Former Davis-Howland Oil Corporation Site 2009 Groundwater Sampling Draft Data Summary Report Rochester, New York

Site Number: 8-28-088

July 2009

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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List of Abbreviations and Acronyms

µg/L	micrograms per liter
amsl	above mean sea level
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
cm/s	centimeters per second
COC	chemical of concern
Davis-Howland	Former Davis-Howland Oil Corporation site
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
DGC	Dunn Geoscience Corporation
DUSR	Data Usability Summary Report
EEEPC	Ecology and Environment Engineering, P.C.
FS	feasibility study
ft/ft	feet per foot
IDW	investigation-derived waste
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tert-butyl ether
NTU	nephelometric turbidity unit
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OU	operable unit

List of Abbreviations and Acronyms (cont.)

PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PPE	personal protective equipment
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RI	remedial investigation
ROD	Record of Decision
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TCA	1,1,1-trichloroethane
TCE	trichloroethene
TOGS	Technical Operational Guidance Series
TPH	total petroleum hydrocarbons
USGS	U.S. Geological Survey
VC	vinyl chloride
VOC	volatile organic compound

1 Introduction

Ecology and Environment Engineering, P.C. (EEEPC), under contract to the New York State Department of Environmental Conservation (NYSDEC) (Work Assignment Number D004422-14) was tasked to perform groundwater sampling and analysis at the former Davis-Howland Oil Corporation (Davis-Howland) site (NYSDEC Site No. 8-28-088), located in the City of Rochester in Monroe County, New York (see Figure 1-1).

Field investigations were performed by EEEPC personnel on May 13 and 14 2009. This report provides a summary of the groundwater sampling and well inspections performed as described in the Groundwater Monitoring and Long-term Well Sampling Procedures prepared by EEEPC in May 2004 and revised for the Site Management Plan in 2008 (Ecology and Environment Engineering, P.C. May 2008). Descriptions of the May 2009 groundwater monitoring well sampling field activities are presented in Section 2. Physical characteristics of the study area are presented in Section 3. A discussion of the new analytical data obtained and a comparison with previous historical analytical data is presented in Section 4.

1.1 Site Location and Description

The former Davis-Howland site is located at 190-220 Anderson Avenue and a portion of 176 Anderson Avenue in the City of Rochester in Monroe County, New York on an approximately 1-acre parcel. The parcel is located in a mixed-use area of residential, municipal, and industrial properties and is bordered by railroad tracks to the north and east, Anderson Avenue to the south, and by operational commercial and retail buildings to the west. The site consists of four buildings of various sizes and an open area adjacent to the railroad tracks.

1.2 General Site History and Background

The site was used to produce industrial chemicals, oils, greases and other lubricants from 1942 to 1972. From 1972 until sometime in 1994 it was operated by the Davis-Howland Oil Company. Davis-Howland Oil Company ceased operations sometime in 1994.

Several reports of spills and releases of materials on the site—including waste oil, mineral oil, hydrochloric acid, and sulfuric acid—were reported to NYSDEC during Davis-Howland Oil Company's operational period. NYSDEC inspected the

site in June 1991 and found several hundred drums of oils, solvents, and other materials, some of which were leaking, as well as several areas of stained surficial soil. A subsequent soil investigation by NYSDEC included soil sampling, a waste inventory and characterization, and over-packing and containerizing of leaking drums. Analytical results showed the soil was contaminated with petroleum and solvents.

In October 1991 the owners of the Davis-Howland Oil Company contracted with Dunn Geosciences Corporation (DGC), Amherst, New York, to conduct a remedial soil investigation. The investigation included test pits and soil gas probing in order to evaluate the distribution of contaminated soils behind (north of) the Davis-Howland buildings on Anderson Avenue. The DGC remedial investigation (RI) report of November 26, 1991 noted that the following contaminants were found on the site:

- Visibly stained soils 6 to 7 feet below grade surface (bgs) north of the building;
- Chlorinated and non-chlorinated solvents 6 to 7 feet bgs that exceeded the NYSDEC Class GA groundwater standards; and
- Lead levels exceeding the groundwater standard at depths of 3 to 3.5 feet bgs.

As recommended by DGC's November 1991 RI report, all containerized liquid drummed wastes and the uppermost 1 to 2 feet of visibly contaminated surficial soils needed to be removed before remediation of deeper soils was attempted.

From April to June 1992, Clean Harbors of Kingston, Inc. (CHI), Kingston, New York, removed drummed waste and cleaned up surficial soils. NYSDEC's inspection during the CHI cleanup indicated that visually contaminated soils remained after the surficial soils excavation work, but further removal would have been impractical at that time. NYSDEC decided that additional soil contamination would be addressed in later investigations. CHI submitted a draft report (1992) summarizing the three-month soil and drummed waste remediation. The report was deemed "inadequate" by NYSDEC because no field monitoring or soil sampling had been conducted to confirm that the surficial soil removal was adequate.

In conjunction with the drum and soil removal work (April to June 1992), CHI performed additional site investigations by sampling soils and installing and sampling six shallow groundwater monitoring wells. In September 1992, Davis-Howland submitted the CHI groundwater report to NYSDEC. The analytical results indicated that the groundwater was contaminated with chlorinated and non-chlorinated solvents and metals.

In December 1994, NYSDEC sampled the site's groundwater monitoring wells to assist in the development of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan. The results were consistent with the September 1992 CHI groundwater report.

In April 1995, NYSDEC made the following conclusions, based on the report results:

- All monitoring well analytical results from the site exceeded the NYSDEC Class GA groundwater standards for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals.

- Additional deep bedrock and shallow monitoring wells were needed to characterize the site.

- The designated groundwater chemicals of concern (COCs) included volatiles, SVOCs, pesticides/polychlorinated biphenyls (PCBs), and metals.

In April 1995, based on the review of previous technical studies, the site was listed on the New York State Registry of Inactive Hazardous Waste Sites (Site No. 8-28-088), indicating that it posed a significant threat to human health and the environment.

The first of a two-phase RI/FS work assignment was completed in October 1996 by Lawler, Matusky, Skelly Engineers, LLP, and Galson/Lozier Engineers. The investigation and study focused on operable unit (OU)-1, which encompasses the shallow groundwater, surficial soil, and subsurface soil on the site. Eight shallow and fifteen bedrock monitoring wells were installed for the Phase I investigation.

Based upon the results of the Phase I RI/FS prepared for the DHOC Inactive Hazardous Waste Site OU-1 (upper aquifer and soils) and the criteria identified for the evaluation of alternatives in that document (Lawler, Matusky and Skelly March 1997), NYSDEC selected Alternative 3 (air sparging, soil vapor extraction [SVE], and soil excavation and removal) as the site remedy in the Record of Decision (ROD). The ROD for the selected remedial alternative OU-1 was signed in March 1997.

A Phase II RI/FS was completed in October 1997 by Lawler, Matusky, Skelly Engineers and Galson/Lozier Engineers. The investigation and study focused on further defining the nature and extent of soil and deep groundwater contamination on the site. Additional soil samples were collected at the surface and near-surface to confirm the results from Phase I of the first RI. In addition, bedrock monitoring wells were installed and sampled. Finally, air sparging and soil vapor extraction pilot tests were performed to evaluate the remedial technologies for use at the site.

Based upon the results of the Phase II remedial investigation for OU-2 (the bedrock aquifer) and the criteria identified for the evaluation of alternatives in that document, NYSDEC selected No Further Action as the site remedy. The second ROD for the selected remedial alternative for OU-2 was signed in March 1998.

Contract documents for remedial construction at the site were prepared by ENSR Engineering New York and issued for bidding in September 2000.

The groundwater treatment system is a trailer-mounted remediation system using 46 sparge points, six SVE points, 1,300 feet of horizontal SVE lines, three groundwater extraction wells, six observation piezometers, and two blasted bedrock trench recovery wells. Treatment-system start-up occurred on July 22, 2002. On August 27, 2002 the continuous 24-hour operation of the treatment system began the operation, maintenance, and monitoring (OM&M) phase, which continues to the present.

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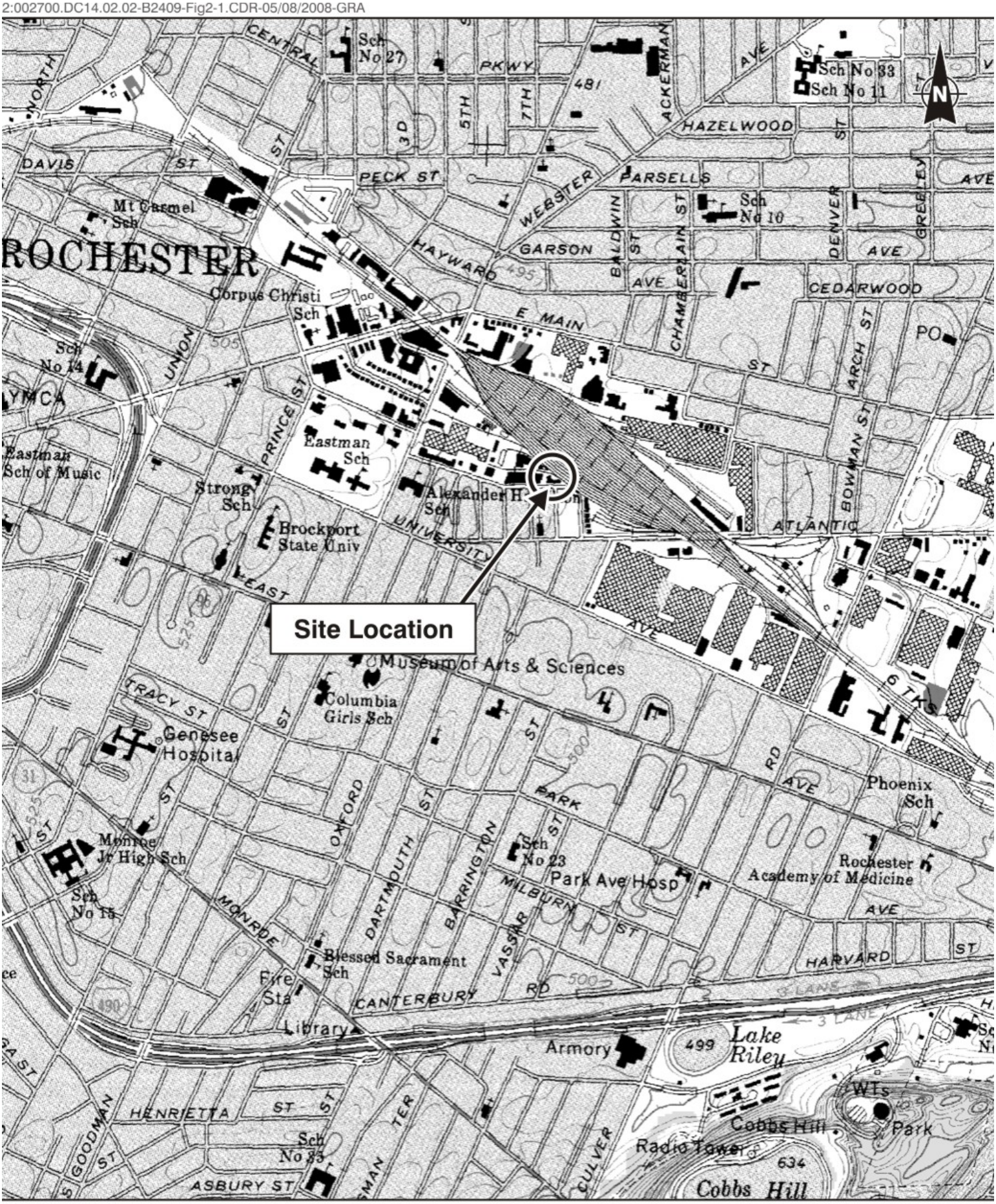


MAP SOURCE: USGS Topographic 7.5 Minute Series,
Rochester East Quadrangle, Monroe County, New York

Figure 1-1
Former Davis-Howland Oil Corporation Site Location Map

2 2009 Field Activities

This section discusses the 2009 groundwater monitoring well field activities performed at the Davis-Howland site in May 2009. All field activities were conducted according to EEEPC's Groundwater Sampling Procedures (May 2008). Sample locations are indicated on Figure 2-1. In addition to the revised 2008 Groundwater Sampling Procedures, Appendix N of the draft Site Management plan (Ecology and Environment Engineering, P.C. May 2008), an addendum to the existing EEEPC site-specific health and safety plan was prepared.

2.1 Monitoring Well Sampling

Groundwater samples were collected from 15 wells at the Davis-Howland site. Sampling was not attempted at two additional wells that were dry. All monitoring wells were purged prior to sampling. Monitoring-well purging was completed using a submersible pump with new polyethylene tubing or using disposable polyethylene bailers on new polypropylene line. Non-dedicated sampling equipment was decontaminated in accordance with the revised 2008 Groundwater Sampling Procedures, located in Appendix N of the Site Management Plan (Ecology and Environment Engineering, P.C. May 2008). Fluids generated during decontamination were handled according to procedures outlined in Section 2.3.

Prior to purging, static water levels were measured to within ±0.01 foot in each well using an electronic water-level indicator. The water level and total depth of each well were recorded (see Table 2-1).

Monitoring wells were purged of at least three volumes of water standing in the well. MW-16R was purged dry after one to two well volumes and was sampled after sufficient recharge occurred. Well MW-2R was purged of 1.2 gallons but never recharged and so was not sampled.

Wells CHI-6 and CHI-1 were measured dry and not sampled. Purged water was handled in accordance with the revised 2008 Groundwater Sampling Procedures (see Section 2.3 below). Temperature, pH, specific conductance, and turbidity were measured and recorded at specified intervals during and after purging. Purging was performed until pH, specific conductance, and temperature had stabilized and turbidity was 50 nephelometric turbidity units (NTUs) or less. The water quality parameters measured at the time of sampling are noted in Table 2-2. Appendix A contains copies of the well purge and sample records.

All groundwater samples were submitted to Columbia Analytical Services for VOC analysis by Method 601, SVOCs by Method 625, pH by Method 150-1, and petroleum products (total petroleum hydrocarbons [TPH]) by Method 310-13 analyses.

In addition to the environmental samples, quality assurance/quality control (QA/QC) samples were collected. Trip blanks accompanied every shipment for VOC analysis to check for the possible introduction of VOCs from the time the samples were collected to the time they were analyzed. All sample portions for VOCs collected on a single day were transported in the same cooler. To check consistency in both sample collection and sample analysis, duplicate samples were collected. Duplicate samples were collected at a rate of approximately one per 20 field samples. The duplicate sample (MW-3R/D) consisted of aliquots of sample media placed in separate sample containers and labeled as separate samples. Additionally, a matrix spike/matrix spike duplicate (MS/MSD) sample (MW-5R) was collected to simulate the background effect and interferences found in the actual samples. The calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. MS/MSD samples were also collected at a rate of one per 20 field samples. QA/QC data were reviewed by an EEEPC chemist and a Data Usability Summary Report (DUSR) was prepared (see Appendix B). Data qualifiers were applied as described in the DUSR and incorporated into the data summary tables in Section 4.

Per the procedures outlined in the revised 2008 Groundwater Sampling Procedures, vials for VOC analysis were filled, leaving no headspace. Upon collection, all samples were labeled and immediately placed in a cooler maintained with ice at 4°C. The samples were then packaged and the cooler was driven to the laboratory with chain-of-custody documents prepared in accordance with the revised 2008 Groundwater Sampling Procedures.

2.2 Monitoring Well Inspections

On May 13, 2009, EEEPC conducted a brief inspection of the groundwater monitoring wells. The purpose of these inspections was to determine and document the physical condition of the wells and to identify maintenance actions required to keep the wells operational. The inspections indicated that the wells were in good condition. The results of the inspections are documented on Table 2-3.

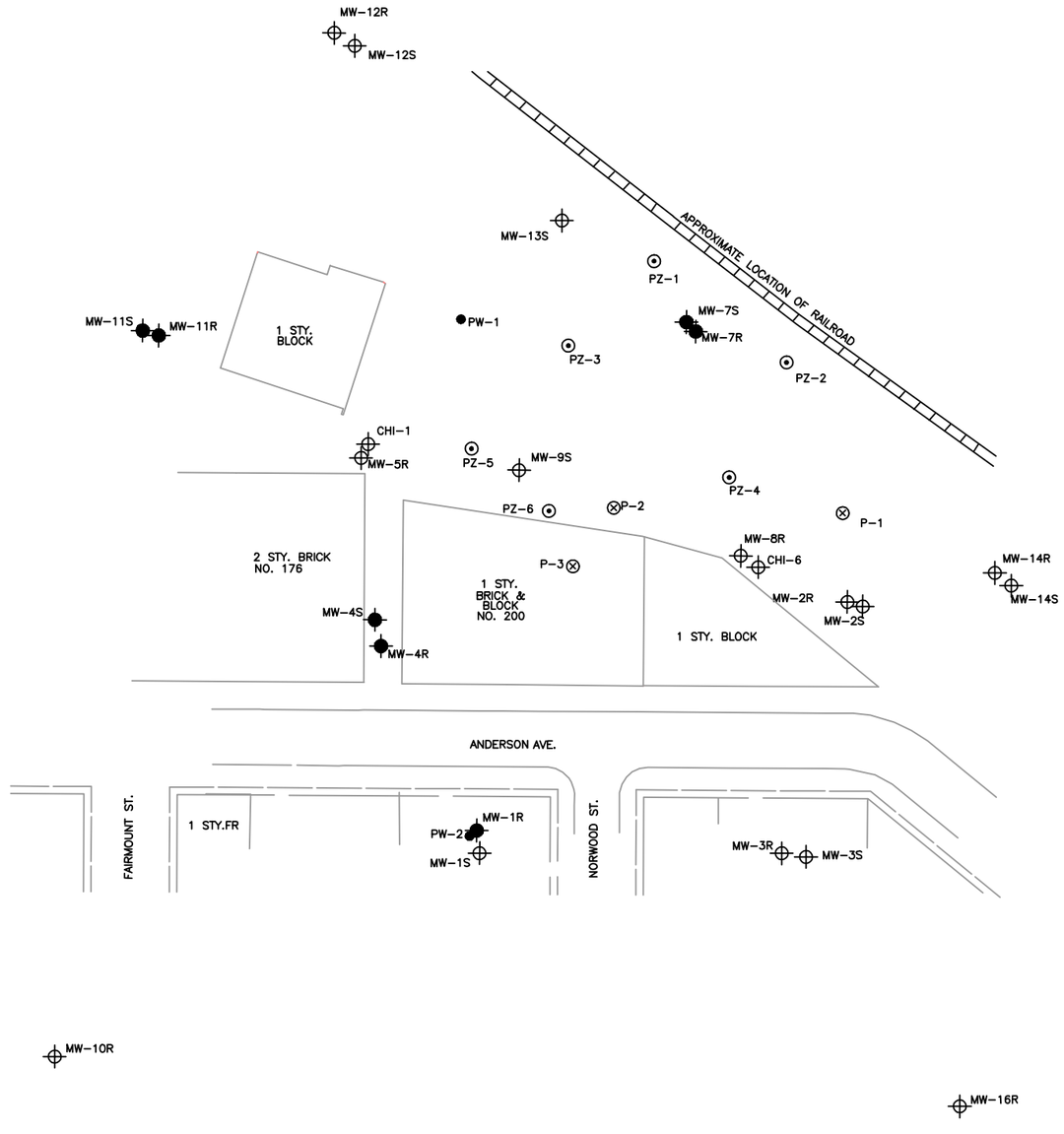
2.3 Investigation-Derived Waste Management

All investigation-derived waste (IDW) generated during this investigation was handled according to procedures outlined in the revised 2008 Groundwater Sampling Procedures Two types of IDW were generated: purging groundwater and expendable materials, including personal protective equipment (PPE). Waste streams were segregated and not mixed.

IDW water was filtered or left undisturbed to allow the solids to settle out of suspension. The water or the water with the fines removed was pumped into equalization tank of the on-site groundwater treatment system.

All expendable PPE generated during the investigation (including but not limited to Tyvek clothing, gloves, and plastic sheeting) was double-bagged and placed in an industrial dumpster.

F:\Davis NY02\2009\Davis-Howland Figure 2-1.dwg



LEGEND

MW-12R	EXISTING MONITORING WELL
MW-7S	DECOMMISSIONED WELL
P-1	SHALLOW – GROUNDWATER PUMPING WELLS
PW-1	BEDROCK – GROUNDWATER PUMPING WELLS
PZ-4	PIEZOMETERS

N

SCALE IN FEET

0 80 160 240

NO.	DATE	DWN	APP'D	DESCRIPTION
C	7/29/09	KMK	MGS	REVISED JULY 2009
B	12/21/07	KMK	MGS	REVISED DECEMBER 2007
A	2/04	KMK	MGS	ISSUED TO NYSDEC FOR REVIEW

REVISIONS

FIGURE 2-1
GROUNDWATER MONITORING WELL LOCATION MAP
DAVIS-HOWLAND OIL CORPORATION SITE
MONROE COUNTY, ROCHESTER, NY

ecology and environment

Table 2-1 May 2009 Groundwater Elevations, Former Davis-Howland Oil Corporation Site, Rochester, NY

Well Type	Well ID	Measurement Date	Measured Total Depth (feet TOIC)	Ground Elevation (feet amsl)	TOIC Casing Elevation (feet amsl)	Water Level (feet TOIC)	Groundwater Elevation (feet amsl)
Shallow Overburden	CHI-1	5/13/2009	4.50			DRY	
	CHI-6	5/13/2009	7.80	496.61	498.77	DRY	498.77
	MW-1S	5/13/2009	17.75	500.41	500.23	11.43	488.80
	MW-2S	5/13/2009	13.76	496.23	496.03	6.23	489.80
	MW-3S	5/13/2009	16.91	498.27	497.97	6.50	491.47
	MW-9S	5/13/2009	18.74	498.57	497.94	7.31	490.63
	MW-12S	5/13/2009	14.45	496.24	495.78	3.62	492.16
	MW-13S	5/13/2009	13.50	496.58	496.24	4.55	491.69
	MW-14S	5/13/2009	12.72	495.93	495.48	3.08	492.40
	PZ-1	5/13/2009	12.02			4.02	
	PZ-2	5/13/2009	12.27			2.63	
	PZ-3	5/13/2009	13.28			6.29	
	PZ-4	5/13/2009	11.32			5.59	
	PZ-5	5/13/2009	11.80			6.31	
	PZ-6	5/13/2009	11.34			7.90	
Bedrock	MW-2R	5/13/2009	25.80	496.43	496.14	22.97	473.17
	MW-3R	5/13/2009	37.86	498.43	498.16	18.42	479.74
	MW-5R	5/13/2009	34.60	499.11	501.32	12.59	488.73
	MW-8R	5/13/2009	35.00	497.10	499.63	14.98	484.65
	MW-10R	5/13/2009	35.35	498.35	497.89	17.70	480.19
	MW-12R	5/13/2009	31.80	496.26	496.86	20.70	476.16
	MW-14R	5/13/2009	33.61	495.97	495.60	5.61	489.99
	MW-15R	5/13/2009	31.00	494.96	494.68	14.15	480.53
	MW-16R	5/13/2009	31.16	493.89	493.48	18.60	474.88

Key:
amsl = Above mean sea level.
MW = Monitoring well.
TOIC = Top of inner casing.

Table 2-2 Summary of Groundwater Quality Field Measurements, Former Davis-Howland Oil Corporation Site, Rochester, New York

Sample Identification	Sample Date	pH (s.u.)	Temperature (°F)	Conductivity (µS/cm)	Unfiltered Turbidity (NTUs)
Overburden Wells					
MW-1S	5/13/09	6.89	12.5	987.0	3.59
MW-2S	5/13/09	7.14	14.5	14.61	1.99
MW-3S	5/13/09	7.47	14.4	576.2	1.19
MW-9S	5/13/09	7.52	14.0	862.7	13.5
MW-12S	5/13/09	6.99	14.6	1111	1.17
MW-13S	5/13/09	7.11	14.5	670.3	4.53
MW-14S	5/13/09	7.20	18.9	579.2	10.6
Bedrock Wells					
MW-3R	5/13/09	8.16	14.2	1376	1.92
MW-5R	5/14/09	8.08	13.6	985.7	1.84
MW-8R	5/14/09	7.87	14.9	2206	29.1
MW-10R	5/14/09	7.29	13.1	950.9	1.43
MW-12R	5/14/09	8.03	13.1	780.2	0.91
MW-14R	5/14/09	7.96	15.3	1448	1.46
MW-15R	5/14/09	7.87	13.1	1139	1.61
MW-16R	5/14/09	7.06	13.9	1436	31.5

Key:
°F = Degrees Fahrenheit.
µS/cm = MicroSiemens per centimeter.
NTU = Nephelometric turbidity unit.
s.u. = Standard units.

Table 2-3 Well Inspection Summary, Former Davis-Howland Oil Corporation Site, Rochester, New York

Well No.	Date Inspected	PVC Well Casing ID (inches)	Inspection Observations
CHI-1	5/13/09	2	Dry, Soft bottom
CHI-6	5/13/09	2	Dry, Soft bottom
MW-1S	5/13/09	2	
MW-2S	5/13/09	2	Soft bottom
MW-3S	5/13/09	2	Soft bottom
MW-4S	5/13/09	NA	Previously decommissioned
MW-7S	5/13/09	NA	Previously decommissioned
MW-9S	5/13/09	2	Soft bottom
MW-11S	5/13/09	NA	Previously decommissioned
MW-12S	5/13/09	2	
MW-13S	5/13/09	2	Soft bottom
MW-14S	5/13/09	2	Soft bottom
MW-1R	5/13/09	NA	Previously decommissioned
MW-2R	5/13/09	4	Dry, Soft bottom
MW-3R	5/13/09	2	Soft bottom
MW-4R	5/13/09	NA	Previously decommissioned
MW-5R	5/13/09	4	
MW-7R	5/13/09	NA	Previously decommissioned
MW-8R	5/13/09	4	Soft bottom
MW-10R	5/13/09	4	Soft bottom
MW-11R	5/13/09	NA	Previously decommissioned
MW-12R	5/13/09	4	Soft bottom
MW-14R	5/13/09	4	Soft bottom
MW-15R	5/13/09	4	
MW-16R	5/13/09	4	Soft bottom

Key:
ID = Inner diameter.
MW = Monitoring well.
NA = Not applicable
PVC = Polyvinyl chloride.

3 Physical Characteristics of the Study Area

3.1 Physiography and Topography

The site is located in the City of Rochester, New York. The area surrounding the site is a mixture of residential, commercial, and industrial uses with generally flat topography. The Genesee River gorge is located approximately 1.6 miles west of the site and the Pinnacle Hills are located approximately 1.4 mile south of the site. East of the Davis-Howland building is a meadow dominated by forbs and grasses (Lawler, Matusky and Skelly Engineers March 1997).

3.2 Geology

The soils at the site and in the vicinity are classified as Urban Land (areas altered or obscured by urban works and structures). The site is situated on alluvial organic silt and sand overlying glacial till deposits and lacustrine sand and silt of varying thickness.

Bedrock in Monroe County dips gently to the south-southwest at approximately 55 feet per mile (Kappel and Young 1989). Bedrock beneath the site is the Penfield Dolostone of the Middle Silurian Lockport Group and was encountered at 26.6 to 27 feet bgs during the RI (Lawler, Matusky and Skelly Engineers 1998). The upper surface bedrock slopes to the south at gradients ranging between 0.008 feet per foot (ft/ft) to 0.02 ft/ft.

3.3 Hydrogeology

Four overburden aquifers have been identified by the U.S. Geological Survey (USGS) in the Rochester, New York area east of the Genesee River. These aquifers include an unconfined aquifer existing in the sand and gravel beach deposits at the north end of Irondequoit Bay; a confined aquifer in the sediments in the base of the Irondequoit Creek Valley; a sand and gravel aquifer present beneath Route 104; and a system of thin, scattered confined aquifers within the Pinnacle Hills kame-moraine complex. None of these aquifers are listed as EPA sole-source aquifers (Lawler, Matusky and Skelly Engineers 1998).

General groundwater flow patterns within the overburden in the region are to the east toward the Irondequoit Creek Valley and to the north toward Lake Ontario. In general, outwash sand and gravel deposits are relatively highly permeable, whereas glacial till and lacustrine silt and clay deposits have low permeability

and may behave as aquitards. The 1998 RI indicated that wells screened partially within the outwash and partially in the glacial till have a mean hydraulic conductivity of 7.77 $x10^{-4}$ centimeters per second (cm/s) and wells screened only in the outwash have a mean hydraulic conductivity of $4.27x10^{-4}$ cm/s.

There are two water-bearing zones beneath the Davis-Howland site: the shallow overburden and upper bedrock zones. The shallow overburden aquifer consists of 1 to 2 feet of topsoil (at one well location) underlain by average thicknesses of 3 feet of fill material (sand and gravel with some cobbles, brick, concrete, wood, and coal fragments); 10 feet of glacial outwash deposits; and 10 feet of glacial till. Bedrock, consisting of Penfield dolostone, occurs at depths of 15 to 27 feet below grade, with an average depth of 22.5 feet. A summary of each water-bearing zone is provided below.

Overburden Water-bearing Zone

Groundwater flow direction has been variable in the past. In 1997, groundwater flow was to the south in the southern portion of the site with a flow divide near the railroad tracks resulting in flow to the northeast, southeast, southwest, and south. In 2004, flow was observed to the northeast across the site at an average horizontal gradient of 0.014 ft/ft, as noted in the Groundwater Sampling Draft Data Summary Report 2004 (Ecology and Environment Engineering, P.C. May 2004). Groundwater flow in the overburden zone in August 2007 was to the southwest from a high area along the railroad tracks at a horizontal hydraulic gradient of 0.012 ft/ft, as noted in the Groundwater Sampling Draft Data Summary Report 2007 (Ecology and Environment Engineering, P.C. 2007). As shown in Figure 3-1, overburden groundwater flow in May 2009 was primarily to the south and west. On the west side of the site, groundwater flow was to the south at a gradient of 0.008 ft/ft, slightly lower than that observed in August 2007. On the east side of the site, flow is to the west, toward low areas in the vicinity of MW-2S and MW-1S. In this area, the horizontal gradient was higher (0.033 ft/ft between MW-14S and MW-2S).

Bedrock Water-bearing Zone

Bedrock groundwater flow historically has been more consistent than groundwater flow in the overburden. In 1997 and 2004 groundwater flowed radially outward from a mound beneath the site, primarily in the northeast and southeast directions. Horizontal gradients measured in 2004 ranged from 0.015 to 0.027 ft/ft. In August 2007, groundwater flow in the bedrock zone was variable, flowing radially from high areas near MW-5R and MW-14R, with a sink, or low area, near MW-2R (Ecology and Environment Engineering P.C. 2007). The horizontal gradient to the north near MW-5R was 0.049 ft/ft, but to the south of MW-5R the gradient was 0.017 ft/ft. In the area between the mound at MW-14R and the sink at MW-2R, the gradient increased to 0.18 ft/ft southwest. As shown in Figure 3-1, a similar flow pattern was observed in bedrock groundwater in May 2009. There was radial flow away from groundwater mounds near MW-5R and MW-14R. To the north of MW-5R, the horizontal gradient was approximately 0.053

ft/ft to the north-northwest, similar to that observed in 2007. South of MW-5R, the gradient was approximately 0.031 ft/ft to the southeast. The gradient between the mound at MW-14R and sink at MW-2R was not determined in May 2009 because MW-2R was dry at the time of sampling; however, the gradient in that area is likely higher than elsewhere on site, as observed in 2007.

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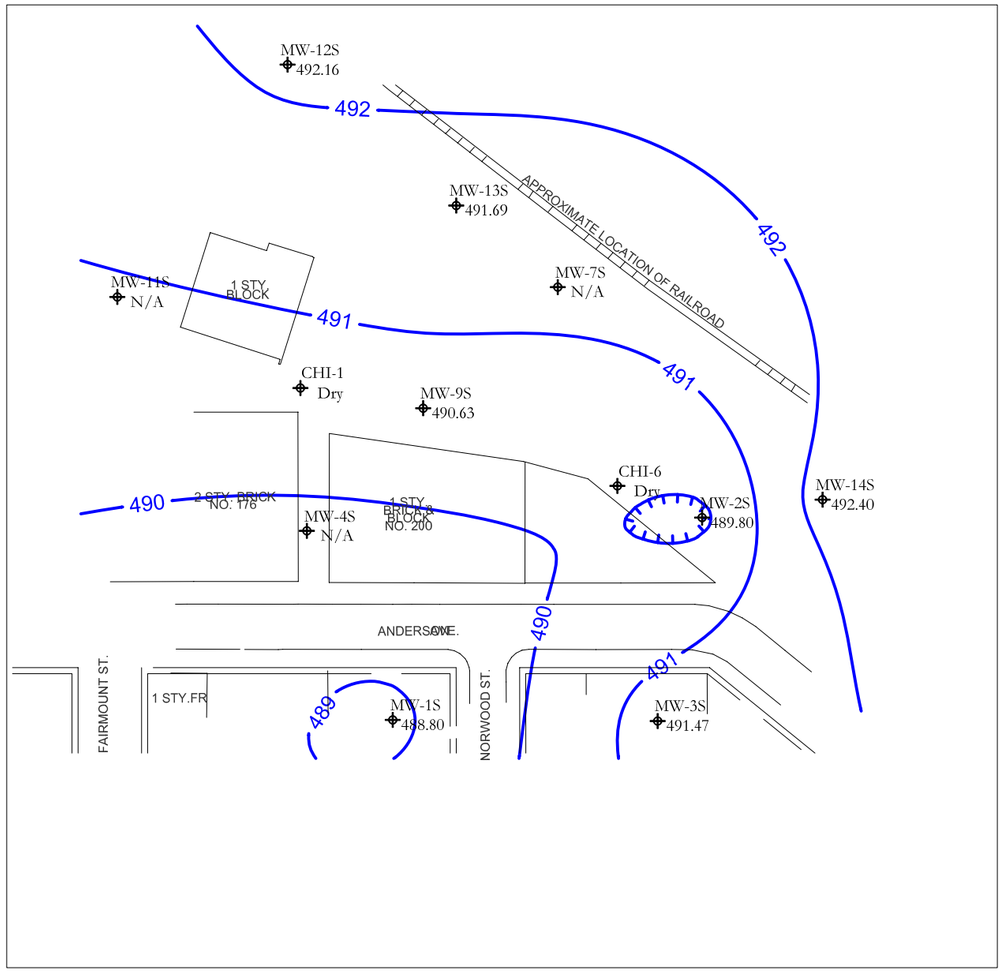
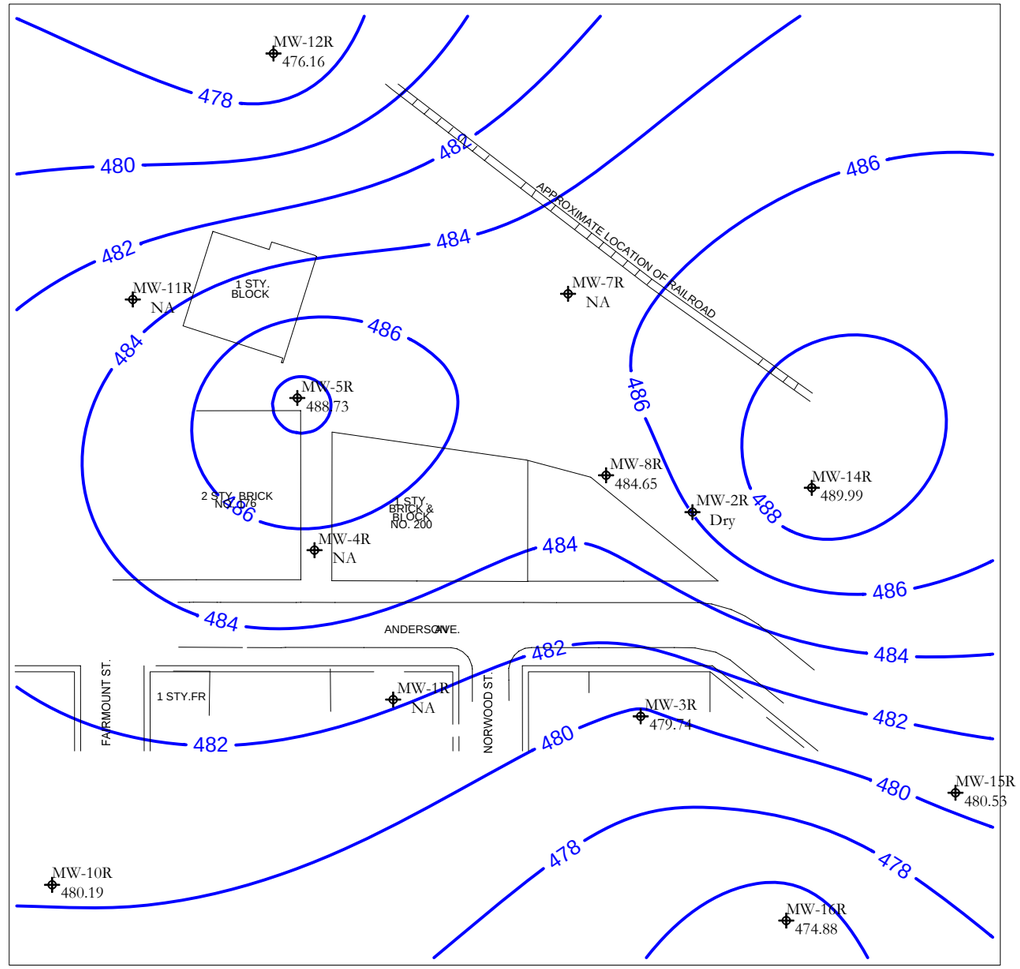
Groundwater Elevation Isopleths
Overburden Monitoring Wells



Groundwater Elevation Isopleths
Bedrock Monitoring Wells



Notes:
1) Groundwater levels measured May 13-14, 2009.

ecology and environment engineering, p.c.
International Specialists in the Environment

0 100 200 300
SCALE IN FEET

FIGURE 3-1
Groundwater Elevation Isopleths
Overburden and Bedrock Monitoring Wells
May 2009
Former Davis-Howland Oil Corporation Site
Rochester, NY

4 Nature and Extent of Contamination

The analytical results for the May 2009 groundwater samples for the Davis-Howland Oil Corporation site and the comparison with historical results are discussed in this section. A summary of the current and historical results for each monitoring well is provided on Figure 4-1[back pocket]. The May 2009 laboratory results of positive contaminant hits are presented in Table 4-1. The complete laboratory data packs for the 2009 samples will be provided under separate cover.

During the May 2009 field activities, groundwater samples were collected from 15 wells (two wells were dry and could not be sampled [see Section 2.1]). Groundwater samples were screened against the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1, Class GA Drinking Water Standards and Guidance Values (New York State Department of Environmental Conservation 1998).

4.1 Overburden Groundwater Results

Nine different VOCs were detected in one or more groundwater samples from overburden wells, including chlorinated solvents (tetrachloroethene [PCE], trichloroethene [TCE], 1,1,1-trichloroethane [TCA] and their degradation byproducts, aromatic hydrocarbons [benzene] and dichlorobenzene [DCB] isomers).

Five VOCs were detected at levels that exceed NYSDEC Class GA groundwater standards. These chemicals and their maximum concentrations in overburden groundwater samples included 1,1,1 TCA (7.6 micrograms per liter [µg/L]); 1,1-dichloroethane (DCA) (33 µg/L); cis-1,2-dichloroethene (DCE) (28 µg/L); tetrachloroethene (PCE) (11 µg/L); and trichloroethene (TCE) (27 µg/L). The maximum chlorinated VOC concentration detected in overburden groundwater samples was in MW-9S at 90.6 µg/L.

Semivolatile Organic Compounds

The only SVOC detected in overburden groundwater samples was total polycyclic aromatic hydrocarbons (PAHs). This was not detected at concentrations exceeding Class GA standards (see Table 4-1).

Petroleum Products

N-dodecane was detected in the overburden groundwater samples at MW-2S at a concentration of 1,000 µg/L.

4.2 Bedrock Groundwater Results

Seven different VOCs were detected in one or more groundwater samples from bedrock wells, including chlorinated solvents (TCE, TCA, and their degradation byproducts). Six of these seven VOCs were detected at levels that exceed NYSDEC Class GA groundwater standards in at least one bedrock well. These chemicals and their maximum concentrations in bedrock groundwater samples included 1,1-DCA (150 µg/L); 1,1-DCE (16 µg/L); benzene (3.1 µg/L), cis-1,2-DCE (5,100 µg/L); TCE (1,200 µg/L); and vinyl chloride (VC) (580 µg/L). The maximum chlorinated VOC concentration detected in bedrock groundwater samples was 5,830 µg/L in MW-8R, primarily due to 5,100 µg/L of cis-1,2-DCE. The maximum TCE concentration detected was 1,200 µg/L in MW10-R.

Semivolatile Organic Compounds

No SVOCs were detected in the bedrock groundwater samples.

Petroleum Products

No petroleum hydrocarbons were detected in the bedrock groundwater samples.

4.3 Summary of 2009 Results

Groundwater beneath the Davis-Howland site is contaminated primarily with chlorinated solvents and their breakdown products. Aromatic hydrocarbon contamination is not as widespread as previously observed and is present at much lower concentrations than the chlorinated solvents. The frequency of detection of these compounds was higher in the overburden wells; however, the magnitude of the concentrations was generally historically higher in the bedrock wells. The highest contaminant concentration was detected in well MW-8R on the east side of the site, and the highest TCE concentration in an individual well was detected in MW10-R, southwest of the site in the residential neighborhood.

4.4 Comparison with Historical Data

The May 2009 concentration isopleths of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total chlorinated VOCs in the overburden and bedrock groundwater samples are presented in Figures 4-2 and 4-3, respectively. Figure 4-1 presents a summary of all groundwater data. Concentration isopleth maps for 1997, 1998, 2004, 2007, and 2009 are provided as Figures 4-2 and 4-3. Historical data were compared with the data from samples collected in May 2009. The following is a summary of the findings:

- Overall, BTEX levels in the overburden have decreased significantly since 1998 and were not detected in 2009. Previously, the highest concentration of

total BETX in the overburden groundwater was detected in well MW-13S. BTEX concentrations in this well decreased from 10,560 µg/L in 1997 to 9,440 µg/L in 1998, below 1 µg/L in 2004, and was non-detect in 2007.

- BTEX levels have also generally decreased since 1997 in the bedrock groundwater. Previously, the highest level of total BTEX in the bedrock groundwater was in MW-5R, where the concentration decreased from 200 µg/L in 1997 to 42 µg/L in 1998, rose to 70.5 µg/L in 2004, decreased again to 15 µg/L in 2007 and decreased further to 3.1 µg/L in 2009. In 2007, MW-8R contained the highest BTEX concentration, at 21µg/L. This concentration is similar to 2004 (17.7 µg/L) but lower than in 1997 (126 µg/L). MW-8R was at non-detect levels in the May 2009 analytical results.

- Chlorinated VOC levels in overburden wells are generally equivalent to or less than those in 2007. In some wells, such as MW-9S and MW-13S, chlorinated VOC concentrations are now significantly less than those in 1997/1998. For example, the TCA concentration in MW-9S was 1,800 µg/L in 1998 and is now 7.6 µg/L. Previously, the highest total chlorinated VOC level in the overburden groundwater was in MW-13S (>40,000 µg/L in 1998). The total chlorinated VOC concentration in this well was only 3.7 µg/L in 2009. An exception is MW-1S, where the total chlorinated VOC concentration increased from 120 µg/L in 1998 to 410 in 2004, decreased to 98 µg/L in 2007, and was 43 µg/L in 2009. The increase seen in 2004 was primarily due to the presence of cis-1,2-DCE, a degradation product of TCE, which indicates that natural degradation processes are occurring. In MW-3S, low-concentration PAHs that were present in 2004 were not detected in 2007 or 2009.

- Chlorinated VOC levels in the bedrock groundwater are generally equivalent to those detected in 2007, with a few exceptions. In MW-5R, chlorinated VOC concentrations decreased from 2007 and remain below those detected in 1998. Similarly, TCE and cis-1,2-DCE levels in MW-12R were higher in 2009 than in 2007 but lower than previous testing in 1997. The highest level of total chlorinated VOCs in the bedrock groundwater previously was in MW-1R (>13,000 µg/L in 1998). This well no longer exists (PW-2 is now at approximately the same location). In the absence of this well, MW-8R currently exhibits the highest chlorinated VOC concentration (5,830 µg/L) and contains primarily cis-1,2-DCE. This compound was not tested for prior to 2004, when it was present at a similar but slightly lower concentration. However, the concentrations of most other chlorinated VOCs have decreased since 1997 in MW-8R (see Figure 4-1).

4.5 Summary and Conclusions

Groundwater samples were collected from seven overburden and eight bedrock monitoring wells at the site in May 2009.

Groundwater beneath Davis-Howland historically contained chlorinated solvents, their degradation products, aromatic hydrocarbons (BTEX), and PAHs. In general, concentrations of these organic compounds have decreased with time. More specifically, PAHs are no longer present at concentrations exceeding groundwater standards. BTEX concentrations have declined significantly and are no longer detected in some wells where they were previously present. No BTEX compounds were present at concentrations exceeding groundwater standards in overburden wells in May 2009. Only benzene in MW-5R was present at concentrations above groundwater standards. In May 2009, five chlorinated VOCs were detected in overburden groundwater samples at levels that exceed the NYSDEC Class GA groundwater standards: TCA, 1,1-DCA, cis-1,2-DCE, PCE, and TCE. Similarly, five chlorinated VOCs were detected in bedrock groundwater samples at levels that exceed the NYSDEC Class GA groundwater standards: 1,1-DCA, 1,1-DCE, cis-1,2-DCE, TCE, and VC. The highest concentrations of chlorinated VOCs and BTEX continue to be detected in the bedrock groundwater.

Based on the observed changes in the distribution of the VOC contamination onsite, the groundwater treatment system, in conjunction with natural processes, appears to be effective at reducing overall contaminant concentrations.

Table 4-1 Summary of Positive Analytical Results for Monitoring Well Samples, Davis Howland Oil Company, Rochester, New York

Analyte	Screening Criteria[1]	Sample ID: / Date:	MW-1S 05/13/09	MW-2S 05/13/09	MW-3R 05/13/09	MW-3R/D 05/13/09	MW-3S 05/13/09	MW-5R 05/14/09	MW-8R 05/14/09	MW-9S 05/13/09	MW-10R 05/14/09	MW-12R 05/14/09
pH by E150.1 (SU)												
pH	NA		7.15	7	7.26	7.27	7.18	7.5	7.09	7.38	7.32	7.37
VOCs by E601_602 (µg/L)												
1,1,1-Trichloroethane (TCA)	5		2.3	1 U	10 U	10 U	1 U	2 U	50 U	**7.6**	10 U	1 U
1,1-Dichloroethane (1,1-DCA)	5		1 U	1 U	**56**	**59**	1 U	**8.7**	**150**	**33**	10 U	1 U
1,1-Dichloroethene (1,1-DCE)	5		1 U	1 U	**16**	**15**	1 U	2 U	50 U	1 U	**12**	1 U
1,2-Dichlorobenzene	3		1 U	1 U	10 U	10 U	1 U	2 U	50 U	2.4	10 U	1 U
Benzene	1		1 U	1 U	10 U	10 U	1 U	**3.1**	50 U	1 U	10 U	1 U
cis-1,2-Dichloroethene	5		**16**	1 U	**1200**	**1300**	1 U	**160**	**5100**	**28**	**30**	**31**
Tetrachloroethene (PCE)	5		3.1	1 U	10 U	10 U	1 U	2 U	50 U	**11**	10 U	1 U
trans-1,2-Dichloroethene	5		1 U	1 U	10 U	10 U	1 U	2 U	50 U	1.8	10 U	1 U
Trichloroethene (TCE)	5		**27**	1 U	**14**	**15**	1 U	**13**	50 U	**11**	**1200**	**35**
Vinyl Chloride	2		1 U	1 U	**230**	**240**	1 U	**32**	**580**	1 U	10 U	1 U
SVOCs by E625 (µg/L)												
Total PAH	NA		4	4	- -	- -	5	- -	- -	- -	- -	- -
Hydrocarbons by NY 310-13 (µg/L)												
n-Dodecane	NA		940 U	1000	940 U	940 U	940 U	940 U	940 U	980 U	940 U	940 U

Table 4-1 Summary of Positive Analytical Results for Monitoring Well Samples, Davis Howland Oil Company, Rochester, New York

Analyte	Screening Criteria[1]	Sample ID: MW-12S	MW-13S	MW-14R	MW-14S	MW-15R	MW-16R	TB-A	TB-B	TB-C	TB-D
		Date: 05/13/09	05/13/09	05/14/09	05/13/09	05/14/09	05/14/09	05/13/09	05/13/09	05/13/09	05/13/09
pH by E150.1 (SU)											
pH	NA	7.06	7.38	7.48	7.27	7.06	7.15	- -	- -	- -	- -
VOCs by E601_602 (µg/L)											
1,1,1-Trichloroethane (TCA)	5	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane (1,1-DCA)	5	1 U	1 U	1 U	1 U	1 U	**11**	1 U	1 U	1 U	1 U
1,1-Dichloroethene (1,1-DCE)	5	1 U	1 U	1 U	1 U	1 U	2.5	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	3.7	3.7	1 U	3.5	**250**	1 U	1 U	1 U	1 U
Tetrachloroethene (PCE)	5	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	1.1	1 U	1 U	2 U	1 U	1 U	1 U	1 U
Trichloroethene (TCE)	5	1 U	1 U	**41**	1 U	1.2	3.9	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U	1 U	**50**	1 U	1 U	1 U	1 U
SVOCs by E625 (µg/L)											
Total PAH	NA	- -	4	- -	- -	- -	- -	- -	- -	- -	- -
Hydrocarbons by NY 310-13 (µg/L)											
n-Dodecane	NA	940 U	940 U	940 U	940 U	940 U	940 U	- -	- -	- -	- -

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance #1.1.1: Ambient Wa

Shaded cells exceed the screening value.

Key:

J = Estimated value.

U = Not detected at the reported value.

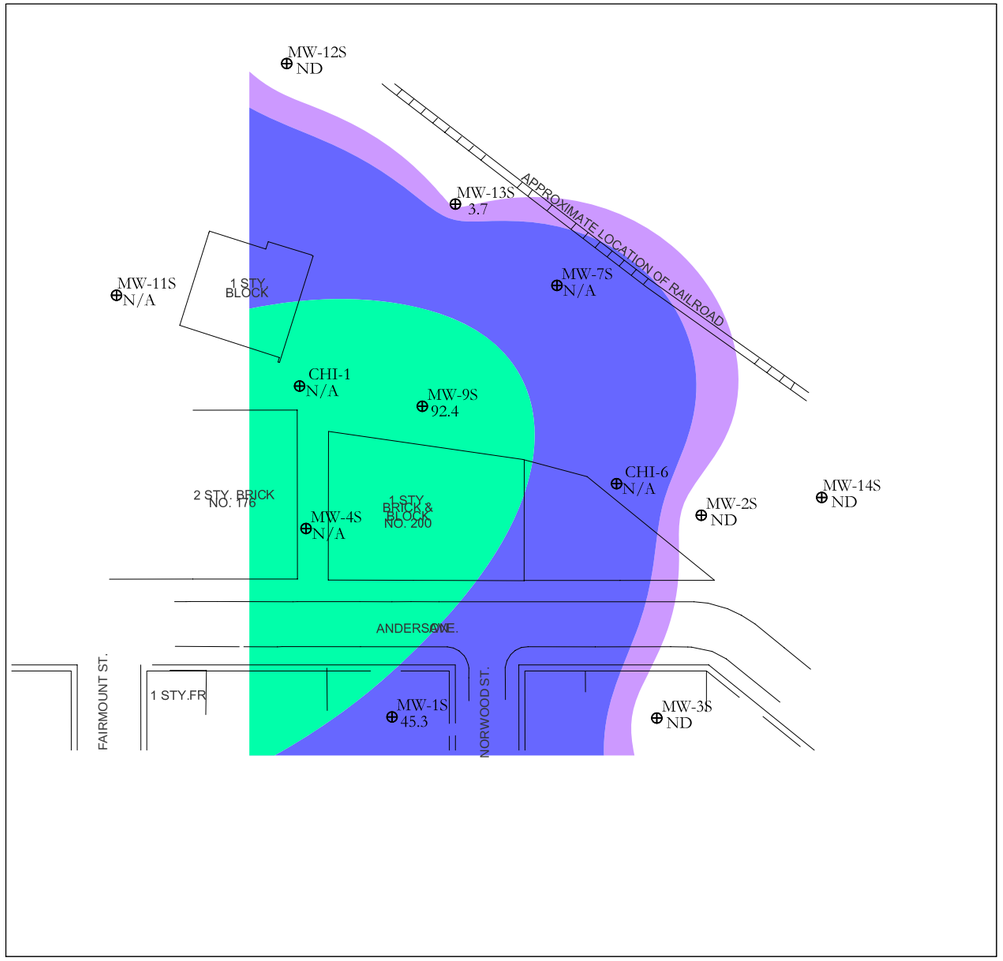
mg/Kg = Milligrams per kilogram.

µg/Kg = Micrograms per kilogram.

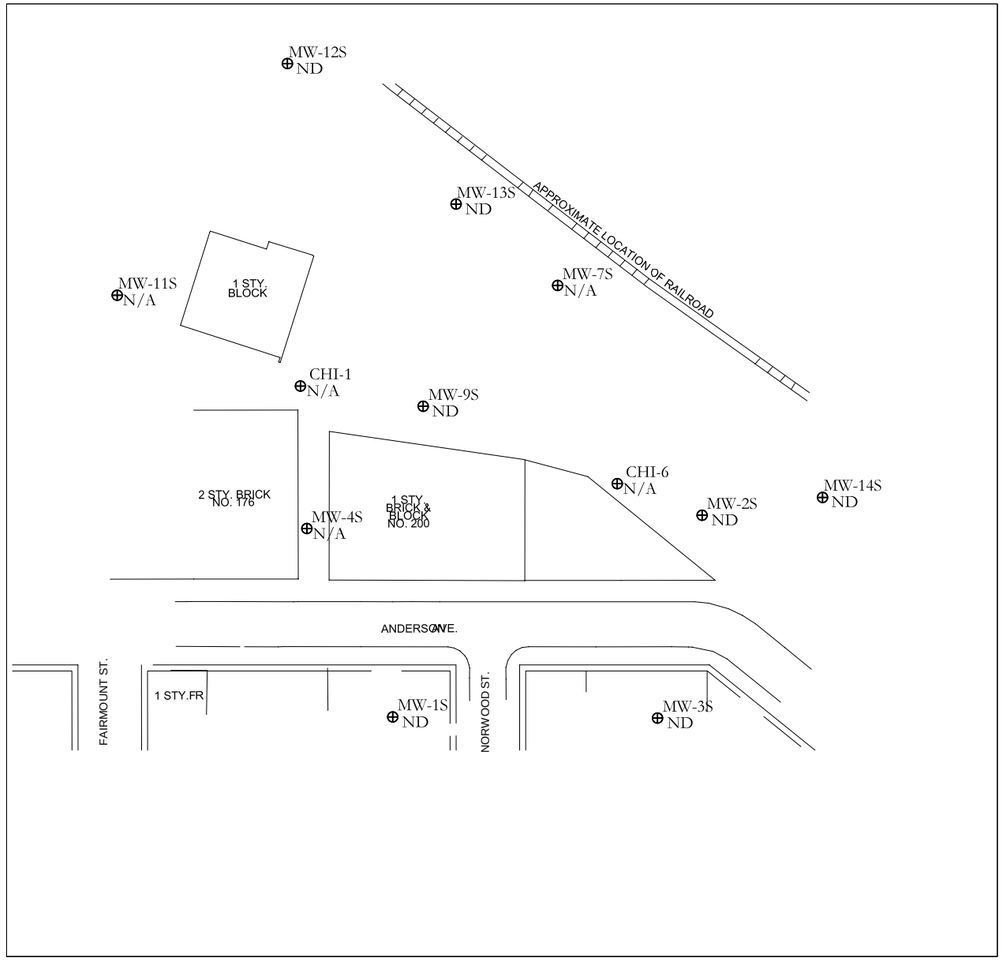
002700.DC14.02.01.02
DavisHowland_VOC_GW-S_2009.srf - 06/23/2009

N

Total Chlorinated VOC Concentrations (µg/L)



Total BTEX Concentrations (µg/L)



Notes:
1) BTEX = sum of benzene, toluene, ethylbenzene, and xylene isomers.
2) VOC = volatile organic compound.
3) Chlorinated VOCs include all chlorinated aliphatic hydrocarbons detected. Other VOCs detected but not presented on this figure include chlorinated aromatics (e.g., dichlorobenzenes).

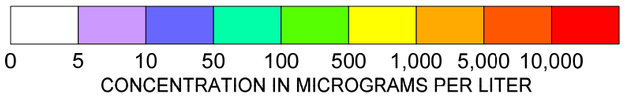


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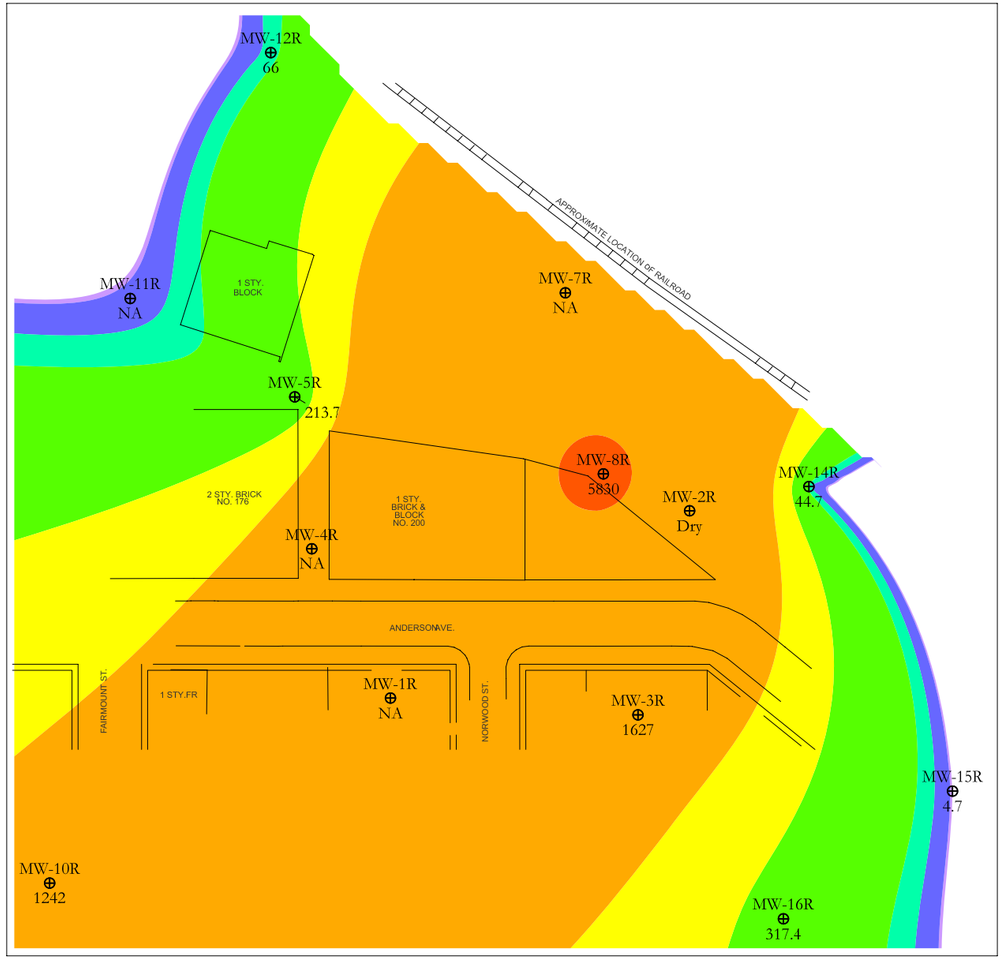
FIGURE 4-2
Total BTEX and Chlorinated VOCs
in Overburden Groundwater, May 2009
Former Davis-Howland Oil Corporation Site
Rochester, New York

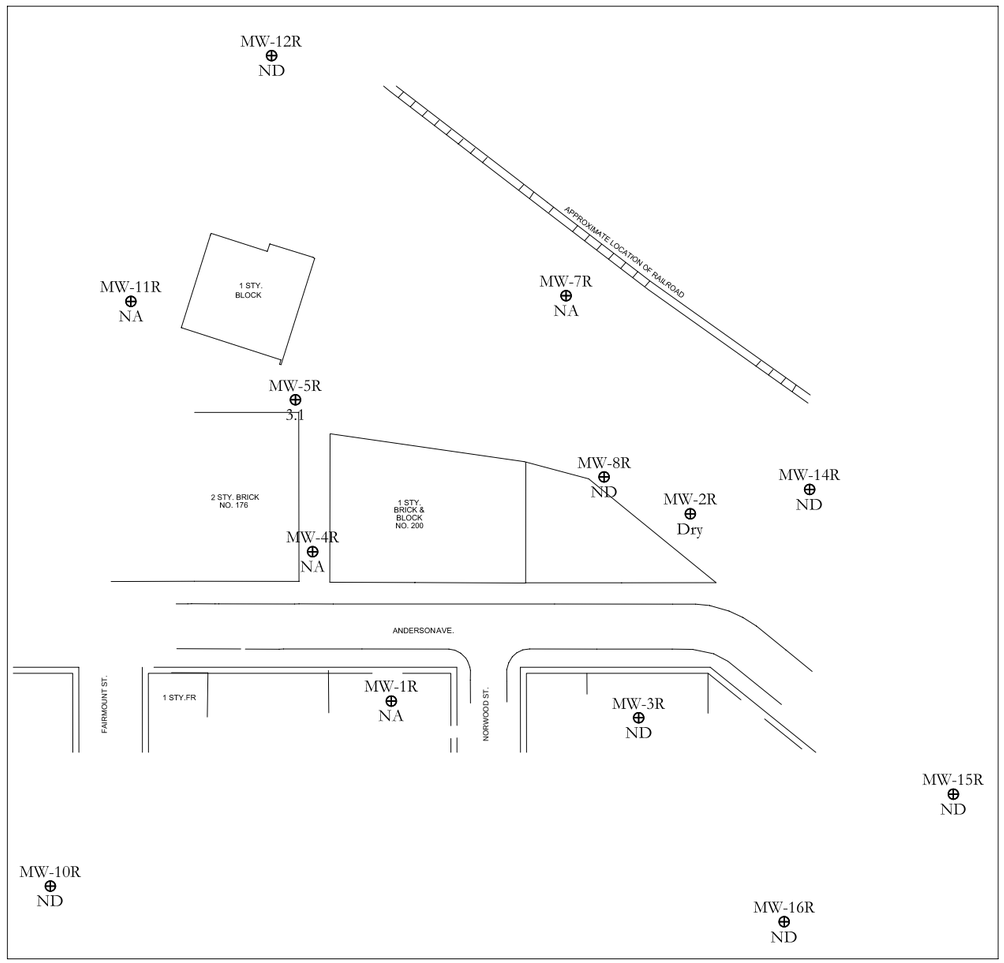
002700.DC14.02.01.02
DavisHowland__VOC_GW-R_2009.srf - 11/16/2007

N

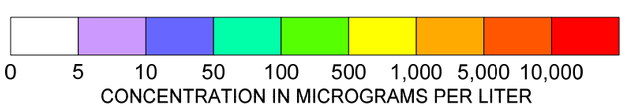
Total Chlorinated VOC Concentrations (µg/L)



Total BTEX Concentrations (µg/L)



Notes:
1) BTEX = sum of benzene, toluene, ethylbenzene, and xylene isomers.
2) VOC = volatile organic compound.
3) Chlorinated VOCs include all chlorinated aliphatic hydrocarbons detected. Other VOCs detected but not presented on this figure include chlorinated aromatics (e.g., dichlorobenzenes).



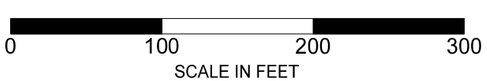


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FIGURE 4-3
Total BTEX and Total Chlorinated VOCs
in Bedrock Groundwater, May 2009
Former Davis-Howland Oil Corporation Site
Rochester, New York

5 References

Clean Harbors of Kingston, Inc. June 1992. *Draft Preliminary Site Investigation, Davis Howland Oil Corporation Site.* Glenmont, New York.

Dunn GeoScience Corporation. November 26, 1991. *Soil Investigation Report for Remedial Investigation: Davis Howland Corporation.*

Ecology and Environment Engineering, P.C. 2004. *Davis-Howland Oil Corporation Site, Groundwater Sampling Draft Data Summary Report 2004, Rochester, New York.* Prepared for New York State Department of Environmental Conservation, Albany, New York.

_____. May 2004. *Groundwater Sampling Procedures, Davis-Howland Oil Corporation, Rochester, New York.* Prepared for New York State Department of Environmental Conservation, Albany, New York.

_____. January 2008. *Groundwater Sampling Draft Data Summary Report* 2007 *Davis-Howland Oil Corporation Site, Rochester, New York.* Prepared for New York State Department of Environmental Conservation, Albany, New York.

_____. 2007. *Groundwater Sampling and Data Summary Report, Davis-Howland Oil Corporation Site.*

_____. May 2008. *Groundwater Sampling Procedures, Appendix N to the Draft Site Management Plan, Davis-Howland Oil Corporation, Rochester, New York.* Prepared for New York State Department of Environmental Conservation, Albany, New York

Kappel, W. M. and R.A. Young. 1989. *Glacial History and Geohydrology of the Irondequoit Creek Valley, Monroe County, New York: United States Department of Interior Geological Survey, Water Resources Investigations Report 88-4145*, pp. 1-34, 3 plates.

Lawler, Matusky & Skelly Engineers, LLP and Galson/Lozier Engineers. October 1996. *New York State Superfund Contract Remedial Investigation Report*, Davis-Howland Oil Corporation, Volume 1.

_____. March 1997. *New York State Superfund Contract Focused Feasibility Study Report, Operable Unit 1 Shallow Groundwater and Soil, Davis-Howland Oil Corporation.*

_____. October 1997. *New York State Phase II Remedial Investigation Report, Davis-Howland Oil Corporation.*

_____. 1998. *Pre-Remedial Design Investigation, Davis-Howland Oil Corporation Site.*

New York State Department of Environmental Conservation.1998. Division of Water Technical and Operational Guidance Series (1.1.1): *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.* Albany, New York: Division of Water.

_____. 1994. *Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Soil Cleanup Levels*. Albany, New York: Division of Hazardous Waste Remediation.

A Well Purge and Sample Records

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Tel: 716/684-8060, Fax: 716/684-0844

WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
EEEPC Project No.: 002700.DC14.02.01.02

Well ID: MW-1S
Date: 5/13/09

Initial Depth to Water: 11.43 feet TOIC
Total Well Depth: 17.75 feet TOIC
Depth to Pump: 15.75 feet TOIC
Initial Pump Rate: _____ Lpm / gpm
adjusted to: _____ at _____ minutes
adjusted to: _____ at _____ minutes

Start Time: 1610
End Time: 1640
Bailer ☒ Pump
Pump Type: 12 V Mini Typhoon
Well Diameter: 2 inches
1x Well Volume: 1.03 gallons 3.0 = 3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1610	0	6.93	15.7	73	983.5	—	269	11.43
1620	1.0	7.05	15.6	70	994.6	—	78.9	—
1625	1.5	7.29	14.2	65	1015	—	31.1	—
1630	2.0	6.91	13.2	72	989.1	—	8.72	—
1635	2.5	6.90	12.8	71	984.2	—	5.73	—
1640	3.0	6.89	12.5	70	987.0		3.59	
Final Sample Data:		6.89	12.5	70	987.0	—	3.59	—

Sample ID: MW-1S
Sample Time: 1642

~~Duplicate?~~ ☐ Dupe ~~Samp ID:~~ _____
~~MS/MSD?~~ ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☐ TPH ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, J.Mays

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-2R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 22.97 feet TOIC
Start Time: 1300
Total Well Depth: 25.80 feet TOIC
End Time: 1305
Depth to Pump: 23.80 feet TOIC
X Bailer Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 1.64 gallons 5.5 = 3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1300	0.0	7.31	16.5	65	2067	—	5.36	22.97
1305	0.8	7.33	16.0	68	2071	—	4.32	—
Final Sample Data:		7.33	16.0	68	2071	—	4.32	—

Sample ID: MW-2R
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: _____
MS/MSD? ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☐ TPH ☐ _____
☒ pH

Comments: Dry @ 1309 Purged 1.2 gal
NOT SAMPLED - DRY on 5/14/09 SAC

Sampler(s): S. Craig, J.Mays

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
EEEPC Project No.: 002700.DC14.02.01.02

Well ID: MW-2S
Date: 5/13/09

Initial Depth to Water: 6.23 feet TOIC
Total Well Depth: 13.76 feet TOIC
Depth to Pump: 11.76 feet TOIC
Initial Pump Rate: _____ Lpm / gpm
adjusted to: _____ at _____ minutes
adjusted to: _____ at _____ minutes

Start Time: 1320
End Time: 1400
Bailer ☒ Pump
Pump Type: 12 V Mini Typhoon
Well Diameter: 2 inches
1x Well Volume: 1.2 gallons 3.608 = 3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1320	0.0	7.16	16.4	31	1516	—	>1000	6.23
1325	0.5	7.03	16.7	0	1523	—	90.7	—
1330	0.9	7.05	16.2	-5	1509	—	14.8	—
1335	1.4	7.14	16.7	-23	1506	—	6.68	—
1340	1.8	7.13	14.7	-14	1489	—	5.73	—
1345	2.6	7.12	14.8	-13	1486	—	2.47	—
1350	3.2	7.14	14.5	-21	1475	—	2.36	—
1355	3.6	7.13	14.9	-20	1469	—	2.53	—
1400	4.0	7.14	14.5	-22	1461	—	1.99	—
Final Sample Data:		7.14	14.5	-22	1461	—	1.99	—

Sample ID: MW-2S
Sample Time: 1402

Duplicate? ☐
MS/MSD? ☐
Dupe Samp ID: _____

Analyses:	Methods:
☒ VOCs	☐ CLP
☒ SVOCs	☐ SW846
☐ PCBs	☐ Drink. Wtr.
☐ Metals	☐ 8260
☐ _TPH_____	☐ _____
☒ pH	

Comments: _____

Sampler(s): ~~S. Craig, J.Mays~~ B. Kloos

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-3R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 8/13/09

Initial Depth to Water: 18.42 feet TOIC
Start Time: 1525
Total Well Depth: 37.86 feet TOIC
End Time: 1721
Depth to Pump: 35.86 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 12.7 gallons 35 = 30 L

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1525	0.0	7.99	17.3	35	717.0	—	22.6	18.42
1530	1.2	7.79	15.2	19	1001	—	20.3	—
1535	1.9	7.49	14.4	-21	1129	—	21.6	—
1540	2.8	7.79	15.0	-41	1310	—	5.38	—
1548	4.8	7.79	14.9	-58	1310	—	4.24	—
1610	9.10	8.02	14.6	-47	1334	—	4.09	—
1625	14.4	8.10	14.5	-51	1351	—	5.10	—
1640	19.2	8.11	15.0	-57	1358	—	3.76	—
1652	24.0	8.19	14.1	-57	1329	—	3.13	—
1700	28.8	8.13	14.1	-60	1367	—	2.79	—
1710	33.6	8.15	14.0	-65	1378	—	2.01	
1720	38.4	8.16	14.2	-63	1376	—	1.92	
Final Sample Data:		8.16	14.2	-63	1376	—	1.52	—

Sample ID: MW-3R
Duplicate? ☒
Dupe Samp ID: MW-3R|D
Sample Time: 1721
MS/MSD? ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☐ _TPH_____ ☐ _____
☒ pH

Comments: _____

Sampler(s): ~~S. Craig, d. Mays~~ B. Kroon

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-3S
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 6.50 feet TOIC
Start Time: 1440
Total Well Depth: 16.91 feet TOIC
End Time: 1530
Depth to Pump: 15.91 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 1.69 gallons 5= 3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm, mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1440	0	7.78	16.5	172	695.7	—	253	6.50
1450	1.0	7.70	15.4	147	617.2	-	115	
1455	1.5	7.90	16.2	120	444.8	—	33.8	
1500	2.0	7.84	14.0	121	430.2	-	11.6	
1505	2.5	7.74	15.0	116	461.5	-	3.74	
1510	3.0	7.70	14.3	112	512.3	-	2.10	
1515	3.5	7.50	13.6	114	556.5	-	1.69	
1520	4.0	7.43	14.1	113	569.7	-	1.77	
1525	4.5	7.45	14.2	110	571.9	-	1.12	
1530	5.0	7.47	14.4	108	576.2	-	1.19	
Final Sample Data:		7.47	14.4	108	576.2	—	1.19	—

Sample ID: MW-3S
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 1532
MS/MSD? ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☒ TPH ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, J.Mays

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-5R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 12.59 feet TOIC
Start Time: 1130
Total Well Depth: 34.60 feet TOIC
End Time: 1347
Depth to Pump: 32.60 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 14 gallons 43 = 3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1130	0	8.14	15.1	55	910.1	—	5.72	—
1150	5	8.25	14.2	67	922.3	—	5.41	—
1210	10	8.10	14.0	81	929.3	—	4.39	—
1227	15	8.11	13.7	45	937.8	—	4.17	—
1237	20	8.10	13.5	26	945.6	—	4.01	—
1253	25	8.07	13.7	-4	949.1	—	3.26	—
1308	30	8.03	13.6	-8	959.6	—	3.07	—
1320	35	8.05	13.5	-20	984.1	—	2.53	—
1345	40	8.08	13.6	-20	985.7	—	1.84	—
Final Sample Data:		8.08	13.6	-20	985.7	—	1.84	—

Sample ID: MW-5R
Duplicate? ☐
~~Dupe Samp ID:~~ _____
Sample Time: 1347
MS/MSD? ☒

Analyses: / Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☒ TPH ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, ~~J.Mays~~

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-8R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 14.98 feet TOIC
Start Time: 1525
Total Well Depth: 35.00 feet TOIC
End Time: 1655
Depth to Pump: 33.00 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 13.0 gallons ~~9.8=30ft~~ 39=30ft

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1525	(1)	7.71	15.7	-84	2050	—	47.3	14.98
1545	5.0	7.82	15.5	-40	2194	—	10.2	—
1555	10.0	7.88	17.0	-59	2232	—	10.8	—
1605	15.0	7.83	17.4	-57	2226	-	18.1	—
1615	20.0	7.74	17.1	-64	2221	-	20.9	—
1625	25.0	7.83	16.5	-68	2201	-	26.7	—
1635	30.0	7.86	15.2	-64	2209	-	31.6	—
1645	35.0	7.88	15.0	-65	2202	-	27.5	-
1655	40.0	7.87	14.9	-68	2206	-	29.1	
Final Sample Data:		7.87	14.9	-68	2206	—	29.1	—

Sample ID: MW-8R
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 1657
MS/MSD? ☐

Analyses:	Methods:
☒ VOCs	☐ CLP
☒ SVOCs	☐ SW846
☐ PCBs	☐ Drink. Wtr.
☐ Metals	☐ 8260
☒ TPH	☐ _____
☒ pH	

Comments: _____
Sampler(s): ~~S. Craig~~, J.Mays & Roedl

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-9S
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 7.31 feet TOIC
Total Well Depth: 15.74 feet TOIC
Depth to Pump: 14.74 feet TOIC
Initial Pump Rate: _____ Lpm / gpm
adjusted to: _____ at _____ minutes
adjusted to: _____ at _____ minutes

Start Time: 1140
End Time: 1250
Bailer ☒ Pump
Pump Type: 12 V Mini Typhoon
Well Diameter: 2 inches
1x Well Volume: 1.4 gallons 4.4 3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1140	0	6.83	17.7	187	842.3	–	899	7.31
1150	1.4	7.16	14.6	166	841.1	–	624	
1200	2.8	7.41	14.4	139	880.4	–	103	
1210	4.2	7.69	14.4	144	872.2	–	36.5	
1220	5.6	7.71	14.6	148	874.9	–	30.4	
1230	7.0	7.46	13.7	153	871.4	–	26.8	
1240	8.4	7.50	13.9	159	865.4	–	19.5	
1250	9.8	7.52	14.0	161	862.7	–	13.5	
Final Sample Data:		7.52	14.0	161	862.7	—	13.5	—

Sample ID: MW-9S
Sample Time: 1252
Duplicate? ☐
MS/MSD? ☐
Dupe Samp ID: _____

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☒ TPH ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, J.Mays

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-10R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/03

Initial Depth to Water: 17.70 feet TOIC
Start Time: 1150
Total Well Depth: 35.35 feet TOIC
End Time: 1253
Depth to Pump: 33.35 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 11.5 gallons 34.5 = 3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1150	0	7.12	15.0	77	745.7	–	217	17.70
1159	5.0	7.21	14.9	68	895.5	–	4.54	–
1208	10.0	7.69	14.5	81	920.0	–	1.74	–
1217	15.0	7.44	13.7	77	932.5	–	1.69	–
1226	20.0	7.34	13.0	79	938.2	–	1.37	–
1235	25.0	7.29	12.9	76	942.8	–	0.97	–
1244	30.0	7.25	13.0	75	948.6	–	1.28	–
1253	35.0	7.29	13.1	72	950.9	–	1.43	–
Final Sample Data:		7.29	13.1	72	950.9	–	1.43	–

Sample ID: MW-10R
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 1255
MS/MSD? ☐

Analyses:	Methods:
☒ VOCs	☐ CLP
☒ SVOCs	☐ SW846
☐ PCBs	☐ Drink. Wtr.
☐ Metals	☐ 8260
☒ TPH	☐ _____
☒ pH	

Comments: _____
Sampler(s): ~~S. Craig~~, J.Mays, L. Roedl

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-12R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 20.70 feet TOIC
Start Time: 1415
Total Well Depth: 31.80 feet TOIC
End Time: 1520
Depth to Pump: 29.80 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 ~~2~~ inches
adjusted to: _____ at _____ minutes
1x Well Volume: 7.2 gallons 21.7 = 30L

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1415	0	8.06	14.3	36	790.6	—	4.79	—
1430	5	8.03	14.3	63	775.3	—	1.72	—
1445	10	8.10	13.8	75	768.9	—	1.10	—
1500	15	8.08	13.6	79	779.5	—	1.01	—
1515	20	8.04	13.2	78	778.7	—	1.00	—
1520	22	8.03	13.1	80	780.2	—	0.91	—
Final Sample Data:		8.03	13.1	80	780.2	—	0.91	—

Sample ID: MW-12R
~~Duplicate?~~ ☐
~~Dupe Samp ID:~~ _____
Sample Time: 1522
~~MS/MSD?~~ ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☒ TPH ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, ~~J.Mays~~

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-12S
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 3.62 feet TOIC
Start Time: 11:31
Total Well Depth: 14.45 feet TOIC
End Time: 12:29
Depth to Pump: 12.45 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 1.76 gallons 5.3=3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
11:30	0	6.10	14.8	119	1169	—	152	—
11:39	1.76	6.68	15.2	109	1111	—	159	—
11:48	3.42	6.72	15.3	93	1095	—	58.3	—
11:57	5.18	6.84	14.1	89	1107	—	22.0	—
12:06	6.94	6.89	15.8	88	1110	—	8.27	—
12:15	6.93	6.99	14.6	85	1111	—	1.17	—
Final Sample Data:		6.99	14.6	85	1111	—	1.17	—

Sample ID: MW-12S
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 12:20
MS/MSD? ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☐ _TPH_____ ☐ _____
☒ pH

Comments: _____
Sampler(s): ~~S. Craig, J. Mays~~ L. Reedl

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-13S
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 4.55 feet TOIC
Start Time: 1145
Total Well Depth: 13.50 feet TOIC
End Time: 1220
Depth to Pump: 11.50 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 1.5 gallons 4.4 = 3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1145	0.0	5.35	16.8	132	689.7	-	232	— 4.55
1150	0.4	6.24	15.2	89	6816.5	-	283	—
1155	1.0	6.62	15.3	79	665.6	-	315	—
1200	1.5	6.72	14.9	76	6616.5	—	95.5	—
1205	2.2	6.88	14.4	69	671.8	-	28.9	—
1210	3.0	7.04	15.2	62	670.6	—	7.05	—
1215	3.8	7.04	14.3	63	671.6	-	5.27	—
1220	4.5	7.11	14.5	58	670.3		4.53	
Final Sample Data:		7.11	14.5	58	670.3	—	4.53	—

Sample ID: MW-13S
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 1221
MS/MSD? ☐

Analyses:	Methods:
☒ VOCs	☐ CLP
☒ SVOCs	☐ SW846
☐ PCBs	☐ Drink. Wtr.
☐ Metals	☐ 8260
☐ _TPH_	☐ _____
☒ pH	

Comments: _____
Sampler(s): ~~S. Craig, J.Mays~~ B. Kroon

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-14R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 5.61 feet TOIC
Total Well Depth: 33.01 feet TOIC
Depth to Pump: 32.61 feet TOIC
Initial Pump Rate: _____ Lpm / gpm
adjusted to: _____ at _____ minutes
adjusted to: _____ at _____ minutes

Start Time: 1330
End Time: 1540
Bailer ☒ Pump
Pump Type: 12 V Mini Typhoon
Well Diameter: 4 2 inches
1x Well Volume: 18 gallons 55gal = 3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1330	0	7.47	13.6	53	1007	—	7.34	5.61
1355	10	7.46	12.7	35	1352	—	1.63	—
1430	20	7.96	14.6	69	1335	—	4.21	—
1450	30	7.80	15.8	75	1395	—	1.36	—
1510	40	7.92	15.5	101	1432	—	1.51	—
1530	50	7.93	15.1	109	1440	—	1.21	—
1540	55	7.96	15.3	107	1448	—	1.46	—
Final Sample Data:		7.96	15.3	107	1448	—	1.46	—

Sample ID: MW-14R
Sample Time: 1542
Duplicate? ☐
MS/MSD? ☐
Dupe Samp ID: _____

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ ___8260___
☒ TPH ☐ _____
☒ pH

Comments: _____

Sampler(s): ~~S Craig~~, J.Mays L Roedl

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-14S
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 3.08 feet TOIC
Start Time: 2:05
Total Well Depth: 12.72 feet TOIC
End Time: 3:00
Depth to Pump: 11.72 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 2 inches
adjusted to: _____ at _____ minutes
1x Well Volume: 1.6 gallons 4.7 = 3 vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
2:05	0	7.98	16.1	49	579.7	—	5.91	—
2:15	1.6	7.39	18.1	59	565.9	—	15.1	—
2:25	3.2	7.29	18.2	52	563.3	—	10.1	—
2:35	4.8	7.13	18.4	66	572.2	—	10.4	—
2:45	6.4	7.18	19.0	56	572.6	—	10.7	—
2:55	8.0	7.20	18.9	56	579.2	—	10.6	—
Final Sample Data:		7.20	18.9	56	579.2	—	10.6	—

Sample ID: MW-14S
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 257
MS/MSD? ☐

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ 8260
☐ _TPH_____ ☐ _____
☒ pH

Comments: _____
Sampler(s): S. Craig, J.Mays

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WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
EEEPC Project No.: 002700.DC14.02.01.02

Well ID: MW-15R
Date: 5/13/09

Initial Depth to Water: 14.15 feet TOIC
Total Well Depth: 31.00 feet TOIC
Depth to Pump: 29.00 feet TOIC
Initial Pump Rate: _____ Lpm / gpm
adjusted to: _____ at _____ minutes
adjusted to: _____ at _____ minutes

Start Time: 0907
End Time: 1120
Bailer ☒ Pump
Pump Type: 12 V Mini Typhoon
Well Diameter: 4 2 inches
1x Well Volume: 11 gallons 33=3vol

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
0907	0	6.24	13.3	130	1247	—	10.8	14.15
0940	6.0	7.49	13.3	96	1199	-	7.14	14.15
1010	12.0	7.81	14.6	107	1102	—	2.16	—
1030	18.0	7.92	13.5	108	1123	-	1.29	—
1050	24.0	7.80	12.8	107	1130	—	1.79	-
1110	30.0	7.86	13.3	101	1142	-	1.72	-
1120	33.0	7.87	13.1	104	1139	—	1.61	-
Final Sample Data:		7.87	13.1	104	1139	—	1.61	—

Sample ID: MW-15R
Sample Time: 1121
Duplicate? ☐
MS/MSD? ☐
Dupe Samp ID: _____

Analyses: Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr:
☐ Metals ☐ ___8260___
☒ TPH___ ☐ _____
☒ pH

Comments: Lost bailer down well.

Sampler(s): ~~S. Craig~~ J.Mays, L Roedl

ecology and environment engineering, p.c.
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Tel: 716/684-8060, Fax: 716/684-0844

WELL PURGE & SAMPLE RECORD

Site Name/Location: Davis Howland OC Site
Well ID: MW-16R
EEEPC Project No.: 002700.DC14.02.01.02
Date: 5/13/09

Initial Depth to Water: 18.60 feet TOIC
Start Time: 1755
Total Well Depth: 31.16 feet TOIC
End Time: 1850
Depth to Pump: 29.16 feet TOIC
Bailer ☒ Pump
Initial Pump Rate: _____ Lpm / gpm
Pump Type: 12 V Mini Typhoon
adjusted to: _____ at _____ minutes
Well Diameter: 4 ½ inches
adjusted to: _____ at _____ minutes
1x Well Volume: 8.2 gallons 24.6=3 VOC

Time	Purge Volume (gallons/liters)	pH (s.u.)	Temp. (°C/°F)	ORP (mV)	Conductivity (µS/cm mS/cm)	DO (mg/L)	Turbidity (NTU)	Water Level (feet)
1755	0.1	7.8	15.7	49	1392	—	9.18	18.60
1802	4.5	7.26	15.0	38	1325	—	18.0	—
1813	9.0	7.29	15.5	79	1174	—	97.2	—
1850	15.0	7.060	13.9	84	1436	—		Dry
Final Sample Data:		7.06	13.9	84	1436	—	31.5	—

Sample ID: MW-16R
Duplicate? ☐
Dupe Samp ID: _____
Sample Time: 14-May-2009 0850
MS/MSD? ☐

Analyses: / Methods:
☒ VOCs ☐ CLP
☒ SVOCs ☐ SW846
☐ PCBs ☐ Drink. Wtr.
☐ Metals ☐ ___8260___
☐ _TPH____ ☐ _____
☒ pH

Comments: Dry @ 15 gal.

Sampler(s): S. Craig, J.Mays, B. Kresan

B Data Usability Summary Report

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per NYSDEC Division of Environmental Remediation Guidance for the Development of DUSRs (June 1999). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concerns affected data usability are summarized listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/ MSD	ID Corrections
R0902693	Water	MW-12S	R0902693-001	5/13/2009			None
R0902693	Water	MW-13S	R0902693-002	5/13/2009			None
R0902693	Water	MW-14S	R0902693-003	5/13/2009			None
R0902693	Water	MW-1S	R0902693-004	5/13/2009			None
R0902693	Water	MW-2S	R0902693-005	5/13/2009			None
R0902693	Water	MW-3S	R0902693-006	5/13/2009			None
R0902693	Water	MW-9S	R0902693-007	5/13/2009			None
R0902693	Water	TB-A	R0902693-008	5/13/2009			None
R0902693	Water	TB-B	R0902693-009	5/13/2009			None
R0902693	Water	TB-C	R0902693-010	5/13/2009			None

Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	Sample Type
R0902693	Water	E150.1	pH (Electrometric)	7	SAMP
R0902693	Water	E601_602	Purgeable Halocarbons and Purgeable Aromatics by G	10	SAMP
R0902693	Water	E625	Semivolatile Organic Compounds by GC/MS	7	SAMP
R0902693	Water	NY 310-13	Petroleum Products in Water (Hydrocarbon Scan) for	7	SAMP

General Sample Information

Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes
Did coolers arrive at lab between 2 and 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate - 1/20 samples Trip Blank - Every cooler with VOCs waters only Equipment Blank - 1/ set of samples per day?	Yes – no Field duplicates present in this SDG, trip blanks supplied for each cooler.
All ASP Forms complete?	Yes
Case narrative present and complete?	Yes
Any holding time violations (See table below)?	No - All samples were prepared and analyzed within holding times.

Insert Holding time table below.

The following tables are presented at the end of this DUSR and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Go to Tables List

Volatile Organics and Semi-volatile Organics by GCMS	
Description	**Notes and Qualifiers**
Any compounds present in method, trip and field blanks (see Table 2)?	No
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples are flagged U as noted on Table 2a for method blanks and Table 2b for field blanks.
Surrogate for method blanks and LCS within limits?	Yes
Surrogate for samples and MS/MSD within limits? (See Table 3). All samples should be re-analyzed for VOCs? Samples should re-analyzed if >1 BN and/or > AP for BNAs is out. Matrix effects should be established.	Yes
Laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
MS/MSD within QC criteria (see Table 4)? If out and LCS is compliant, then J flag positive data in original sample due to matrix?	Yes
LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes - LCS Duplicate RPD for Benzidine outside of limits, no positive detections so no qualification required.
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix (see Table 6)?	N/A
Is initial calibration for target compounds <15 %RSD or curve fit?	N/A

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

Volatile Organics and Semi-volatile Organics by GCMS	
Description	**Notes and Qualifiers**
Is continuing calibration for target compounds < 20.5%D.	N/A
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	N/A
For TICs are there any system related compounds that should not be reported?	No
Do field duplicate results show good precision for all compounds except TICs (see Table 7)?	No field duplicates associated with this SDG

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

General Analytical Methods	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are <5 times the blank then "U" flag data.	Samples are flagged U as noted on Table 2a for method blanks and Table 2b for field blanks.
Laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
MS/MSD within QC criteria (see Table 4)? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes
LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes
Do field duplicate results show good precision for all compounds (see Table 7)?	Yes

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None

Table 2 - List of Positive Results for Blank Samples
None

Table 2A - List of Samples Qualified for Method Blank Contamination
None

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits
None

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results
None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference
T = Tentatively Identified Compound

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per NYSDEC Division of Environmental Remediation Guidance for the Development of DUSRs (June 1999). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concerns affected data usability are summarized listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/ MSD	ID Corrections
R0902726	Water	MW-10R	R0902726-006	5/14/2009			None
R0902726	Water	MW-12R	R0902726-007	5/14/2009			None
R0902726	Water	MW-14R	R0902726-008	5/14/2009			None
R0902726	Water	MW-15R	R0902726-004	5/14/2009			None
R0902726	Water	MW-16R	R0902726-003	5/14/2009			None
R0902726	Water	MW-3R	R0902726-001	5/13/2009			None
R0902726	Water	MW-3R/D	R0902726-002	5/13/2009			None
R0902726	Water	MW-5R	R0902726-005	5/14/2009			None
R0902726	Water	MW-8R	R0902726-009	5/14/2009			None
R0902726	Water	TB-D	R0902726-010	5/13/2009			None
R0902726	Water	MW-5R	R0902726-D	5/14/2009			None
R0902726	Water	MW-5R	RQ0903727	5/14/2009	MS/MSD	*	None
R0902726	Water	MW-5R	RQ0903732	5/14/2009	MS/MSD	*	None
R0902726	Water	MW-5R	RQ0904035	5/14/2009	MS/MSD	*	None

Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	Sample Type
R0902726	Water	E601_602	Purgeable Halocarbons and Purgeable Aromatics by G	10	SAMP
R0902726	Water	E625	Semivolatile Organic Compounds by GC/MS	9	SAMP
R0902726	Water	NY 310-13	Petroleum Products in Water (Hydrocarbon Scan) for	9	SAMP

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

Work Orders	Matrix	Test Method	Method Name	Number of Samples	Sample Type
R0902726	Water	SM 4500-H+ B	pH Value, Electrometric Method 20th Ed.	9	SAMP

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate - 1/20 samples Trip Blank - Every cooler with VOCs waters only Equipment Blank - 1/ set of samples per day?	Yes – Field duplicate MW-3R/D included with this SDG, trip blank included with cooler.
All ASP Forms complete?	Yes
Case narrative present and complete?	Yes
Any holding time violations (See table below)?	No - All samples were prepared and analyzed within holding times.

Insert Holding time table below.

The following tables are presented at the end of this DUSR and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Go to Tables List

Volatile Organics and Semi-volatile Organics by GCMS	
Description	**Notes and Qualifiers**
Any compounds present in method, trip and field blanks (see Table 2)?	No
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples are flagged U as noted on Table 2a for method blanks and Table 2b for field blanks.
Surrogate for method blanks and LCS within limits?	Yes
Surrogate for samples and MS/MSD within limits? (See Table 3). All samples should be re-analyzed for VOCs? Samples should re-analyzed if >1 BN and/or > AP for BNAs is out. Matrix effects should be established.	Yes
Laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes

Data Usability Summary Report	Project: Davis Howland Oil Company
Date Completed: June 16, 2009	Completed by: Bryan Kroon

Volatile Organics and Semi-volatile Organics by GCMS	
Description	**Notes and Qualifiers**
MS/MSD within QC criteria (see Table 4)? If out and LCS is compliant, then J flag positive data in original sample due to matrix?	No - Several compounds outside of QC limits, positive detections qualified "J".
LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes – Benzidine recovery was low all detects and non-detects qualified "J".
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix (see Table 6)?	N/A
Is initial calibration for target compounds <15 %RSD or curve fit?	N/A
Is continuing calibration for target compounds < 20.5%D.	N/A
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	No
For TICs are there any system related compounds that should not be reported?	No
Do field duplicate results show good precision for all compounds except TICs (see Table 7)?	Yes

General Analytical Methods	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are <5 times the blank then "U" flag data.	Samples are flagged U as noted on Table 2a for method blanks and Table 2b for field blanks.
Laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
MS/MSD within QC criteria (see Table 4)? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes
LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes
Do field duplicate results show good precision for all compounds (see Table 7)?	Yes

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None

Table 2 - List of Positive Results for Blank Samples
None

Table 2A - List of Samples Qualified for Method Blank Contamination
None

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	REPORTABLE
E625	MW-5R	MS	Benzidine	<32	94.3	0	1	10	113	ND	-1
E625	MW-5R	MSD	Benzidine	<32	94.3	2	1	10	113	ND	-1
E601_602	MW-5R	MS	2-Chloroethyl Vinyl Ether	<0	40	0	2	14	186	ND	-1
E601_602	MW-5R	MSD	2-Chloroethyl Vinyl Ether	<0	40	0	2	14	186	ND	-1
E601_602	MW-5R	MS	o-Xylene	<0	40	97	2	50	50	ND	-1
E601_602	MW-5R	MSD	o-Xylene	<0	40	95	2	50	50	ND	-1

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
E625	MW-5R	MSD	Benzidine	200	30	None

Table 5 - List LCS Recoveries outside Control Limits

Method	Sample ID	Analyte	Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
E625	RQ0903727-02	Benzidine	2	10	113	9	J Flag

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	PQL	MW-3R	MW-3R/D	RPD	RPD Rating	Samp Qual
E601_602	1,1-Dichloroethane	ug/L	10	56	59	5.22%	Good	None
E601_602	1,1-Dichloroethene	ug/L	10	16	15	6.45%	Good	None
E601_602	cis-1,2-Dichloroethene	ug/L	10	1200	1300	8.00%	Good	None
E601_602	Trichloroethene	ug/L	10	14	15	6.90%	Good	None
E601_602	Vinyl Chloride	ug/L	10	230	240	4.26%	Good	None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference
T = Tentatively Identified Compound

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MW-11R (Decommissioned)	1/97	9/98	5/04
Vinyl Chloride	160	180	--
Acetone	ND	31 J	--
1,1-Dichloroethene	6 J	11 J	--
1,1-Dichloroethane	20 J	48	--
cis-1,2-Dichloroethene	NA	780	--
1,2-Dichloroethene (total)	870	820	--
Trichloroethene	150	160	--
Benzene	12 J	12 J	--
Bis(2-ethylhexyl)phthalate	6 J	NA	--

DB-1 (Well Dry-No sample obtained)	10/95	1/97	9/98
1,1,1-Trichloroethane	1500 J	NA	NA
1,1-Dichloroethene	1700 J	NA	NA
1,2-Dichloroethene (total)	24000	NA	NA
2-Methylnaphthalene	240 D	NA	NA
Benzene	620 J	NA	NA
cis-1,2-Dichloroethene	24000	NA	NA
Ethyl Benzene	1600 J	NA	NA
Naphthalene	290 D	NA	NA
Toluene	3400 J	NA	NA
Vinyl Chloride	5800	NA	NA
Xylene (total)	9600 J	NA	NA
Xylene (meta & para)	7100	NA	NA
Xylene (ortho)	2500 J	NA	NA

MW-12R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	2 J	NA	ND	ND	1 U
1,1-Dichloroethene	6 J	NA	--	0.51 J	1 U
1,2-Dichloroethene (total)	150	NA	--	ND	--
alpha-BHC	NA	NA	0.00835 J	ND	--
Benzene	4 J	NA	ND	ND	1 U
Bis(2-ethylhexyl)phthalate	7 J	NA	NA	ND	--
cis-1,2-Dichloroethene	NA	NA	10.1	29 J	31
delta-BHC	NA	NA	0.00906 J	ND	--
gamma-BHC	NA	NA	0.00844 J	ND	--
trans-1,2-Dichloroethene	--	--	--	0.26 J	1 U
Trichloroethene (TCE)	87	NA	11.5	45 J	35
Vinyl Chloride	29	NA	ND	0.51 J	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
1,1-Dichloroethane (1,1-DCA)	--	--	--	--	1 U

MW-12S	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	3 J	ND	ND	ND	1 U
1,2-Dichloroethene (total)	4 J	ND	--	ND	--
Acetone	ND	8 J	NA	ND	--
Bis(2-ethylhexyl)phthalate	0.6 J	NA	4.62 J	0.60 J	--
cis-1,2-Dichloroethene	--	--	--	0.26 J	1 U
Di-n-butylphthalate	0.6 J	NA	ND	ND	--
Methyl tert-butyl ether	NA	NA	0.985 J	ND	--
Trichloroethene (TCE)	22	6 J	ND	4.1 J	1 U
1,1-Dichloroethane (1,1-DCA)	--	--	--	--	1 U
1,1-Dichloroethene (1,1-DCE)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
trans-1,2-Dichloroethene	--	--	--	--	1 U
Vinyl Chloride	--	--	--	--	1 U

MW-13S	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	6600	1100 J	ND	0.30 J	1 U
1,1-Dichloroethene	1600 J	1300 J	3.45	3.4 J	1 U
1,1-Dichloroethane	580 J	460 J	ND	ND	1 U
1,2-Dichlorobenzene	--	--	--	0.18 J	1 U
1,2-Dichloroethene (total)	25000	34000	--	ND	--
2,4-Dimethylphenol	5 J	NA	NA	ND	--
2-Methylphenol	8 J	NA	NA	ND	--
4-Methylphenol	18	NA	NA	ND	--
Acetone	ND	1700 J	NA	ND	--
Aldrin	NA	NA	0.0282	ND	--
alpha-BHC	NA	NA	0.0221 J	ND	--
Bis(2-ethylhexyl)phthalate	2 J	NA	5.40 J	1.1 J	--
cis-1,2-Dichloroethene	NA	34000	27.5	56 J	3.7
Ethyl Benzene	1700 J	1500 J	0.344 J	ND	--
Fluoranthene	NA	NA	1.23 J	ND	--
Naphthalene	2 J	NA	ND	ND	--
Pyrene	NA	NA	0.858 J	ND	--
Toluene	560 J	640 J	ND	ND	--
trans-1,2-Dichloroethene	--	--	--	0.65 J	1 U
Vinyl Chloride	2200	3200	10.5	7.4 J	1 U
Xylene (total)	8300	7300	ND	ND	--
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
Trichloroethene (TCE)	--	--	--	--	1 U

MW-7S (Decommissioned)	1/97	9/98	5/04
1,1-Dichloroethene	350 J	350 J	--
1,1-Dichloroethane	110 J	170 J	--
1,2-Dichloroethene (total)	8600	8100	--
Acetone	ND	970	--
Bis(2-ethylhexyl)phthalate	2 J	NA	--
cis-1,2-Dichloroethene	ND	8100	--
Ethyl Benzene	76 J	ND	--
Trichloroethene (TCE)	220 J	120 J	--
Vinyl Chloride	1400	2500	--

MW-7R (Decommissioned)	1/97	9/98	5/04
1,1,1-Trichloroethane	26 J	NA	--
1,1-Dichloroethene	89	NA	--
1,1-Dichloroethane	23 J	NA	--
1,2-Dichloroethene (total)	1100	NA	--
Bis(2-ethylhexyl)phthalate	10	NA	--
Di-n-butylphthalate	1 J	NA	--
Tetrachloroethene (PCE)	8 J	NA	--
Trichloroethene (TCE)	31 J	NA	--
Vinyl Chloride	130	NA	--

MW-8R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	270	NA	ND	20 J	50 U
1,1-Dichloroethene	210	NA	ND	130 J	150
1,1-Dichloroethane	63 J	NA	ND	40 J	50 U
1,2-Dichloroethene (total)	1600	NA	ND	ND	--
2,4-Dichlorophenol	1 J	NA	NA	0.31 J	--
Benzene	NA	NA	0.935 J	ND	50 U
Bis(2-ethylhexyl)phthalate	20	NA	ND	ND	--
cis-1,2-Dichloroethene	NA	NA	3230	3700 J	5100
delta-BHC	NA	NA	0.00459 J	NA	--
Ethyl Benzene	53 J	NA	10.4	21 J	--
Heptachlor epoxide	NA	NA	0.0273	ND	--
Methylene Chloride	10 J	NA	28.9 J	ND	--
Tetrachloroethene	87 J	NA	ND	ND	50 U
trans-1,2-Dichloroethene	--	--	--	11 J	50 U
Toluene	NA	NA	1.34	ND	--
Trichloroethene (TCE)	95 J	NA	ND	30 J	50 U
Vinyl Chloride	240	NA	5.75	320 J	580
Xylene (total)	73 J	NA	5.03	ND	--
1,2-Dichlorobenzene	--	--	--	--	50 U

CHI-6	10/95	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	3100	NA	NA	ND	DRY	--
1,1-Dichloroethene	420 J	NA	NA	ND	DRY	--
Bis(2-ethylhexyl)phthalate	520	NA	NA	ND	DRY	--
Butylbenzylphthalate	2.3 J	NA	NA	NA	DRY	--
Fluoranthene	3.2 J	NA	NA	ND	DRY	--
Methyl tert-butyl ether	NA	NA	NA	1.00 J	DRY	--
Motor Oil	NA	NA	NA	Present	DRY	--
Pyrene	4.3 J	NA	NA	ND	DRY	--

MW-5R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	ND	23 J	ND	ND	2 U
1,1-Dichloroethene	32 J	66 J	ND	19 J	2 U
1,1-Dichloroethane	82 J	140	82.8	120 J	8.7
1,2-Dichloroethene (total)	4200	3100	--	ND	--
Acetone	ND	66 J	NA	ND	--
Benzene	200 J	42 J	58.5	15 J	3.1
Bis(2-ethylhexyl)phthalate	5 J	NA	6.53 J	ND	--
cis-1,2-Dichloroethene	NA	3000	742	1900 J	160
Di-n-butylphthalate	0.7 J	NA	ND	ND	--
Ethyl Benzene	NA	NA	3.27 J	ND	--
Methyl tert-butyl ether	NA	NA	12.2 J	ND	--
Toluene	NA	NA	8.76 J	ND	--
trans-1,2-Dichloroethene	--	--	--	11 J	2 U
Trichloroethene (TCE)	360	180 J	66.6 J	190 J	13
Vinyl Chloride	510	720	235	460 J	32
1,2-Dichlorobenzene	--	--	--	--	2 U
Tetrachloroethene (PCE)	--	--	--	--	2 U

MW-2R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	23 J	NA	ND	DRY	--
1,1-Dichloroethene	100 J	NA	ND	DRY	--
1,1-Dichloroethane	28 J	NA	ND	DRY	--
1,2-Dichloroethene (total)	1700	NA	NA	DRY	--
Benzene	NA	NA	0.254 J	DRY	--
Benz(a)anthracene	NA	NA	1.45 J	DRY	--
Benzo(a)pyrene	NA	NA	1.48 J	DRY	--
Benzo(b)fluoranthene	NA	NA	1.20 J	DRY	--
Benzo(g,h,i)perylene	NA	NA	2.10 J	DRY	--
Benzo(k)fluoranthene	NA	NA	1.35 J	DRY	--
Bis(2-ethylhexyl)phthalate	7 J	NA	ND	DRY	--
cis-1,2-Dichloroethene	NA	NA	790	DRY	--
Chrysene	NA	NA	1.66 J	DRY	--
Di-n-butylphthalate	0.9 J	NA	ND	DRY	--
Ethyl Benzene	NA	NA	0.907 J	DRY	--
Fluoranthene	NA	NA	2.85 J	DRY	--
Heptachlor epoxide	NA	NA	0.0183 J	DRY	--
Indeno(1,2,3-cd)pyrene	NA	NA	2.96 J	DRY	--
Phenanthrene	NA	NA	1.67 J	DRY	--
Pyrene	NA	NA	2.68 J	DRY	--
Trichloroethene (TCE)	66 J	NA	ND	DRY	--
Vinyl Chloride	210	NA	152	DRY	--

MW-9S	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	4900	1800	4.98	7.3 J	7.6
1,1-Dichloroethene	220 J	410	ND	ND	1 U
1,1-Dichloroethane	280 J	5900	14.0	28 J	33
1,2-Dichlorobenzene	170	NA	110.8	66 J	2.4
1,2-Dichloroethene (total)	680	1700	NA	ND	--
1,3-Dichlorobenzene	2 J	NA	0.617 J	0.46 J	--
1,4-Dichlorobenzene	10 J	NA	6.56 J	3.1 J	--
2,4-Dichlorobenzene	6 J	NA	NA	ND	--
2-Methylnaphthalene	10 J	NA	NA	ND	--
2-Methylphenol	10 J	NA	NA	ND	--
4,4'-DDD	NA	NA	0.0720 J	ND	--
4-Methylphenol	9 J	NA	--	ND	--
Acenaphthene	13 J	NA	ND	ND	--
Acetone	ND	340	--	ND	--
Benzene	NA	NA	0.321 J	0.19 J	1 U
Bis(2-ethylhexyl)phthalate	3 J	NA	ND	0.76 J	--
Carbazole	5 J	NA	--	ND	--
Chloroethane	82 J	ND	--	ND	--
cis-1,2-Dichloroethene	ND	1700	8.37	9.4 J	28
delta-BHC	NA	NA	0.0709 J	ND	--
Dibenzofuran	3 J	NA	NA	ND	--
Endosulfan II	NA	NA	0.0581 J	ND	--
Endrin Ketone	NA	NA	0.0577 J	ND	--
Ethyl Benzene	300 J	1900	1.22	1.7 J	--
Fluorene	4 J	NA	ND	ND	--
Heptachlor epoxide	NA	NA	0.0390 J	ND	--
Methylene Chloride	50 J	3500	ND	ND	--
Methyl tert-butyl ether	NA	NA	1.76 J	ND	--
Naphthalene	84	NA	ND	ND	--
Tetrachloroethene (PCE)	--	--	--	0.26 J	11
Toluene	140 J	88 J	ND	0.17 J	--
trans-1,2-Dichloroethene	--	--	--	0.66 J	1.8
Trichloroethene (TCE)	ND	100 J	2.10	2.2 J	11
Vinyl Chloride	66 J	1400	2.35	0.49 J	1 U
Xylene (total)	980	2700	ND	0.41 J	--

MW-14R	1/97	9/98	5/04	8/07	5/09
1,2-Dichloroethene (total)	4 J	10	--	ND	--
Acetone	ND	78	NA	ND	--
Bis(2-ethylhexyl)phthalate	18	NA	ND	ND	--
Butylbenzylphthalate	0.6 J	NA	ND	ND	--
cis-1,2-Dichloroethene	NA	11	4.40	5.9 J	3.7
Diethyl phthalate	NA	NA	2.95 J	ND	--
Heptachlor	NA	NA	0.0258	ND	--
Methyl tert-butyl ether	NA	NA	0.649 J	ND	--
trans-1,2-Dichloroethene	--	--	--	2.0 J	1.1
Trichloroethene (TCE)	16	36	12.6	59 J	41
Vinyl Chloride	2 J	3 J	ND	0.56 J	1 U
1,1,1-Trichloroethane (TCA)	--	--	--	--	1 U
1,1-Dichloroethane (1,1-DCA)	--	--	--	--	1 U
1,1-Dichloroethene (1,1-DCE)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U

MW-45 (Decommissioned)	1/97	9/98	5/04
1,1-Dichloroethene	130 J	NA	
1,2-Dichlorobenzene	10	NA	
1,2-Dichloroethene (total)	9700	NA	
1,3-Dichlorobenzene	0.8 J	NA	
1,4-Dichlorobenzene	4 J	NA	
2-Methylnaphthalene	11	NA	
Bis(2-ethylhexyl)phthalate	1 J	NA	
Carbazole	2 J	NA	
Di-n-octylphthalate	0.9 J	NA	
Naphthalene	31	NA	
Trichloroethene	2000	NA	

MW-14S	1/97	9/98	5/04	8/07	5/09
1,2-Dichloroethene (total)	3 J	2 J	--	ND	--
Acetone	ND	95	NA	ND	--
Bis(2-ethylhexyl)phthalate	4 J	NA	8.40 J	0.57 J	--
cis-1,2-Dichloroethene	NA	2 J	ND	0.36 J	1 U
Di-n-butylphthalate	0.5 J	NA	ND	ND	--
Endosulfan sulfate	NA	NA	0.0278 J	ND	--
Trichloroethene (TCE)	1 J	ND	ND	ND	1 U
1,1,1-Trichloroethane (TCA)	--	--	--	--	1 U
1,1-Dichloroethene (1,1-DCE)	--	--	--	--	1 U
1,1-Dichloroethane (1,1-DCA)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
trans-1,2-Dichloroethene	--	--	--	--	1 U
Vinyl Chloride	--	--	--	--	1 U

MW-11S (Decommissioned)	1/97	9/98	5/04
Acetone	8 J	23	--
Trichloroethene	0.9 J	3 J	--
Bis(2-ethylhexyl)phthalate	1 J	NA	--

MW-4R (Decommissioned)	1/97	9/98	5/04
1,1,1-Trichloroethane	41 J	30 J	
1,1-Dichloroethene	140	200	
1,1-Dichloroethane	26 J	56 J	
1,2-Dichloroethene (total)	1900	2800	
Acetone	110 J	ND	
Benzene	18 J	ND	
Bis(2-ethylhexyl)phthalate	22	NA	
cis-1,2-Dichloroethene	2900	2900	
Di-n-butylphthalate	0.7 J	NA	
Methylene Chloride	13 J	ND	
Trichloroethene	62 J	67 J	
Vinyl Chloride	370	490	

MW-1R (Decommissioned)	1/97	9/98	5/04
1,1,1-Trichloroethane	140 J	210 J	
1,1-Dichloroethene	330	600 J	
1,1-Dichloroethane	70 J	180 J	
1,2-Dichloroethene (total)	4200	11000	
2,4-Dichlorophenol	2 J	NA	
Acetophenone	3 J	NA	
Bis(2-ethylhexyl)phthalate	16	NA	
Butylbenzylphthalate	0.9 J	NA	
cis-1,2-Dichloroethene	NA	11000	
Naphthalene	0.5 J	NA	
Tetrachloroethene	37 J	ND	
Trichloroethene	220 J	310 J	
Vinyl Chloride	420	920	
Xylene (total)	62 J	150 J	

MW-10R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	32 J	75 J	13.7	9.4 J	10 U
1,1-Dichloroethene	19 J	ND	7.30	ND	10 U
1,1-Dichloroethane	40 J	41 J	17.1	7.9 J	12
1,2-Dichloroethene (total)	28 J	20 J	NA	ND	--
Bis(2-ethylhexyl)phthalate	12	NA	ND	ND	--
cis-1,2-Dichloroethene	NA	22 J	13.9	16 J	30
Di-n-butylphthalate	0.5 J	NA	ND	ND	--
Tetrachloroethene (PCE)	NA	NA	3.04	ND	10 U
trans-1,2-Dichloroethene	NA	NA	3.57	ND	10 U
Trichloroethene (TCE)	2200	2900	1120	1600 J	1200
1,2-Dichlorobenzene	--	--	--	--	10 U
Benzene	--	--	--	--	10 U
Vinyl Chloride	--	--	--	--	10 U

MW-15	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	ND	2 J	10.5	6 J	2.3
1,1-Dichloroethene	ND	2 J	3.79	0.52 J	1 U
1,1-Dichloroethane	NA	NA	2.45	0.17 J	1 U
1,2-Dichloroethene (total)	2 J	2 J	ND	ND	ND
Acetone	ND	97	NA	NA	ND
Bis(2-ethylhexyl)phthalate	4 J	NA	ND	ND	ND
Chloroform	2 J	4 J	ND	NA	ND
cis-1,2-Dichloroethene	NA	2 J	277	40 J	16
Di-n-butylphthalate	0.5 J	NA	ND	ND	ND
Ethyl Benzene	NA	4 J	ND	ND	ND
Methyl tert-butyl ether	NA	NA	1.18 J	NA	ND
Tetrachloroethene (PCE)	1 J	2 J	10.4	5.3 J	3.1
Trichloroethene (TCE)	14	110	103	46 J	27
Xylenes (total)	ND	5 J	3.79	ND	ND
Vinyl Chloride	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
trans-1,2-Dichloroethene	--	--	--	--	1 U

MW-3R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	47 J	26 J	ND	13 J	10 U
1,1-Dichloroethene	160	180 J	ND	120 J	59
1,1-Dichloroethane	46 J	54 J	23.3	32 J	16
1,2-Dichlorobenzene	NA	NA	3.47 J	ND	10 U
1,2-Dichloroethene (total)	2500	3200	--	ND	--
4-4'-DDE	NA	NA	0.00740 J	ND	--
Acetone	NA	130 J	NA	ND	--
Bis(2-ethylhexyl)phthalate	14	NA	ND	ND	--
cis-1,2-Dichloroethene	NA	3500	938	2700 J	1300
delta-BHC	NA	NA	0.0135 J	ND	--
Di-n-butylphthalate	0.7 J	NA	NA	ND	--
Ethyl Benzene	NA	NA	9.59	ND	--
Fluoranthene	1 J	NA	ND	ND	--
gamma-BHC	NA	NA	0.0079 J	ND	--
Phenanthrene	0.5 J	NA	ND	ND	--
Pyrene	0.5 J	NA	ND	ND	--
Toluene	NA	NA	0.376 J	ND	--
trans-1,2-Dichloroethene	--	--	--	9.1 J	10 U
Trichloroethene (TCE)	89 J	46 J	ND	35 J	15
Vinyl Chloride	310	500	272	400 J	240
Xylenes (total)	NA	NA	10.5	ND	--
Benzene	--	--	--	--	10 U
Tetrachloroethene (PCE)	--	--	--	--	10 U

MW-16R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	7 J	ND	ND	0.28 J	2 U
1,1-Dichloroethene	31 J	110	8.88	8.1 J	11
1,1-Dichloroethane	13 J	30 J	1.35	2.7 J	2.5
1,2-Dichloroethene (total)	870	1800	NA	ND	--
Acetone	ND	66 J	NA	ND	--
cis-1,2-Dichloroethene	NA	1900	190	200 J	250
Bis(2-ethylhexyl)phthalate	3 J	NA	14.0	ND	--
Di-n-octylphthalate	0.7 J	NA	ND	ND	--
Fluoranthene	--	--	--	0.63 J	--
Methyl tert-butyl ether	NA	NA	0.971 J	ND	--
trans-1,2-Dichloroethene	--	--	--	0.87 J	2 U
Trichloroethene (TCE)	12 J	21 J	3.52	6.3 J	3.9
Vinyl Chloride	160	380	52.8	30 J	50
1,2-Dichlorobenzene	--	--	--	--	2 U
Benzene	--	--	--	--	2 U
Tetrachloroethene (PCE)	--	--	--	--	2 U

MW-15R	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	2 J	NA	ND	ND	1 U
1,2-Dichloroethene (total)	18	NA	NA	ND	--
Bis(2-ethylhexyl)phthalate	8 J	NA	ND	ND	--
cis-1,2-Dichloroethene	NA	NA	6.00	5.5 J	3.5
Trichloroethene (TCE)	3 J	NA	1.74	1.6 J	1.2
Vinyl Chloride	10	NA	ND	0.59 J	1 U
1,1-Dichloroethane (1,1-DCE)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
trans-1,2-Dichloroethene	--	--	--	--	1 U

MW-2S	1/97	9/98	5/04	8/07	5/09
1,1,1-Trichloroethane	1 J	NA	ND	ND	1 U
1,1-Dichloroethene	2 J	NA	ND	1.4 J	1 U
Acetone	8 J	NA	NA	ND	--
Anthracene	NA	NA	1.76 J	ND	--
Benz(a)anthracene	NA	NA	1.35 J	ND	--
Benzo(a)pyrene	NA	NA	1.33 J	ND	--
Benzo(b)fluoranthene	NA	NA	1.32 J	ND	--
Benzo(g,h,i)perylene	NA	NA	1.64 J	ND	--
Bis(2-ethylhexyl)phthalate	8 J	NA	ND	0.54 J	--
Chrysene	NA	NA	1.51 J	ND	--
Di-n-butylphthalate	0.5 J	NA	NA	2.0 J	--
Fluoranthene	NA	NA	2.60 J	ND	--
Indeno(1,2,3-cd)pyrene	NA	NA	2.96 J	ND	--
Phenanthrene	NA	NA	1.43 J	ND	--
Pyrene	NA	NA	1.96 J	ND	--
1,1-Dichloroethene (1,1-DCE)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
cis-1,2-Dichloroethene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
trans-1,2-Dichloroethene	--	--	--	--	1 U
Trichloroethene (TCE)	--	--	--	--	1 U
Vinyl Chloride	--	--	--	--	1 U

MW-3S	1/97	9/98	5/04	8/07	5/09
4-4'-DDE	NA	NA	0.0385 J	ND	--
Acenaphthylene	NA	NA	1.11 J	ND	--
Acetone	ND	2200	NA	ND	--
Benz(a)anthracene	NA	NA	0.841 J	ND	--
Benzo(a)pyrene	NA	NA	1.17 J	ND	--
Benzo(b)fluoranthene	NA	NA	1.22 J	ND	--
Benzo(g,h,i)perylene	NA	NA	2.73 J	ND	--
Benzo(k)fluoranthene	NA	NA	1.09 J	ND	--
Bis(2-ethylhexyl)phthalate	4 J	NA	ND	ND	--
cis-1,2-Dichloroethene	--	--	--	4.6 J	1 U
Chrysene	NA	NA	0.907 J	ND	--
delta-BHC	NA	NA	0.0863 J	ND	--
Fluoranthene	NA	NA	0.949 J	ND	--
Indeno(1,2,3-cd)pyrene	NA	NA	3.61 J	ND	--
Pyrene	NA	NA	0.930 J	ND	--
Toluene	2 J	ND	ND	ND	--
1,1,1-Trichloroethane (TCA)	--	--	--	--	1 U
1,1-Dichloroethene (1,1-DCA)	--	--	--	--	1 U
1,1-Dichloroethene (1,1-DCE)	--	--	--	--	1 U
1,2-Dichlorobenzene	--	--	--	--	1 U
Benzene	--	--	--	--	1 U
Tetrachloroethene (PCE)	--	--	--	--	1 U
Trichloroethene (TCE)	--	--	--	--	1 U
Vinyl Chloride	--	--	--	--	1 U

LEGEND

- MW-12R — EXISTING MONITORING WELL
- P-1 — GROUNDWATER PUMPING WELLS
- PW-1 — DEEP PUMPING WELLS
- PZ-4 — PIEZOMETERS

NOTES:

1. ONLY DETECTED COMPOUNDS ARE PRESENTED.
2. ALL VALUES ARE IN µg/L.
3. 10/95 DATA TAKEN FROM FINAL DRAFT REMEDIAL INVESTIGATION REPORT (OCTOBER 1996).
4. 1/97 DATA TAKEN FROM PHASE 2 REMEDIAL INVESTIGATION. (OCTOBER 1997).
5. 1/97 SAMPLES WERE ONLY ANALYZED FOR TARGET COMPOUND LIST VOCS AND SVOCS.
6. 9/98 DATA FROM PRE-REMEDIAL DESIGN INVESTIGATION REPORT (NOVEMBER 1998).
7. E IDENTIFIES COMPOUNDS WHOSE CONCENTRATIONS EXCEED THE CALIBRATION RANGE OF THE INSTRUMENTS.
8. J INDICATES AN ESTIMATED QUANTITATION VALUE BELOW REPORTING LIMIT.
9. NA INDICATES THAT DATA IS NOT AVAILABLE.
10. ND INDICATES THAT THE COMPOUND WAS NOT DETECTED ABOVE THE QUANTITATION LIMIT.
11. FOR ANALYTICAL DATA FROM 1/97 AND 9/98, THE DETECTION LIMITS ARE UNKNOWN.

ANALYTICAL ABBREVIATIONS

ND	NOT DETECTED
NA	NOT ANALYZED
--	NOT ANALYZED OR NOT DETECTED
(J)	ESTIMATED VALUE
(U)	ANALYZED FOR BUT NOT DETECTED AT THE DETECTION LIMIT INDICATED

SCALE IN FEET
0 40 80 120

NO.	DATE	DWN	APP'D	DESCRIPTION
C	6/24/09	KMK	MGS	UPDATED PER MAY 2009 SAMPLE EVENT
B	12/21/07	KMK	RW	UPDATED PER AUGUST 2007 SAMPLE EVENT
A	2/04	KMK	MGS	ISSUED TO NYSDEC FOR REVIEW

REVISIONS

FIGURE 4-1
MONITORING WELL ANALYTICAL DATA
DAVIS-HOWLAND OIL CORPORATION SITE
MONROE COUNTY, ROCHESTER, NY

ecology and environment engineering p.c.