyl ether (MTBE), trichloroethene, and vinyl chloride at concentrations of 4 micrograms per liter (μg/L), 1,000 μg/L, 120 μg/L, 350 μg/L, and 190 μg/L, respectively, in the groundwater sample from this well. Concentrations of other VOCs included in EPA Method 8260 were reported below detection limits. The concentration of vinyl chloride in the groundwater sample from monitoring well MW-P9-3-3 exceeds the GSI criterion of 15 μg/L. No other compounds exceeded GSI criteria. None of the detected compounds exceed GCC values. The laboratory analytical results are presented in Table 1 and shown in Figure 4.

4.4 PAOC #4 - Fire Protection Trench Excavation

Groundwater samples collected from monitoring well MW-P9-4-3 was analyzed for SVOCs by EPA Method 8270 and copper by EPA Method 200.8. SVOCs and copper were reported below laboratory detection limits in this groundwater sample. Free oil was not recorded in this monitoring well over the course of the field investigation.

4.5 PAOC #5 - Former Trichloroethylene Degreasing Unit and Sump

Groundwater samples collected from monitoring wells MW-P9-5-4 and MW-P9-5-5 were analyzed for VOCs by EPA Method 8260. Cis-1,2-dichloroethene was detected in the groundwater samples from MW-P9-5-4 and MW-P9-5-5 at concentrations of 310 μg/L and 150 μg/L, respectively. TCE was detected in the groundwater samples from MW-P9-5-4 and MW-P9-5-5 at concentrations of 15 μg/L and 110 μg/L, respectively. Additionally, vinyl chloride was detected in the groundwater sample from MW-P9-5-5 at a concentration of 7 μg/L. Concentrations of other VOCs included in EPA Method 8260 were reported below detection limits. The concentrations of VOC compounds detected in the two groundwater samples did not exceed GSI criteria or GCC. The laboratory analytical results are presented in Table 1 and shown in Figure 4.

4.6 Quality Assurance/Quality Control

As stipulated in the project-specific QAPP, the data was validated by the QA Officer following USEPA Functional Data Validation Guidelines and the appropriate DQOs and analytical data levels. Sampling procedures were determined to be complete and acceptable, and results of laboratory QA/QC samples were within acceptable

Section 5

5. Conclusions and Recommendations

BBL performed this Supplemental Phase II ESI field investigation at the former Building 9 of the Delphi-Flint West Facility to verify subsurface conditions reported in the Phase II ESI. Four monitoring wells were installed at three PAOCs investigated in the initial Phase II ESI (BBL, 1997). Groundwater samples were collected and analyzed for VOCs, SVOCs, and copper. Conclusions and recommendations for each PAOC, based on the results of this investigation, are discussed in the following subsections.

5.1 PAOC #3 - Gravel Area, Northwest Side of Building

VOCs were detected in the groundwater sample collected from this PAOC. However, only vinyl chloride was reported at a concentration that exceeded GSI criteria. Two shallow monitoring wells (P7-1 and P7-2) are present down-gradient of Building 9 (Figure 4A). The monitoring wells are located in the vicinity of former underground storage tanks (USTs) 14 and 15 at Building 7. The wells were installed after the USTs were removed. Vinyl chloride was not detected in the most recent groundwater samples collected from these monitoring wells. The sampling event was conducted by Environmental Consulting & Technology, Inc. (ECT) in March 1995 and summarized in a tank closure report (ECT, 1995). Therefore, this area can be eliminated as a PAOC because the groundwater quality in a downgradient monitoring well meets GSI criteria.

5.2 PAOC #4 - Fire Protection Trench Excavation Area

SVOCs, and copper were not detected in the groundwater sample collected from this PAOC. It appears that the SVOC and copper impacts are localized to the temporary well point location installed during the initial Phase II ESI investigation. Free oil was not detected in this monitoring well over the course of this investigation. BBL recommends no further action at this PAOC at present. However, monitoring well MW-P9-4-3 should be gauged for free oil during future activities at the Property. The clay and silt-clay material beneath the Property may be restricting the flow of free oil in the subsurface. If free oil does not appear in this well within three months, this area can be eliminated as a PAOC.

5.3 PAOC #5 - Former Trichloroethylene Degreasing Unit and Sump

VOCs were detected in the groundwater samples collected from this PAOC. However, none of the detected compounds were above applicable regulatory criteria. Consequently, this area can be eliminated as a PAOC.

Section 6

6. References

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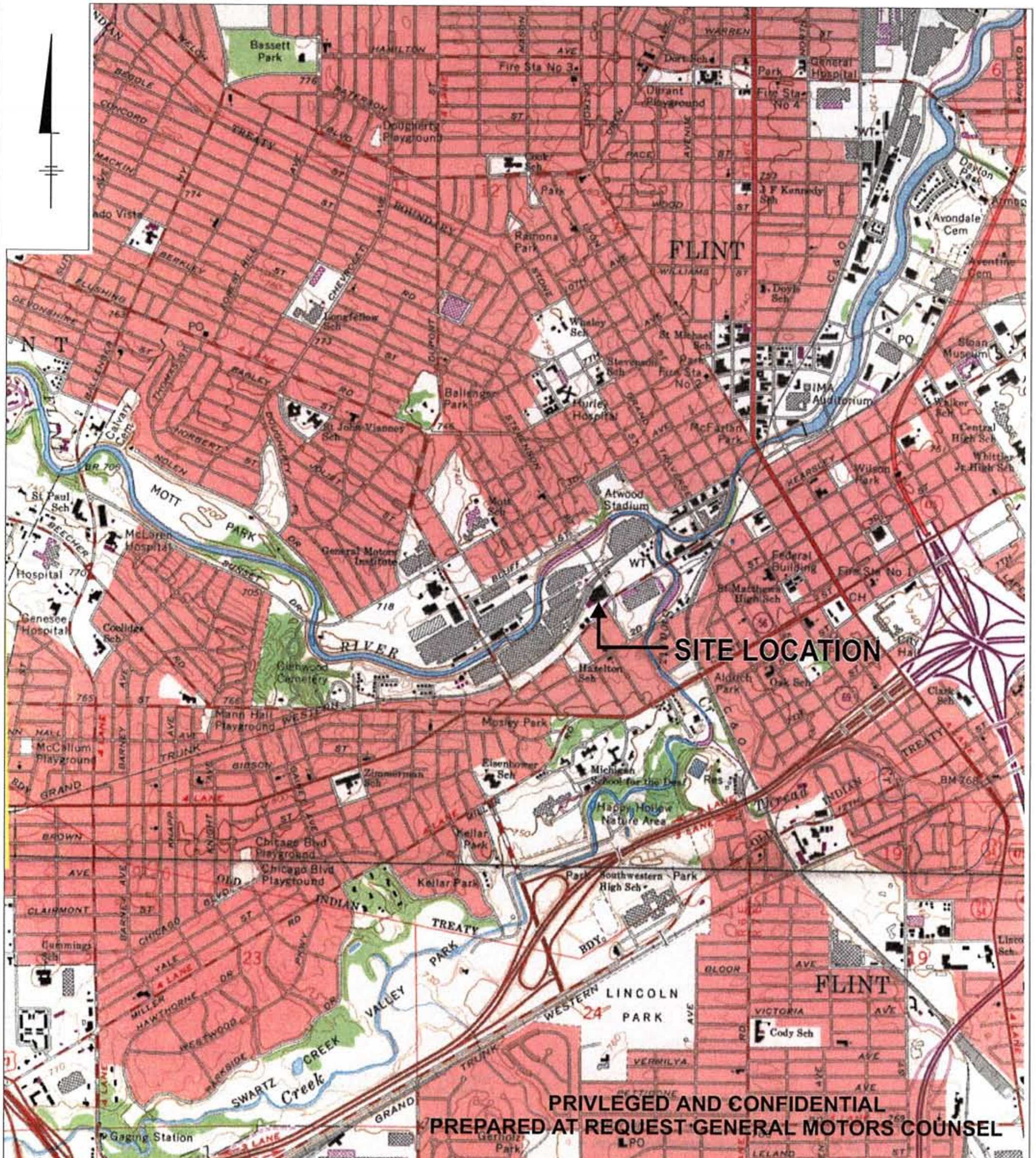
Figures



MAP SOURCE: UNITED STATES GEOLOGIC SURVEY TOPOGRAPHIC QUADRANGLE, 7.5 MIN. SERIES, FLINT NORTH & FLINT SOUTH, MICHIGAN, (1969).

2000 0 2000

APPROXIMATE SCALE IN FEET

6/26/97 BOC-54 APD
48061001/48061014.CDR

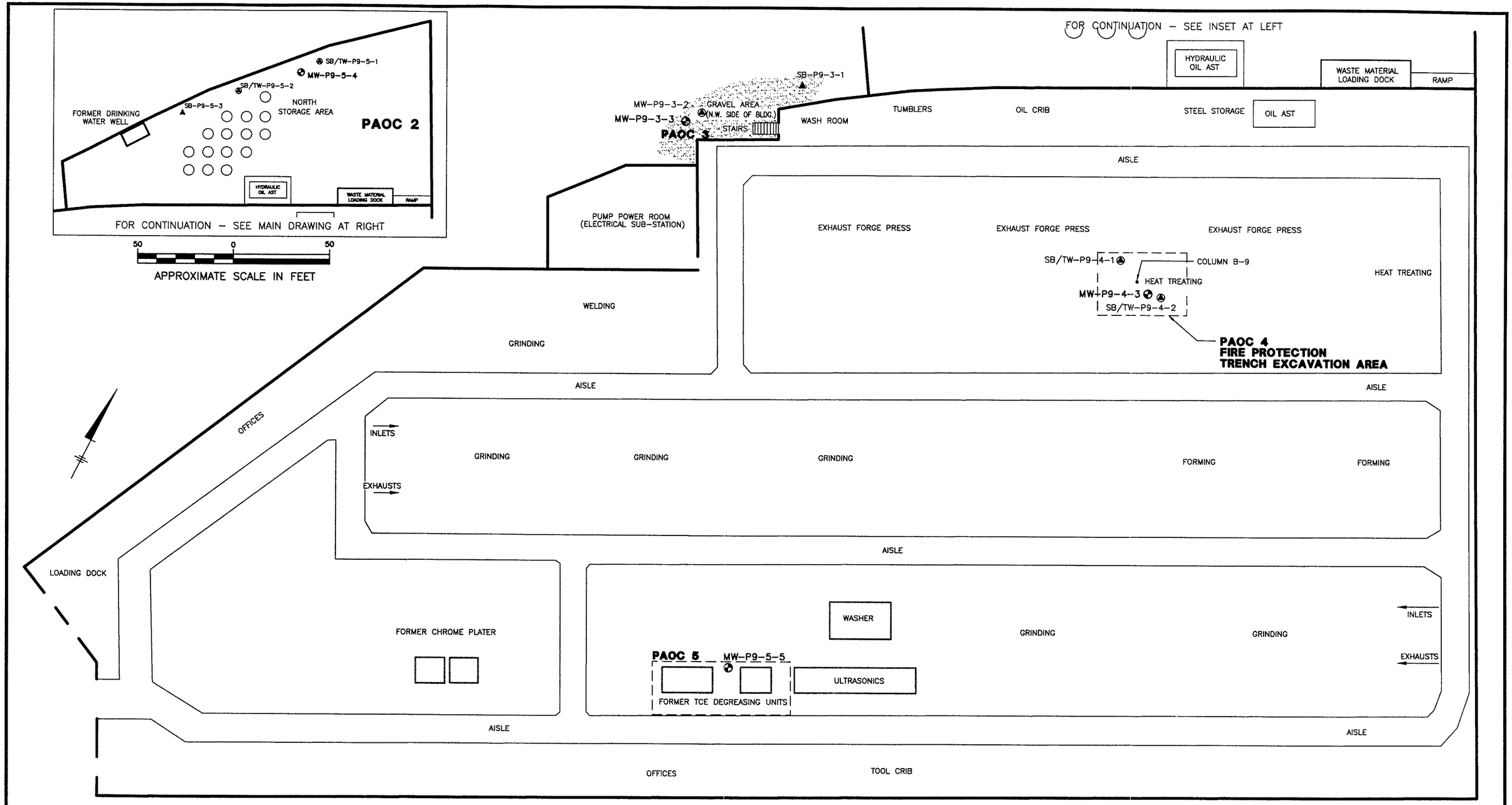
GENERAL MOTORS CORPORATION
BUILDING 9, DELPHI - FLINT WEST FACILITY
FLINT, MICHIGAN

SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE INVESTIGATION

SITE LOCATION MAP

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE
1



30 0 30

APPROXIMATE SCALE IN FEET

LEGEND

- ▲ SOIL BORING
- ⍟ TEMPORARY WELL
- ⍟ MONITORING WELL

Privileged and Confidential
Prepared at Request General Motors Counsel

BASE MAP SOURCE: GENERAL MOTORS, FLINT, MICHIGAN – GENERAL ARRANGEMENT DWG – MPEC

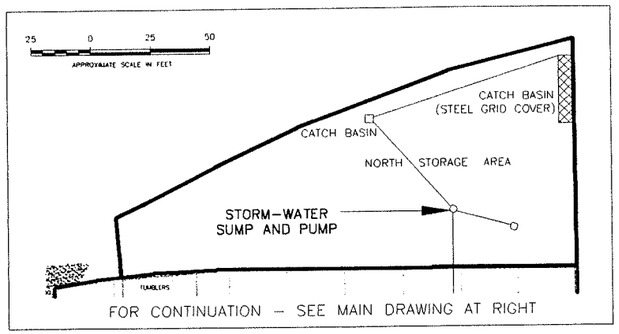
P: 48061009
11/19/97 BOC-54 MAJ, APD
48061001/48061014.DWG

GENERAL MOTORS CORPORATION
BUILDING 9 DELPHI-FLINT WEST FACILITY
FLINT, MICHIGAN
SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE INVESTIGATION

SITE MAP

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 2



FOR CONTINUATION - SEE INSET AT LEFT

STORM-WATER SUMP AND PUMP

NORTH STORAGE AREA

GRAVEL AREA (N.W. SIDE OF BLDG.)

STAIRS

TUMBLERS

TO WASTEWATER TREATMENT SYSTEM

ELECTRICAL SUB-STATION

EXHAUST FORGE PRESS

EXHAUST FORGE PRESS

EXHAUST FORGE PRESS

MAIN PROCESS WASTE-WATER LIFT STATION

HEAT TREATING

HEAT TREATING

STORM SEWER SYSTEM TO FLINT RIVER

POLLUTION WASTEWATER SUMP

CONNECTING OVERFLOW PIPE DECONTAMINATED AND PLUGGED IN 1995

WELDING

GRINDING

GRINDING

GRINDING

GRINDING

FORMING

FORMING

25 0 25 50

APPROXIMATE SCALE IN FEET

FORMER CHROME PLATER

FORMER DEGREASING

GRINDING

GRINDING

LEGEND

- BELOW-GROUND INDUSTRIAL WASTEWATER TRENCH DRAIN
- BELOW-GROUND INDUSTRIAL WASTEWATER LINE
- SUMP
- PUMP
- PLANT PROCESS MACHINERY

Privileged and Confidential
Prepared at Request General Motors Counsel

SOURCE: GENERAL MOTORS, FLINT, MICHIGAN - GENERAL ARRANGEMENT DWG - MPEC

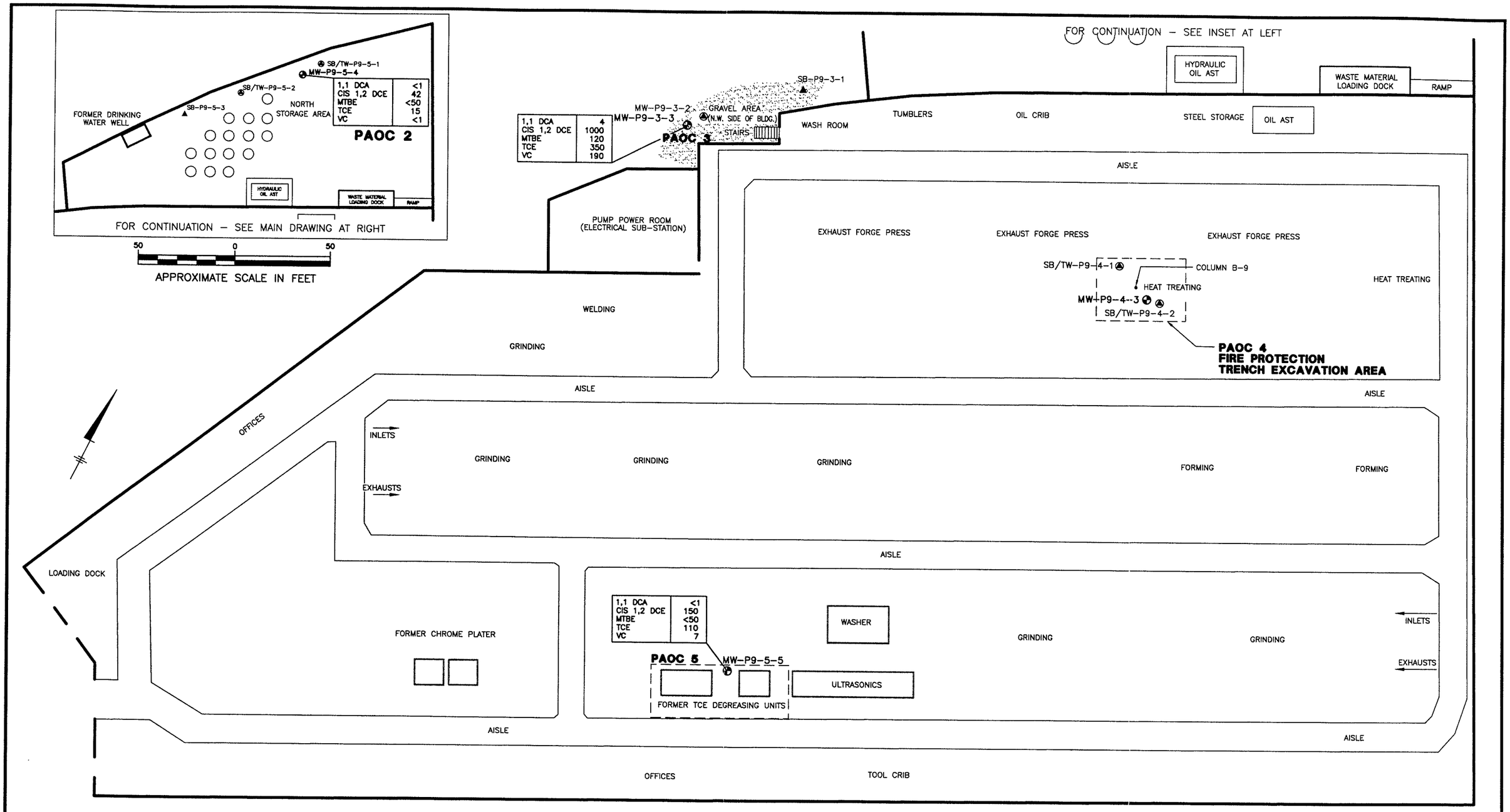
GENERAL MOTORS CORPORATION
BUILDING 9 DELPHI-FLINT WEST FACILITY
FLINT, MICHIGAN
SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE INVESTIGATION

WASTEWATER TREATMENT SYSTEMS LAYOUT

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 3

P: 48061007
11/19/97 BOC-54 MAJ. APD
48061001/48061015.DWG



LEGEND

- ▲ SOIL BORING
- ⍟ TEMPORARY WELL
- ⊕ MONITORING WELL

1,1 DCA = 1,1 DICHLOROETHANE
CIS 1,2 DCE = CIS 1,2 DICHLOROETHENE
MTBE = METHYL-TERT-BUTYL ETHER
TCE = TRICHLOROETHENE
VC = VINYL CHLORIDE

CONCENTRATIONS IN MICROGRAMS PER LITER

30 0 30
APPROXIMATE SCALE IN FEET

Privileged and Confidential
Prepared at Request General Motors Counsel

BASE MAP SOURCE: GENERAL MOTORS, FLINT, MICHIGAN – GENERAL ARRANGEMENT DWG -- MPEC

P: 48061009
11/20/97 BOC-54 MAJ, APD
48061001/48061016.DWG

GENERAL MOTORS CORPORATION
BUILDING 9 DELPHI-FLINT WEST FACILITY
FLINT, MICHIGAN
SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE INVESTIGATION

VOC IMPACTS IN GROUNDWATER

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 4

PRIVILEGED AND CONFIDENTIAL
PREPARED AT REQUEST OF
GENERAL MOTORS COUNSEL

RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
BLUFF ST.
BUILDING 3
BLDG 36
INDUSTRIAL
FLOW
INDUSTRIAL
INDUSTRIAL
BUILDING 2
BUILDING 6
River
Flint
29
13
17
BUILDING 7
TCE
VC
P7-1
P7-2
FORMER UST
P7-3
BUILDING 8
BUILDING 9
INDUSTRIAL
BUILDING 4
KEARSLEY STREET
BUILDING
RESIDENTIAL
GLENWOOD AVE.
RESIDENTIAL
THAYER ST.
RESIDENTIAL
HAZELTON ST.
RESIDENTIAL
ASYLUM ST.
RESIDENTIAL
CHASE ST.
INDUSTRIAL

LEGEND

- RAILROAD
- ROADS, PAVEMENT
- CONCRETE CHANNELIZED FLINT RIVER
- MAJOR BUILDING, PLANT
- MINOR BUILDING
- FORMER BUILDING LOCATION
- ⊗ MONITORING WELL

TCE	TRICHLOROETHENE
VC	VINYL CHLORIDE
UST	UNDERGROUND STORAGE TANK
BLDG	BUILDING
RESIDENTIAL	RESIDENTIAL ZONING
INDUSTRIAL	INDUSTRIAL ZONING

CONCENTRATIONS IN MICROGRAMS PER LITER

200 0 200
APPROXIMATE SCALE IN FEET

BASE MAP DIGITIZED FROM "GROUNDWATER ELEVATION MAP" FROM O'BRIEN & GERE, ENGINEERS, INC. (9/95) FILE NUMBER 5858-014-003, FIGURE 3. SOURCE SCALE IS 1"=200'.

ALL LOCATIONS AND FEATURES ARE APPROXIMATE ONLY.

GENERAL MOTORS CORPORATION
BUILDING 9
DELPHI FLINT WEST FACILITY, FLINT, MICHIGAN
SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE INVESTIGATION

VOC IMPACTS IN GROUNDWATER (DOWNGRADIENT)

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 4A

1/22/98 BOC-54-MAJ/APD
48076050\BLDG9\SITE1.DWG

Tables

Table 1
Laboratory Analytical Results - Groundwater

General Motors Corporation
Former Building 9
Delphi-Flint West
Flint, Michigan

Compound	Monitoring Well						GSI (ug/L)	GCC (ug/L)
	MW-P9-3-3 (ug/L)	MW-P9-5-4 (ug/L)	MW-P9-5-5 (ug/L)	P7-1* (ug/L)	P7-2* (ug/L)	P7-3* (ug/L)		
1,1-Dichloroethane	4	<1	<1	NA	NA	NA	NLS	2.1E+06
cis-1,2-Dichloroethene	1,000	42	150	NA	NA	NA	NE	1.7E+05
Methyl-Tert-Butyl Ether	120	<50	<50	NA	NA	NA	8,000	1.7E+06
Trichloroethene	350	15	110	<1	<1	<1	370	11,000
Vinyl Chloride	**190**	<1	7	<1	<1	<1	15	290

Notes:

* Sampled March 18, 1995

ug/L - Micrograms per liter

GSI - Groundwater/surface water interface; from MDEQ Operational Memorandum #14, Revision 2

GCC - Groundwater Contact Criteria; from Generic Groundwater Contact Criteria Technical Support Document, 1/17/97

MDEQ - Michigan Department of Environmental Quality

Bold values indicate concentrations above GSI criteria.

NLS - A literature survey has not been completed.

NE - Not established.

NA - Not analyzed

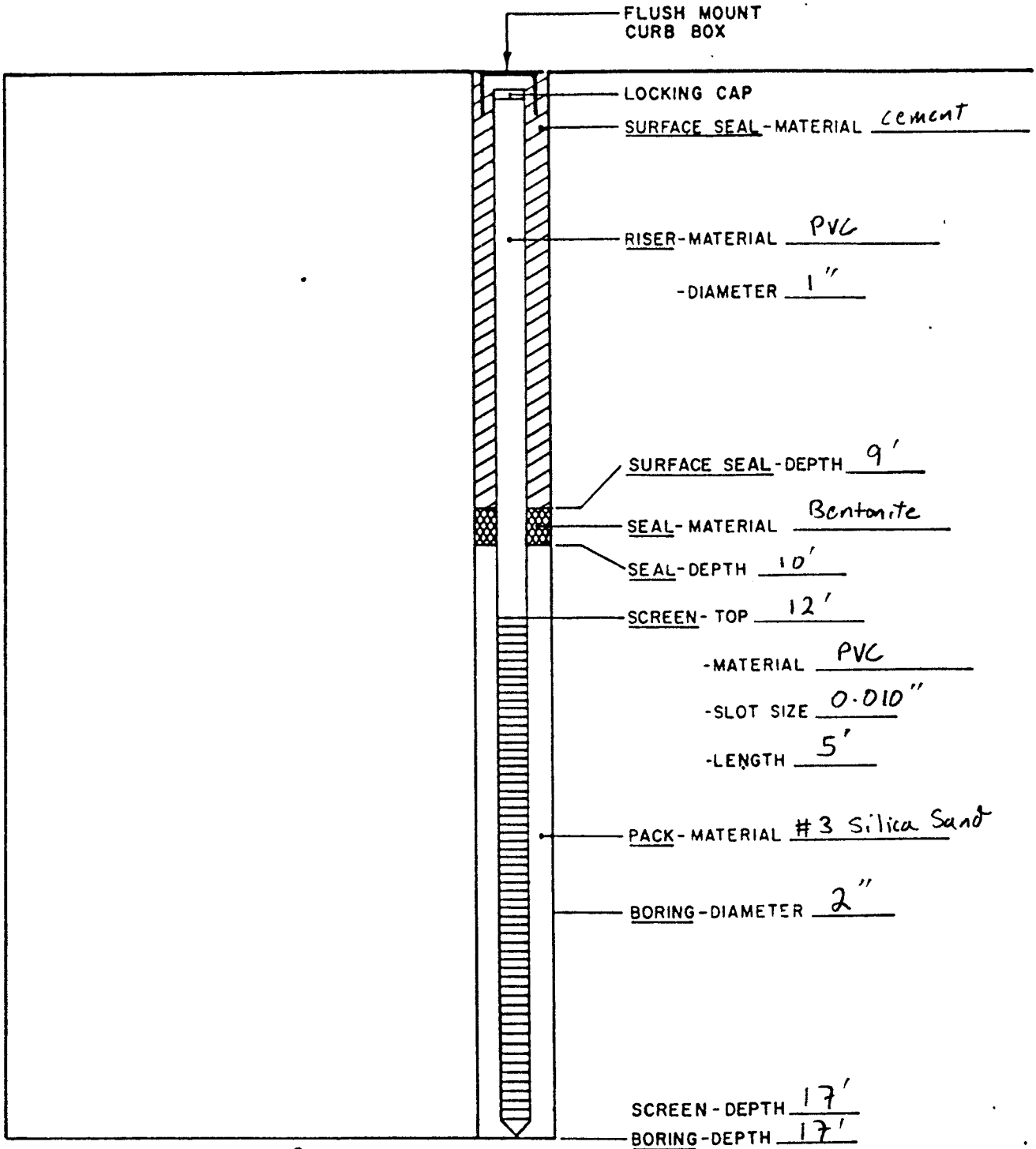
Appendix A

APPENDIX A

MONITORING WELL LOGS

SUBSURFACE FIELD LOG
MONITORING WELL CONSTRUCTION DETAILS

(NOT TO SCALE)



WELL NO. MW-P9-3-3

PROJECT Supplemental Phase II ESI, Building 9

PROJECT NO. 480.76

BY Richard Blasland

DATE October 23, 1997

CASING ELEVATION _____

DEPTH TO WATER UPON COMPLETION 12.10'

DRILLER Environmental Investigations, Inc.

METHOD Geoprobe

RIG TYPE Geoprobe

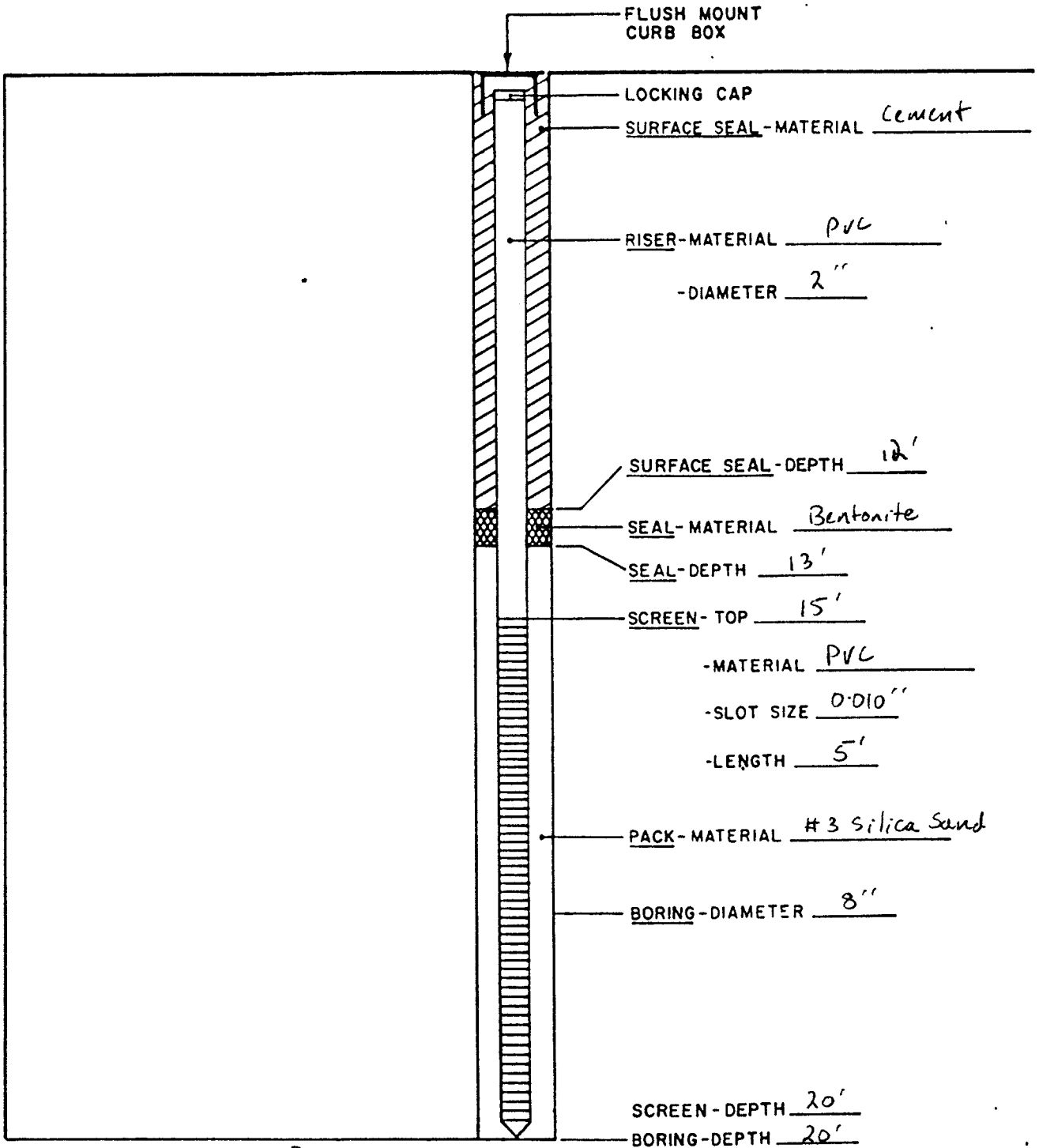
DEVELOPMENT DATE October 23, 1997

DEVELOPMENT METHOD Overpumping

BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

SUBSURFACE FIELD LOG
MONITORING WELL CONSTRUCTION DETAILS

(NOT TO SCALE)



WELL NO. MW-P9-4-3

PROJECT Supplemental Phase II ESI, Building 9

PROJECT NO. 480.76

BY Richard Blasland

DATE October 23, 1997

CASING ELEVATION _____

DEPTH TO WATER UPON COMPLETION 17.90

DRILLER McDowell Drilling

METHOD Hollow Stem Augers

RIG TYPE MOBIL B-57

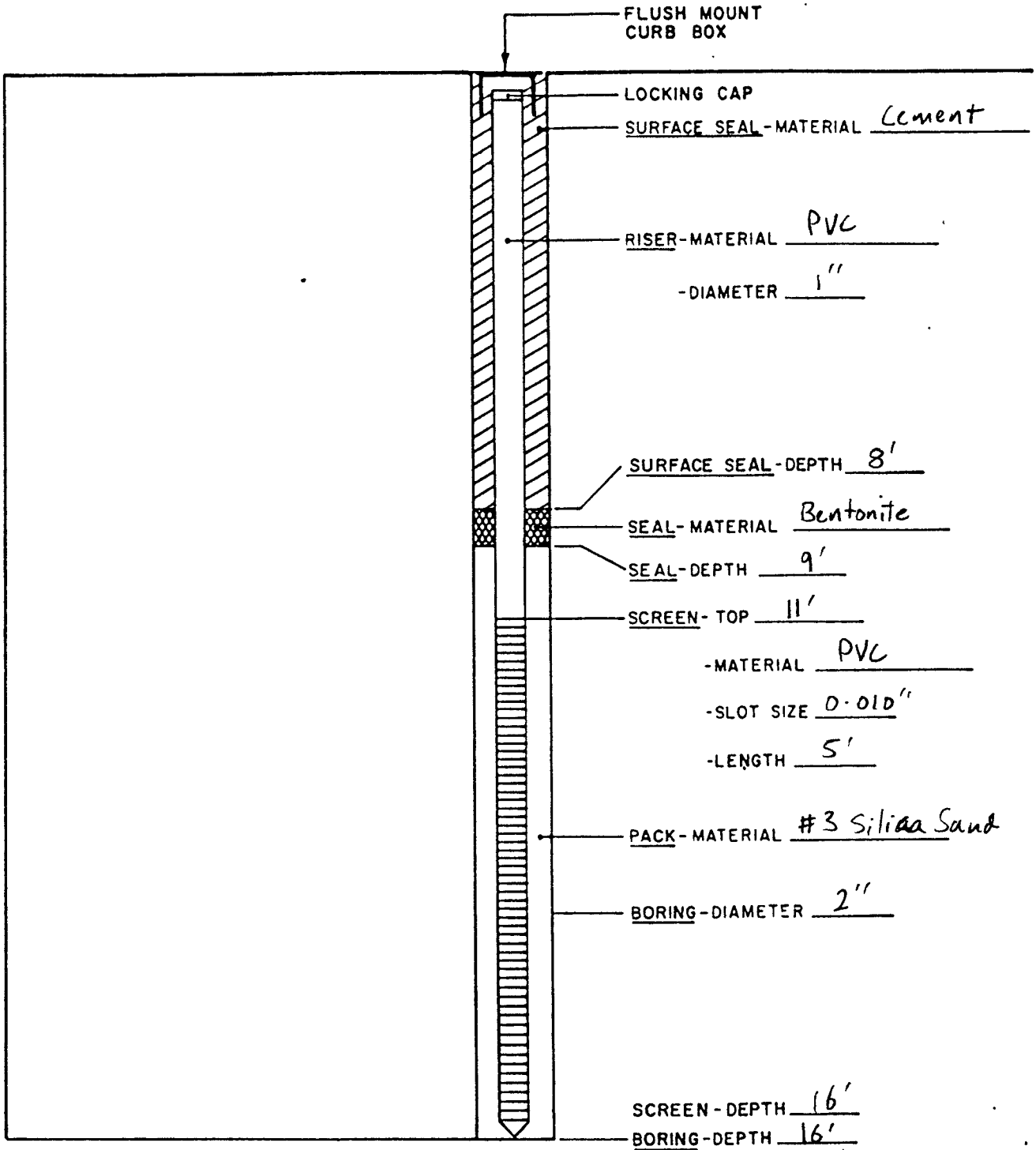
DEVELOPMENT DATE October 23, 1997

DEVELOPMENT METHOD Overpumping

BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

SUBSURFACE FIELD LOG
MONITORING WELL CONSTRUCTION DETAILS

(NOT TO SCALE)



WELL NO. MW-P9-5-4

PROJECT Supplemental Phase II ESI, Building 9

PROJECT NO. 480.76

BY Richard Blasland

DATE October 23, 1997

CASING ELEVATION _____

DEPTH TO WATER UPON COMPLETION 12.49'

DRILLER Environmental Investigations, Inc.

METHOD Geoprobe

RIG TYPE Geoprobe

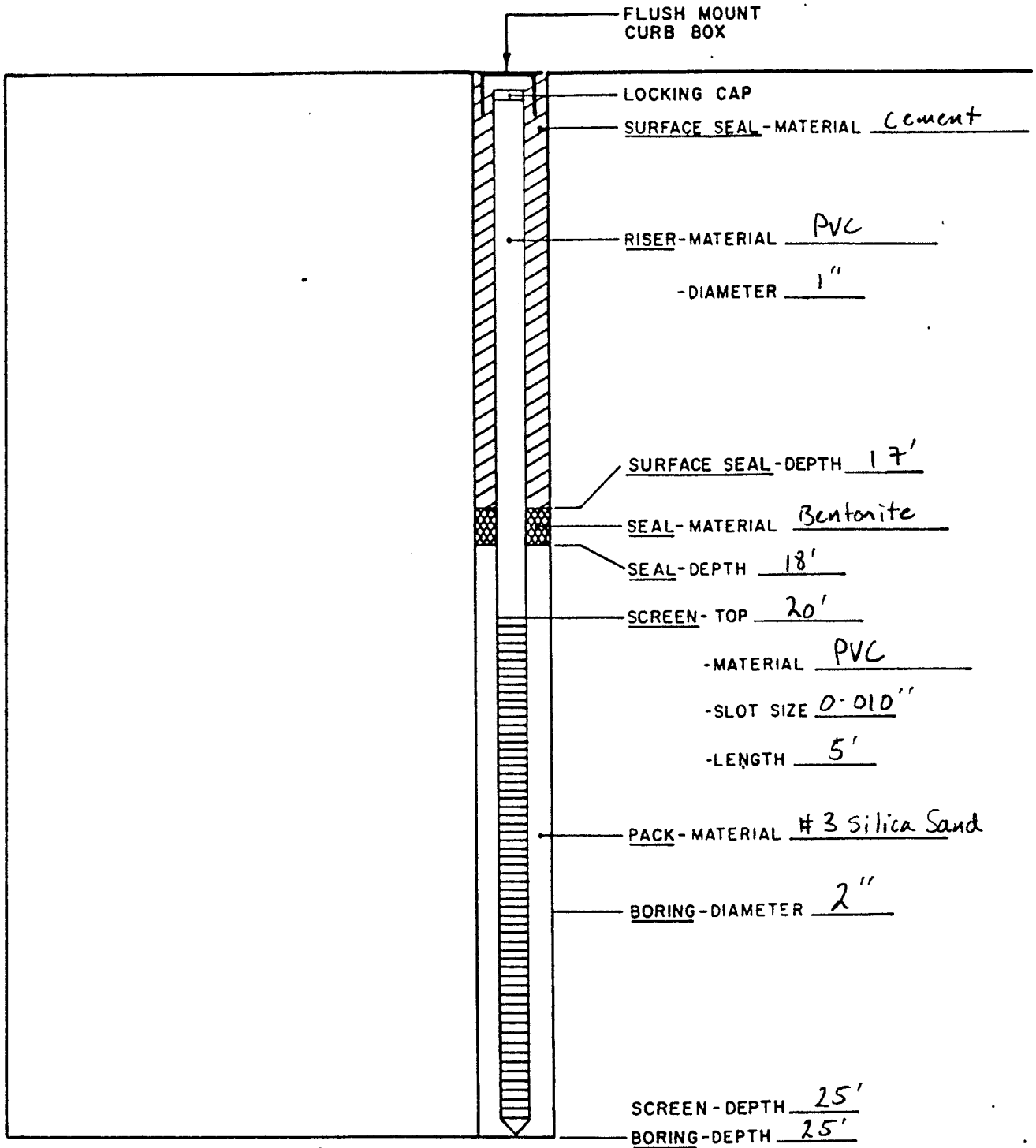
DEVELOPMENT DATE October 23, 1997

DEVELOPMENT METHOD Overpumping

BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

SUBSURFACE FIELD LOG
MONITORING WELL CONSTRUCTION DETAILS

(NOT TO SCALE)



WELL NO. MW-P9-5-5

PROJECT Supplemental Phase II ESI, Building 9

PROJECT NO. 480.76

BY Richard Blasland

DATE October 23, 1997

CASING ELEVATION _____

DEPTH TO WATER UPON COMPLETION 18.98'

DRILLER Environmental Investigations, Inc.

METHOD Geoprobe

RIG TYPE Geoprobe

DEVELOPMENT DATE October 23, 1997

DEVELOPMENT METHOD Over pumping

BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

APPENDIX B

LABORATORY ANALYTICAL RESULTS

Brighton Analytical Inc.
TM

Brighton Analytical, Inc.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810)229-7575 FAX: (810)229-8650

Date: 10/29/97

To: Blasland, Blouck & Lee
185 N.W. Spanish River
Suite 110
Boca Raton, FL 33431

Date Submitted: 10/23/97
Date Sampled: 10/23/97

BA Report Number: **24767**
Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-3-3**
BA Sample ID: **AL05194**
Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Acetone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Benzene	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
Benzyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromoform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Butanone (MEK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon disulfide	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-3-3**

BA Sample ID: **AL05194**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethane	**4**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,2-Dichloroethene	**1000**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Diethyl ether	**Not detected**	ug/L	100	SW846 8260	CW	10/27/97
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Hexanone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methylene chloride	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methyl(tert)butyl ether(MTBE)	**120**	ug/L	50	SW846 8260	CW	10/27/97
Styrene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Toluene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichloroethene	**350**	ug/L	1	SW846 8260	CW	10/27/97
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Vinyl acetate	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Vinyl chloride	**190**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-3-3**

BA Sample ID: **AL05194**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes	**Not detected**	ug/L	3	SW846 8260	CW	10/27/97

DL=Detection Limit as recommended by MDEQ.

Released by: _____

Date: 10/30/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-5-4**

BA Sample ID: **AL05195**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,2-Dichloroethene	**42**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Diethyl ether	**Not detected**	ug/L	100	SW846 8260	CW	10/27/97
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Hexanone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methylene chloride	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Styrene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Toluene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichloroethene	**15**	ug/L	1	SW846 8260	CW	10/27/97
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Vinyl acetate	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-5-4**

BA Sample ID: **AL05195**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes	**Not detected**	ug/L	3	SW846 8260	CW	10/27/97

DL=Detection Limit as recommended by MDEQ.

Released by: _____

Date: 10/30/97

Brighton Analytical Inc.

TM

Brighton Analytical, Inc.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810)229-7575 FAX: (810)229-8650

Date: 10/30/97

To: Blasland, Blouck & Lee
185 N.W. Spanish River
Suite 110
Boca Raton, FL 33431

Date Submitted: 10/23/97
Date Sampled: 10/23/97

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-4-3**

BA Sample ID: **AL05196**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Metal Analysis						
Total Copper	**Not detected**	mg/L	0.02	EPA 200.8	GW	10/30/97
Metal Water Total(digestion)	**Digested**				LS	10/28/97
Semi-Volatile Analysis						
Acenaphthene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Acenaphthylene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Anthracene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzidine	**Not detected**	ug/L	50	EPA 625	MC	10/27/97
Benzoic acid	**Not detected**	ug/L	50	EPA 625	MC	10/27/97
Benzo(a)anthracene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzo(b)fluoranthene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzo(k)fluoranthene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzo(ghi)perylene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzo(a)pyrene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Benzyl alcohol	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Bis(2-chloroethoxy)methane	**Not detected**	ug/L	5	EPA 625	MC	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-4-3**

BA Sample ID: **AL05196**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Di-n-octylphthalate	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
1,2-Diphenylhydrazine	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Fluoranthene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Fluorene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Hexachlorobenzene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Hexachlorobutadiene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Hexachlorocyclopentadiene	**Not detected**	ug/L	2	EPA 625	MC	10/27/97
Hexachloroethane	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Indeno(1,2,3)pyrene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Isophorone	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
2-Methylnaphthalene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
2-Methylphenol (o-Cresol)	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
3-Methylphenol (m-Cresol)	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
4-Methylphenol (p-Cresol)	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Naphthalene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
2-Nitroaniline	**Not detected**	ug/L	20	EPA 625	MC	10/27/97
3-Nitroaniline	**Not detected**	ug/L	20	EPA 625	MC	10/27/97
4-Nitroaniline	**Not detected**	ug/L	20	EPA 625	MC	10/27/97
Nitrobenzene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
2-Nitrophenol	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
4-Nitrophenol	**Not detected**	ug/L	20	EPA 625	MC	10/27/97
N-Nitrosodimethylamine	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
N-Nitrosodiphenylamine	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
N-Nitrosodi-n-propylamine	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Pentachlorophenol	**Not detected**	ug/L	1	EPA 625	MC	10/27/97
Phenanthrene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
Phenol	**Not detected**	ug/L	5	EPA 625	MC	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-4-3**

BA Sample ID: **AL05196**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Pyrene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
2,4,5-Trichlorophenol	**Not detected**	ug/L	50	EPA 625	MC	10/27/97
2,4,6-Trichlorophenol	**Not detected**	ug/L	5	EPA 625	MC	10/27/97
BNA (extraction)	**Extracted**			8270/625	BY	10/24/97

DL=Detection Limit as recommended by MDEQ.

Released by: JHKenyon

Date: 10/30/97

Brighton Analytical Inc.
TM

Brighton Analytical, Inc.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810)229-7575 FAX: (810)229-8650

Date: 10/29/97

To: Blasland, Blouck & Lee
185 N.W. Spanish River
Suite 110
Boca Raton, FL 33431

Date Submitted: 10/23/97
Date Sampled: 10/23/97

BA Report Number: **24767**
Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-5-5**
BA Sample ID: **AL05197**
Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Acetone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Benzene	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
Benzyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromoform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Butanone (MEK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon disulfide	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-5-5**

BA Sample ID: **AL05197**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,2-Dichloroethene	**150**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Diethyl ether	**Not detected**	ug/L	100	SW846 8260	CW	10/27/97
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Hexanone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methylene chloride	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Styrene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Toluene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichloroethene	**110**	ug/L	1	SW846 8260	CW	10/27/97
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Vinyl acetate	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Vinyl chloride	**7**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **MW-P9-5-5**

BA Sample ID: **AL05197**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes	**Not detected**	ug/L	3	SW846 8260	CW	10/27/97

DL=Detection Limit as recommended by MDEQ.

Released by: J. Kenyon

Date: 10/30/97

Brighton Analytical Inc.
TM

Brighton Analytical, Inc.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810)229-7575 FAX: (810)229-8650

Date: 10/29/97

To: Blasland, Blouck & Lee
185 N.W. Spanish River
Suite 110
Boca Raton, FL 33431

Date Submitted: 10/23/97
Date Sampled: 10/23/97

BA Report Number: **24767**
Project Name: **Flint Delphi Build #9**

Sample ID: **Duplicate**
BA Sample ID: **AL05198**
Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Acetone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Benzene	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
Benzyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromoform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Butanone (MEK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon disulfide	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **Duplicate**

BA Sample ID: **AL05198**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,2-Dichloroethene	**310**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Diethyl ether	**Not detected**	ug/L	100	SW846 8260	CW	10/27/97
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Hexanone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methylene chloride	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Styrene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Toluene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichloroethene	**86**	ug/L	1	SW846 8260	CW	10/27/97
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Vinyl acetate	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Vinyl chloride	**12**	ug/L	1	SW846 8260	CW	10/27/97

Brigpton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **Duplicate**

BA Sample ID: **AL05198**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes	**Not detected**	ug/L	3	SW846 8260	CW	10/27/97

DL=Detection Limit as recommended by MDEQ.

Released by: J. Kenyon

Date: 10/30/97

Brighton Analytical Inc.
TM

Brighton Analytical, Inc.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810)229-7575 FAX: (810)229-8650

Date: 10/29/97

To: Blasland, Blouck & Lee
185 N.W. Spanish River
Suite 110
Boca Raton, FL 33431

Date Submitted: 10/23/97
Date Sampled: 10/23/97

BA Report Number: **24767**
Project Name: **Flint Delphi Build #9**

Sample ID: **Equipment Blank**
BA Sample ID: **AL05199**
Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Acetone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Benzene	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
Benzyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromoform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Bromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Butanone (MEK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon disulfide	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloroform	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Chloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dibromomethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **Equipment Blank**

BA Sample ID: **AL05199**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Diethyl ether	**Not detected**	ug/L	100	SW846 8260	CW	10/27/97
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
2-Hexanone	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methylene chloride	**Not detected**	ug/L	5	SW846 8260	CW	10/27/97
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Styrene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Toluene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichloroethene	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97
Vinyl acetate	**Not detected**	ug/L	50	SW846 8260	CW	10/27/97
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260	CW	10/27/97

Brighton Analytical Inc.

BA Report Number: **24767**

Project Name: **Flint Delphi Build #9**

Sample ID: **Equipment Blank**

BA Sample ID: **AL05199**

Project Number: **869.76.030**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes	**Not detected**	ug/L	3	SW846 8260	CW	10/27/97

DL=Detection Limit as recommended by MDEQ.

Released by: J. H. Kenyon

Date: 10/30/97

2177

Brighton Analytical, Inc.™

2105 Pless Dr.
Brighton, MI 48116
Phone: 810-229-7575
Fax: 810-229-8650

COMPANY NAME: BBL
Blasland, Bouck, + Lee, Inc.

PROJECT NAME: Flint Delphi Build #9

REQUESTED TURNAROUND: (circle one)
Rush: 24 hours (verify with lab)
Rush: 48-72 hours (verify with lab)
Expedited: 5 business days
Standard: 10 business days

PROJECT NUMBER: 869.76.030

P. O. NUMBER/QUOTE #: 15429

Analysis Requested

Brighton ID #	Sample Description	Date Sampled	Time Sampled	# of Containers	Sample Matrix	METHOD # 8260	METHOD # 8270	METHOD # 6000/7000 Copper	METHOD # [illegible]	METHOD # (see note 6)	METHOD #	METHOD #	METHOD #
1) 05194	MW-P9-3-3	10/23/97	11:50	2	Q	1							
2) 95	MW-P9-5-4	10/23/97	12:15	2	Q	1							
3) 96	MW-P9-4-3	10/23/97	13:25	3	Q	/	1	1	1				
4) 97	MW-P9-5-5	10/23/97	14:02	2	Q	1							
5) 98	Duplicate	10/23/97	—	2	Q	1							
6) 99	EQUIPMENT BLANK	10/23/97	—	2	Q	X			1	1			
7)													
8)													
9)													
10)													
11)													

REPORT RESULTS TO:
Simon Sunderland
185 NW Spanish River Blvd.
Boca Raton, FL 33431
PHONE: 561-750-3733
FAX:

ABBREVIATIONS FOR MATRIX
S = Solids A = Air
U = Sludge Q = Aqueous

Comments:

Please fill out the Chain of Custody completely and review. Incorrect or incomplete information will result in a "hold" on all analyses

(1) Relinquished by: [signature]	(1) Date/Time: 10/23/97 7:10	(1) Received by: Cynthia L Williams	(1) Date/Time: 10/23/97 7:30AM.
(2) Relinquished by:	(2) Date/Time:	(2) Received by:	(2) Date/Time:
(3) Relinquished by:	(3) Date/Time:	(3) Received by:	(3) Date/Time:

Brighton Analytical Inc.

BRIGHTON ANALYTICAL, INC.

QUALITY ASSURANCE/QUALITY CONTROL

Brighton Analytical Inc.

METALS QC

Sample QC Report

File : C:\HPCHEM\1\DATA\Oct3097.07A\010SMPL.D\010SMPL.D#
Acquired : Oct 30 97 08:12 am using AcqMethod DB200_8.M
Operator : G.J.W.
Sample Name: SPEX 2
Misc Info : ,
Vial Number: 2102
CurrentMeth: C:\HPCHEM\1\METHODS\DB200_8.M
BkgFile : --------
Sample Type: --------
Dilution : 1000.000000

Element		Concentration	Cal Conc	LRS Conc	Flag
Be	9	99280.000 µg/L	100.000	500	Pass
Na	23	86950.000 µg/L	10000.000	50000	Pass
Mg	26	101400.000 µg/L	10000.000	50000	Pass
Al	27	102700.000 µg/L	100.000	500	>Cal std
K	39	100800.000 µg/L	10000.000	50000	Pass
Ca	44	151100.000 µg/L	10000.000	50000	Pass
V	51	106000.000 µg/L	100.000	500	>Cal std
Cr	52	108800.000 µg/L	100.000	500	>Cal std
Cr	53	108000.000 µg/L	100.000	500	>Cal std
Mn	55	108100.000 µg/L	100.000	500	>Cal std
Fe	57	100400.000 µg/L	10000.000	50000	Pass
Co	59	111000.000 µg/L	100.000	500	>Cal std
Ni	60	112000.000 µg/L	100.000	500	>Cal std
Cu	63	104300.000 µg/L	100.000	500	>Cal std
Cu	65	105600.000 µg/L	100.000	500	>Cal std
Zn	66	111300.000 µg/L	100.000	500	>Cal std
As	75	103000.000 µg/L	100.000	500	>Cal std
Se	77	105600.000 µg/L	100.000	500	>Cal std
Se	82	106200.000 µg/L	100.000	500	>Cal std
Mo	98	103900.000 µg/L	100.000	500	>Cal std
Ag	107	102300.000 µg/L	10.000	50	>LRS
Cd	111	106500.000 µg/L	100.000	500	>Cal std
Sb	123	105900.000 µg/L	100.000	500	>Cal std
Ba	137	104600.000 µg/L	100.000	500	>Cal std
Tl	205	101800.000 µg/L	100.000	500	>Cal std
Pb	208	99970.000 µg/L	100.000	500	Pass

Internal Standard QC Report

ISTD m/z	Ref. Counts	Sample Counts	Flag
6	5425	5852	Pass
45	16000	17187	Pass
89	27893	28860	Pass
115	28699	30178	Pass
209	25193	26806	Pass

Internal Standards referenced to 001CALB.D#

19 Element Failures. Maximum Number of Failures Allowed (30)
0 ISTD Failures. Maximum Number of ISTD Failures Allowed (6)

Spiked Sample QC Report

File : C:\HPCHEM\1\DATA\Oct3097.07A\014SPK_.D\014SPK_.D#
Acquired : Oct 30 97 08:33 am using AcqMethod DB200_8.M
Operator : G.J.W.
Sample Name: M.STD.
Misc Info : TOTAL WATERS
Vial Number: 2106
CurrentMeth: C:\HPCHEM\1\METHODS\DB200_8.M
BkgFile : --------
Sample Type: SPIKE
Dilution : 10.000000

Spike Reference Sample is C:\HPCHEM\1\DATA\Oct3097.07A\013SPKR.D\013SPKR.D#

Spike Recovery

Element		Conc.		Ref. Conc.	Conc. Added	%Rec.	QC Range	Flag
Be	9	2107.000	µg/L	-0.389	2000.0	105	80-120	Spk>Cal
Na	23	21400.000	µg/L	177.400	20000	106	80-120	Pass
Mg	26	22050.000	µg/L	-14.070	20000	110	80-120	Pass
Al	27	2142.000	µg/L	17.260	2000.0	107	80-120	Spk>Cal
K	39	21080.000	µg/L	-51.620	20000	105	80-120	Pass
Ca	44	21110.000	µg/L	-12.860	20000	106	80-120	Pass
V	51	2130.000	µg/L	-0.491	2000.0	106	80-120	Spk>Cal
Cr	52	2181.000	µg/L	0.084	2000.0	109	80-120	Spk>Cal
Cr	53	2152.000	µg/L	0.232	2000.0	108	80-120	Spk>Cal
Mn	55	2180.000	µg/L	-0.281	2000.0	109	80-120	Spk>Cal
Fe	57	21640.000	µg/L	20.360	20000	108	80-120	Pass
Co	59	2217.000	µg/L	-0.375	2000.0	111	80-120	Spk>Cal
Ni	60	2210.000	µg/L	-0.235	2000.0	110	80-120	Spk>Cal
Cu	63	2145.000	µg/L	-0.106	2000.0	107	80-120	Spk>Cal
Cu	65	2182.000	µg/L	-0.061	2000.0	109	80-120	Spk>Cal
Zn	66	2214.000	µg/L	12.860	2000.0	110	80-120	Spk>Cal
As	75	2221.000	µg/L	8.147	2000.0	111	80-120	Spk>Cal
Se	77	2199.000	µg/L	-1.452	2000.0	110	80-120	Spk>Cal
Se	82	2189.000	µg/L	6.814	2000.0	109	80-120	Spk>Cal
Mo	98	2191.000	µg/L	-0.704	2000.0	110	80-120	Spk>Cal
Ag	107	20.330	µg/L	0.030	20	102	80-120	Pass
Cd	111	2142.000	µg/L	-0.696	2000.0	107	80-120	Spk>Cal
Sb	123	2146.000	µg/L	4.073	2000.0	107	80-120	Spk>Cal
Ba	137	2169.000	µg/L	0.089	2000.0	108	80-120	Spk>Cal
Tl	205	2106.000	µg/L	-1.356	2000.0	105	80-120	Spk>Cal
Pb	208	2086.000	µg/L	0.205	2000.0	104	80-120	Spk>Cal

Internal Standard QC Report

ISTD m/z	Ref. Counts	Sample Counts	Flag
6	5425	6062	Pass
45	16000	17979	Pass
89	27893	28642	Pass
115	28699	30449	Pass
209	25193	26434	Pass

Internal Standards referenced to 001CALB.D#

0 Element Failures. Maximum Number of Failures Allowed (30)
0 ISTD Failures. Maximum Number of ISTD Failures Allowed (6)

Spiked Sample QC Report

File : C:\HPCHEM\1\DATA\Oct3097.09A\007SPK_.D\007SPK_.D#
Acquired : Oct 30 97 10:00 am using AcqMethod DB200_8.M
Operator : G.J.W.
Sample Name: 5331 MS
Misc Info : TOTAL WATERS
Vial Number: 2114
CurrentMeth: C:\HPCHEM\1\METHODS\DB200_8.M
BkgFile : --------
Sample Type: SPIKE
Dilution : 10.000000

Spike Reference Sample is C:\HPCHEM\1\DATA\Oct3097.09A\006SPKR.D\006SPKR.D#

Spike Recovery

Element		Conc.		Ref. Conc.	Conc. Added	%Rec.	QC Range	Flag
Be	9	1954.000	µg/L	-0.473	2000.0	98	80-120	Spk>Cal
Na	23	157100.000	µg/L	1.4860E+5	20000	42	80-120	High in SR
Mg	26	59800.000	µg/L	43510.000	20000	81	80-120	Pass
Al	27	1953.000	µg/L	19.590	2000.0	98	80-120	Spk>Cal
K	39	24030.000	µg/L	5549.000	20000	92	80-120	Pass
Ca	44	172500.000	µg/L	1.6670E+5	20000	29	80-120	High in SR
V	51	1897.000	µg/L	-0.443	2000.0	95	80-120	Spk>Cal
Cr	52	1902.000	µg/L	-0.851	2000.0	95	80-120	Spk>Cal
Cr	53	1883.000	µg/L	-0.101	2000.0	94	80-120	Spk>Cal
Mn	55	2472.000	µg/L	593.300	2000.0	94	80-120	Spk>Cal
Fe	57	19250.000	µg/L	214.300	20000	95	80-120	Pass
Co	59	1956.000	µg/L	0.350	2000.0	98	80-120	Spk>Cal
Ni	60	1924.000	µg/L	3.823	2000.0	96	80-120	Spk>Cal
Cu	63	1957.000	µg/L	15.010	2000.0	97	80-120	Spk>Cal
Cu	65	1949.000	µg/L	1.499	2000.0	97	80-120	Spk>Cal
Zn	66	2042.000	µg/L	80.420	2000.0	98	80-120	Spk>Cal
As	75	2034.000	µg/L	6.070	2000.0	101	80-120	Spk>Cal
Se	77	2019.000	µg/L	-0.230	2000.0	101	80-120	Spk>Cal
Se	82	1990.000	µg/L	7.818	2000.0	99	80-120	Spk>Cal
Mo	98	1989.000	µg/L	2.613	2000.0	99	80-120	Spk>Cal
Ag	107	18.710	µg/L	-0.006	20	94	80-120	Pass
Cd	111	1931.000	µg/L	-0.757	2000.0	97	80-120	Spk>Cal
Sb	123	2175.000	µg/L	0.381	2000.0	109	80-120	Spk>Cal
Ba	137	2168.000	µg/L	185.500	2000.0	99	80-120	Spk>Cal
Tl	205	2009.000	µg/L	-1.533	2000.0	100	80-120	Spk>Cal
Pb	208	1922.000	µg/L	10.570	2000.0	96	80-120	Spk>Cal

Internal Standard QC Report

ISTD m/z	Ref. Counts	Sample Counts	Flag
6	5425	6246	Pass
45	16000	18999	Pass
89	27893	31967	Pass
115	28699	33140	Pass
209	25193	29520	Pass

Internal Standards referenced to 001CALB.D#

0 Element Failures. Maximum Number of Failures Allowed (30)
0 ISTD Failures. Maximum Number of ISTD Failures Allowed (6)

Spiked Sample QC Report

File : C:\HPCHEM\1\DATA\Oct3097.09A\008SPK_.D\008SPK_.D#
Acquired : Oct 30 97 10:06 am using AcqMethod DB200_8.M
Operator : G.J.W.
Sample Name: 5331 MSD
Misc Info : TOTAL WATERS
Vial Number: 2115
CurrentMeth: C:\HPCHEM\1\METHODS\DB200_8.M
BkgFile : --------
Sample Type: SPIKE
Dilution : 10.000000

Spike Reference Sample is C:\HPCHEM\1\DATA\Oct3097.09A\006SPKR.D\006SPKR.D#

Spike Recovery

Element		Conc.		Ref. Conc.	Conc. Added	%Rec.	QC Range	Flag
Be	9	2013.000	µg/L	-0.473	2000.0	101	80-120	Spk>Cal
Na	23	176900.000	µg/L	1.4860E+5	20000	142	80-120	High in SR
Mg	26	65450.000	µg/L	43510.000	20000	110	80-120	Pass
Al	27	2143.000	µg/L	19.590	2000.0	107	80-120	Spk>Cal
K	39	25670.000	µg/L	5549.000	20000	101	80-120	Pass
Ca	44	180500.000	µg/L	1.6670E+5	20000	69	80-120	High in SR
V	51	2053.000	µg/L	-0.443	2000.0	103	80-120	Spk>Cal
Cr	52	2054.000	µg/L	-0.851	2000.0	103	80-120	Spk>Cal
Cr	53	2040.000	µg/L	-0.101	2000.0	102	80-120	Spk>Cal
Mn	55	2681.000	µg/L	593.300	2000.0	104	80-120	Spk>Cal
Fe	57	21030.000	µg/L	214.300	20000	104	80-120	Pass
Co	59	2109.000	µg/L	0.350	2000.0	105	80-120	Spk>Cal
Ni	60	2076.000	µg/L	3.823	2000.0	104	80-120	Spk>Cal
Cu	63	2111.000	µg/L	15.010	2000.0	105	80-120	Spk>Cal
Cu	65	2087.000	µg/L	1.499	2000.0	104	80-120	Spk>Cal
Zn	66	2170.000	µg/L	80.420	2000.0	104	80-120	Spk>Cal
As	75	2150.000	µg/L	6.070	2000.0	107	80-120	Spk>Cal
Se	77	2111.000	µg/L	-0.230	2000.0	106	80-120	Spk>Cal
Se	82	2083.000	µg/L	7.818	2000.0	104	80-120	Spk>Cal
Mo	98	2114.000	µg/L	2.613	2000.0	106	80-120	Spk>Cal
Ag	107	19.460	µg/L	-0.006	20	97	80-120	Pass
Cd	111	2039.000	µg/L	-0.757	2000.0	102	80-120	Spk>Cal
Sb	123	2298.000	µg/L	0.381	2000.0	115	80-120	Spk>Cal
Ba	137	2314.000	µg/L	185.500	2000.0	106	80-120	Spk>Cal
Tl	205	2129.000	µg/L	-1.533	2000.0	106	80-120	Spk>Cal
Pb	208	2045.000	µg/L	10.570	2000.0	102	80-120	Spk>Cal

Internal Standard QC Report

ISTD m/z	Ref. Counts	Sample Counts	Flag
6	5425	6254	Pass
45	16000	18207	Pass
89	27893	30636	Pass
115	28699	32142	Pass
209	25193	28290	Pass

Internal Standards referenced to 001CALB.D#

0 Element Failures. Maximum Number of Failures Allowed (30)
0 ISTD Failures. Maximum Number of ISTD Failures Allowed (6)

Duplicate QC Report

File : C:\HPCHEM\1\DATA\OCT3097.09A\008SPK_.D\008SPK_.D#
Acquired : Oct 30 97 10:06 am using AcqMethod DB200_8.M
Operator : G.J.W.
Sample Name: 5331 MSD
Misc Info : TOTAL WATERS
Vial Number: 2115
CurrentMeth: C:\HPCHEM\1\METHODS\DB200_8.M
BkgFile : --------
Sample Type: SPIKE
Dilution : 10.000000

Duplicate Reference Sample is C:\HPCHEM\1\DATA\OCT3097.09A\007SPK_.D\007SPK

Element		Concentration	Reference	RPD or Delta	Allowed RPD or CRDL limit	Flag
Be	9	2013 µg/L	1954	3%	20%	Dup>Cal
Na	23	176900 µg/L	157100	12%	20%	Dup>Cal
Mg	26	65450 µg/L	59800	9%	20%	Pass
Al	27	2143 µg/L	1953	9%	20%	Dup>Cal
K	39	25670 µg/L	24030	7%	20%	Pass
Ca	44	180500 µg/L	172500	5%	20%	Dup>Cal
V	51	2053 µg/L	1897	8%	20%	Dup>Cal
Cr	52	2054 µg/L	1902	8%	20%	Dup>Cal
Cr	53	2040 µg/L	1883	8%	20%	Dup>Cal
Mn	55	2681 µg/L	2472	8%	20%	Dup>Cal
Fe	57	21030 µg/L	19250	9%	20%	Pass
Co	59	2109 µg/L	1956	8%	20%	Dup>Cal
Ni	60	2076 µg/L	1924	8%	20%	Dup>Cal
Cu	63	2111 µg/L	1957	8%	20%	Dup>Cal
Cu	65	2087 µg/L	1949	7%	20%	Dup>Cal
Zn	66	2170 µg/L	2042	6%	20%	Dup>Cal
As	75	2150 µg/L	2034	6%	20%	Dup>Cal
Se	77	2111 µg/L	2019	4%	20%	Dup>Cal
Se	82	2083 µg/L	1990	5%	20%	Dup>Cal
Mo	98	2114 µg/L	1989	6%	20%	Dup>Cal
Ag	107	19.46 µg/L	18.71	4%	20%	Pass
Cd	111	2039 µg/L	1931	5%	20%	Dup>Cal
Sb	123	2298 µg/L	2175	5%	20%	Dup>Cal
Ba	137	2314 µg/L	2168	7%	20%	Dup>Cal
Tl	205	2129 µg/L	2009	6%	20%	Dup>Cal
Pb	208	2045 µg/L	1922	6%	20%	Dup>Cal

Internal Standard QC Report

ISTD m/z	Ref. Counts	Sample Counts	Flag
6	5425	6254	Pass
45	16000	18207	Pass
89	27893	30636	Pass
115	28699	32142	Pass
209	25193	28290	Pass

Internal Standards referenced to 001CALB.D#

0 Element Failures. Maximum Number of Failures Allowed (30)

Brigpton Analytical Inc.

GC/MS
VOLATILE METHOD 8260

REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY

Analysis Date: 10/27/97 Standard ID: #563 Inst./Detec: HP5972/GC-MS

Laboratory ID#: AL05076 Matrix: WATER Analyst: CLW

SURROGATES	Matrix Spike - Precision *			Matrix Spike - Accuracy			
	Spike 1	Spike 2	Relative Percent Difference	Spk Conc	% Recovery	Range (%)	Method Blank ug/L
D4-1,2-Dichloroethane	49.4	46.1	6.9	50ug/L	99	76 - 114	96
D8-Toluene	49.2	51.7	5.0	50ug/L	98	88 - 110	99
4-Bromofluorobenzene	49.1	49.9	1.6	50ug/L	98	86 - 115	97
COMPOUNDS							
1,1-Dichloroethene	9.5	9.8	3.1	10ug/L	95	61 - 145	<1
Benzene	8.4	10.3	19.9	10ug/L	84	76 - 127	<1
Trichloroethene	8.0	9.7	19.2	10ug/L	80	71 - 170	<1
Toluene	8.6	10.5	19.9	10ug/L	86	76 - 125	<1
Chlorobenzene	8.5	10.3	19.1	10ug/L	85	75 - 130	<1

* Matrix Spike Precision +/-20 Relative Percent Difference.

(ug/L is equivalent to ppb)

Comments: _____

Brighton Analytical Inc.

GC/MS
SEMI-VOLATILE METHOD 8270

REPRESENTATIVE EXTRACTION BATCH QUALITY CONTROL SUMMARY

Analysis Date: 10/27/97 Extraction Date: 10/24/97

Standard ID: #407 Analyst: MC

Matrix: Water

SURROGATES	Method Standard % Recovery	Standard Concentration	Soil Matrix Range	Method Blank ug/L
2-Fluorophenol	79	100ug/L	21 - 110	87
D6-Phenol	78	100ug/L	10 - 110	67
D5-Nitrobenzene	75	100ug/L	34 - 114	69
2-Fluorobiphenyl	92	100ug/L	43 - 116	77
2,4,6-Tribromophenol	78	100ug/L	10 - 123	72
D14-Terphenyl	75	100ug/L	33 - 141	73
COMPOUNDS				
Phenol	85	100ug/L	12 - 110	<5
2-Chlorophenol	98	100ug/L	27 - 123	<5
1,4-Dichlorobenzene	91	100ug/L	36 - 97	<5
N-nitrosodipropylamine	80	100ug/L	41 - 116	<5
1,2,4-Trichlorobenzene	87	100ug/L	39 - 98	<5
4-Chloro-3-Methyl Phenol	99	100ug/L	23 - 97	<5
Acenaphthene	89	100ug/L	46 - 118	<5
4-Nitrophenol	69	100ug/L	10 - 110	<5
2,4-Dinitrotoluene	65	100ug/L	24 - 96	<5
Pentachlorophenol	77	100ug/L	9 - 103	<1
Pyrene	100	100ug/L	26 - 127	<5

Comments:

Brighton Analytical Inc.

GC/MS

SEMI-VOLATILE METHOD 8270

REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY

Analysis Date: 10/27/97 Standard ID: #552 Inst./Detec: HP5972/GC-MS

Laboratory ID#: Method Stds Matrix: WATER Analyst: MC

SURROGATES				Matrix Spike - Accuracy			
	Spike 1	Spike 2	Relative Percent Difference	Spk Conc	% Recovery	Range (%)	Method Blank ug/kg
2-Fluorophenol	78.7	83.1	5.4	100ug/L	79	21 - 110	87
D6-Phenol	77.7	83.8	7.6	100ug/L	78	10 - 110	67
D5-Nitrobenzene	74.6	67.8	9.5	100ug/L	75	34 - 114	69
2-Fluorobiphenyl	92.1	91.1	1.1	100ug/L	92	43 - 116	77
2,4,6-Tribromophenol	77.7	86.2	10.4	100ug/L	78	10 - 123	72
D14-Terphenyl	75.4	66.2	13.0	100ug/L	75	33 - 141	73
COMPOUNDS							
Phenol	84.7	75.0	12.1	100ug/L	85	12 - 110	<330
2-Chlorophenol	98.4	99.0	0.6	100ug/L	98	27 - 123	<330
1,4-Dichlorobenzene	91.0	93.2	2.4	100ug/L	91	36 - 97	<330
N-nitrosodipropylamine	79.9	88.0	9.6	100ug/L	80	41 - 116	<330
1,2,4-Trichlorobenzene	86.6	72.8	17.3	100ug/L	87	39 - 98	<330
4-Chloro-3-Methyl Phenol	99.1	96.0	3.2	100ug/L	99	23 - 97	<330
Acenaphthene	88.9	91.4	2.8	100ug/L	89	46 - 118	<330
4-Nitrophenol	68.5	61.3	11.1	100ug/L	69	10 - 110	<330
2,4-Dinitrotoluene	64.9	73.9	13.0	100ug/L	65	24 - 96	<330
Pentachlorophenol	77.5	76.9	0.8	100ug/L	78	9 - 103	<1700
Pyrene	99.8	96.4	3.5	100ug/L	100	26 - 127	<330

* Matrix Spike Precision +/-20 Relative Percent .

Comments: