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US ARMY CORPS
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New England District

Contract No. DACW33-01-D-0004
Delivery Order No. 01
June 2003

DRAFT
DATA SUMMARY REPORT

Interim Data Collection Remedial Investigation And Feasibility Study

Centredale Manor Restoration Project Site North Providence, Rhode Island

Data Summary Report

Interim Data Collection
Remedial Investigation And Feasibility Study
Centredale Manor Restoration Project Site
North Providence, Rhode Island

CONTRACT NO. DACW33-01-D-0004
DELIVERY ORDER NO. 01

Submitted to:

Department of the Army
U.S. Army Corps of Engineers
New England Division

June 2003

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ABBREVIATIONS AND ACRONYMS

BHHRA	Baseline human health risk assessment
COPC	Chemical of potential concern
CSM	Conceptual site model
FS	Feasibility Study
HCX	Hexachloroxanthene
ICS	Instrument control sample
LEA	Loureiro Engineering Associates
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MS	Matrix spike sample
MSD	Matrix spike sample duplicate
NPL	National Priorities List
NTCRA	Non-time critical removal action
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
ppb	parts per billion
QA	Quality assurance
QC	Quality control
QAPP	*Quality Assurance Project Plan*
RI	Remedial Investigation
RPD	Relative percent difference
SRM	Standard reference material
SVOC	Semi volatile organic compound
TCDD	Tetrachlorodibenzodioxin
TCRA	Time-critical removal action
TEQ	Toxic Equivalency Quotient
TOC	Total organic carbon
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) Region I and U.S. Army Corps of Engineers (USACE) New England District are conducting a Remedial Investigation and Feasibility Study (RI/FS) for the Centredale Manor Restoration Project Site located in North Providence, Rhode Island. This Interim Data Collection Data Summary Report presents data that were collected to fill data gaps associated with the RI/FS for the terrestrial part of the site. The scope of work is described in the Interim Data Collection Work Plan (Battelle, 2002a). Complete analytical results for the interim data collection effort were presented in the Task RI-3 Data Chemistry Report (Battelle, 2003a).

1.1 Project Objectives

The purpose of the Centredale Manor Restoration Project Site RI is to determine the sources, nature, and extent of contamination at the site; characterize the fate and transport of contaminants; and evaluate potential human health and ecological risks resulting from exposure to site-related contaminants. The RI will evaluate areas of the Centredale Manor Restoration Project Site that have not already been addressed by time-critical removal actions (TCRA) and non-time critical removal actions (NTCRA) completed at the site. The specific objectives of the interim data collection effort were as follows:

- Collect and analyze soil samples from the tailrace on the east side of the source area to refine the conceptual site model (CSM), better define the distribution and extent of dioxin contamination, and screen for the presence of other site-related contaminants;
- Collect and analyze soil samples from the John E. Fogarty Center property on the southeast shore of Lyman Mill Pond to evaluate potential human health risks to site users; and
- Collect and analyze groundwater samples from all existing monitoring wells to evaluate temporal trends in contaminant concentrations.

Additional data collection to complete the RI for the aquatic part of the site is in progress. The overall approach for addressing environmental contamination at the site is described in the RI/FS Work Plan (Battelle, 2003b).

1.2 Site Description and History

The main part of the site (i.e., the source area) is located at 2072 and 2074 Smith Street (Figure 1-1) in North Providence, Rhode Island. The site is currently occupied by the Brook Village and Centredale Manor apartment complexes, and is privately owned. The main part of the site comprises parking lots, roadways, lawn areas, and two residential buildings, Centredale Manor and Brook Village (Figure 1-2). Brook Village is on the northern part of the property and Centredale Manor is located to the south. The site also consists of reaches of the Woonasquatucket River associated with Allendale and Lyman Mill Ponds. The site consists of all contaminated areas within this area as well as any other location to which contamination from that area has come to be located, or from which that contamination came. Two interim protective soil caps (Interim Cap #1 and Interim Cap #2) are located to the south and west of Centredale Manor, respectively.

Prior to 1936, Centredale Worsted Mills, a woolens manufacturing plant, occupied the main part of the site. In approximately 1940, Metro Atlantic Chemical Corporation began manufacturing chemicals on the site. The mill complex buildings were located at north end of site, north of the existing Centredale Manor building and north parking lot. Trichlorphenols were shipped to the site, where it is believed that Metro Atlantic manufactured hexachlorophene (of which hexachloroxanthene [HCX] and dioxin are by-products). Operations at Metro Atlantic Chemical Corporation ceased during the late 1960s or early 1970s. Between 1952 and 1971, New England Container Company operated a drum reconditioning

facility at the south end of the mill complex (immediately north of the Centredale Manor north parking lot). Chemical residues were dumped or burned prior to drum reconditioning. Residues associated with drum reconditioning operations may also be a source of dioxin to the site. In 1972, fire destroyed most property structures. Brook Village was constructed in 1977 and Centredale Manor was constructed in 1982. The site was listed on the National Priorities List (NPL) in 2000.

Evidence of improper historical waste disposal was discovered during construction of the apartment complexes, and approximately 400 drums and 6,000 cubic yards of contaminated soil were removed from the Centredale Manor site. Chemicals that were potentially used onsite were identified based on drum labels and included caustics, halogenated solvents, polychlorinated biphenyls (PCBs), and inks. An analysis of historical aerial photographs and geophysical data suggests that some waste material (e.g., metallic fill and debris) may still be present in the source area (TTNUS, 2002).

The Allendale Dam was partially breached in 1991, reducing the surface water level in Allendale Pond. The dam breached completely in 2001, exposing most of the pond bottom adjacent to residential properties along the eastern bank of Allendale Pond from 1991-2002. Allendale Dam was reconstructed and the Allendale Pond was restored to its pre-1991 elevation in early 2002 as part of a NTCRA for the site.

1.3 Conceptual Site Model

The conceptual site model CSM identifies potential sources of contamination, release mechanisms, contaminated media and contaminant transport mechanisms, exposure pathways and potential receptors. The CSM provides a framework for characterizing the movement of contaminants at the site and evaluating potential human health and ecological risks from exposure to contamination.

Potential historical sources of contamination at the Centredale Manor site include improper storage and disposal of chemicals in drums, stockpiles and surface impoundments. Direct infiltration of chemicals and leaching of the ground surface led to the contamination of surface and subsurface soils, primarily in the areas that are currently beneath Interim Caps #1 and #2. Localized groundwater contamination has also occurred. The erosion and transport of contaminated soils by surface runoff and periodic flooding of the river resulted in sediment contamination in the adjacent river and ponds and tailrace on the east side of the site. Direct discharge of chemicals to the river and possibly the tailrace during site operations may also have contributed to sediment contamination. The breach of the Allendale Dam in 1991 and again in 2001 apparently resulted in the downstream transport of contaminated sediment from Allendale Pond to Lyman Mill Pond and possibly downstream of the Lyman Mill dam, and left the pond bottom sediments exposed as floodplain soils. Allendale Pond was restored to its original level in early 2002. It is presumed that contaminated sediments have accumulated in depositional areas of the Woonasquatucket River. Additionally, sediments may have been remobilized by high river flows and deposited on the river banks and in the adjacent floodplain during storm events. The nature and extent of sediment contamination is currently being investigated.

The CSM for the tailrace east of the source area is described in more detail below because it was the primary focus of the interim data collection effort. Examination of historical aerial photos and maps indicated that prior to about 1940, the Woonasquatucket River flowed along the east side of the site (in the current location of the tailrace) (LEA, 2002). After about 1940, the majority of the river flow was diverted to the west side of the site, although some flow remained through the tailrace. Between 1939 and 1951, the north end of tailrace was filled and it no longer flowed continuously, although surface water was present throughout the tailrace. During 1960s and 70s, the tailrace was vegetated and appeared to receive some surface drainage from the site. The west side of the tailrace was modified

during redevelopment and landscaping of the site (i.e., during the construction of Centredale Manor), although the east side remained vegetated and relatively unchanged.

The presence of moderate to heavy vegetation and ponded water in the tailrace throughout the period when the Metro Atlantic Chemical Corporation operated suggests that it was not actively or frequently disturbed by site operations or used as a waste disposal area, although it appears likely that the tailrace received drainage from site impoundments and/or surface water at various times in the past. Aerial photos from the 1950s show a waste disposal area south of the drum recycling building (in the current location of the Centredale Manor north parking lot), with drainage from the waste piles east into the tailrace. A 1970 photo shows an impoundment in the current location of the Centredale Manor building and southeast corner of the north parking lot. It appears that a drainage feature from this impoundment entered the tailrace. A 1979 photo shows surface flow paths from west to east towards the tailrace near the former drum recycling facility and impoundment. Contaminants in surface runoff could have accumulated in low-lying areas in the tailrace, with post-depositional reworking by flood waters and episodic flow. The western edge of the tailrace was apparently modified during construction of the Centredale Manor apartment complex and parking lot; however, the nature of these modifications and materials used are unknown.

1.4 Organization of Report

This Data Summary Report is organized as follows:

Section 1.0: Introduction.

Section 2.0: Field summary; including a summary of field activities, conditions encountered, and samples collected.

Section 3.0: Summary of analytical results for all samples, and assessment of data usability based on an evaluation of field and laboratory quality control (QC) data.

Section 4.0: Data evaluation and interpretation.

Section 5.0: Conclusions.

Section 6.0. References.

The Field Summary Report is provided in Appendix A.

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2.0 FIELD SUMMARY

This section summarizes the interim data collection field effort conducted in the fall of 2002 at the Centredale Manor Restoration Project site.

2.1 Soil Sampling

Soil sampling was conducted in the tailrace east of the source area and at the John E. Fogarty Center property at the south end of Lyman Mill Pond.

2.1.1 Tailrace Soils

Nine soil borings were installed to a depth of 9 ft in the tailrace from November 18 through 22, 2002. Two surface locations were sampled on 11/21/02. Table 2-1 provides a summary of the boring locations, soil samples collected, and analyses completed. Sample locations are shown in Figure 2-1. Twenty nine soil samples were analyzed for dioxin/HCX, and two samples were analyzed for a full suite of chemicals of potential concern (COPCs). The full suite of COPCs included conventional parameters (grain size and total organic carbon [TOC]), metals, semivolatile organic compounds (SVOCs), chlorinated pesticides, and PCBs.

Soil samples were collected from the borings using stainless steel split spoon samplers, and from the surface locations using a hand auger. Soil characteristics were recorded on boring logs, which are provided in Appendix A. A photoionization detector (PID) was used to measure headspace volatile organic compound (VOC) concentrations in soil. Headspace values are reported on the soil boring logs in Appendix A. Additional details regarding the field effort are provided in the Field Summary Report in Appendix A.

Four of the borings (CMS-4105, CMS-4106, CMS-4109, and CMS-4110) were drilled through 6 to 12 inches of standing water using a barge-mounted hollow stem auger rig. The remaining borings were drilled on dry land using a conventional truck-mounted rig (CMS-4107, CMS-4108, and CMS-4111) or a portable tripod rig (CMS-4101 and CMS-4102). Sample locations were staked, and station coordinates were obtained by a professional surveyor on March 26, 2003.

2.1.2 John E. Fogarty Center Soils

Surface soil samples were collected from the fenced yard behind the John E. Fogarty Center at the south end of Lyman Mill Pond on November 22, 2002 using a hand auger. A sample summary is provided in Table 2-2 and sample locations are shown in Figure 2-2. Four surface soil samples were analyzed for dioxin/HCX and a full suite of COPCs. Station coordinates were obtained by a professional surveyor on March 26, 2003.

2.2 Groundwater Sampling

Groundwater samples for VOC analysis were collected from the 33 existing monitoring wells from October 22 through 24, 2002, except for the sample from Well MW-03S, which was collected on November 21, 2002. Well MW-03S was not sampled in October because it could not be located in the dense vegetation. Well MW-05S was sampled for dioxin analysis on November 21, 2002; this sample was not collected in October because the well contained insufficient water for dioxin sampling and was extremely slow to recharge.

All samples were collected following the procedures outlined in the USEPA Region I document *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (July 30, 1996, Revision 2). A sample summary is provided in Table 2-3. Monitoring well locations are shown in Figure 2-3. Thirty seven groundwater samples were analyzed for VOCs and two were analyzed for dioxin.

Water levels in all accessible monitoring wells, piezometers, and surface water staff gauges were measured on October 21, 2002 (the water level in well MW-03S was measured on November 21, 2002). Monitoring well, piezometer, and staff gauge locations are shown in Figure 2-3. The well headspace was monitored with a PID when each well was opened. Water level data are presented in Section 4.0. Additional information regarding the groundwater sampling field effort are provided in the Field Summary Report in Appendix A.

3.0 DATA SUMMARY

This section summarizes the analytical results for samples collected in the fall of 2002, and evaluates data usability. Complete analytical and data validation results for all samples are provided in the Task RI-3 Data Chemistry Report (Battelle, 2003b). Data are discussed and evaluated in Section 4.0.

3.1 Sample Results

Samples collected include tailrace soils, John E. Fogarty center soils, and groundwater.

3.1.1 Tailrace Soils

Table 3-1 presents 2,3,7,8-TCDD and total TEQ concentrations on a dry weight basis in tailrace surface and subsurface soil samples. Table 3-2 summarizes the results for two surface soil samples that were analyzed for a broad range of COPCs to screen for the presence of site-related contaminants; including conventional parameters, metals, SVOCs, chlorinated pesticides, and PCBs.

3.1.2 Commercial Use Soils

Table 3-3 summarizes the results for three surface soil samples that were collected and analyzed for a full suite of COPCs (conventional parameters, metals, SVOCs, chlorinated pesticides, and PCBs). These results will be evaluated in an addendum to the baseline human health risk assessment (BHHRA) report to determine whether exposure to soils poses a potential risk to site users.

3.1.3 Groundwater

Table 3-4 summarizes detected VOC data for all samples and 2,3,7,8-TCDD and total TEQ results for samples from Well MW-05S.

3.2 Data Usability

Laboratory data generated for this study received internal verification and validation by the Quality Assurance (QA) officers from each participating laboratory. Data submitted by each laboratory were then finalized through third party validation, which was conducted by USEPA Region 1 and Environmental Standards of Valley Forge, PA.

The samples for dioxin/furan and HCX analyses were validated by USEPA Region 1 at a Tier III level using first the criteria in the Centredale Manor Tasks 19-22 QAPP (Battelle, 2001), including the QAPP Addendum (Battelle, 2002b), the QAPP Errata Sheet (Battelle, 2002c), and the criteria in EPA Method 1613B, September 15, 1997; defaulting next to *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, and to EPA Region I's Environmental Services Assistance Team Dioxin Data Validation SOP ESAT-01-0007 (01/08/2003).

The samples for all other testing parameters (e.g., PCB Aroclor) were validated by Environmental Standards of Valley Forge, PA at a Tier II level in accordance with the *Region I, EPA New England Data Validation Functional Guidelines for Evaluating Environmental Analyses* (US EPA, 12/1996), the *Centredale Manor Restoration Project Site Final Quality Assurance Project Plan (QAPP) – Addendum to Tasks 19-22 QAPP* (Battelle, 2002b), and the *Errata to Centredale Manor Tasks 19-22 Quality Assurance Project Plan – Addendum* (Battelle, 2002c).

Complete details of the validation findings are presented in Section 8 of the *Task RI-3 Chemistry Data Report, Interim Data Collection Remedial Investigation And Feasibility Study, Centredale Manor Restoration Project Site, North Providence, Rhode Island* (Battelle, 2003a).

3.2.1 Field-Based Quality Control

Field QC samples collected for the soil-sampling event included rinsate blank and field duplicate samples, at a frequency of 1 per 20 study samples. Field QC samples collected for the groundwater sampling event included trip blanks (for VOC analysis only) at a minimum frequency of 1 per sampling event and field duplicates at a frequency of 1 per 20 study samples. Rinsate blanks were not collected for the groundwater-sampling event because dedicated sampling equipment was used for the sample collections.

Results from the third party validation showed several cases where sample results for one or more analyte within each parameter class (e.g., dioxin, PAH) did not meet the field duplicate criterion of relative percent difference (RPD) less than 50%. Wherever the RPD criteria were not met, data were J flagged by the validators to indicate that sample results were estimated (Battelle, 2003a). The RPD exceedances between field duplicates suggest that the sediment material collected is naturally heterogeneous, and contaminant data may vary as a result, even within a sampling location. Additional details regarding validation findings for field-based QC samples are summarized below; complete details are provided with the chemistry data report (Battelle, 2003a).

Data validation for dioxin/furan and HCX indicated two relative percent difference (RPD) exceedances in one field duplicate pair and eight RPD exceedances in the second field duplicate pair. These exceedances did not significantly impact the usability of the dioxin/furan data according to the EPA validator. The final validated data were qualified accordingly by the validators to indicate that selected sample results were estimated (Battelle, 2003a).

Data validation for pesticide/PCB and PAH indicated minor RPD exceedances in field duplicate data (pesticide and PAH), and some low level contamination (PAH) for the rinsate blank. Overall, the data quality is satisfactory and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validators (Battelle, 2003a).

Data validation for metals, TOC and grain size analysis indicated minor RPD exceedances for field duplicates. Overall, the data quality is satisfactory and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validators (Battelle, 2003a).

Data validation for SVOC analysis by Method 8270C and volatile VOC analysis by Method 8260B indicated low level rinsate blank contamination (SVOC), low level trip blank contamination (VOC) and field duplicate RPD exceedances. Overall, the data quality is good and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validators (Battelle, 2003a).

3.2.2 Laboratory-Based Quality Control

A routine set of laboratory-based QC samples were prepared with the study samples to monitor data quality in terms of accuracy and precision. In general, laboratory-based QC included one method blank, one laboratory control sample (LCS), one matrix spike/spike duplicate (MS/MSD) pair, one laboratory duplicate, and one standard reference material (SRM), where available. Laboratory QC samples were prepared at a frequency of 1 per 20 study samples.

Results from the third party validation indicated minor data quality problems, which do not significantly impact the usability of these sample data. Data quality issues addressed by the validators are also discussed in laboratory prepared QA/QC narratives, which are reported with the chemistry data (Battelle, 2003a). The QA/QC narrative include a discussion of the laboratory QC results and a description of MPC exceedances and the impact, if any, the exceedances may have on the overall field sample data. Additional details regarding validation findings for laboratory-based QC samples are summarized below; complete details are provided with the chemistry data report (Battelle, 2003a).

Data validation for dioxin/furan and HCX indicated the minor data quality problems, which do not significantly impact the usability of the dioxin/furan data according to the EPA validator. Low-level blank contamination was observed in the soil and ground water sample analysis, however, the low level blank contamination does not have an impact on the usability of the dioxin/furan data according to the validator. The final validated data were qualified accordingly by the validator (Battelle, 2003a).

Data validation for pesticide/PCB and PAH analysis indicated the blank contamination (PAH), an exceeded holding time (rinsate blank), high instrument control sample (ICS) percent differences, a high laboratory control sample recovery, and a high MS recovery (pesticide) issues. Overall, the data quality is satisfactory and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validator (Battelle, 2003a).

Data validation for metals, TOC and grain size analysis indicated the blank contamination (metals), low MS/MSD, SRM, and blank spike recoveries (metals), and laboratory duplicate precision (grain size) issues. Overall, the data quality is satisfactory and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validator (Battelle, 2003a).

Data validation for SVOC analysis by Method 8270C and VOC analysis by Method 8260B indicated an exceeded holding time (rinsate blank), low MS/MSD and LCS and/or LCS Duplicate (LCSD) recoveries issues. Overall, the data quality is good and the data are acceptable for use according to the validator. The final validated data were qualified accordingly by the validator (Battelle, 2003a).

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4.0 DATA EVALUATION

4.1 Tailrace Soils

The objectives of the tailrace soil sampling were to refine the CSM, better define the distribution and extent of dioxin contamination, and screen for the presence of other site-related contaminants.

4.1.1 Soil Type and Dioxin Distribution

Cross sections of the soil types observed in the 2002 tailrace borings are provided in Figure 4-1. Surface soils consisted of silty sand near the north end of the tailrace, and a 1-2 ft thick, dark brown to black, organic rich layer in the underwater portion of the tailrace. Subsurface soils consisted of sandy gravel and medium to coarse sand, which presumably represent historic river channel sediments. Silt was encountered in one boring (CMS-4110) from a depth of 7 ft to the bottom of the boring at 9 ft. Artificial fill was encountered in the three borings (CMS-4107, CMS-4108, and CMS-4111) on the west side of the tailrace adjacent to the access road behind the Centredale Manor building. The fill layer was 3 ft thick and was composed of silty sand, gravel, clinker material, friable coal-like material and ash, and wood fibers.

No visible evidence of contamination was noted in any of the borings except for a slight sheen on several samples and anthropogenic material in the artificial fill on the west side of the tailrace. A slight hydrocarbon odor was noted in several borings, and a strong, sweet hydrocarbon odor was noted in boring CMS-4111 from 2 ft to 7 ft below the surface. Samples with dioxin TEQ concentrations exceeding 1 ppb were found in the organic-rich surface layer in borings CMS-4106, CMS-4109, and CMS-4110. One sample collected from the artificial fill along the western edge of the tailrace also had a dioxin TEQ concentration above 1 ppb (CMS-4111, 1 to 2.8 ft below the surface). The dioxin TEQ concentration also exceeded 1 ppb in the surface soil sample collected from the organic-rich surface layer at CMS-4104 (Figure 4-2). None of the samples collected from the sandy gravel or sand layers had dioxin TEQ concentrations exceeding 1 ppb.

Dioxin data collected in 2002 were combined with data from previous investigations to better define the distribution of dioxin in the tailrace (Figure 4-2). Dioxin data from previous investigations are tabulated in the Interim Data Collection Work Plan (Battelle, 2002a). Dioxin concentrations are highest at the north end of the broad, low-lying part of the tailrace that is covered with standing water, in the vicinity of sample locations 01-DEL-05 and 01-DEL-100. Surface soil with TEQ concentrations above 1 ppb are found throughout the low-lying part of the tailrace. Although fewer subsurface samples have been collected, available data indicate that the dioxin tends to occur in the organic-rich surface layer and not in the subsurface sand and gravel deposits. The majority of samples collected downstream of CMS-SD-2020 and SD-30 at the south end of the area shown in Figure 4-2 have dioxin TEQ concentrations below 1 ppb.

North of the area around 01-DEL-100 and 01-DEL-05, the tailrace narrows and is dry. Dioxin concentrations in this area are below 1 ppb, with the exception of a 2-3 ft sample from MW-01S (TEQ of 1.1 ppb). Dioxin TEQ concentrations in surface soils on the embankment on the east side of the tailrace are below 1 ppb (it should be noted that samples have not been collected on the embankment immediately east of 01-DEL-100 and CMS-4104 because it is located on private property). Dioxin TEQ concentrations on the west side of the tailrace are generally below 1 ppb with the exception of several

samples collected from the artificial fill adjacent to the access road behind the Centredale Manor building (i.e., from borings CMS-098 and CMS-4111).

The distribution of dioxin contamination suggests that dioxin-containing waste may have been discharged directly into the tailrace at the north end of the broad, low-lying area. Contaminated soils subsequently may have been transported downstream and reworked by episodic flow; alternatively, contaminated surface soils from the site may have been eroded, transported by surface runoff, and deposited in the low-lying part of the tailrace. The dioxin is primarily associated with the fine-grained, highly organic layer on the surface of the tailrace.

4.1.2 Other Contaminants

Concentrations of a variety of COPCs measured in two surface soil samples from the tailrace were compared to Rhode Island residential direct exposure criteria to screen for the presence of other potential site-related contaminants (Table 4-1). Concentrations of four metals (arsenic, beryllium, lead, and manganese), a variety of polycyclic aromatic hydrocarbons (PAHs), dieldrin, and total PCBs exceeded the residential direct exposure criteria in both samples.

4.2 Groundwater

Table 4-2 compares VOC concentrations measured in groundwater samples in 2002 to levels measured in 2001, and Table 4-3 compares the dioxin concentration in groundwater samples from Well MW-05S. These data indicate that contaminant concentrations generally have decreased or remained the same from 2001 to 2002. In wells with tetrachloroethene (PCE) concentrations exceeding 100 µg/L (wells GEC-6, MW-02D, MW-05S, MW-13B, and MW-13D), the PCE concentrations have decreased since 2001. However, the PCE concentration in Well MW-14M increased from below detection in 2001 to 1900 µg/L in 2002. This well is in the Brook Village parking lot, south-southeast (downgradient) of Well MW-05S, which has the highest PCE concentration on site. These results indicate that the PCE plume has migrated downgradient from the vicinity of Well MW-05S to Well MW-14M. The dioxin (2,3,7,8-TCDD) concentration in Well MW-05S decreased from 4460 pg/L in 2001 to 1071 pg/L in 2002 (1513 pg/L in the field duplicate sample).

Table 4-4 presents the groundwater elevation data measured in October 2002. Figure 4-3 is a water table elevation map based on the shallow monitoring well data (piezometer data were not included in the map because of uncertainties regarding data comparability). Groundwater elevations are consistent with those measured in the fall of 2001 (TTNUS, 2002). The direction of shallow groundwater flow is generally to the south. Differences in groundwater elevations between collocated shallow, deep, and bedrock wells indicate that there are no strong vertical hydraulic gradients, which is also consistent with previous groundwater measurements at the site (TTNUS, 2002).

5.0 CONCLUSIONS

The results of the interim data collection effort will be used in conjunction with previously-collected data to complete the RI for the Centredale Manor Restoration Project Site. The following conclusions can be drawn from the data collected in the fall of 2002:

Tailrace Soils

- Dioxin concentrations are highest at the north end of the low-lying part of the tailrace that is inundated with standing water (i.e., east of the Centredale Manor north parking lot). Historical aerial photographs indicate that this area may have received discharges from surface impoundments in the source area.
- Dioxin TEQ concentrations above 1 ppb are found throughout the low-lying part of the tailrace downstream of the area of highest concentrations. Contaminated soils may have been transported downstream during periods of high flow, or may have been contained in runoff from the source area and deposited in the tailrace depression.
- Dioxin is primarily associated with the organic-rich surface layer beneath the ponded water in the tailrace. Native sands and gravels beneath the organic layer generally do not appear to be contaminated.
- Dioxin TEQ concentrations exceeding 1 ppb are also found in artificial fill material present on the west side of the tailrace, adjacent to the access road behind the Centredale Manor building.
- Concentrations of metals, PAHs, dieldrin, and total PCBs in two surface soil samples collected in the center of the tailrace exceeded Rhode Island residential direct exposure criteria.

John E. Fogarty Center Soils

- Three surface soil samples were collected from the John E. Fogarty Center at the south end of Lyman Mill Pond and analyzed for a variety of COPCs. These data will be evaluated in an addendum to the BHHRA report.

Groundwater

- VOC concentrations in groundwater samples collected from existing monitoring wells on the site generally remained the same or decreased from 2001 to 2002, except in Well MW-14M, where the PCE concentration increased from below detection to 1900 µg/L. Well MW-14M is downgradient of Well MW-05S, where the highest PCE concentrations on site have been measured. The dioxin concentration in samples from Well MW-05S decreased.
- Groundwater elevations and gradients were similar to those measured in the fall of 2001.

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7.0 TABLES

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Table 2-1. Tailrace Soil Sample Summary, Fall 2002

Boring ID	Top Of Sample (ft)	Bottom Of Sample (ft)	Northing	Easting	Sample Collection Date	Sample ID	Analysis Completed
CMS-4101	1.0	1.9	282068.8708	331815.6462	22-Nov-02	CMS-SS-4101-1019-01	Dioxin/HCX
CMS-4101	3.0	4.2	282068.8708	331815.6462	22-Nov-02	CMS-SS-4101-3042-01	Dioxin/HCX
CMS-4102	0.0	0.8	281861.4373	331900.6413	22-Nov-02	CMS-SS-4102-0008-01	Dioxin/HCX
CMS-4102	1.0	1.9	281861.4373	331900.6413	22-Nov-02	CMS-SS-4102-1019-01	Dioxin/HCX
CMS-4102	3.0	3.8	281861.4373	331900.6413	22-Nov-02	CMS-SS-4102-3038-01	Dioxin/HCX
CMS-4103	0.0	1.0	281849.9108	331916.0011	22-Nov-02	CMS-SS-4103-0010-01	Dioxin/HCX
CMS-4104	0.0	1.0	281824.6230	331925.9334	22-Nov-02	CMS-DU-112202A-01 (a)	Dioxin/HCX
CMS-4104	0.0	1.0	281824.6230	331925.9334	22-Nov-02	CMS-SS-4104-0010-01	Dioxin/HCX
CMS-4105	0.0	1.0	281789.5767	331913.4607	20-Nov-02	CMS-SS-4105-0010-01	Full suite (c)
CMS-4105	1.0	1.5	281789.5767	331913.4607	20-Nov-02	CMS-SS-4105-1015-01	Dioxin/HCX
CMS-4105	3.0	4.0	281789.5767	331913.4607	20-Nov-02	CMS-SS-4105-3040-01	Dioxin/HCX
CMS-4106	0.0	1.0	281733.4293	331930.7663	19-Nov-02	CMS-DU-111902A-01 (a)	Dioxin/HCX
CMS-4106	0.0	1.0	281733.4293	331930.7663	19-Nov-02	CMS-SS-4106-0010-01	Dioxin/HCX
CMS-4106	1.0	1.6	281733.4293	331930.7663	19-Nov-02	CMS-SS-4106-1016-01	Dioxin/HCX
CMS-4106	3.0	3.6	281733.4293	331930.7663	19-Nov-02	CMS-SS-4106-3036-01	Dioxin/HCX
CMS-4107	1.0	3.0	281711.7051	331886.1194	21-Nov-02	CMS-SS-4107-1030-01	Dioxin/HCX
CMS-4107	3.0	4.0	281711.7051	331886.1194	21-Nov-02	CMS-SS-4107-3040-01	Dioxin/HCX
CMS-4108	0.0	1.0	281661.0193	331898.2405	21-Nov-02	CMS-SS-4108-0010-01	Dioxin/HCX
CMS-4108	1.0	3.0	281661.0193	331898.2405	21-Nov-02	CMS-SS-4108-1030-01	Dioxin/HCX
CMS-4108	3.0	4.0	281661.0193	331898.2405	21-Nov-02	CMS-SS-4108-3040-01	Dioxin/HCX
CMS-4109	0.0	1.0	281624.6748	331964.7882	18-Nov-02	CMS-SS-4109-0010-01	Dioxin/HCX
CMS-4109	1.0	1.4	281624.6748	331964.7882	18-Nov-02	CMS-SS-4109-1014-01	Dioxin/HCX
CMS-4109	3.0	3.8	281624.6748	331964.7882	18-Nov-02	CMS-SS-4109-3038-01	Dioxin/HCX
CMS-4110	0.0	1.0	281573.0434	332000.7455	19-Nov-02	CMS-SS-4110-0010-01	Dioxin/HCX, full suite (c)
CMS-4110	1.0	1.5	281573.0434	332000.7455	19-Nov-02	CMS-SS-4110-1015-01	Dioxin/HCX
CMS-4110	3.7	3.9	281573.0434	332000.7455	19-Nov-02	CMS-SS-4110-3739-01	Dioxin/HCX
CMS-4111	0.0	0.9	281549.2179	331935.9552	21-Nov-02	CMS-SS-4111-0009-01	Dioxin/HCX
CMS-4111	1.0	2.8	281549.2179	331935.9552	21-Nov-02	CMS-SS-4111-1028-01	Dioxin/HCX
CMS-4111	3.0	4.5	281549.2179	331935.9552	21-Nov-02	CMS-SS-4111-3046-01	Dioxin/HCX
N/A	N/A	N/A	N/A	N/A	21-Nov-02	CMS-RB-112102A-01 (b)	Dioxin/HCX

N/A: Not applicable.
(a) Field duplicate sample.
(b) Rinsate blank sample.
(c) Full suite: grain size, TOC, metals, SVOCs, chlorinated pesticides, and PCBs

Table 2-2. John E. Fogarty Center Soil Sample Summary, Fall 2002

Boring ID	Top Of Sample (ft)	Bottom Of Sample (ft)	Northing	Easting	Sample Collection Date	Sample ID	Analysis Completed
LPX-4112	0.0	0.5	275853.2575	334445.1798	22-Nov-02	LPX-DU-112202B-01 (a)	Dioxin/HCX, full suite [b]
LPX-4112	0.0	0.5	275853.2575	334445.1798	22-Nov-02	LPX-SS-4112-0005-01	Dioxin/HCX, full suite (b)
LPX-4113	0.0	0.5	275834.8632	334456.2825	22-Nov-02	LPX-SS-4113-0005-01	Dioxin/HCX, full suite (b)
LPX-4114	0.0	0.5	275818.2951	334466.5947	22-Nov-02	LPX-SS-4114-0005-01	Dioxin/HCX, full suite (b)

(a) Field duplicate sample.
(b) Full suite: grain size, TOC, metals, SVOCs, chlorinated pesticides, PCBs.

Table 2-3. Groundwater Sample Summary, Fall 2002

Well ID	Northing	Easting	Sample Collection Date	Sample ID	Analysis Completed
GEC1	282460.5000	331644.3000	23-Oct-02	CMS-GW-GEC1-03	VOCs
GEC2	282220.0000	331641.3000	23-Oct-02	CMS-GW-GEC2-03	VOCs
GEC3	282243.9000	331684.4000	24-Oct-02	CMS-GW-GEC3-03	VOCs
GEC4	282142.9000	331616.3000	23-Oct-02	CMS-GW-GEC4-03	VOCs
GEC5	282112.1000	331662.1000	23-Oct-02	CMS-GW-GEC5-03	VOCs
GEC6	282028.5000	331650.7000	23-Oct-02	CMS-GW-GEC6-03	VOCs
GEC7	281990.3000	331696.7000	23-Oct-02	CMS-GW-GEC7-03	VOCs
MW01S	281970.4000	331841.8000	24-Oct-02	CMS-GW-MW01S-03	VOCs
MW02D	281435.5000	332002.1000	22-Oct-02	CMS-GW-MW02D-03	VOCs
MW02M	281446.7000	331999.4000	22-Oct-02	CMS-GW-MW02M-03	VOCs
MW02S	281459.3000	332019.5000	22-Oct-02	CMS-GW-MW02S-03	VOCs
MW03S	282104.3000	331787.6000	21-Nov-02	CMS-GW-MW03S-03	VOCs
MW03S	282104.3000	331787.6000	21-Nov-02	CMS-GW-MW03S-03 DUP (a)	VOCs
MW04B	281137.2000	331995.0000	22-Oct-02	CMS-GW-MW04B-03	VOCs
MW04D	281142.7000	331986.8000	22-Oct-02	CMS-GW-MW04D-03	VOCs
MW04S	281148.6000	331981.2000	22-Oct-02	CMS-GW-MW04S-03	VOCs
MW05S	282100.3000	331613.2000	24-Oct-02	CMS-DU-102402A-03 (a)	VOCs
MW05S	282100.3000	331613.2000	24-Oct-02	CMS-GW-MW05S-03	VOCs
MW05S	282100.3000	331613.2000	21-Nov-02	CMS-GW-MW05S-04	Dioxin
MW05S	282100.3000	331613.2000	21-Nov-02	CMS-GW-MW05S-04 DU (a)	Dioxin
MW06S	281925.6000	331684.9000	23-Oct-02	CMS-DU-102302A-03 (a)	VOCs
MW06S	281925.6000	331684.9000	23-Oct-02	CMS-GW-MW06S-03	VOCs
MW07D	281671.7000	331660.7000	23-Oct-02	CMS-GW-MW07D-03	VOCs
MW07S	281685.8000	331657.5000	23-Oct-02	CMS-GW-MW07S-03	VOCs
MW08S	281409.3000	331727.6000	22-Oct-02	CMS-GW-MW08S-03	VOCs
MW09S	281241.9000	331797.1000	22-Oct-02	CMS-GW-MW09S-03	VOCs
MW10B	282151.7000	331826.1300	22-Oct-02	CMS-GW-MW10B-03	VOCs
MW10D	282155.9000	331825.0000	22-Oct-02	CMS-GW-MW10D-03	VOCs
MW11B	281773.1000	331366.6000	23-Oct-02	CMS-GW-MW11B-03	VOCs
MW11M	281774.4000	331373.6000	23-Oct-02	CMS-GW-MW11M-03	VOCs
MW11S	281775.1000	331361.7000	24-Oct-02	CMS-GW-MW11S-03	VOCs
MW12B	280888.6000	331817.2000	24-Oct-02	CMS-GW-MW12B-03	VOCs
MW12D	280894.1000	331815.5000	24-Oct-02	CMS-GW-MW12D-03	VOCs
MW13B	281288.2000	332129.9000	22-Oct-02	CMS-GW-MW13B-03	VOCs
MW13D	281283.3000	332131.3000	22-Oct-02	CMS-GW-MW13D-03	VOCs
MW13S	281287.2000	332135.4000	22-Oct-02	CMS-GW-MW13S-03	VOCs
MW14M	282015.6000	331645.6000	23-Oct-02	CMS-GW-MW14M-03	VOCs
MW15D	282204.5000	331619.2000	23-Oct-02	CMS-GW-MW15D-03	VOCs
N/A	N/A	N/A	22-Oct-02	CMS-TB-102202A-03 (b)	VOCs
N/A	N/A	N/A	21-Nov-02	CMS-TB-112102A (b)	VOCs

N/A: Not applicable.
(a) Field duplicate sample.
(b) Trip blank sample.

Table 3-1. Summary of Dioxin Concentrations in Tailrace Soil Samples, Fall 2002

Boring ID	Top Of Sample (ft)	Bottom Of Sample (ft)	2,3,7,8-TCDD (pg/g dry wt)	Qualifier	HCX (pg/g dry wt)	Qualifier	Total TEQ (pg/g dry wt)
CMS-4101	1.0	1.9	3.14		14	J	10.4
CMS-4101	3.0	4.2	44	J	367	J	59.7
CMS-4102	0.0	0.8	65.2		257	J	76
CMS-4102	1.0	1.9	52.6		469	J	60.9
CMS-4102	3.0	3.8	58.6		384	J	67.2
CMS-4103	0.0	1.0	151		7270	J	160
CMS-4104 (a)	0.0	1.0	3020	J	85100	J	3070
CMS-4104	0.0	1.0	5730	J	68900	J	5780
CMS-4105	1.0	1.5	41.9		236	J	42.9
CMS-4105	3.0	4.0	223		5370	J	229
CMS-4106 (a)	0.0	1.0	929	J	5830	J	967
CMS-4106	0.0	1.0	523		3560	J	542
CMS-4106	1.0	1.6	2310	J	11400	J	2400
CMS-4106	3.0	3.6	348		5240	J	351
CMS-4107	1.0	3.0	54.4		164	J	76.7
CMS-4107	3.0	4.0	19.4		64.4	J	20
CMS-4108	0.0	1.0	54.6		357	J	68.1
CMS-4108	1.0	3.0	65.3		343	J	114
CMS-4108	3.0	4.0	15.8		88.2	J	23.4
CMS-4109	0.0	1.0	2130	J	16000	J	2290
CMS-4109	1.0	1.4	88.3		105	J	90.3
CMS-4109	3.0	3.8	143		90.3	J	146
CMS-4110	0.0	1.0	4060		55900	J	4160
CMS-4110	1.0	1.5	787		3720	J	798
CMS-4110	3.7	3.9	16.5	J	25.7	J	16.6
CMS-4111	0.0	0.9	279		7450	J	311
CMS-4111	1.0	2.8	1660		55900	J	3970
CMS-4111	3.0	4.5	15.2		147	J	21.7

(a) Field duplicate sample.
J Estimated value.

Table 3-2. Summary of COPCs Detected in Tailrace Soil Samples, Fall 2002

Parameter	Boring ID / Sample Depth (ft)	CMS-4105 0.0 - 1.0		CMS-4110 0.0 - 1.0	
Grain size					
Clay	Percent	9		10.3	
Coarse Sand	Percent	5.57		2.38	
Fine Sand	Percent	23.4		25.7	
Gravel	Percent	12.7		0.59	
Medium Sand	Percent	14.5		15.2	
Silt	Percent	34.9		45.9	
Total Organic Carbon					
Total Organic Carbon	Percent	12.2		10.5	
Metals					
Aluminum	mg/kg dry wt	12000	J	13000	J
Antimony	mg/kg dry wt	0.815	J	0.387	J
Arsenic	mg/kg dry wt	17.3		4.93	
Barium	mg/kg dry wt	151		106	
Beryllium	mg/kg dry wt	1.03		0.95	
Cadmium	mg/kg dry wt	12.6		4.23	
Chromium	mg/kg dry wt	330		195	
Cobalt	mg/kg dry wt	8.88		5.75	
Copper	mg/kg dry wt	106		103	
Iron	mg/kg dry wt	27700		19400	
Lead	mg/kg dry wt	1110	J	761	J
Manganese	mg/kg dry wt	480		423	
Mercury	mg/kg dry wt	2.98		5.91	
Methyl mercury	mg/kg dry wt	0.000513		0.00526	
Molybdenum	mg/kg dry wt	10.7	J	3.66	J
Nickel	mg/kg dry wt	24.6		31.1	
Silver	mg/kg dry wt	1.75	J	2.05	J
Thallium	mg/kg dry wt	0.215	J	0.2	J
Vanadium	mg/kg dry wt	77.2		56.9	
Zinc	mg/kg dry wt	731		417	
Detected SVOCs					
bis(2-Ethylhexyl)phthalate	µg/kg dry wt	33000		35000	
Carbazole	µg/kg dry wt	610	J	6400	U
Di-n-butylphthalate	µg/kg dry wt	5400	J	6400	U
2-Methylnaphthalene	µg/kg dry wt	493	J	482	J
Acenaphthene	µg/kg dry wt	336	J	274	J
Acenaphthylene	µg/kg dry wt	1300	J	930	J
Anthracene	µg/kg dry wt	1710	J	741	J
Benzaldehyde	µg/kg dry wt	632	J	347	J
Benzo[a]anthracene	µg/kg dry wt	7070	J	2980	J
Benzo[a]pyrene	µg/kg dry wt	5840	J	2320	J
Benzo[b]fluoranthene	µg/kg dry wt	6380	J	3220	J
Benzo[g,h,i]perylene	µg/kg dry wt	4370	J	1790	J
Benzo[k]fluoranthene	µg/kg dry wt	7140	J	3050	J
Biphenyl	µg/kg dry wt	1610	J	338	J
Chrysene	µg/kg dry wt	9270	J	4660	J
Dibenz[a,h]anthracene	µg/kg dry wt	1500	J	673	J
Dibenzofuran	µg/kg dry wt	422	J	309	J
Fluoranthene	µg/kg dry wt	17900	J	9360	J
Fluorene	µg/kg dry wt	992	J	621	J
Indeno[1,2,3-c,d]pyrene	µg/kg dry wt	4190	J	1560	J
Naphthalene	µg/kg dry wt	471	J	449	J

Table 3-2. Summary of COPCs Detected in Tailrace Soil Samples, Fall 2002 (continued)

Parameter	Boring ID / Sample Depth (ft)	CMS-4105 0.0 - 1.0		CMS-4110 0.0 - 1.0	
Phenanthrene	µg/kg dry wt	5240	J	3540	J
Pyrene	µg/kg dry wt	16700	J	8680	J
Total PAH (a)	µg/kg dry wt	91300	J	45600	J
Pesticides	µg/kg dry wt				
4,4'-DDD	µg/kg dry wt	58.1	J	79.2	J
4,4'-DDE	µg/kg dry wt	545	J	39.4	J
4,4'-DDT	µg/kg dry wt	0.164	UJ	2.49	J
alpha-Chlordane	µg/kg dry wt	5.44	J	32.6	J
Dieldrin	µg/kg dry wt	151	J	54.3	J
Endosulfan II	µg/kg dry wt	96.2	J	59.8	J
gamma-BHC	µg/kg dry wt	0.611	J	2.84	J
gamma-Chlordane	µg/kg dry wt	1.03	J	59.9	J
Technical chlordane	µg/kg dry wt	10600	J	6360	J
Total Endosulfan (b)	µg/kg dry wt	96.2	J	59.8	J
Total DDT (c)	µg/kg dry wt	603	J	121	J
PCB as Aroclors					
Aroclor-1254	µg/kg dry wt	14600	J	8960	J
Aroclor-1268	µg/kg dry wt	4350	J	2010	J
Total PCB as Aroclor (d)	µg/kg dry wt	19000	J	11000	J

(a) Total PAH = sum of PAHs (non-detects considered zero in sums).
(b) Total endosulfan = sum of endo I, endo II and endo sulfate (non-detects considered zero in sums).
(c) Total DDT = sum of 4,4'-DDT, 4,4'-DDE and 4,4'-DDD (non-detects considered zero in sums).
(d) Total PCB = sum of Aroclors (non-detects considered zero in sums).
J Estimated value.
U Not detected at the given detection limit.

Table 3-3. Summary of COPCs Detected in John E. Fogarty Center Soil Samples, Fall 2002

Parameter	Boring ID / Sample Depth (ft)	LPX-4112 (a) 0.0 - 0.5		LPX-4112 0.0 - 0.5		LPX-4113 0.0 - 0.5		LPX-4114 0.0 - 0.5	
Dioxin/HCX									
2,3,7,8-TCDD	pg/g dry wt			2.01		3.18		2.65	
HCX	pg/g dry wt			15.2	J	4.35	J	25	J
Total TEQ	pg/g dry wt			4.98		4.88		6.45	
Grain Size									
Clay	Percent	4		5		4.5		6	
Coarse Sand	Percent	7.64		7.72		10.1		2.5	J
Fine Sand	Percent	25		24.2		14.1		25.1	
Gravel	Percent	16.8		15.4		26.2		21.7	J
Medium Sand	Percent	21.7		20.2		19.1		19.7	
Silt	Percent	24.8		27.6		26.1		25.1	
Total Organic Carbon									
Total Organic Carbon	Percent	1.99	J	0.88	J	2.3		4.36	
Metals									
Aluminum	mg/kg dry wt	15900	J	17100	J	24800	J	18300	J
Antimony	mg/kg dry wt	0.0702	J	0.13	J	0.0675	J	0.163	J
Arsenic	mg/kg dry wt	9.64		11.5		9.98		9.77	
Barium	mg/kg dry wt	51.6		54.7		126		80.7	
Beryllium	mg/kg dry wt	0.473		0.556		0.934		0.623	
Cadmium	mg/kg dry wt	0.222	J	0.184	J	0.409	J	0.428	J
Chromium	mg/kg dry wt	20.6		21.7		27		22.3	
Cobalt	mg/kg dry wt	4.76		5.11		6.62		5.56	
Copper	mg/kg dry wt	26.9		30		29.2		36.7	
Iron	mg/kg dry wt	18500		22800		23100		21800	
Lead	mg/kg dry wt	109	J	169	J	154	J	215	J
Manganese	mg/kg dry wt	372		402		448		478	
Mercury	mg/kg dry wt	0.111		0.116		0.258		0.243	
Methyl mercury	mg/kg dry wt	0.000203		0.000223		0.000195	J	0.000183	J
Molybdenum	mg/kg dry wt	0.538	J	0.636	J	0.84	J	0.723	J
Nickel	mg/kg dry wt	9.87		10.6		15.2		13.9	
Silver	mg/kg dry wt	0.173	J	0.201	J	0.257	J	0.27	J
Thallium	mg/kg dry wt	0.141	J	0.143	J	0.242	J	0.18	J
Vanadium	mg/kg dry wt	36.3		39.5		54.9		38	
Zinc	mg/kg dry wt	366		397		2190		583	
Detected SVOCs									
bis(2-Ethylhexyl)phthalate	µg/kg dry wt	220	J	280	J	65	J	280	J
Butylbenzylphthalate	µg/kg dry wt	400	U	80	J	400	U	440	U
Carbazole	µg/kg dry wt	400	U	400	U	630		440	U
Di-n-butylphthalate	µg/kg dry wt	400	U	400	U	400		440	U
2-Methylnaphthalene	µg/kg dry wt	5.63	J	2.38	J	1560		4.45	
Acenaphthene	µg/kg dry wt	14	J	4.74	J	2590		10.3	
Acenaphthylene	µg/kg dry wt	13.8	J	7.09	J	152		13.4	
Anthracene	µg/kg dry wt	35	J	15.9	J	3380		28.4	
Benzaldehyde	µg/kg dry wt	39.9	J	15.8	U	23	U	26	U
Benzo[a]anthracene	µg/kg dry wt	142		105		7300		172	
Benzo[a]pyrene	µg/kg dry wt	112		86.3		5120		128	
Benzo[b]fluoranthene	µg/kg dry wt	141		123		5140		207	
Benzo[g,h,i]perylene	µg/kg dry wt	90.6		91.3		3170		135	
Benzo[k]fluoranthene	µg/kg dry wt	127		110		5720		181	
Biphenyl	µg/kg dry wt	2.8		1.11		503		2.2	

Table 3-3. Summary of COPCs Detected in John E. Fogarty Center Soil Samples, Fall 2002 (continued)

Parameter	Boring ID / Sample Depth (ft)	LPX-4112 (a) 0.0 - 0.5		LPX-4112 0.0 - 0.5		LPX-4113 0.0 - 0.5		LPX-4114 0.0 - 0.5	
Chrysene	µg/kg dry wt	159		122		7510		212	
Dibenz[a,h]anthracene	µg/kg dry wt	27.4		25.8		668		37.8	
Dibenzofuran	µg/kg dry wt	13.3	J	3.95	J	3110		7.16	
Fluoranthene	µg/kg dry wt	331		210		21800		381	
Fluorene	µg/kg dry wt	16.6	J	4.86	J	2810		9.88	
Indeno[1,2,3-c,d]pyrene	µg/kg dry wt	104		97.5		3570	J	148	
Naphthalene	µg/kg dry wt	9.02	J	3.97	J	4390		7.86	
Phenanthrene	µg/kg dry wt	203	J	94.2	J	24600		174	
Pyrene	µg/kg dry wt	283		185		17300		337	
Total PAH (b)	µg/kg dry wt	1830		1290		120000		2190	
Pesticides									
4,4'-DDD	µg/kg dry wt	2.7		2.55		0.0888	U	2.59	
4,4'-DDE	µg/kg dry wt	12.5		11.4		17.1		9.05	
4,4'-DDT	µg/kg dry wt	27.2	J	22.8	J	22.2	J	16.8	J
alpha-Chlordane	µg/kg dry wt	114		88.8		6.03		31	
Dieldrin	µg/kg dry wt	3.22		2.88		3.36		2.56	
Endosulfan II	µg/kg dry wt	2.55		2.36		32		1.58	
Endosulfan Sulfate	µg/kg dry wt	1.12		1.08		0.0936	U	0.101	U
gamma-Chlordane	µg/kg dry wt	94.5		76.2		0.0701	U	25.5	
Heptachlor	µg/kg dry wt	3.44		3.09		0.0742	U	1.37	
Heptachlor Epoxide	µg/kg dry wt	13.2		10.2		1.83		4.6	
Technical chlordane	µg/kg dry wt	1220		943		490		598	
Total Endosulfan (c)	µg/kg dry wt	3.67		3.44		32		1.58	
Total DDT (d)	µg/kg dry wt	42.4		36.8		39.3		28.4	
PCB as Aroclors									
Aroclor-1254	µg/kg dry wt	826		938		10.1	U	467	
Total PCB as Aroclor (e)	µg/kg dry wt	826		938		10.1	U	467	

(a) Field duplicate sample.
(b) Total PAH = sum of PAHs (detects considered zero in sums).
(c) Total endosulfan = sum of endo I, endo II and endo sulfate (detects considered zero in sums).
(d) Total DDT = sum of 4,4'-DDT, 4,4'-DDE and 4,4'-DDD (detects considered zero in sums).
(e) Total PCB = sum of Aroclors (value detects considered zero in sums).
J Estimated value.
U Not detected at the given detection limit.

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples

Parameter	Units	MW-05S	MW-05S	MW03S	MW-06S	MW-05S	GEC-1	GEC-2	GEC-3
		CMS-GW-MW05S-04	CMS-GW-MW05S-04 DU(a)	CMS-GW-MW03S-03-DUP(a)	CMS-DU-102302A-03 (a)	CMS-DU-102402A-03 (a)	CMS-GW-GEC1-03	CMS-GW-GEC2-03	CMS-GW-GEC3-03
2,3,7,8-TCDD	pg/L	1030	1460	NA	NA	NA	NA	NA	NA
Total TEQ	pg/L	1030	1460	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	NA	NA	1 U	13	1000 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
1,3-Dichlorobenzene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	NA	NA	1 U	6.2 J	1000 U	1 U	1 U	1 U
Benzene	µg/L	NA	NA	1 U	11	1000 U	1 U	1 U	1 U
Chlorobenzene	µg/L	NA	NA	1 U	190	1000 U	1 U	1 U	1 U
Chloroform	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	NA	NA	1 U	10 U	520 J	1 U	1 U	1 U
Ethylbenzene	µg/L	NA	NA	1 U	2.7 J	1000 U	1 U	1 U	1 U
Isopropylbenzene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
Methylene Chloride	µg/L	NA	NA	2 U	3.6 J	2000 U	2 U	2 U	2 U
n-Propylbenzene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
Naphthalene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
p-Isopropyltoluene	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	NA	NA	1 U	10 U	37000	1 U	1 U	1 U
Toluene	µg/L	NA	NA	0.35 U	10 U	1000 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	NA	NA	1 U	10 U	1000 UJ	1 UJ	1 UJ	1 UJ
Trichloroethene	µg/L	NA	NA	1 U	10 U	2200	1 U	1 U	1 U
Vinyl Chloride	µg/L	NA	NA	1 U	10 U	1000 U	1 U	1 U	1 U
m-Xylene & p-Xylene	µg/L	NA	NA	0.21 J	12 J	2000 U	2 U	2 U	2 U
o-Xylene	µg/L	NA	NA	1 U	11	1000 U	1 U	1 U	1 U

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples (continued)

Parameter	Units	GEC-4		GEC-5		GEC-6		GEC-7		MW-01S		MW-02D		MW-02M		MW-02S	
		CMS-GW-GEC4-03		CMS-GW-GEC5-03		CMS-GW-GEC6-03		CMS-GW-GEC7-03		CMS-GW-MW01S-03		CMS-GW-MW02D-03		CMS-GW-MW02M-03		CMS-GW-MW02S-03	
2,3,7,8-TCDD	pg/L	NA		NA		NA		NA		NA		NA		NA		NA	
Total TEQ	pg/L	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trimethylbenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
1,2-Dichlorobenzene	µg/L	1	U	1	U	0.22	J	1	U	1	U	4	U	5	U	1	U
1,3,5-Trimethylbenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
1,3-Dichlorobenzene	µg/L	1	U	1	U	1	U	0.27	J	1	U	4	U	5	U	1	U
1,4-Dichlorobenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Benzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Chlorobenzene	µg/L	1	U	1	U	1.5		0.31	J	1	U	4	U	5	U	2.1	
Chloroform	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
cis-1,2-Dichloroethene	µg/L	2.8		21		5.6		0.48	J	1	U	12		5	U	1	U
Ethylbenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Isopropylbenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Methylene Chloride	µg/L	2	U	2	U	2	U	2	U	2	U	1.9	J	10	U	2	U
n-Propylbenzene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Naphthalene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
p-Isopropyltoluene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U
Tetrachloroethene	µg/L	1	U	0.86	J	11		0.21	J	1	U	73		110		1	U
Toluene	µg/L	1	U	1	U	1	U	1	U	1	U	1.8	J	5	U	1	U
trans-1,2-Dichloroethene	µg/L	1	UJ	1	U	1	UJ	1	U	1	UJ	4	U	5	U	1	U
Trichloroethene	µg/L	1	U	0.62	J	0.74	J	1	U	1	U	4.2		1.1	J	1	U
Vinyl Chloride	µg/L	1		1.8		0.39	J	1	U	1	U	4	U	5	U	0.69	J
m-Xylene & p-Xylene	µg/L	2	U	2	U	2	U	2	U	2	U	8	U	10	U	2	U
o-Xylene	µg/L	1	U	1	U	1	U	1	U	1	U	4	U	5	U	1	U

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples (continued)

Parameter	Units	MW-03S CMS-GW-MW03S-03		MW-04B CMS-GW-MW04B-03		MW-04D CMS-GW-MW04D-03		MW-04S CMS-GW-MW04S-03		MW-05S CMS-GW-MW05S-03		MW-06S CMS-GW-MW06S-03		MW-07D CMS-GW-MW07D-03	
2,3,7,8-TCDD	pg/L	NA		NA		NA		NA		NA		NA		NA	
Total TEQ	pg/L	NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trimethylbenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	2.1	J	1	U
1,2-Dichlorobenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	13		1	U
1,3,5-Trimethylbenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
1,3-Dichlorobenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
1,4-Dichlorobenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	4.9	J	1	U
Benzene	µg/L	1	U	1	U	1	U	1	U	1000	UJ	6.8	J	1	UJ
Chlorobenzene	µg/L	1	U	1	U	1	U	2.1		1000	U	160		1	U
Chloroform	µg/L	1	U	1	U	0.31	J	1	U	1000	U	6	U	1	U
cis-1,2-Dichloroethene	µg/L	1	U	1	U	1	U	5.9		1600	J	2.8	J	1	U
Ethylbenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	1.2	J	1	U
Isopropylbenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
Methylene Chloride	µg/L	2	U	2	U	2	U	2	U	2000	U	12	U	2	U
n-Propylbenzene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
Naphthalene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
p-Isopropyltoluene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
Tetrachloroethene	µg/L	1	U	17		27		4.4		28000		6	U	10	
Toluene	µg/L	0.44	U	1	U	1	U	1	U	1000	U	3.3	J	1	U
trans-1,2-Dichloroethene	µg/L	1	U	1	U	1	U	1	U	1000	U	6	U	1	U
Trichloroethene	µg/L	1	UJ	0.39	J	0.46	J	3.2		1800		6	U	0.31	J
Vinyl Chloride	µg/L	1	U	1	U	1	U	0.68	J	1000	U	6	U	1	U
m-Xylene & p-Xylene	µg/L	0.22	J	2	U	2	U	2	U	2000	U	9.2	J	2	U
o-Xylene	µg/L	1	U	1	U	1	U	1	U	1000	U	9.5		1	U

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples (continued)

Parameter	Units	MW-07S		MW-08S		MW-09S		MW-10B		MW-10D		MW-11B		MW-11M	
		CMS-GW-MW07S-03		CMS-GW-MW08S-03RE		CMS-GW-MW09S-03		CMS-GW-MW10B-03		CMS-GW-MW10D-03		CMS-GW-MW11B-03		CMS-GW-MW11M-03	
2,3,7,8-TCDD	pg/L	NA		NA		NA		NA		NA		NA		NA	
Total TEQ	pg/L	NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trimethylbenzene	µg/L	1	U	110		1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	µg/L	1	U	2.1	J	1	U	1	U	1	U	1	U	1	U
1,3,5-Trimethylbenzene	µg/L	1	U	29		1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	µg/L	1	U	3	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	µg/L	1	U	3	U	1	U	1	U	1	U	1	U	1	U
Benzene	µg/L	1	U	12	J	9.7		1	U	1	U	1	U	1	U
Chlorobenzene	µg/L	1	U	25		3.4		1	U	1	U	1	U	1	U
Chloroform	µg/L	1	U	3	U	1	U	1.7		4.1		1	U	1	U
cis-1,2-Dichloroethene	µg/L	1	U	9.3		14		1	U	1	U	1	U	1	U
Ethylbenzene	µg/L	1	U	2.7	J	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	µg/L	1	U	2.4	J	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	µg/L	2	U	6	U	2	U	2	U	2	U	2	U	2	U
n-Propylbenzene	µg/L	1	U	8.1		1	U	1	U	1	U	1	U	1	U
Naphthalene	µg/L	1	U	1.5	J	1	U	1	U	1	U	1	U	1	U
p-Isopropyltoluene	µg/L	1	U	1.4	J	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	µg/L	1	U	3	U	3.3		0.25	J	0.39	J	1	U	1	U
Toluene	µg/L	1	U	0.98	J	1	U	1	U	1	U	1	U	1	U
trans-1,2-Dichloroethene	µg/L	1	UJ	3	U	1	U	1	U	1	U	1	UJ	1	UJ
Trichloroethene	µg/L	1	U	2.8	J	0.72	J	1	U	1	U	1	U	1	U
Vinyl Chloride	µg/L	1	U	3	U	14		1	U	1	U	1	U	1	U
m-Xylene & p-Xylene	µg/L	2	U	14		2	U	2	U	2	U	2	U	2	U
o-Xylene	µg/L	1	U	16		1	U	1	U	1	U	1	U	1	U

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples (continued)

Parameter	Units	MW-11S CMS-GW-MW11S-03		MW-12B CMS-GW-MW12B-03		MW-12D CMS-GW-MW12D-03		MW-13B CMS-GW-MW13B-03		MW-13D CMS-GW-MW13D-03		MW-13S CMS-GW-MW13S-03		MW-14M CMS-GW-MW14M-03		MW-15D CMS-GW-MW15D-03	
2,3,7,8-TCDD	pg/L	NA		NA		NA		NA		NA		NA		NA		NA	
Total TEQ	pg/L	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trimethylbenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
1,2-Dichlorobenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
1,3,5-Trimethylbenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
1,3-Dichlorobenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
1,4-Dichlorobenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Benzene	ug/L	1	U	1	U	1	U	4	UJ	10	U	1	U	100	UJ	1	U
Chlorobenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Chloroform	ug/L	1	U	0.25	J	1	U	4	U	10	U	1	U	100	U	1	U
cis-1,2-Dichloroethene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Ethylbenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Isopropylbenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Methylene Chloride	ug/L	2	U	2	U	2	U	8	U	20	U	2	U	200	U	0.2	J
n-Propylbenzene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Naphthalene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
p-Isopropyltoluene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
Tetrachloroethene	ug/L	1	U	0.89	J	0.64	J	96		220		7.7		1900		1	U
Toluene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
trans-1,2-Dichloroethene	ug/L	1	UJ	1	UJ	1	U	4	U	10	U	1	U	100	U	1	U
Trichloroethene	ug/L	1	U	1	U	1	U	5		5.2	J	1	U	100	U	1	U
Vinyl Chloride	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U
m-Xylene & p-Xylene	ug/L	2	U	2	U	2	U	8	U	20	U	2	U	200	U	2	U
o-Xylene	ug/L	1	U	1	U	1	U	4	U	10	U	1	U	100	U	1	U

Table 3-4. Summary of Dioxin and VOCs Detected in Fall 2002 Groundwater Samples (continued)

Parameter	Units	CMS-TB-102202A-03 (b)		CMS-TB-112102A (b)	
2,3,7,8-TCDD	pg/L	NA		NA	
Total TEQ	pg/L	NA		NA	
1,2,4-Trimethylbenzene	µg/L	1	U	1	U
1,2-Dichlorobenzene	µg/L	1	U	1	U
1,3,5-Trimethylbenzene	µg/L	1	U	1	U
1,3-Dichlorobenzene	µg/L	1	U	1	U
1,4-Dichlorobenzene	µg/L	1	U	1	U
Benzene	µg/L	1	U	1	U
Chlorobenzene	µg/L	1	U	1	U
Chloroform	µg/L	1	U	1	U
cis-1,2-Dichloroethene	µg/L	1	U	1	U
Ethylbenzene	µg/L	1	U	1	U
Isopropylbenzene	µg/L	1	U	1	U
Methylene Chloride	µg/L	2	U	2	U
n-Propylbenzene	µg/L	1	U	1	U
Naphthalene	µg/L	1	U	1	U
p-Isopropyltoluene	µg/L	1	U	1	U
Tetrachloroethene	µg/L	1	U	1	U
Toluene	µg/L	1	U	0.22	J
trans-1,2-Dichloroethene	µg/L	1	UJ	1	U
Trichloroethene	µg/L	1	U	1	UJ
Vinyl Chloride	µg/L	1	U	1	U
m-Xylene & p-Xylene	µg/L	2	U	2	U
o-Xylene	µg/L	1	U	1	U

(a) Field duplicate sample.

(b) Trip blank sample.

J Estimated value.

U Not detected above the given detection limit.

NA Not applicable.

Table 4-1. Comparison of Tailrace COPC Concentrations to Rhode Island Residential Direct Exposure Criteria

Parameter	Units	RI Standard (a)	CMS-4105 0.0 - 1.0 ft		CMS-4105 Exceeds RI Standard	CMS-4110 0.0 - 1.0 ft		CMS-4110 Exceeds RI Standard
Metals								
Antimony	mg/kg dry wt	10	0.815	J		0.387	J	
Arsenic	mg/kg dry wt	1.7	17.3		Yes	4.93		Yes
Barium	mg/kg dry wt	5500	151			106		
Beryllium	mg/kg dry wt	0.4	1.03		Yes	0.95		Yes
Cadmium	mg/kg dry wt	39	12.6			4.23		
Chromium	mg/kg dry wt	1790 (b)	330			195		
Copper	mg/kg dry wt	3100	106			103		
Lead	mg/kg dry wt	150	1110	J	Yes	761	J	Yes
Manganese	mg/kg dry wt	390	480		Yes	423		Yes
Mercury	mg/kg dry wt	23	2.98			5.91		
Nickel	mg/kg dry wt	1000	24.6			31.1		
Selenium	mg/kg dry wt	390	2.49	U		1.38	U	
Silver	mg/kg dry wt	200	1.75	J		2.05	J	
Thallium	mg/kg dry wt	5.5	0.215	J		0.2	J	
Vanadium	mg/kg dry wt	550	77.2			56.9		
Zinc	mg/kg dry wt	6000	731			417		
SVOCs								
2,4,5-Trichlorophenol	µg/kg dry wt	330000	5400	U		6400	U	
2,4-Dinitrophenol	µg/kg dry wt	160000	26000	U		31000	U	
bis(2-Ethylhexyl)phthalate	µg/kg dry wt	46000	33000			35000		
Pentachlorophenol	µg/kg dry wt	5300	26000	U		31000	U	
Phenol	µg/kg dry wt	6000000	5400	U		6400	U	
2-Methylnaphthalene	µg/kg dry wt	123000	493	J		482	J	
Acenaphthene	µg/kg dry wt	43000	336	J		274	J	
Acenaphthylene	µg/kg dry wt	23000	1300	J		930	J	
Anthracene	µg/kg dry wt	35000	1710	J		741	J	
Benzo[a]anthracene	µg/kg dry wt	900	7070	J	Yes	2980	J	Yes
Benzo[a]pyrene	µg/kg dry wt	400	5840	J	Yes	2320	J	Yes
Benzo[b]fluoranthene	µg/kg dry wt	900	6380	J	Yes	3220	J	Yes
Benzo[g,h,i]perylene	µg/kg dry wt	800	4370	J	Yes	1790	J	Yes
Benzo[k]fluoranthene	µg/kg dry wt	900	7140	J	Yes	3050	J	Yes
Biphenyl	µg/kg dry wt	800	1610	J	Yes	338	J	
Chrysene	µg/kg dry wt	400	9270	J	Yes	4660	J	Yes
Dibenz[a,h]anthracene	µg/kg dry wt	400	1500	J	Yes	673	J	Yes
Fluoranthene	µg/kg dry wt	20000	17900	J		9360	J	
Fluorene	µg/kg dry wt	28000	992	J		621	J	
Indeno[1,2,3-c,d]pyrene	µg/kg dry wt	900	4190	J	Yes	1560	J	Yes
Naphthalene	µg/kg dry wt	54000	471	J		449	J	
Phenanthrene	µg/kg dry wt	40000	5240	J		3540	J	
Pyrene	µg/kg dry wt	13000	16700	J	Yes	8680	J	
Pesticides								
Dieldrin	µg/kg dry wt	40	151	J	Yes	54.3	J	Yes
PCB as Aroclor								
Total PCB as Aroclor (c)	µg/kg dry wt	10000	18950	J	Yes	10970	J	Yes

(a) Direct Exposure Criteria for residential soils, State of Rhode Island Remediation Regulations.
(b) Generated from Chromium III (Trivalent) + Chromium VI (Hexavalent) = 1400 + 390 (mg/kg)
(c) Total PCB = sum of Aroclors (value 0 used for non-detect).

Table 4-2. VOC Concentrations in Groundwater Samples Collected in 2001 and 2002

Well ID	Parameter	Spring 2001 (µg/L)	Summer 2001 (µg/L)	Fall 2002 (µg/L)	Fall 2002 Field Duplicate Sample (µg/L)
GEC-1	Total Xylenes	4.1		3 U	
GEC-4	cis-1,2-Dichloroethene	1 U		2.8	
GEC-4	Vinyl Chloride	27		1	
GEC-5	cis-1,2-Dichloroethene	38 U		21	
GEC-5	Tetrachloroethene	2.2		0.86 J	
GEC-5	Trichloroethene	1.3		0.62 J	
GEC-5	Vinyl Chloride	2 U		1.8	
GEC-6	1,2-Dichlorobenzene		10 U	0.22 J	
GEC-6	Chlorobenzene		10 U	1.5	
GEC-6	cis-1,2-Dichloroethene	10 U	18	5.6	
GEC-6	Tetrachloroethene	150	200 *	11	
GEC-6	Trichloroethene	1 U	10 U	0.74 J	
GEC-6	Vinyl Chloride	2 U	10 U	0.39 J	
GEC-7	Benzene	1.3		1 U	
GEC-7	cis-1,2-Dichloroethene	5.6 U		0.48 J	
GEC-7	Tetrachloroethene	11		0.21 J	
GEC-7	Trichloroethene	2		1 U	
GEC-7	Vinyl Chloride	6.9		1 U	
MW02D	cis-1,2-Dichloroethene		2 J	12	
MW02D	Methylene Chloride		10 U	1.9 J	
MW02D	Tetrachloroethene		700 *	73	
MW02D	Toluene		10 U	1.8 J	
MW02D	Trichloroethene		27	4.2	
MW02M	Tetrachloroethene		110	110	
MW02M	Trichloroethene		2 J	1.1 J	
MW02S	Benzene	10 U	1 J	1 U	
MW02S	Chlorobenzene	10 U	1 J	2.1	
MW02S	Vinyl Chloride	10 UJ	10 U	0.69 J	
MW03S	Total Xylenes	10 U	10 U	0.22 J	0.21 J
MW04B	Tetrachloroethene		63	17	
MW04B	Trichloroethene		0.9 J	0.39 J	
MW04D	Chloroform		10 U	0.31 J	
MW04D	Tetrachloroethene		64	27	
MW04D	Trichloroethene		1 J	0.46 J	
MW04S	Benzene		2 J	1 U	
MW04S	Chlorobenzene		5 J	2.1	
MW04S	cis-1,2-Dichloroethene		7 J	5.9	
MW04S	Tetrachloroethene		17 U	4.4	
MW04S	Trichloroethene		0.8 J	3.2	
MW04S	Vinyl Chloride		3 J	0.68 J	
MW05S	cis-1,2-Dichloroethene		1200 J	1600 J	520 J
MW05S	Tetrachloroethene		61000 *	28000	37000
MW05S	Trichloroethene		2500	1800	2200
MW06S	1,2-Dichlorobenzene	21	4 J	13	13
MW06S	1,4-Dichlorobenzene	5 J	3 J	4.9 J	6.2 J
MW06S	Benzene	5 J	6 J	6.8 J	11
MW06S	Chlorobenzene	100	58	160	190
MW06S	cis-1,2-Dichloroethene	4 J	4 J	2.8 J	10 U
MW06S	Ethylbenzene	7 J	10 U	1.2 J	2.7 J
MW06S	Isopropylbenzene	1 J	10 U	6 U	10 U
MW06S	Methylene Chloride	20 U	10 UJ	12 U	3.6 J
MW06S	Toluene	5 J	10 U	3.3 J	10 U

Table 4-2. VOC Concentrations in Groundwater Samples Collected in 2001 and 2002 (continued)

Well ID	Parameter	Spring 2001 (µg/L)	Summer 2001 (µg/L)	Fall 2002 (µg/L)	Fall 2002 Field Duplicate Sample (µg/L)
MW06S	Trichloroethene	10 U	0.9 J	6 U	10 U
MW06S	Total Xylenes	69	3 J	18.7	23
MW07D	Tetrachloroethene		10 U	10	
MW07D	Trichloroethene		10 U	0.31 J	
MW07S	1,1,2,2-Tetrachloroethane	10 U	4 J	1 U	
MW07S	1,2-Dibromo-3-chloropropane	10 U	7 J	1 U	
MW07S	1,2-Dibromoethane	10 U	1 J	1 U	
MW07S	Bromoform	10 U	2 J	1 U	
MW08S	1,2-Dichlorobenzene	1 J	10 U	2.1 J	
MW08S	1,3,5-Trimethylbenzene	61 NJ		29	
MW08S	1,4-Dichlorobenzene	10 U	10 U	3 U	
MW08S	Benzene	6 J	4 J	12 J	
MW08S	Chlorobenzene	10	40	25	
MW08S	cis-1,2-Dichloroethene	10 U	10 U	9.3	
MW08S	Ethylbenzene	1 J	10 U	2.7 J	
MW08S	Isopropylbenzene	10 U	10 U	2.4 J	
MW08S	Toluene	1 J	10 U	0.98 J	
MW08S	trans-1,2-Dichloroethene	10 U	10 UJ	3 U	
MW08S	Trichloroethene	10 U	10 U	2.8 J	
MW08S	Vinyl Chloride	10 UJ	10 U	3 U	
MW08S	Total Xylenes	27	8 J	30	
MW09S	Benzene	1 J	21	9.7	
MW09S	Chlorobenzene	1 J	10 U	3.4	
MW09S	cis-1,2-Dichloroethene	2 J	12	14	
MW09S	Tetrachloroethene	2 J	21 U	3.3	
MW09S	Trichloroethene	10 U	1 J	0.72 J	
MW09S	Vinyl Chloride	10 UJ	10 J	14	
MW10B	Chloroform		10 U	1.7	
MW10B	Tetrachloroethene		10 U	0.25 J	
MW10D	Chloroform		10 U	4.1	
MW10D	Tetrachloroethene		10 U	0.39 J	
MW12B	Chloroform		10 U	0.25 J	
MW12B	Tetrachloroethene		10 U	0.89 J	
MW12D	Tetrachloroethene		18	0.64 J	
MW13B	Tetrachloroethene		220 *	96	
MW13B	Trichloroethene		7 J	5	
MW13D	Tetrachloroethene		340 *	220	
MW13D	Trichloroethene		6 J	5.2 J	
MW13S	Tetrachloroethene		10 U	7.7	
MW14M	Tetrachloroethene		10 U	1900	
MW15D	Methylene Chloride		10 UJ	0.2 J	

J Estimated value.
U Not detected at the given detection limit.
NA Not applicable.

*** From dilution analysis.**

Table 4-3. Dioxin Concentrations in Samples from Well MW-05S in 2001 and 2002

		Summer 2001		Fall 2002			
PARAMETER	UNITS	CMS-GW-MW05S-02		CMS-GW-MW05S-04		CMS-GW-MW05S-04 DU	
Total TCDD	pg/L	4460	J	1071	J	1513	J
Total TCDF	pg/L	2710	J	113	J	108	J
Total TEQ	pg/L	4400	J	1030		1460	

J Estimated value.

Table 4-4. Groundwater Elevation Data, October 2002

Station ID	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft MSL)	Comments
MW-01S	10/21/2002	4.29	94.94	
MW-02S	10/21/2002	3.93	93.23	
MW-02M	10/21/2002	6.71	93.07	
MW-02D	10/21/2002	6.91	93.04	
MW-03S	11/21/2002	4.29	96.30	not included in water level map
MW-04S	10/21/2002	6.87	91.92	
MW-04D	10/21/2002	6.78	91.92	
MW-04B	10/21/2002	6.30	91.87	
MW-05S	10/21/2002	7.42	94.92	
MW-06S	10/21/2002	5.90	94.60	odor present
MW-07S	10/21/2002	4.24	94.08	
MW-07D	10/21/2002	3.65	94.26	
MW-08S	10/21/2002	3.58	92.75	
MW-09S	10/21/2002	7.96	92.59	
MW-10D	10/21/2002	12.56	95.43	
MW-10B	10/21/2002	12.66	95.45	
MW-11S	10/21/2002	24.19	95.23	
MW-11M	10/21/2002	23.51	95.22	
MW-11B	10/21/2002	24.01	95.29	
MW-12D	10/21/2002	14.22	91.40	
MW-12B	10/21/2002	13.96	91.44	
MW-13S	10/21/2002	6.42	92.43	
MW-13D	10/21/2002	5.99	92.44	
MW-13B	10/21/2002	6.00	92.48	
MW-14M	10/21/2002	4.30	95.01	
MW-15D	10/21/2002	7.34	95.35	
GEC-1	10/21/2002	7.91	96.41	
GEC-2	10/21/2002	8.62	95.18	
GEC-3	10/21/2002	8.12	95.55	
GEC-4	10/21/2002	7.55	94.79	
GEC-5	10/21/2002	8.49	95.02	
GEC-6	10/21/2002	4.77	94.93	
GEC-7	10/21/2002	3.92	94.98	
P2	10/24/2002	5.12	97.51	piezometer
P3	10/24/2002	8.36	95.04	piezometer
P4	10/24/2002	2.75	95.88	piezometer
P5	10/24/2002	7.11	94.48	piezometer
P6	10/24/2002	2.89	94.70	piezometer
P7	10/24/2002	3.41	94.20	piezometer
P8	10/24/2002	4.87	93.92	piezometer
P9	10/24/2002	3.42	94.15	piezometer
P10	10/24/2002	4.91	93.23	piezometer

Table 4-4. Groundwater Elevation Data, October 2002 (continued)

Station ID	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft MSL)	Comments
P11	10/24/2002	5.05	93.15	piezometer
P12	10/24/2002	4.37	93.89	piezometer
P13	10/24/2002	4.42	93.03	piezometer
P14	10/24/2002	2.67	92.10	piezometer
P16	10/24/2002	9.15	95.86	piezometer
P17	10/24/2002	3.80	92.09	piezometer
P20	10/24/2002	7.35	94.90	piezometer
P21	10/24/2002	4.36	94.62	piezometer
SP-01	10/21/2002	N/A	N/A	staff gauge; minimal water
SP-02	10/21/2002	N/A	N/A	staff gauge; minimal water
SP-03	10/21/2002	N/A	N/A	staff gauge; minimal water
SP-04	10/21/2002	2.20	96.90	USGS staff gauge location

8.0 FIGURES

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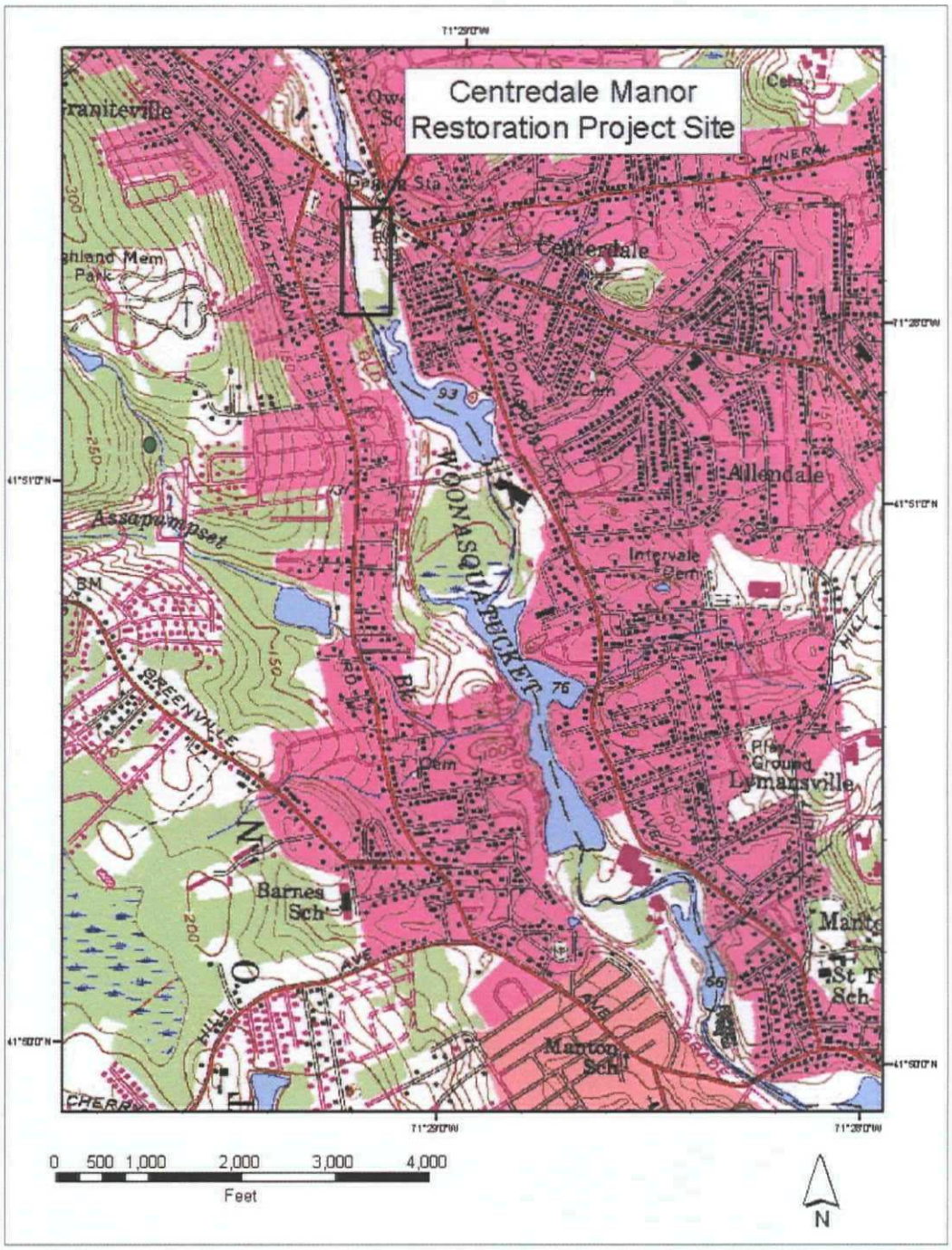


Figure 1-1. Site Location Map

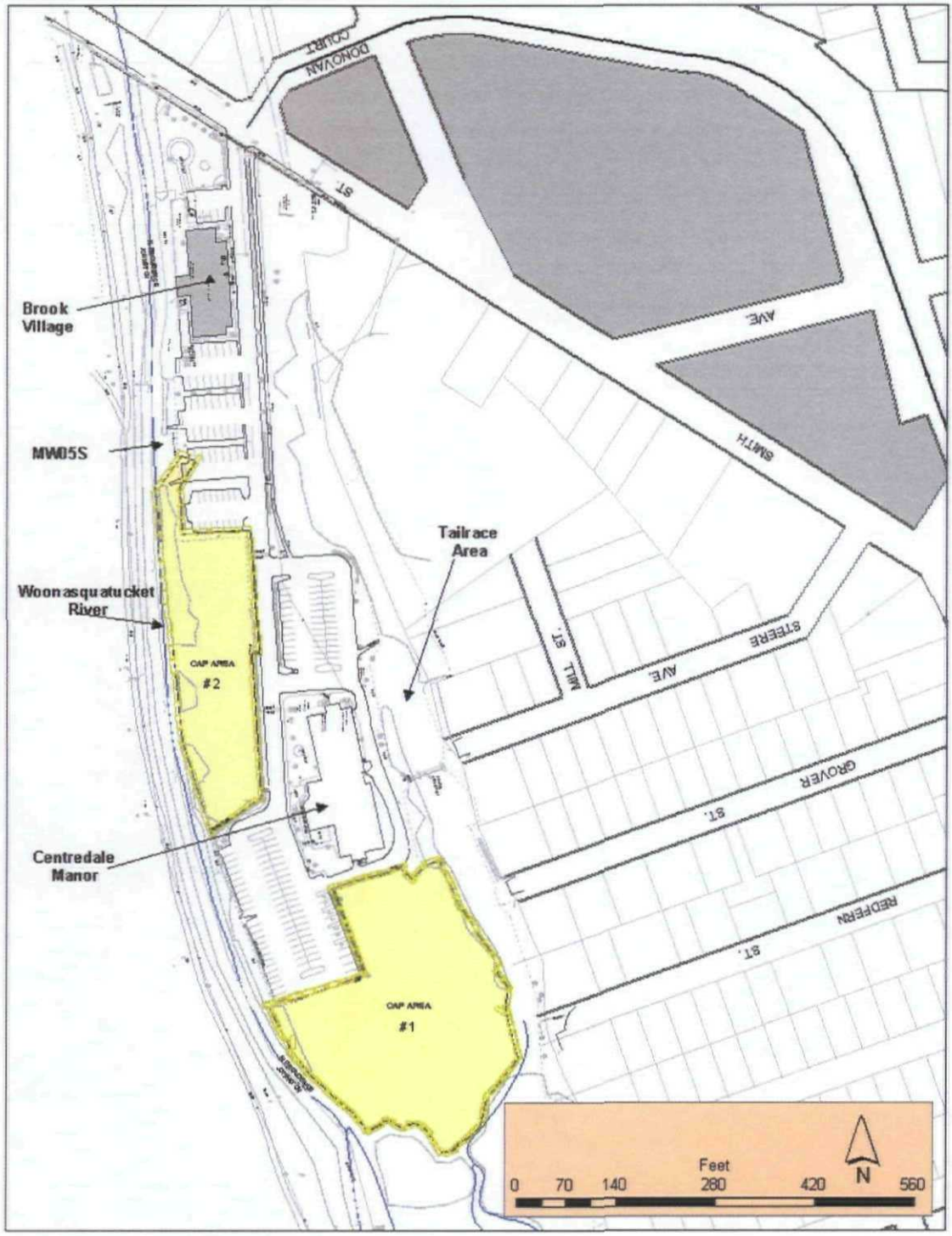


Figure 1-2. Source Area Features

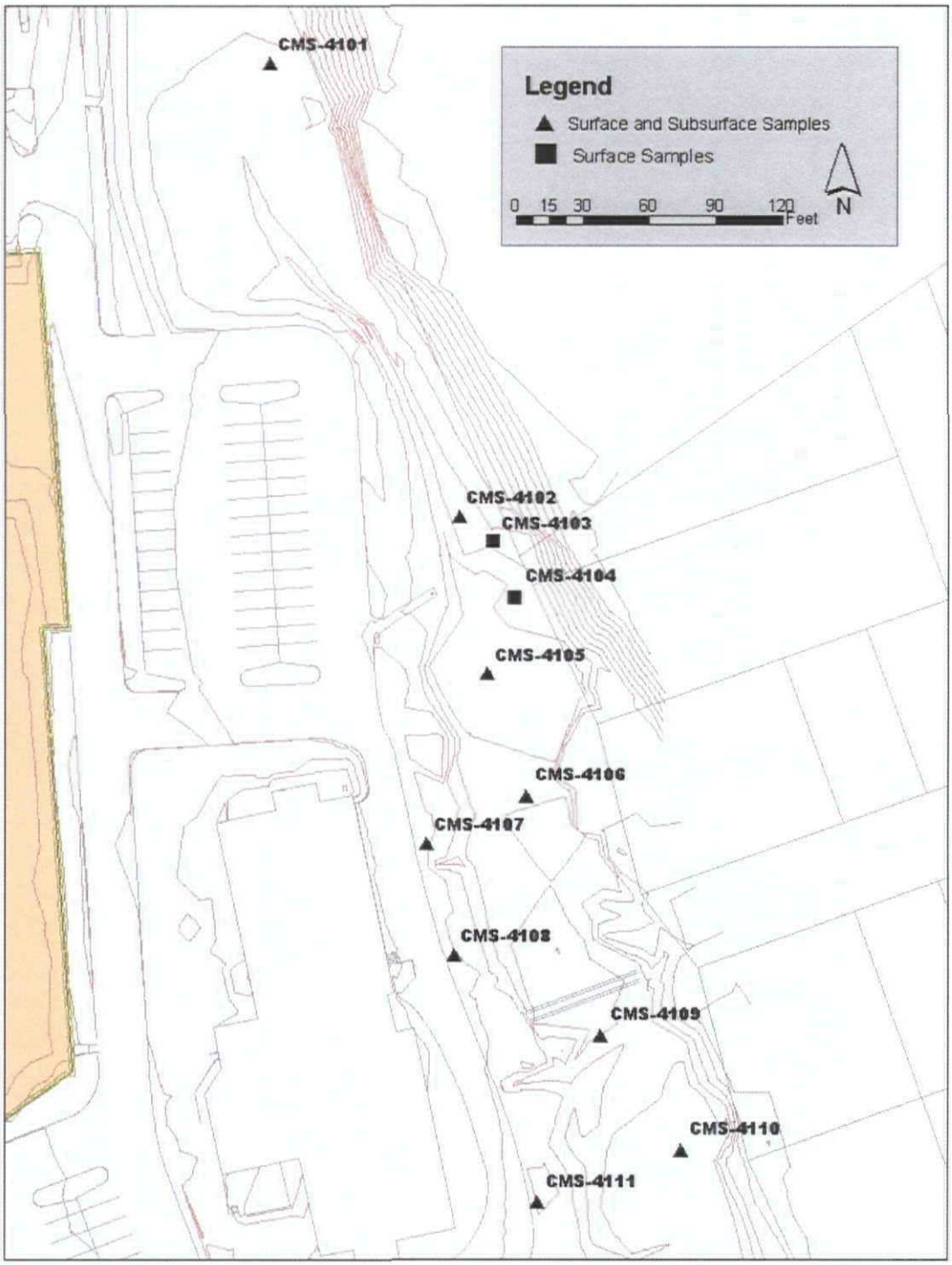


Figure 2-1. Tailrace Soil Boring Locations

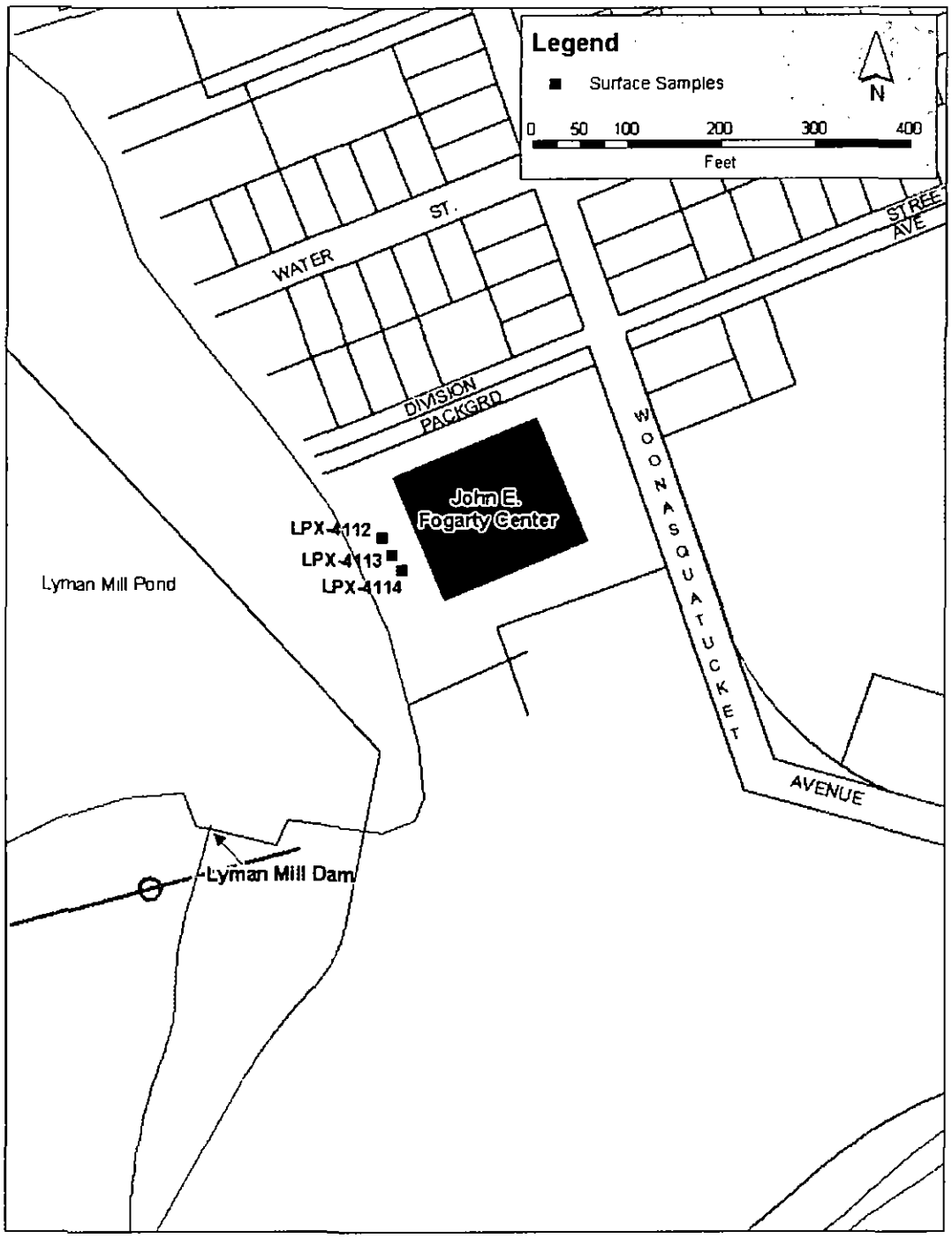


Figure 2-2. John E. Fogarty Center Soil Sample Locations

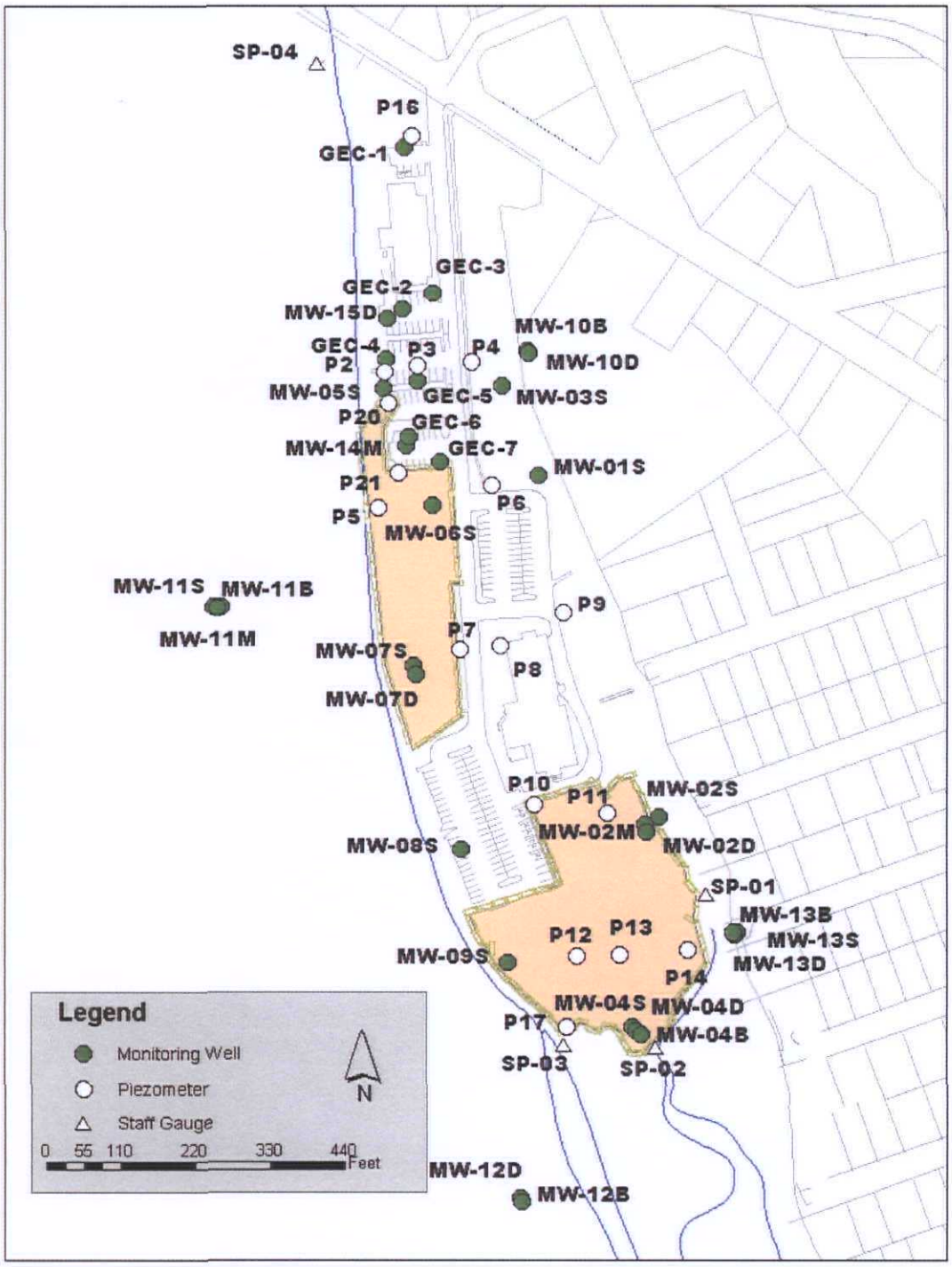
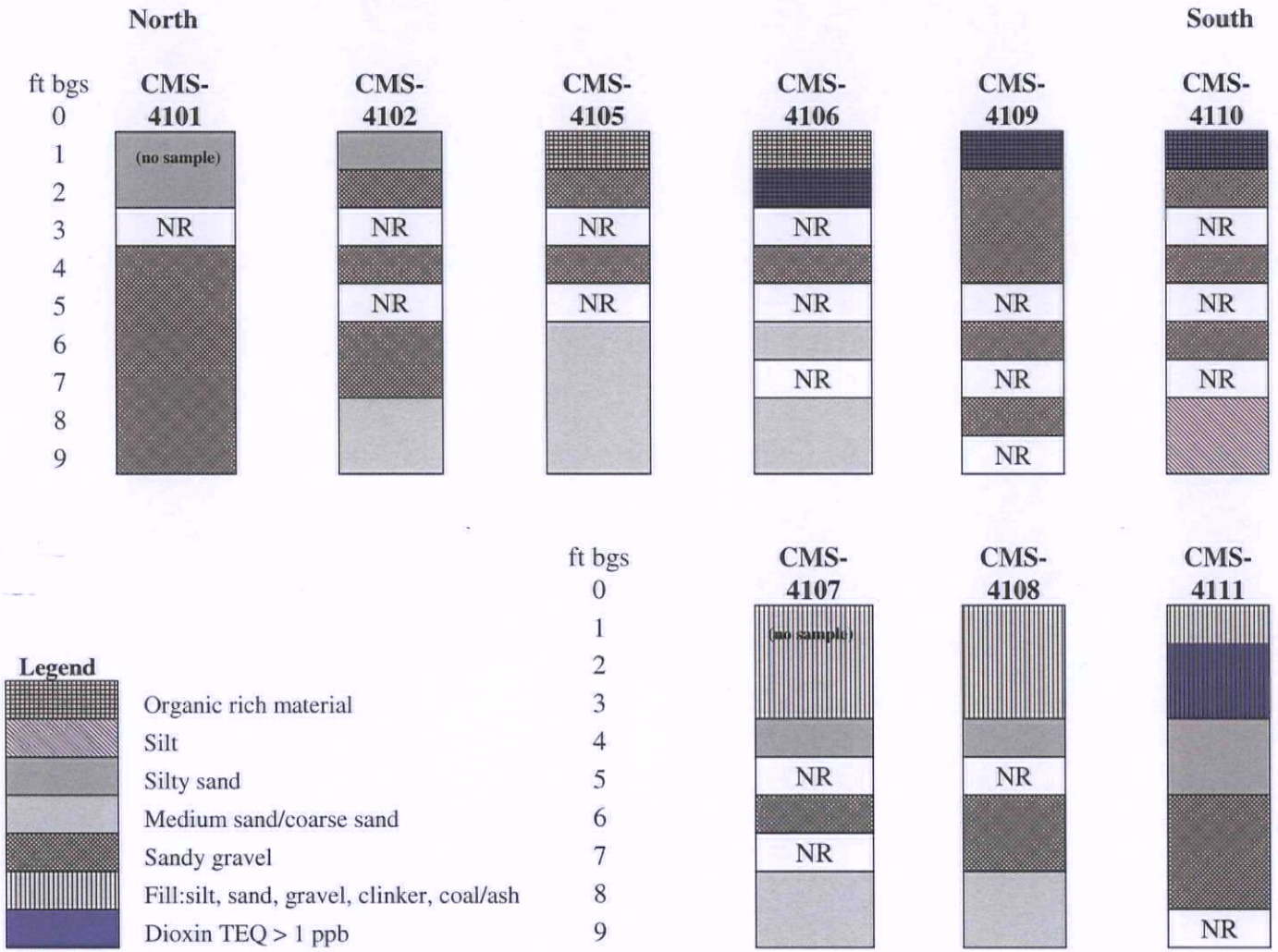


Figure 2-3. Monitoring Well, Piezometer and Staff Gauge Locations

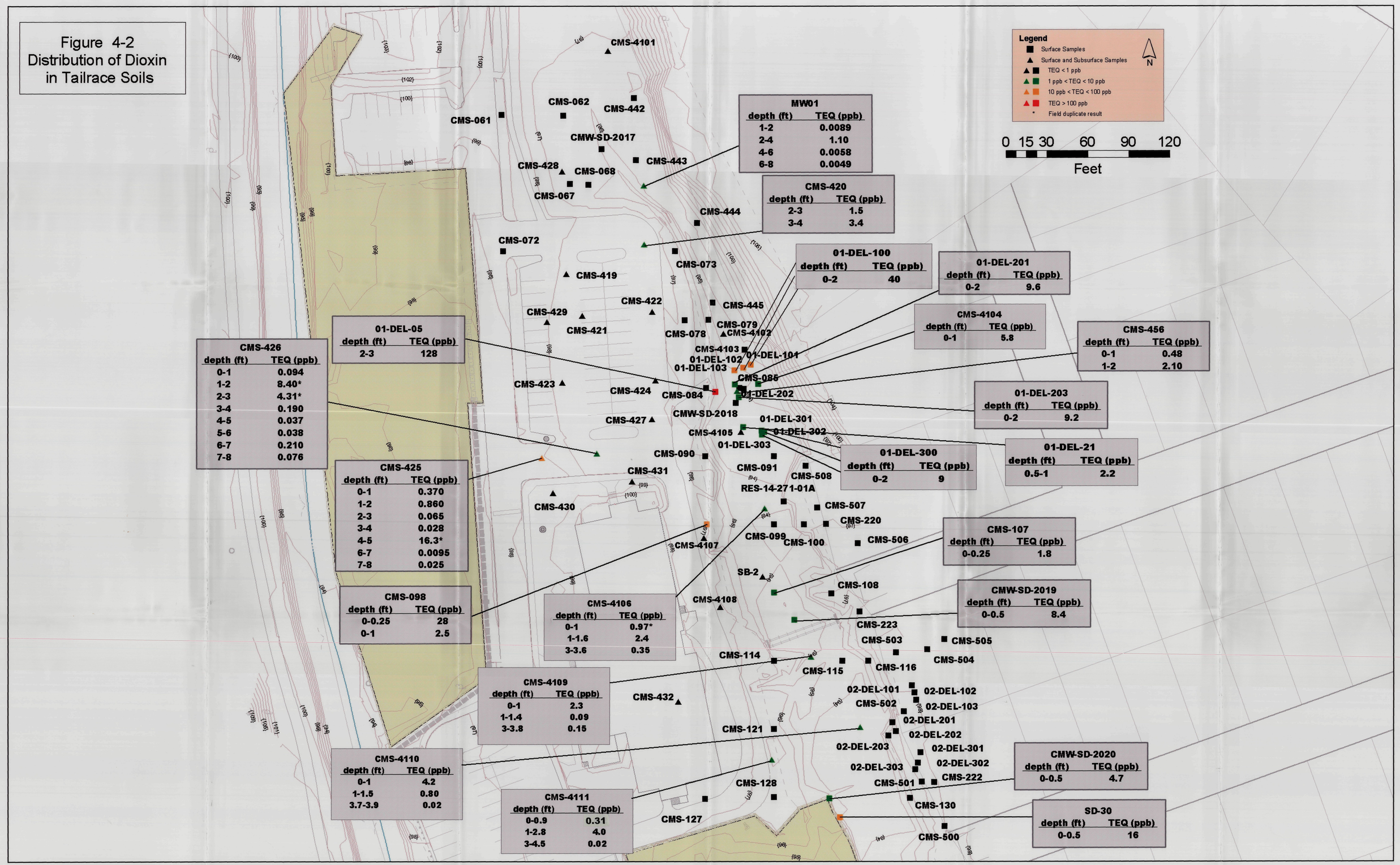


NR: No recovery

Note: dioxin concentrations not measured in samples below 5 ft.

Figure 4-1 Cross Sections of Tailrace Soil Types

Figure 4-2
Distribution of Dioxin in Tailrace Soils



See Map in Sleeve

Figure 4-2. Distribution of Dioxin in Tailrace Soils

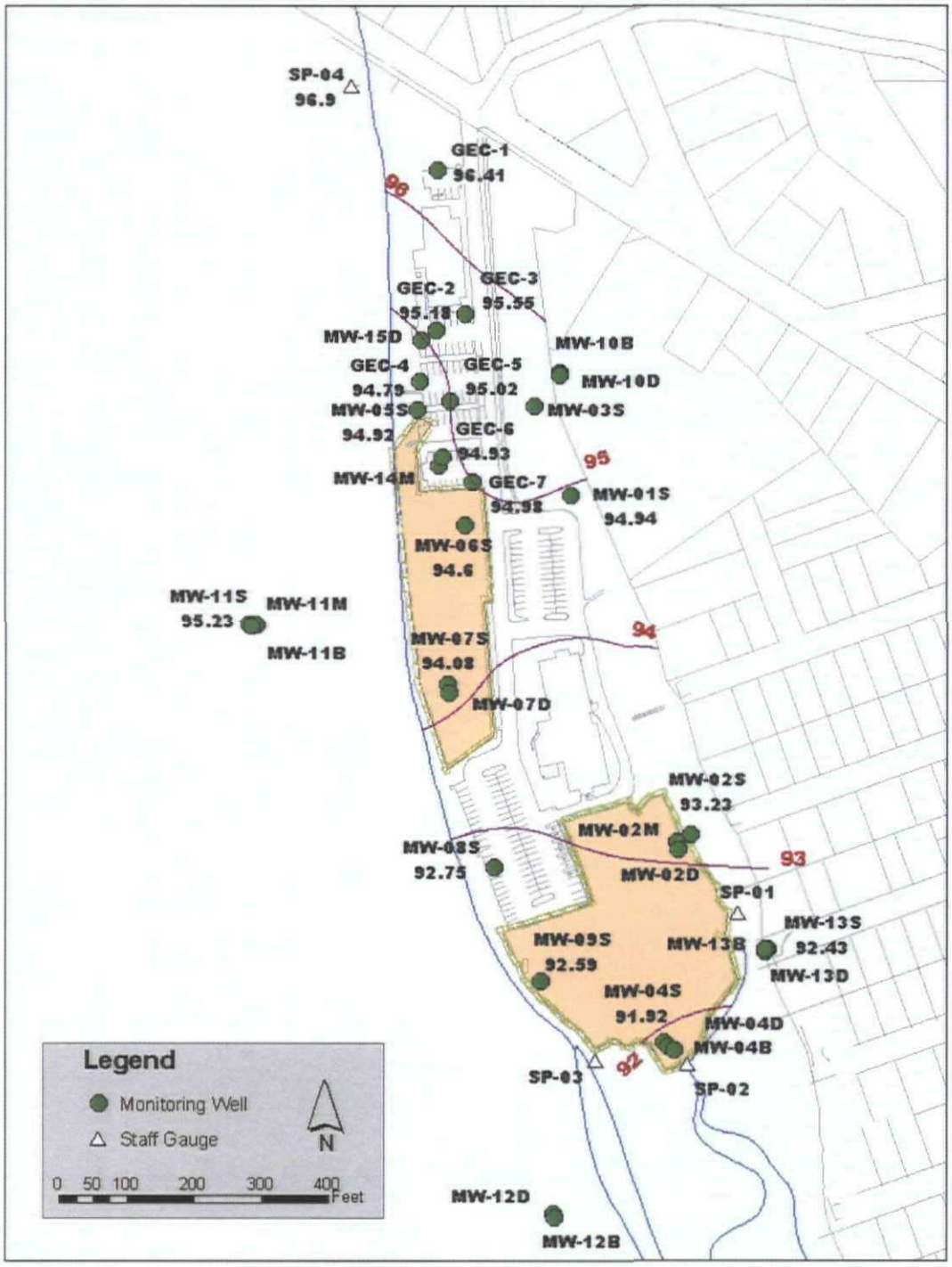


Figure 4-3. Water Table Elevations, October 2002

APPENDIX A

FIELD SUMMARY REPORT

December 19, 2002

PN: 51226/RI1

Ms. Patricia White
Battelle
397 Washington Street
Duxbury, Massachusetts 02332

SUBJECT: **October/November 2002 Field Summary Report**
Centredale Manor Restoration Project Site
North Providence, Rhode Island
Contract No. DACW33-01-D-0004

Dear Ms. White:

MACTEC Engineering and Consulting, Inc. (MACTEC) (formerly Harding ESE, Inc.) is pleased to present the following Field Summary Report from the recent subsurface field investigation conducted at the Centredale Manor Restoration Project Site (the Site) in North Providence, Rhode Island located at 2072 and 2074 Smith Street.

INTRODUCTION

MACTEC completed the field work at the Site in two mobilizations during the weeks of October 21 and November 18, 2002, in accordance with specifications outlined in the Final Field Sampling Plan (September 2002) prepared by Battelle. The first mobilization pertained to activities performed to complete the groundwater sampling portion and the second mobilization pertained to activities performed to complete the soil sampling activities.

The following is a chronological listing of field activities performed completing the two mobilizations of field work: (Note: several activities overlapped as field conditions warranted.)

- GPS and flagging of proposed soil sampling locations;
- Site-wide groundwater monitoring well and staff gauging activities;
- Groundwater monitoring well sampling activities;
- Underground utility clearance;
- Brush clearing and fence removal/repair activities;
- Piezometer gauging activities;
- Soil sampling activities; and
- Investigation Derived Waste (IDW) handling.

Each of these activities is described in more detail below.

GLOBAL POSITIONING SYSTEM (GPS) AND FLAGGING ACTIVITIES

On October 21, 2002, MACTEC arrived on Site to flag/stake and obtain GPS coordinates for the nine proposed sampling locations using a back-mounted Trimble GPS unit (model TSC1) capable of sub meter accuracy once post processing steps are completed. The GPS unit was programmed to the Rhode Island State Planar coordinate system (NAD 83 Conus) prior to mobilizing to the field. The GPS was also pre-programmed to receive real time corrective data from a nearby fixed position beacon.

Battelle and MACTEC walked the Site placing a flag/stake at the proposed soil sampling locations. Several locations were not accessible by foot due to the standing water in the tail race area. At the time, the depth of the standing water was unknown, so these multiple locations (CMS-4104, CMS-4105, CMS-4106, CMS-4109 and CMS-4110) were not marked with a stake until the sampling activities were completed with the barge drill rig. Upon completion of sampling activities at each of the above mentioned boring locations, a wooden stake was driven into the ground and labeled accordingly.

On October 21, 2002 MACTEC was able to acquire GPS coordinates for the following locations: CMS-4102, CMS-4108, and CMS-4111. MACTEC attempted to obtain satellite and beacon reception at other locations, but was restricted due to poor reception from several possible factors. The combination of dense vegetation in the tail race and the proximity of the tall apartment building likely contributed to the poor reception. On several occasions during the field work, the GPS was utilized to reacquire locations. On October 24, 2002 MACTEC was able to acquire two additional locations with the GPS: CMS-4103 and CMS-4107.

During the second phase of field work that occurred during the week of November 18, 2002, the vegetation in the tail race had significantly thinned out since October. Although the canopy covering the tail race in November was much thinner, the tall apartment building still proved to be the dominant factor in interrupting transmissions to the GPS. This was apparent when MACTEC walked across the parking lot away from the building and was able to obtain strong satellite and beacon signals. Several attempts were made back in the tail race without successfully receiving signals for the remaining locations.

Post processing of GPS data was corrected due to the information obtained from the University of Rhode Island's web site using the Pathfinder software provided with the Trimble unit. Corrective information was downloaded from the University of Rhode Island Cooperative CORS in Kingston, Rhode Island via:

- www.ngs.noaa.gov/CORS/Sites/uril.html; and
- www.edc.uri.edu/gpsdata/ssf/yymm/yymmhh.exe.

Coordinates for the LPX surface soil locations are unavailable at this time. It is noted that the GPS rover files for the three LPX sampling locations at the John E. Fogerty Complex were possibly corrupted during the downloading process from the TSC1 unit to the PC. Attempts at recovering the files have been unsuccessful to date. It is unknown if the three files will be able to be recovered.

The table below lists the post-processed corrected coordinates for the soil sampling locations where satellite and beacon information was received by the GPS unit.

Sample Location	North (ft)	East (ft)
CMS-4102	281861.583	331898.102
CMS-4103	281847.938	331918.994
CMS-4107	281727.581	331854.501
CMS-4108	281662.706	331900.144
CMS-4111	281536.824	331935.193
*MW-05S	282099.670	331613.150

* Note: Denotes GPS control point

After discussions with Battelle, a Site ground survey completed by a registered survey crew may be necessary in order to locate and map all sampling locations where GPS data is not available.

The following soil sampling locations do not have known coordinates to date: CMS-4101, CMS-4104, CMS-4105, CMS-4106, CMS-4109, CMS-4110, LPX-4112, LPX-4113, and LPX-4114.

SITE-WIDE GROUNDWATER MONITORING WELL AND STAFF GAUGING ACTIVITIES

On October 21, 2002, MACTEC completed the Site-wide round of water level gauging for the proposed groundwater sampling locations and staff gauges. Several of the river gauges were not gauged due to the low water level in the Woonasquatucket River. Also, monitoring well MW-03S was not gauged on this date due to the inability to locate the well in the dense vegetation. On November 21, 2002, MW-03S was gauged and sampled by MACTEC for VOCs after being located by Battelle personnel.

Water levels were obtained using a ¼" diameter Slope transducer. Measurements were recorded to the nearest hundredth of a foot referenced to the top of riser material (TOR), unless otherwise stated. Well mouth headspace readings were also recorded upon opening the well cap with a Thermo Environmental Model TE-580B photoionization detector (PID) calibrated to zero gas and 100 parts per million by volume (ppmv) isobutylene.

Keys for the locked wells were not available during the time that MACTEC was in the field; therefore, the locks were cut open using bolt cutters. Once the wells were accessed and gauged, new Master Lock® brand locks (key code 3117) were used to secure the wells.

Below is a table listing depths to water for the 33 monitoring well locations and single staff gauge that were measured on October 21, 2002:

Sample Location	Depth to Water	Headspace PPMV	Date Measured	Reference Point	Comments
MW-09S	7.96	0	10/21/02	TOR	
MW-04S	6.87	0	10/21/02	TOR	
MW-04D	6.78	0	10/21/02	TOR	
MW-04B	6.30	0	10/21/02	TOR	
MW-02D	6.91	0	10/21/02	TOR	
MW-02M	6.71	0	10/21/02	TOR	
MW-02S	3.93	0	10/21/02	TOR	
MW-07S	4.24	0	10/21/02	TOR	
MW-07D	3.65	0	10/21/02	TOR	
MW-06S	5.90	10.1	10/21/02	TOR	odor present
MW-14M	4.30	0	10/21/02	TOR	
GEC-6	4.77	0	10/21/02	TOR	
GEC-7	3.92	0	10/21/02	TOR	
GEC-5	8.49	0	10/21/02	TOR	bailer remaining in well
GEC-4	7.55	0	10/21/02	TOR	bailer remaining in well
MW-15D	7.34	0	10/21/02	TOR	
GEC-2	8.62	0	10/21/02	TOR	
GEC-3	8.12	0	10/21/02	TOR	
GEC-1	7.91	0	10/21/02	TOR	bailer remaining in well
MW-10D	12.56	0	10/21/02	TOR	
MW-10B	12.66	0	10/21/02	TOR	
MW-01S	4.29	0	10/21/02	TOR	
MW-05S	7.42	338	10/21/02	TOR	
SP-04	2.20	0	10/21/02	NA	USGS staff gauge location
MW-13S	6.42	0	10/21/02	TOR	
MW-13D	5.99	19.5	10/21/02	TOR	
MW-13B	6.00	21.4	10/21/02	TOR	
MW-12B	13.96	0	10/21/02	TOR	
MW-12D	14.22	0	10/21/02	TOR	
MW-11S	24.19	5.7	10/21/02	TOR	
MW-11B	24.01	0	10/21/02	TOR	
MW-11M	23.51	0	10/21/02	TOR	
MW-08S	3.58	0	10/21/02	TOR	
MW-03S	4.29	0	11/21/02	TOR	**not part of Site-wide event**

*Note: MW and GEC indicate monitoring well location
SP indicates USGS staff gauge

GROUNDWATER MONITORING WELL SAMPLING ACTIVITIES

Upon completion of the Site-wide round of water level gauging on October 21, 2002, MACTEC returned to the Site on October 22, 2002, to begin low flow sampling of the 33 existing monitoring wells as listed in the table above.

The list below consists of equipment and materials used by MACTEC for the groundwater sampling activities.

- ¼ inch diameter Slope water level meter
- Geopump and battery
- Horiba U-22 and flow through cell
- ¼ inch diameter, new dedicated tubing
- Silicone (pliable) tubing for pump head, new and dedicated
- Graduated container for flow rate measurement
- Collapsible five-gallon purge container
- TE-580B (PID)

From October 22 through October 24, 2002, MACTEC executed the groundwater sampling activities. The monitoring wells were purged and groundwater samples collected following the procedures outlined in the USEPA Region I document, *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (July 30, 1996 Revision 2).

In order to expedite the groundwater sampling activities, MACTEC incorporated the use of three separate sets of sampling equipment and three field scientists. Each scientist mobilized to predetermined wells for sampling activities.

Upon opening each well cap, a static depth to water was recorded on each of the field sheets. See Attachment A (Field Data Record- Groundwater Sampling) for details pertaining to low flow sampling. New, dedicated, disposable tubing was lowered into the water column until the intake was at the midpoint of the well screen. Each well was purged using the Geopump through a flow through cell connected to a Horiba U-22. Purge rates were maintained below 500 milliliters per minute. Field parameters including depth to water, purge rate, temperature, pH, turbidity, specific conductivity, dissolved oxygen and reduction-oxidation potential were measured and recorded on the field sheets. Upon stabilization of the above parameters, the flow through cell was disconnected and the sample was then collected in the appropriate sample container supplied by the laboratory and then immediately placed on ice.

Samples from each well were analyzed in the laboratory for volatile organic compounds (VOCs) using USEPA method 8260B with an additional analysis for Dioxin/Furan at MW-05S. On October 24, 2002, MW-05S did not contain an adequate amount of water to fill the required sample volume for the Dioxin/Furan analysis; therefore, MW-05S was sampled for VOCs only. When MACTEC returned to the Site in November, the water table was slightly higher, and therefore, an adequate

amount of water was available to collect a sample at MW-05S on November 21, 2002, for Dioxin/Furan analysis.

Upon completion of the sampling activities at each well, the depth to the bottom of the well was measured and recorded for historical confirmation. Samples were packed in coolers on ice and sent to the appropriate laboratories for chemical analysis. See the electronic field data deliverable (EDD) for sample identifications and QC information.

Purge water generated from the groundwater sampling was field screened for total VOCs with a PID and disposed of at the ground surface in the vicinity of the well to non-landscaped, vegetated areas. If PID readings exceeded 10 ppmv or the water visually exhibited a color or sheen, the purge water was containerized in the on-Site 55-gallon drums until later being purged through the bag filters on the soil cap area #1 located in the southern portion of the Site.

For additional details regarding information on well conditions and groundwater characteristics, please see the attached low-flow sampling field data sheets.

UNDERGROUND UTILITY CLEARANCE

On October 22, 2002, prior to initiating soil sampling activities, MACTEC obtained a legal start date and time through DIGSAFE by calling DIGSAFE from the field phone at 1-888-DIGSAFE. DIGSAFE provided MACTEC with the following information over the field phone on October 22, 2002 at 1245:

- DIGSAFE Ticket Number: 20024304379
- Site Address: 2072/2074 Smith Street, North Providence, Rhode Island
- Legal Start Date: October 24, 2002
- Legal Start Time: 1245

Intrusive, subsurface field work did not commence until November 18, 2002, during the active DIGSAFE ticket number. November 18, 2002 was the start date for the second mobilization when the crane, barge, and drill rig arrived on Site to commence drilling in the tail race area.

BRUSH CLEARING AND FENCE REMOVAL/REPAIR ACTIVITIES

On October 23, 2002, Fleet Environmental Services, LLC (Fleet) of Randolph, Massachusetts, met with MACTEC on Site to clear access ways into the tail race area from the parking lot. MACTEC walked the Site with Fleet indicating to them which areas would need to be cleared so that safe foot and rig passage to the proposed soil boring locations could be made.

Fleet commenced activities by temporarily altering three sections of the chain link fence so that access into the tail race area could be gained. The three fence sections between the support poles were cut so that during the field work they could be rolled back, allowing for an approximate eight foot wide opening. Each night prior to leaving the Site, the fence was rolled back and locked into place. This enabled day use access only, and prevented any unauthorized entry by passersby.

Once the fence altering activities were completed, Fleet utilized gasoline powered brush cutting equipment to clear pathways from the fence openings to the waters edge in the tail race portion of the Site. An additional pathway was cleared at the northern end of the Site for access to boring location CMS-4101. This location did not require fence altering activities.

Clearing activities were limited to the removal of tall grass, weeds, Purple Loosestrife (Lythrum salicaria) and small saplings with trunk sizes no greater than two-inches in diameter at waist height. The cut brush was laid aside and left to naturally decompose in the wetland. All equipment refueling activities were completed outside of the fenced area in the parking lot to avoid any possible spills to the wetland biota.

While MACTEC was on Site managing the IDW, Fleet returned to the Site on November 25, 2002, to permanently repair the three sections of fence. Prior to Fleet's departure, MACTEC inspected the fence repair work. All three sections of fence were adequately and permanently repaired to the extent that one could not distinguish where the previous openings existed.

PIEZOMETER GAUGING ACTIVITIES

In addition to the monitoring well gauging activities, MACTEC completed a Site-wide round of water level gauging for 17 piezometers on October 24, 2002. MACTEC gauged a total of 17 of 19 listed piezometers. Piezometer P19 could not be gauged because of a private vehicle that was parked over this location. MACTEC was not able to contact the owner of this vehicle while on Site. Piezometer P1 could not be gauged because this location could not be found. After visually searching for P1, MACTEC used the metal detector in an attempt to locate it. After scanning a large area surrounding the location for P1 with the metal detector, it was determined that P1 may have been damaged or removed.

Water levels were obtained using a ¼" diameter Slope transducer as was used for the groundwater measurements at each of the monitoring wells. Measurements were recorded to the nearest hundredth of a foot and referenced to the top of riser material (TOR), unless otherwise stated.

Below is a list of the piezometers gauged and associated depths to water.

Piezometer ID	Depth to Water	Date Measured	Reference Point	Comments
P2	5.12	10/24/02	TOR	
P19	NM	10/24/02	TOR	vehicle blocking location
P16	9.15	10/24/02	TOR	
P4	2.75	10/24/02	TOR	
P3	8.36	10/24/02	TOR	
P20	7.35	10/24/02	TOR	
P1	NM	10/24/02	TOR	could not locate w/ metal detector
P21	4.36	10/24/02	TOR	

Piezometer ID	Depth to Water	Date Measured	Reference Point	Comments
P6	2.89	10/24/02	TOR	
P9	3.42	10/24/02	TOR	
P8	4.87	10/24/02	TOR	
P7	3.41	10/24/02	TOR	
P10	4.91	10/24/02	TOR	
P11	5.05	10/24/02	TOR	
P12	4.37	10/24/02	TOR	
P13	4.42	10/24/02	TOR	
P14	2.67	10/24/02	TOR	
P17	3.80	10/24/02	TOR	
P5	7.11	10/24/02	TOR	

*NM-denotes piezometer not measured, see comments in table above.

SOIL SAMPLING ACTIVITIES

Prior to the commencement of the soil boring activities, a brief health and safety meeting was held for all of those involved in the field work. The work carried out during the soil boring installations was completed with workers wearing poly-coated Tyvek suits, gloves, hard hats, and disposable rubber boots.

On November 18, 2002, GeoSearch, Inc. (GeoSearch) arrived on Site to begin the soil boring installations in the tail race area. TG&B Marine Services provided a 24 foot barge (Carolina Skiff) to complete the four wet boring locations in the tail race (CMS-4105, CMS-4106, CMS-4109, and CMS-4110). GeoSearch also subcontracted a crane to assist in the movement and placement of the barge and rig in the tail race.

On November 18, 2002, MACTEC initiated the soil boring activities. Boring installation was initiated by advancing stainless steel split spoon samplers for the collection and continuous logging of soil characteristics. Following the sampler, steel casing was advanced to keep the hole open. See attached field boring logs for details regarding soil characteristics and associated depths. A PID was used to measure headspace VOC concentration levels in soil. Headspace values are reported in parts per million by volume (ppmv) and are provided on the attached soil boring logs.

A poly-sheeted decontamination pad was constructed in the grass area adjacent to, but outside of the tail race area. High pressure steam cleaning of tools and equipment between each boring was carried out within this decontamination pad.

Sampling equipment was decontaminated in the decontamination pad between sample intervals and locations. The following is a list of decontamination steps executed for the decontamination of sampling equipment.

- Liquinox and water scrub
- Water rinse
- Isopropanol rinse
- Deionized water rinse
- Hexane rinse
- Deionized water rinse

Upon completion of the four wet boring locations, water remaining in the pad was containerized in on-Site 55-gallon drums. Soil cuttings were also containerized in appropriately labeled drums.

The soil sampling program began at location CMS-4109. From this location, the boat was relocated with the crane and set up at CMS-4110. Generally, the work continued from the southern end of the tail race towards the northern end of the tail race ending with CMS-4105 on November 20, 2002. Ground surface averaged approximately nine inches below the standing water in the tail race. In total, four locations were completed using the barge and crane.

Upon completion of the four wet boring locations mentioned above, the barge was lowered into the decontamination pad and high pressure steam cleaned prior to placement of the barge on the truck trailer for demobilization. During the decontamination process of the barge, a worker from GeoSearch slipped and fell. The worker slipped while stepping on the wet plastic sheeting inside the decontamination pad while wearing disposable, rubber boot covers and a hard hat. These boot covers were required as outlined in the Health and Safety Plan. According to the worker, he was not injured during the fall. Several times during the day, MACTEC's FOL checked on the worker's status. MACTEC's FOL made an entry into the health and safety logbook on this day noting the incident. MACTEC's FOL also prepared a near miss report for this incident at the request of the US Army Corps of Engineers and submitted it to Battelle. No other health and safety issues occurred while on Site for either of the two mobilizations.

The remaining borings were completed on dry land utilizing a conventional truck-mounted rig (CMS-4107, CMS-4108, and CMS-4111) and portable tripod rig (CMS-4101 and CMS-4102).

Three soil borings were completed using a conventional truck mounted rig capable of 4.25-inch hollow stem augers. Continuous split spoon samples were collected from the ground surface to nine feet below ground surface. Similar sampling and logging practices were followed as was executed in the barge drilling.

The two borings, CMS-4101 and CMS-4102 were completed with the same techniques as described in the barge drilling, just using a portable tripod rig.

Upon completion of each of the nine soil borings, the drillers introduced a cement/bentonite mix to seal off the hole from the ground surface to the termination depth.

Five locations (CMS-4103, CMS-4104, LPX-4112, LPX-4113, and LPX-4114) were completed as surface soil sampling locations and collected using a stainless steel hand auger.

The following table is a summary of the soil sampling locations, further detail can be found on the attached soil boring logs.

Sample Location	Location Type	Method Used	Date Completed	Depth to Water (ft bgs)	Termination Depth (ft bgs)	Highest PID Reading in Soil
CMS-4101	soil boring	tripod	11/22/02	2" standing water	9.0	0.9 ppmv
CMS-4102	soil boring	tripod	11/22/02	~1.0	9.0	0.0 ppmv
CMS-4103	surface soil	hand auger	11/21/02	NA	1.0	NM
CMS-4104	surface soil	hand auger	11/21/02	4" standing water	1.0	NM
CMS-4105	soil boring	barge rig	11/20/02	12" standing water	9.0	NM
CMS-4106	soil boring	barge rig	11/19/02	6" standing water	9.0	0.9 ppmv
CMS-4107	soil boring	truck rig	11/21/02	~3.0	9.0	NM
CMS-4108	soil boring	truck rig	11/21/02	~3.0	9.0	NM
CMS-4109	soil boring	barge rig	11/18/02	6" standing water	9.0	NM
CMS-4110	soil boring	barge rig	11/19/02	12" standing water	9.0	4.9 ppmv
CMS-4111	soil boring	truck rig	11/21/02	~3.0	9.0	11.1 ppmv
LPX-4112	surface soil	hand auger	11/22/02	NA	0.5	NM
LPX-4113	surface soil	hand auger	11/22/02	NA	0.5	NM
LPX-4114	surface	hand auger	11/22/02	NA	0.5	NM

*NA- denotes that water table not reached
*NM- denotes not measured (see boring log)
*~ indicates approximate depth

INVESTIGATION DERIVED WASTE (IDW)

Solid Waste

Solid IDW (soil and PPE) was handled and containerized in 55-gallon DOT approved drums located on the cap area #1 behind a locked gate. Soil cuttings generated from the drilling activities are containerized in one drum. Analytical results will determine the ultimate disposal characteristics for the soil drum. Five 55-gallon drums contain solid waste such as used personal protective equipment (PPE), poly sheets and bag filters. The six total drums will ultimately be transported off-Site for proper disposal.

Liquid IDW

All liquid IDW generated was temporarily stored in 55-gallon DOT approved drums until November 25, 2002 when the liquid was pumped through a series of bag filters. Service Tech Industries provided MACTEC with equipment to pump the liquid waste through a series of three bag filters with pore spaces

was discharged to the middle of the cap and allowed to percolate through the soil. The bag filters were disposed of in the solid waste drums while the bag housing units were pressure washed and flushed with approximately 60 gallons of fresh water. As of November 25, 2002, there is no liquid IDW on Site.

If you have any questions regarding the information contained in this report, please do not hesitate to call either of the undersigned at (781) 245-6606.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Mark Phaneuf
Senior Staff Scientist

Alan Fillip
Project Manager

FIELD BORING LOGS

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4101**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/22/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/22/2002	**Drilling Method:**	Tripod with casing and spoons
Total Depth:	9'	**Depth to Water:**	~ surface (2" standing water)

Comments: **Tripod Drilling, 140 lb hammer**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	Dk brown saturated silty sand, with organic roots, leaves, burned (blackened) wood fragments. From (0.8-1.0') Med to coarse sand. No odors.	1.0/1.0	0	17,22	CMS-SS-4101-0010-01 Archive (0-1') 1150
2	Same dk brown silty sand as in 0-1', only a trace of organics (roots), saturated, med to coarse sand and subrounded gravel and angular rock fragments.	1.0/0.9	0	29,22	CMS-SS-4101-0019-01 Dioxin (1-1.9') 1200
3	No Recovery	1.0/0.0	-	15,16	
4	Brown to grey, sandy gravel, well sorted, well rounded, gravel to 0.08" dia., 5-10% fines. Minor Fe-staining, slight hydrocarbon odor	1.0/1.0	0.9	30,37	CMS-SS-4101-3042-01 Dioxin (3-4.2') 1220
5	Same sandy gravel as in 3-4' interval, no change	1.0/0.2	0.6	35,40	
6	Same sandy gravel as in 3-4', grey, saturated very slight hydrocarbon odor, no Fe-staining	1.0/1.0	0	13,17	CMS-SS-4101-5062-01 Archive (5-6.2') 1235
7	Saturated sandy gravel as in 5-6', slight hydrocarbon odor, contains angular rock frags, 0.30" dia.	1.0/0.2	0	19,24	
8	Sandy gravel, 5-10% silt, saturated, light brown, gravel subrounded, 0.1-0.3" dia, med to coarse sand, no odors.	1.0/1.0	0	30,31	CMS-SS-4101-7085-01 Archive (7-8.5') 1300
9	Same material as in 7-8', saturated sandy gravel.	1.0/0.5	0	25,26	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4102**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/22/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/22/2002	**Drilling Method:**	Tripod with casing and spoons
Total Depth:	9'	**Depth to Water:**	~1' bgs
Comments:		**Tripod Drilling, 140 lb hammer**	

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0					
1	Dk brown, wet, silty sand with large angular rock frags to 1" dia, roots, leaves, pebbles subrounded 0.05-0.1" dia.	1.0/0.8	0	27,35	CMS-SS-4102-0008-01 Dioxin (0-0.8') 0930
2	Sandy gravel, <5% fines, large subrounded pebbles to 0.5" dia. With angular rock frags, saturated, tan.	1.0/0.9	0	10,12	CMS-SS-4102-1019-01 Dioxin (1-1.9') 0945
3	No Recovery	1.0/0.0	-	14,10	
4	Sandy gravel, 5-10% fines, gravel well rounded, 0.05-0.15" dia. Grey, saturated, med to coarse sand	1.0/0.8	0	26,46	CMS-SS-4102-3038-01 Dioxin (3-3.8') 1005
5	No Recovery	1.0/0.0	-	63,20	
6	Dk grey sandy gravel, med to coarse sand, saturated, no odors, pebbles rounded to subrounded with trace angular rock frags	1.0/1.0	NA	17,15	CMS-SS-4102-5062-01 Archive (5-6.2') 1025
7	Top 0.2' of sample same sandy gravel as in 5-6'	1.0/0.2	NA	20,21	
8	Grey grading to yellow/tan med to coarse sand, saturated, trace amounts of pebbles, no odors, well sorted	1.0/1.0	0	25,27	CMS-SS-4102-7090-01 Archive (7-9') 1045
9	Tan to yellow med to coarse sand, saturated, trace amounts of pebbles, subrounded, well sorted, no odors	1.0/1.0	0	24,27	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4105**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/20/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/20/2002	**Drilling Method:**	Casing w/ hammer and spoon
Total Depth:	9'	**Depth to Water:**	1' standing water

Comments: **Barge Drilling, 140 lb hammer**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	Organic rich layer with leaves and roots, med to coarse sand throughout, dk brown to black, saturated, with pebbles from 0.25-0.50" dia., subrounded pebbles and rock frags near tip from 0.8-1.0'. <5% fines, hydrocarbon odor	1.0/1.0 (total 1.0 obtained after 2 attempts)	Not Enough Recovery	17,37; second attempt 41,37	CMS-SS-4105-0010-01 Full suite of analyses except Dioxin (0-1') 0915
2	Sandy gravel, <5% fines, saturated, large rock frags, med to coarse sand, with Fe-staining present	1.0/0.5	Not Enough Recovery	11,15	CMS-SS-4105-1015-01 Dioxin (1-1.5') 0930
3	No Recovery	1.0/0.0	-	15,9	-
4	Sandy gravel, med to fine grained, with 5-10% fines, 5% subrounded gravel, grey in color with organic rich layer from 3.3-3.6' black with roots, all saturated	1.0/1.0	-	15,27	CMS-SS-4105-3040-01 Dioxin (3-4') 1055
5	No Recovery	1.0/0.0	-	30,27	-
6	Saturated well sorted med to coarse sand, <5% fines, yellow to tan color with 5% pebbles subrounded 0.25" dia.	1.0/1.0	NA	11,11	CMS-SS-4105-5066-01 Archive (5-6.6') 1015
7	Same well sorted sand as in 5-6' interval	1.0/0.6	NA	13,7	
8	Coarse to med sand, 5% fines,saturated, black in color, well sorted with large subrounded cobbles and pebbles	1.0/1.0	NA	18,20	CMS-SS-4105-8088-01 Archive (8-8.8')1130
9	Coarse to med sand as above in 7-8' but yellow in color, no black. Interface is at 8'	1.0/0.8	NA	20,27	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4106**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/19/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/19/2002	**Drilling Method:**	Casing with hammer and spoons
Total Depth:	9'	**Depth to Water:**	6" of standing water at surface

Comments: **Barge Drilling, 140 lb. hammer**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0					
1	Dk brown, saturated organic rich layer with leaves, trace amount of silty sand, non-plastic	1.0/0.3	0.6	2,3	CMS-SS-4106-0003-01 Dioxin (0-0.3') 1445
2	Dk brown saturated organic rich layer with leaves, wood (roots), silty sand, slightly plastic	1.0/0.6	0	4,4	CMS-SS-4106-1016-01 and duplicate ID CMS-DU-111902A-01 for Dioxin (1-1.6') 1315
3	No Recovery	1.0/0.0	-	5,4	
4	Dk brown to black sandy gravel, coarse to med sand with 5% fines, saturated, slight sheen, gravel and pebbles, 0.25-0.5" dia. With angular rock frags	1.0/0.6	0	13,42	CMS-SS-4106-3036-01 Dioxin (3-3.6') 1330
5	No Recovery	1.0/0.0	-	52,40	
6	Med to coarse sand, well sorted, saturated, qtz. rich, <5% fines, tan to grey	1.0/0.7	0.1	3,8	CMS-SS-4106-5057-01 Archive (5-5.7') 1400
7	No Recovery	1.0/0.0	-	30,14	
8	Coarse, well sorted sand, saturated, qtz. rich, grey. <5% fines	1.0/1.0	0.9	5,7	
9	Coarse sand, well sorted as above, <5% fines, with slightly siltier layer from 8.4-8.5'	1.0/0.5	0	7,11	CMS-SS-4106-7085-01 Archive (7-8.5') 1415

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4107**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/21/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/21/2002	**Drilling Method:**	4.25" HSA
Total Depth:	9'	**Depth to Water:**	~3' bgs
Comments:		**Truck Rig, 140 lb hammer**	

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	Light to med brown silty sand with no odors, <5% subrounded pebbles 0.1-0.2" dia with trace of roots and organics, slight amount of clinker material throughout (fill)	1.0/1.0	NA	4,5	No offsite sample for 0-1' interval
2	Dk brown, wet, slightly plastic silty sand, med to coarse sand, few wood fibers and clinkers, no odors, with Fe-staining thoughout (fill)	1.0/1.0	-	4,5	CMS-SS-4107-1030-01 Dioxin (1-3') 1330
3	Same material as in 1-2' with slightly greyer color from 2.3-3'. Fe-staining present throught interval. Saturated, approx. 3', trace amount clinkers (fill)	1.0/1.0	-	4,5	
4	Light brown, saturated silty sand, native, Fe-staining, slightly plastic, no evidence of fill, no pebbles	1.0/1.0	-	12,15	CMS-SS-4107-3040-01 Dioxin (3-4') 1345
5	No Recovery	1.0/0.0	-	18,21	
6	Saturated, grey, sandy gravel, <5% fines, large angular rock frags, to 2.5" dia. No odor, trace pebbles, subrounded	1.0/0.8	-	13,15	CMS-SS-4107-5058-01 Dioxin (5-5.8') 1400
7	No Recovery	1.0/0.0	-	21,21	
8	Tan to grey saturated med to coarse sand, well sorted, ~5% fines, with trace amounts of gravel, mod. Rounded. No odors	1.0/1.0	-	7,11	CMS-SS-4107-7088-01 Archive (7-8.8') 1420
9	Same material as in 7-8' tan to grey saturated med to coarse sand. No odors	1.0/0.8	-	15,17	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4108**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/21/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/21/2002	**Drilling Method:**	4.25" HSA
Total Depth:	9'	**Depth to Water:**	~3' bgs

Comments: **Truck Rig, 140 lb hammer**
NA under headspace indicates PID inoperable.

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0					
1	Light brown silty sand with 5-10% subrounded pebbles, with trace organics, roots, stiff, damp, and contains clinker materials from 0.5-1.0 (FILL) Also noted live earthworm	1.0/1.0	0	8,7	CMS-SS-4108-0010-01 Dioxin (0-1') 1145
2	Tan to light brown silty sand with wood fibers and friable coal like material and ash. Wet to saturated near 2'. 5% subrounded pebbles. No odor evident (FILL)	1.0/1.0	0	5,4	CMS-SS-4108-1030-01 Dioxin (1-3') 1205
3	Med to dk. Brown silty sand as above with trace amounts of friable burned wood and ash. Near saturated at 3'. No odor evident (FILL)	1.0/1.0	0	6,5	
4	Saturated dk brown silty sand with 5-12% fines, 10-15% gravel 0.1-0.2" dia, subrounded. No odors evident, appears to be native material	1.0/1.0	0	15,18	CMS-SS-4108-3040-01 Dioxin (3-4') 1215
5	No Recovery	1.0/0.0	NA	21,19	
6	Dk brown, saturated sandy gravel, <5% fines, (0.1-0.25" dia) sub to well rounded, no odors	1.0/1.0	NA	22,18	CMS-SS-4108-5070-01 Archive (5-7') 1230
7	Same saturated sandy gravel material as in 5-6'. No odors present	1.0/1.0	NA	15,15	
8	Tan to grey saturated med to coarse sand, well sorted, <5% fines, no odors, trace amounts of well rounded pebbles	1.0/1.0	NA	5,9	CMS-SS-4108-7090-01 Archive (7-9') 1245
9	Same material as in 7-8', saturated med. to coarse sand. No odors	1.0/1.0	NA	8,15	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4109**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/18/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/18/2002	**Drilling Method:**	casing with hammer and spoons
Total Depth:	9'	**Depth to Water:**	6" of standing water at location

Comments: **Barge Drilling (note drillers moved over 1' to collect 1-3' interval)**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0					
1	Black, organic rich, saturated, slight hydrocarbon odor, leaves, twigs	1.0/0.6	12.9	weight of rods	CMS-SS-4109-0010-01 Dioxin (0-1') 1230
2	Gravel, subrounded, qtz at tip, little recovery (will move over to obtain sample from 1-3' interval) Sandy gravel, 3-5mm dia, <5% fines	1.0/0.4	not enough recovery	weight of rods	CMS-SS-4109-1014-01 Dioxin (1-1.4') 1415
3	See 1-2' description	1.0/0.0	not enough recovery	weight of rods	
4	Subangular rock frags 8-10mm dia, with subrounded pebbles 3-5mm, coarse sand with <5% fines, grey saturated silt at spoon tip. Sandy gravel	1.0/0.8	not enough recovery	10,9	CMS-SS-4109-3038-01 Dioxin (3-3.8') 1300
5	No Recovery	1.0/0.0	-	6,4	
6	Subrounded qtz rich pebbles with 15-20% coarse sand, <5% fines, sheen noted. Sandy gravel	1.0/0.6	not enough recovery	14,10	CMS-SS-4109-5056-01 Archive (5-5.6') 1330
7	No Recovery	1.0/0.0	-	6,4	
8	Sandy gravel, coarse sand, saturated, well sorted, <5% fines, Fe-staining present	1.0/0.9	-	10,6	CMS-SS-4109-7079-01 Archive (7-7.9') 1405
9	No Recovery	1.0/0.0	-	4,3	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location:	**CMS-4110**		
Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/19/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/19/2002	**Drilling Method:**	casing with hammer and spoons
Total Depth:	9'	**Depth to Water:**	1' standing water at location
Comments:	**Barge Drilling, 140 lb hammer**		

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0					
1	Saturated, black organics with silty sand, slightly plastic, well sorted, 20% fine sand, slight hydrocarbon odor	1.0/1.0	4.9	14,11	CMS-SS-4110-0010-01 Pesticides, PCBs, PAHs, Aroclors, Dioxin, HCX, MeHg, Metals, TOC, Grainsize, SVOCs (0-1') 0915
2	Poorly sorted sandy gravel, subrounded 0.25-0.5" dia, coarse to med sand, saturated	1.0/0.5	0	11,7	CMS-SS-4110-1015-01 Dioxin (1-1.5') 1055
3	No Recovery	1.0/0.0	-	7,7	
4	Poorly sorted sandy gravel, coarse sand, <5% fines, pebbles from 0.25-0.5" dia, subrounded. (Silt, grey, saturated, slightly plastic from 3.7-3.9')	1.0/0.9	0.2	80,64	CMS-SS-4110-3739-01 Dioxin (3.7-3.9') 1015
5	No Recovery	1.0/0.0	-	40,60	
6	Poorly sorted sandy gravel, coarse to med sand, 5-10% fines, subrounded gravel with angular rock frags 0.25-0.5" dia	1.0/0.5	0.1	2,2	CMS-SS-4110-5055-01 Archive (5-5.5') 1045
7	No Recovery	1.0/0.0	-	2,5	
8	Silt, non plastic, tan with grey in color, saturated, with fine, thin alternating grey silt beds	1.0/1.0	0.1	11,7	CMS-SS-4110-7085-01 Archive (7-8.5') 1115
9	Silt as above in 7-8' with fine thin beds of grey silt	1.0/0.5	0	7,3	

MACTEC

Soil Boring Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **CMS-4111**

Project Name:	Centredale RIFS	**Geologist:**	M. Phaneuf
Date Started:	11/21/2002	**Drilling Company:**	GeoSearch
Date Completed:	11/21/2002	**Drilling Method:**	4.25" HSA
Total Depth:	9'	**Depth to Water:**	~3' bgs
Comments:	**Truck rig with 140 lb hammer Noted odors, sweet and hydrocarbon**		

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	Light brown silty sand with 5% pebbles, subrounded (0.25" dia) Minor amounts of organic roots throughout interval, stiff, damp, noted several clinkers near 0.8-0.9' (FILL)	1.0/0.9	0.8	9,10	CMS-SS-4111-0009-01 Dioxin (0-0.9') 0905
2	Tan to light brown silty sand with piece of rigid black plastic, wood fibers, coal-like material (friable) with white ash present, thin lens of grey silty sand from 1.3-1.4' then grading to darker brown silty sand as above (FILL)	1.0/1.0	3.1	8,7	CMS-SS-4111-1028-01 Dioxin (1-2.8') 0920
3	Darker brown silty sand as in 1-2' interval with trace amounts of clinkers and coal like material, small pieces of white friable burned wood, med sands, wet at 2.8'. Soil has a sweet smell to it (FILL)	1.0/0.8	9.8	5,4	
4	Saturated, dk brown silty sand with 5-10% med to coarse sand and gravel, small pieces of white plastic at 3.1' with wood, then appears to be native material. Sweet hydrocarbon smell	1.0/1.0	11.6	6,12	CMS-SS-4111-3046-01 Dioxin (3-4.6') 0935
5	Saturated, dk brown silty sand as above in 3-4' with 5-10% med to coarse sand and gravel. Grey gravel at spoon tip, well rounded 0.25-0.5" dia, <5% fines with coarse sand	1.0/0.6	11.1	10,12	
6	Dk grey to black, saturated sandy gravel, <5% fines, gravel from 0.1-0.4" in dia, well rounded, hydrocarbon, sweet odor present	1.0/1.0	8.2	13,20	CMS-SS-4111-5070-01 Archive (5-7') 0955
7	Same material as in 5-6' interval, also exhibits sweet odor with hydrocarbon smell	1.0/1.0	8.9	26,22	
8	Same dk grey to black saturated sandy gravel <5% fines, med to coarse sands, very slight hydrocarbon odor, similar material as in 5-6' and 6-7'. Note: angular rock frags up to 2.5" in diameter present.	1.0/1.0	3.9	14,26	CMS-SS-4111-7080-01 Archive (7-8') 1015
9	No Recovery	1.0/0.0	-	19,21	

SURFACE SOIL SAMPLE FIELD DATA RECORD

Project: Centerdale Manor Tailrace
Project Number: 51276-RA
Sample Location ID: CMS-4103-0010-01
Time: Start: 0815 End: 0900
Date: 11/22/02
Signature of Sampler:

SOIL SAMPLE

DEPTH OF SAMPLE 0-1

EQUIPMENT USED FOR COLLECTION:
- [X] HAND AUGER
- [ ] S.S. SPLIT SPOON
- [ ] SHOVEL
- [ ] HAND SPOON
- [ ] ALUMINUM PANS
- [ ] SS BUCKET
- [ ]

TYPE OF SAMPLE COLLECTED:
- [ ] DISCRETE
- [X] COMPOSITE

SAMPLE OBSERVATIONS:
- [ ] ODOR
- [ ] COLOR
- [ ]

DECONTAMINATION FLUIDS USED:
- [✓] ALL USED
- [X] ~~ETHYL ALCOHOL~~ ISOPROPANOL
- [ ] 25% METHANOL/75% ASTM TYPE II WATER
- [X] DEIONIZED WATER
- [ ] LIQUINOX SOLUTION
- [X] HEXANE
- [ ] HNO_3 SOLUTION
- [ ] POTABLE WATER
- [ ] NONE

SOIL TYPE:
- [X] CLAY
- [X] SAND
- [ ] ORGANIC
- [ ] GRAVEL

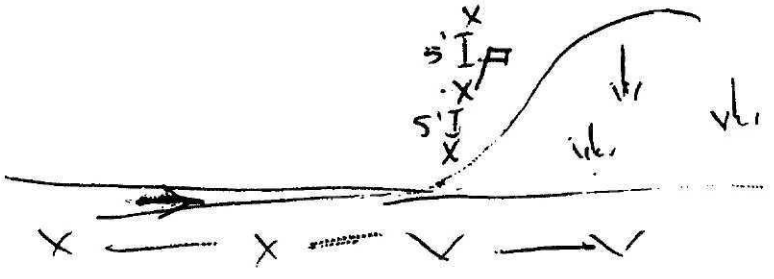
FIELD QC DATA: [ ] FIELD DUPLICATE COLLECTED
DUPLICATE ID

SAMPLE LOCATION SKETCH:
- [X] YES
- [ ] NO

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION	MATRIX: SURFACE WATER	MATRIX: SEDIMENT	MATRIX: SOIL	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[X] DIOXIN			X		125 mL	[X] 0830	
[X] FURAN			X				
[X] HCX			X				
[ ]						[ ]	
[ ]						[ ]	
[ ]						[ ]	

NOTES/SKETCH SAMPLE CONSISTS OF LT BRN CLAY AND FINE TO MED SAND WITH SOME GRAVEL, ROOT MATTER. WET.



SURFACE SOIL SAMPLE FIELD DATA RECORD

SURFACE SOIL SAMPLE FIELD DATA RECORD

Project: Centredale Manor Tailings
Project Number: 51226-R1 Date: 11/22/02
Sample Location ID: CMS-SS-4104-0010-01
Time: Start: 0745 End: 0815 Signature of Sampler:

SOIL SAMPLE

DEPTH OF SAMPLE 0-1 ft bgs

EQUIPMENT USED FOR COLLECTION:
- [X] HAND AUGER
- [ ] S.S. SPLIT SPOON
- [ ] SHOVEL
- [ ] HAND SPOON
- [ ] ALUMINUM PANS
- [ ] SS BUCKET
- [ ] _____

TYPE OF SAMPLE COLLECTED:
- [ ] DISCRETE
- [X] COMPOSITE

SAMPLE OBSERVATIONS:
- [ ] ODOR _____
- [ ] COLOR _____
- [ ] _____

DECONTAMINATION FLUIDS USED:
- [✓] ALL USED
- [X] ~~ETHYL ALCOHOL~~ ISOPROPANOL
- [ ] 25% METHANOL/75% ASTM TYPE II WATER
- [X] DEIONIZED WATER
- [ ] LIQUINOX SOLUTION
- [X] HEXANE
- [ ] HNO_3 SOLUTION
- [ ] POTABLE WATER
- [ ] NONE

SOIL TYPE:
- [ ] CLAY
- [ ] SAND
- [X] ORGANIC
- [ ] GRAVEL

FIELD GC DATA: [X] FIELD DUPLICATE COLLECTED
DUPLICATE ID CMS-DU-112202A-01

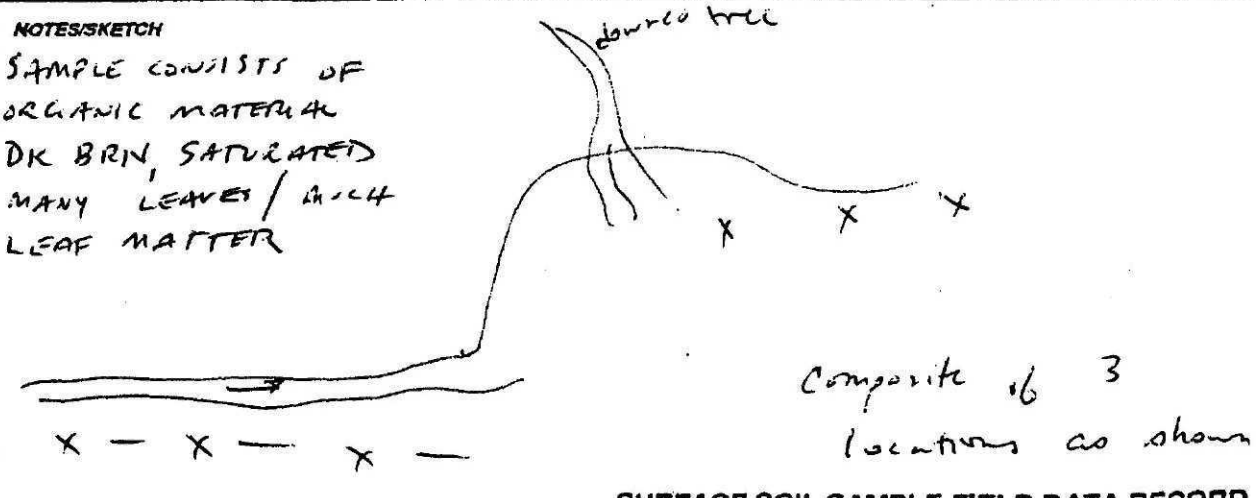
SAMPLE LOCATION SKETCH:
- [X] YES
- [ ] NO

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION	MATRIX: SURFACE WATER	MATRIX: SEDIMENT	MATRIX: TISSUE	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[X] DIOXIN	[ ]	[ ]	[ ]	[ ]	125mL	[X] 0800	
[X] FURAN	[ ]	[ ]	[ ]	[ ]	↓	[ ]	
[X] HCX	[ ]	[ ]	[ ]	[ ]		[ ]	
[ ]	[ ]	[ ]	[ ]	[ ]		[ ]	
[ ]	[ ]	[ ]	[ ]	[ ]		[ ]	

NOTES/SKETCH

SAMPLE CONSISTS OF ORGANIC MATERIAL DK BRN, SATURATED MANY LEAVES / MUCH LEAF MATTER



Composite of 3 locations as shown

SURFACE SOIL SAMPLE FIELD DATA RECORD

SURFACE SOIL SAMPLE FIELD DATA RECORD

Project: Centredale Manor — 1100 SAMPLE
Project Number: 57226 — Date: 11/22/02
Sample Location ID: ~~[illegible]~~ LPX-SS-4112-0005-01
Time: Start: 1055 End: 1105 — Signature of Sampler: [signature]

SOIL SAMPLE

DEPTH OF SAMPLE: 0-0.5 ft.

EQUIPMENT USED FOR COLLECTION:
- [ ] HAND AUGER
- [X] ~~S.S. SELF~~ SPOON
- [ ] SHOVEL
- [ ] HAND SPOON
- [ ] ALUMINUM PANS
- [ ] SS BUCKET
- [ ] _____

TYPE OF SAMPLE COLLECTED:
- [ ] DISCRETE
- [X] COMPOSITE

SAMPLE OBSERVATIONS:
- [ ] ODOR _____
- [ ] COLOR _____
- [ ] _____

DECONTAMINATION FLUIDS USED:
- [✓] ALL USED
- [X] ~~ETHYL ALCOHOL~~ ISOPROPANOL
- [ ] 25% METHANOL/ 75% ASTM TYPE II WATER
- [X] DEIONIZED WATER
- [ ] LIQUINOX SOLUTION
- [X] HEXANE
- [ ] HNO_3 SOLUTION
- [ ] POTABLE WATER
- [ ] NONE

SOIL TYPE:
- [ ] CLAY
- [X] SAND
- [ ] ORGANIC
- [ ] GRAVEL

FIELD GC DATA: [X] FIELD DUPLICATE COLLECTED
DUPLICATE ID: LPX-DU-112202B-01

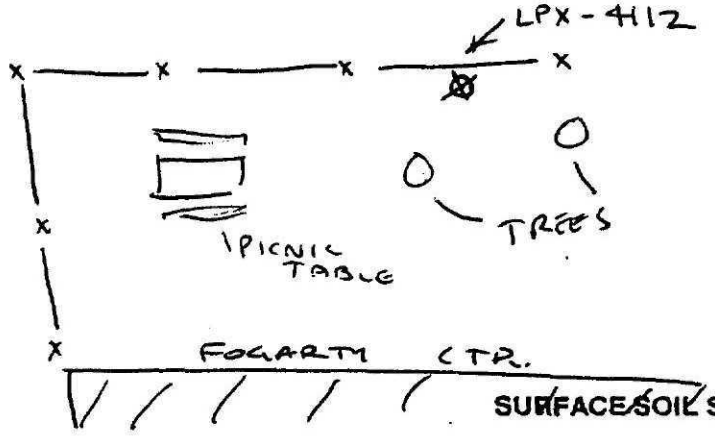
SAMPLE LOCATION SKETCH:
- [X] YES
- [ ] NO

(except Dioxin/Furan/HCX)

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION	MATRIX: SURFACE WATER	MATRIX: SEDIMENT	MATRIX: SOIL	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED (mL)	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[X] SVOC	[ ]	[ ]	[X]	[ ]	125	[X]	1100
[X] DIOXIN	[ ]	[ ]	[X]	[ ]	125	[X]	
[X] TOC	[ ]	[ ]	[X]	[ ]	500	[X]	
[X] METAL	[ ]	[ ]	[X]	[ ]	125	[X]	
[X] Me Hg	[ ]	[ ]	[X]	[ ]	125	[X]	
[X] PEST/PCB	[ ]	[ ]	[X]	[ ]	250	[X]	
[ ]	[ ]	[ ]	[ ]	[ ]		[ ]	

NOTES/SKETCH: LT BRN SAND & GRAVEL WITH CLAY, COBBLES. SOME ROOT MATTER, COBBLES. DAMP



SURFACE SOIL SAMPLE FIELD DATA RECORD

Project: CENTRDALE MANOR — 1110 SAMPLE
Project Number: 51226 — Date: 11/22/02
Sample Location ID: LPX-4113-0005-01
Time: Start: 1105 End: 1115 — Signature of Sampler:

SOIL SAMPLE

DEPTH OF SAMPLE 0-0.5 ft

EQUIPMENT USED FOR COLLECTION:
- [ ] HAND AUGER
- [X] S.S. ~~SPLIT~~ SPOON
- [ ] SHOVEL
- [ ] HAND SPOON
- [ ] ALUMINUM PANS
- [ ] SS BUCKET
- [ ] _____

TYPE OF SAMPLE COLLECTED:
- [ ] DISCRETE
- [X] COMPOSITE

SAMPLE OBSERVATIONS:
- [ ] ODOR _____
- [ ] COLOR _____
- [ ] _____

DECONTAMINATION FLUIDS USED:
- ✓ ALL USED
- [X] ~~STEAM/ALCOHOL~~ ISOPROPANOL
- [ ] 25% METHANOL/75% ASTM TYPE II WATER
- [X] DEIONIZED WATER
- [ ] LIQUINOX SOLUTION
- [X] HEXANE
- [ ] HNO_3 SOLUTION
- [ ] POTABLE WATER
- [ ] NONE

SOIL TYPE:
- [ ] CLAY
- [X] SAND
- [ ] ORGANIC
- [ ] GRAVEL

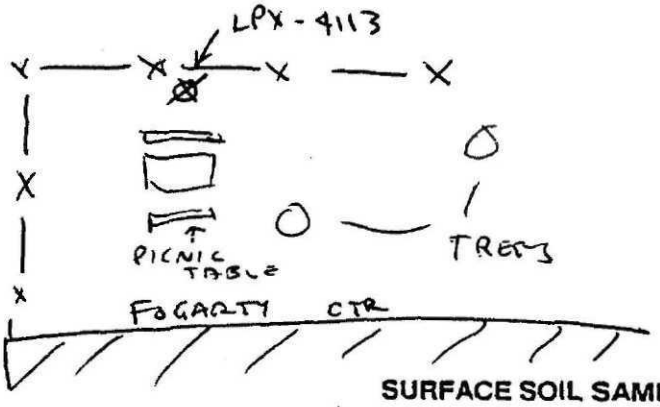
FIELD QC DATA: [ ] FIELD DUPLICATE COLLECTED
DUPLICATE ID _____

SAMPLE LOCATION SKETCH:
- [X] YES
- [ ] NO

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION		MATRIX: SURFACE WATER	MATRIX: SEDIMENT	MATRIX: OIL	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED (mL)	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[X]	SVOC	[ ]	[ ]	[X]	[ ]	125	[X]	1110
[X]	DIOXIN	[ ]	[ ]	[X]	[ ]	125	[X]	
[X]	TOC	[ ]	[ ]	[X]	[ ]	500	[X]	
[X]	METAL	[ ]	[ ]	[X]	[ ]	125	[X]	
[X]	PESTIPCB	[ ]	[ ]	[X]	[ ]	250	[X]	
[X]	Mehg	[ ]	[ ]	[X]	[ ]	125	[X]	
[ ]		[ ]	[ ]	[ ]	[ ]		[ ]	

NOTES/SKETCH LT BRN SAND & GRAVEL WITH COBBLES, SOME CLAY. DAMP.



SURFACE SOIL SAMPLE FIELD DATA RECORD

SURFACE SOIL SAMPLE FIELD DATA RECORD

Project: CENTERDALE MANOR — 1120 SAMPLE
Project Number: 51226 — Date: 11/22/02
Sample Location ID: LPX-SS-4114-0005-01
Time: Start: 1115 End: 1125 — Signature of Sampler: [signature]

SOIL SAMPLE

DEPTH OF SAMPLE 0-0.5 ft

EQUIPMENT USED FOR COLLECTION:
- [ ] HAND AUGER
- [X] S.S. SPOON
- [ ] SHOVEL
- [ ] HAND SPOON
- [ ] ALUMINUM PANS
- [ ] SS BUCKET
- [ ] _____

TYPE OF SAMPLE COLLECTED:
- [ ] DISCRETE
- [X] COMPOSITE

SAMPLE OBSERVATIONS:
- [ ] ODOR _____
- [ ] COLOR _____
- [ ] _____

DECONTAMINATION FLUIDS USED:
- [✓] ALL USED
- [X] ~~ETHYL ALCOHOL~~ ISOPROPANOL
- [ ] 25% METHANOL/75% ASTM TYPE II WATER
- [X] DEIONIZED WATER
- [ ] LIQUINOX SOLUTION
- [X] HEXANE
- [ ] HNO_3 SOLUTION
- [ ] POTABLE WATER
- [ ] NONE

SOIL TYPE:
- [X] CLAY
- [X] SAND
- [ ] ORGANIC
- [ ] GRAVEL

FIELD QC DATA: [ ] FIELD DUPLICATE COLLECTED — DUPLICATE ID _____

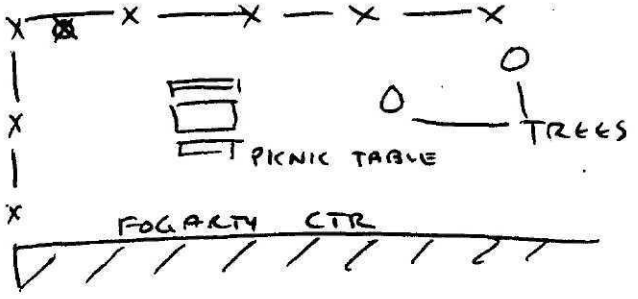
SAMPLE LOCATION SKETCH:
- [ ] YES
- [ ] NO

EXTRA SVOC VOLUME COLLECTED FOR MS/MSD

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION		MATRIX: SURFACE WATER	MATRIX: SEDIMENT	MATRIX: SOIL	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED (mL)	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[X]	SVOC	[ ]	[ ]	[X]	[ ]	125	[X]	/ / /
[X]	DIOXIN	[ ]	[ ]	[X]	[ ]	125	[X]	/ / /
[X]	METAL	[ ]	[ ]	[X]	[ ]	125	[X]	/ / /
[X]	Melt	[ ]	[ ]	[X]	[ ]	125	[X] 1120	/ / /
[X]	TOC	[ ]	[ ]	[X]	[ ]	500	[X]	/ / /
[X]	PEST/PCB	[ ]	[ ]	[X]	[ ]	250	[X]	/ / /
[ ]		[ ]	[ ]	[ ]	[ ]		[ ]	/ / /

NOTES/SKETCH BRN SAND & GRAVEL WITH CLAY, ORGANICS, AND FEW COBBLES. ROOT MATTER. DAMP



SURFACE SOIL SAMPLE FIELD DATA RECORD

LOW FLOW SAMPLING DATA LOG

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale Manor | JOB NUMBER: 51226.32 | DATE: 10-22-02

WELL ID: MW-10D | ACTIVITY | TIME START: 930 END: 1035 | BOTTLE TIME: 1035

SAMPLE ISIS ID: CMS-GW-MW10D-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: ~ | MS ID: ~ | MSD ID: ~

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	48.75 FT (TOR)	HISTORICAL WELL DEPTH	45.0 FT (TOR) 863	PROTECTIVE CASING STICKUP (FROM GROUND)	3.30' N/A FT MSP	PROTECTIVE CASING / WELL DIFFERENCE	-0.5 FT
DEPTH TO WATER	12.63 FT (TOR)	SCREEN LENGTH	6.3 FT	WELL DIAMETER	2" IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 32.12 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 5.60 GAL/VOL

TOTAL VOLUME PURGED: 5.60 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	920	940	950	1000	1005	1010	1020	1025	1030	1035
DEPTH TO WATER (ft)	12.69	12.49	12.53	12.56	12.54	12.61	12.60	12.61	12.61	S
PURGE VOLUME (gallons)										A
TEMPERATURE (degrees C)	13.1	13.4	13.4	13.3	13.3	13.3	13.3	13.4	13.4	M
pH (units)	5.91	5.99	6.09	6.10	6.04	6.04	6.13	6.13	6.13	P
TURBIDITY (ntu)	5.4	4.2	4.9	6.1	6.2	6.9	6.9	4.1	4.6	L
SPEC. COND. (mS/cm)	.519	.500	.502	.504	.521	.537	.525	.524	.514	E
DISSOLVED OXYGEN (mg/L)	8.72	9.37	9.55	9.73	10.07	10.47	10.49	10.51	10.44	
REDOX POTENTIAL	310	305	310	314	304	306	299	298	299	

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ SAMPLING: ☒
- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER
- _____

DECON FLUIDS USED:
- ☐ METHANOL
- ☐ LIQUINOX
- ☒ POTABLE WATER Ded. tubing
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- _____

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260C	N	HCl	3x40mL	☒	

NOTES - Well purge ~ 300 ml/min.
- Dedicated tubing.
- Pump intake @ 42.5 B.T.O.R

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/22/02

WELL ID: MW08S | ACTIVITY | TIME START: 0900 END: 1140 | BOTTLE TIME: 1125

SAMPLE ISIS ID: CMS-GW-MW08S-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	9.21 FT (TOR)	HISTORICAL WELL DEPTH	8.50 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.29 FT
DEPTH TO WATER	3.58' FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 5.63 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.90 GAL/VOL

TOTAL VOLUME PURGED: 5.0 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	0920	1010	1020	1030	1040	1050
DEPTH TO WATER (ft)	3.63	3.94	3.94	3.94	3.94	3.94
PURGE VOLUME (gallons)		1.5	2.0	2.5	3.0	3.5
3% TEMPERATURE (degrees C)		18.99	18.98	19.13	19.17	19.09
0.1 pH (units)	8.52	8.67	8.43	8.09	7.97	7.91
10% TURBIDITY (ntu)		0	0	0	0	0
3% SPEC. COND. ~~(uhos/cm)~~ mS/cm		7.37	5.02	3.38	2.91	2.62
10% DISSOLVED OXYGEN (mg/L)		0.0	0.0	0.0	0.0	0.0
± 10mV REDOX POTENTIAL	Stopped	-253	-278	-273	-266	-265
Rate ml/min		250ml/min	250ml/min	250	250	250

SEE PAGE 2 →

SAMPLE OBSERVATIONS:

- ☐ CLEAR
- ☐ CLEAR
- ☒ COLORED AMBER
- ☐ COLORED
- ☐ CLOUDY
- ☐ TURBID
- ☐ ODOR
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ GEO PUMP

SAMPLING: ☒ GEO PUMP
- ☐ PERISTALTIC PUMP
- ☐ SUBMERSIBLE PUMP
- ☐ BLADDER PUMP
- ☐ PVC/SILICON TUBING
- ☐ TEFLON/SILICON TUBING
- ☐ WATTERA
- ☐ IN LINE FILTER
- ☐ PRESS/VAC FILTER

DECON FLUIDS USED
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID

DEDICATED TUBING

WATER LEVEL EQUIPMENT USED
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs 8260	8260B	No	HCL/ICE	3X40ml	☒	

Stopped purging around 925 when Fleet was onsite, then performed site walk w/ Dave L. Rhinerez w/ Corp. Restarted low flow around 1010

NOTES

Initial purging H_2O is amber colored. Hdspc on water is 6.1 ppm, Will however containerize due to color of water. Took several Photos of well setup showing color of water

SIGNATURE: [signature]

RECEIVED BY:

3% Cond, Temp
0.1 PH
10% Turb, D.O
ORP ± 10mV

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HARDING ESE, INC. PAGE 2 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/22/03

WELL ID: MW08S | ACTIVITY | BOTTLE

TIME: START 0900 END 1140 | TIME: 1125

SAMPLE ISIS ID: CMS-GW-MW08S-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: / MS ID: / MSD ID: /

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	9.21 FT (TOR)	HISTORICAL WELL DEPTH	9.5 FT (TOR) 8/05	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.24 FT
DEPTH TO WATER	3.58 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 5.63 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.90 GAL/VOL

TOTAL VOLUME PURGED: 5.0 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1100	1115 (1110)	1120	1125
DEPTH TO WATER (ft)	3.94	3.94	3.94	C
PURGE VOLUME (gallons)	4.0	4.5	5.0	O S
TEMPERATURE (degrees C)	19.14	19.15	19.14	L A
pH (units)	7.82	7.75	7.73	L M
TURBIDITY (ntu)	0	0	0	E I
SPEC. COND. (mS/cm)	2.38	2.13	2.13	C L
DISSOLVED OXYGEN (mg/L)	0.0	0.0	0.0	F E
REDOX POTENTIAL	-261	-261	-262	
Rate ml/min	250	250	250	

SAMPLE OBSERVATIONS:
- ☐ CLEAR
- ☐ CLEAR
- ☒ COLORED Amber
- ☐ COLORED ____
- ☐ CLOUDY ____
- ☐ TURBID ____
- ☐ ODOR ____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒

SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; ____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; ____

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; ____

NUMBER OF FILTERS USED ____

Dedicated tubing

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ 8260 B	8260B	No	HCl/ICE	3X40ml	☒	/ / /

NOTES

SEE PAGE 1

SIGNATURE: [signature]

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/22/02

WELL ID: MW-10B | ACTIVITY | BOTTLE TIME: 1200

TIME: START 0945 END 1215

SAMPLE ISIS ID: CMS-GW-MW10B-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	69 ~~85~~ FT (TOR)	HISTORICAL WELL DEPTH	85 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	2.9 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.15 FT
DEPTH TO WATER	12.74 FT (TOR)	SCREEN LENGTH	25 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC / bedrock

HEIGHT OF WATER COLUMN: 72 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 11.52 GAL/VOL

TOTAL VOLUME PURGED: 12 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

BEGIN PURGE AT 1015, 200 mL/min

TIME	1020	1025	1030	1035	1040
DEPTH TO WATER (ft)	12.76	12.74	12.75	12.75	12.75
PURGE ~~VOLUME~~ RATE (gallons) mL/min	200	200	200	200	200
TEMPERATURE (degrees C)	13.1	13.4	13.4	13.4	13.4
pH (units)	6.43	6.51	6.52	6.53	6.52
TURBIDITY (ntu)	3.6	0	0	0	0
SPEC. COND. (~~mhos~~ mS/cm)	0.401	0.400	0.399	0.396	0.394
DISSOLVED OXYGEN (mg/L)	2.63	0	0	0	0
REDOX POTENTIAL	-182	-207	-211	-213	-214

OVER →

SAMPLE OBSERVATIONS:

- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒

SAMPLING: ☒ PERISTALTIC PUMP

- ☐ SUBMERSIBLE PUMP
- ☐ BLADDER PUMP
- ☐ PVC/SILICON TUBING
- ☐ TEFLON/SILICON TUBING
- ☐ WATTERA
- ☐ IN LINE FILTER
- ☐ PRESS/VAC FILTER

DECON FLUIDS USED

- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- ☒ dedicated, disposable tubing used

WATER LEVEL EQUIPMENT USED

- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260	N	HCl	120 mL	☒	

NOTES

More purge data on reverse

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centerdale Manor | JOB NUMBER: 51226.32 | DATE: 10-22-02
WELL ID: MW-04B | ACTIVITY | BOTTLE
TIME: START 1215 END 1340 | TIME: 1340
SAMPLE ISIS ID: CMS-GW-MW4B-03
☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	77.91 FT (TOR)	HISTORICAL WELL DEPTH	77.0 FT (TOR) BTOR	PROTECTIVE CASING STICKUP (FROM GROUND)	2.16 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.19 FT
DEPTH TO WATER	6.42 FT (TOR)	SCREEN LENGTH	31.0 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 71.58 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 11.5 GAL/VOL
TOTAL VOLUME PURGED: 8.5 GAL
AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1215	1225	1235	1245	1255	1305	1315	1325	1335	1340	SAMPLE OBSERVATIONS:
DEPTH TO WATER (ft)	6.49	6.52	6.41	6.45	6.49	6.47	6.41	6.45	6.45	S	☑ CLEAR
PURGE VOLUME (gallons)										A	☐ CLEAR
TEMPERATURE (degrees C)	13.4	13.4	13.3	13.3	13.3	13.3	13.3	13.3	13.3	M	☐ COLORED
pH (units)	6.81	6.72	6.30	6.01	6.02	6.06	6.08	6.02	6.01	P	☐ COLORED
TURBIDITY (ntu)	14.0	0.0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	L	☐ CLOUDY
SPEC. COND. (µmhos/cm)	1591	1601	.607	.679	.693	.745	.755	.753	.755	I	☐ TURBID
DISSOLVED OXYGEN (mg/L)	7.55	4.07	2.95	1.15	1.18	0.93	.90	.99	.99	N	☐ ODOR
REDOX POTENTIAL	274	268	275	264	263	260	256	258	258	G	☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ PERISTALTIC PUMP
SAMPLING: ☒ PERISTALTIC PUMP
☐ SUBMERSIBLE PUMP
☐ BLADDER PUMP
☐ PVC SILICON TUBING
☐ TEFLON/SILICON TUBING
☐ WATTERA
☐ IN LINE FILTER
☐ PRESS/VAC FILTER
_____

DECON FLUIDS USED:
☐ METHANOL
☐ LIQUINOX
☐ POTABLE WATER
☒ DEIONIZED WATER
☐ HEXANE
☐ NITRIC ACID
_____

WATER LEVEL EQUIPMENT USED:
☑ ELECTRIC COND. PROBE
☐ FLOAT ACTIVATED
☐ KECK INTERFACE PROBE
_____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260C	N	HCl	3x40	☐	

NOTES
- Intake for tubing @ 57.0' BTOR.
- Purge @ 350 mL/min.
- Dedicated tubing.

SIGNATURE: _____
RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF ~~2~~ 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/22/02

WELL ID: MW-04S | ACTIVITY | TIME START: 1300 END: 1415 | BOTTLE TIME: 1405

SAMPLE ISIS ID: CMS-GW-MW04S-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	14 FT (TOR)	HISTORICAL WELL DEPTH	14 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	3.95 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.62 FT
DEPTH TO WATER	6.96 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 7 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.12 GAL/VOL | TOTAL VOLUME PURGED: 4 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

13:30 begin purging MW-04S at 350 mL/min

PURGE DATA

TIME	1340	1345	1350	1355	1400
DEPTH TO WATER (ft)	6.96	6.96	6.96	6.96	6.96
PURGE ~~VOLUME (gallons)~~ mL/min	350	350	350	350	350
TEMPERATURE (degrees C)	15.8	15.7	15.7	15.6	15.6
pH (units)	6.13	6.13	6.13	6.14	6.14
TURBIDITY (ntu)	0	0	0	0	0
SPEC. COND. (mS/cm)	0.566	0.573	0.575	0.577	0.576
DISSOLVED OXYGEN (mg/L)	1.16	0	0	0	0
REDOX POTENTIAL	-20	-17	-18	-18	-17

SAMPLE OBSERVATIONS:

- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED
- ☐ COLORED
- ☐ CLOUDY
- ☐ TURBID
- ☐ ODOR
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒

SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; ☒ disposable dedicated equipment used

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED: _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120 mL	☒	

NOTES

dedicated tubing used

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: CENTREDALE | JOB NUMBER: 51226 | DATE: 10/22/02

WELL ID: MW09S | ACTIVITY | TIME START: 1330 END: 1430 | BOTTLE TIME: 1420

SAMPLE ISIS ID: CMS-GW-MW09S-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: / / | MS ID: / / | MSD ID: / /

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	14.30 FT (TOR)	HISTORICAL WELL DEPTH	10.00 FT ~~TOR~~ BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	2.90 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.50 FT
DEPTH TO WATER	7.95 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 6.35 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.02 GAL/VOL

TOTAL VOLUME PURGED: ≈3 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1335	1345	1355	1405	1415	1420			
DEPTH TO WATER (ft)	8.28	6.45	6.39	6.39	6.40	C			
PURGE VOLUME (gallons) ≈	0.3	1	1.5	2.5	3	O			
TEMPERATURE (degrees C)	13.77	14.06	14.05	14.05	14.06	L			
pH (units)	6.28	6.37	6.40	6.40	6.43	E S			
TURBIDITY (ntu)	2	0	0	0	0	T M P			
SPEC. COND. mS/cm (µmhos/cm)	0.459	0.513	0.513	0.513	0.513	P			
DISSOLVED OXYGEN (mg/L)	0.0	0.0	0.0	0.0	0.0	L			
REDOX POTENTIAL mV	-77	-105	-132	-135	-133	E			
RATE ml/min	260	260	260	260	260				

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

Dedicated Tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED: —

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs 8260B	8260B	No	HCL/ice	3X40ml	☒	

NOTES

0ppm Hdspc. on Water from this well, no sheen
cuttings ≈ 20-25' East of this well location
on cropped area 1.

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale Manor | JOB NUMBER: 51226.32 | DATE: 10-22-07

WELL ID: MW-04D. | ACTIVITY | BOTTLE

TIME: START 1400 END 1450 | TIME: 1450

SAMPLE ISIS ID: CMS-GW-MW04D-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: \ \ | MS ID: \ \ | MSD ID: \ \

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	48.25 FT (TOR)	HISTORICAL WELL DEPTH	45.0 FT (BGS) (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	2.62 FT
PROTECTIVE CASING / WELL DIFFERENCE	0.35 FT	DEPTH TO WATER	6.87 FT (TOR)	SCREEN LENGTH	3.5 FT
WELL DIAMETER	2 IN	WELL MATERIAL	PVC	HEIGHT OF WATER COLUMN	39.13 FT

☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) × = 6.20 GAL/VOL

TOTAL VOLUME PURGED: 5.0 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1400	1440	1420	1430	1435	1440	1445	1450
DEPTH TO WATER (ft)	6.99	6.91	6.87	6.89	6.89	6.93		
PURGE VOLUME (gallons)								
TEMPERATURE (degrees C)	14.1	13.6	13.7	13.9	13.0	13.0	13.0	13.0
pH (units)	6.59	6.60	6.99	6.31	5.72	5.70	5.73	5.74
TURBIDITY (ntu)	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
SPEC. COND. (µmhos/cm)	.504	.488	.510	.513	.710	.728	.730	.730
DISSOLVED OXYGEN (mg/L)	6.95	2.91	2.21	2.27	.80	.62	.61	.68
REDOX POTENTIAL	25-1	260	270	274	273	285	280	281

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING	SAMPLING	
☐	☐	PERISTALTIC PUMP
☐	☐	SUBMERSIBLE PUMP
☐	☐	BLADDER PUMP
☐	☐	PVC/SILICON TUBING
☐	☐	TEFLON/SILICON TUBING
☐	☐	WATTERA
☐	☐	IN LINE FILTER
☐	☐	PRESS/VAC FILTER
		_____

DECON FLUIDS USED
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- _____

WATER LEVEL EQUIPMENT USED
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒	VOC	8260C	N	HCl	3x40mL	☒	

NOTES
- Dedicated tubing
- purge @ 350 mL/min
- Pump intake @ 43.0' BTOR.

SIGNATURE: _____

RECEIVED BY: _____

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centerdale | JOB NUMBER: 51226-32 | DATE: 10/20/02

WELL ID: MW-02D | ACTIVITY | BOTTLE

TIME: START 1430 END 1545 | TIME: 1520

SAMPLE ISIS ID: CMS-GW-MW02D-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	75 ~~79~~ Avg FT (TOR)	HISTORICAL WELL DEPTH	69 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	2.95 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.25 FT
DEPTH TO WATER	6.96 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 62 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 9.92 GAL/VOL | TOTAL VOLUME PURGED: 4 GAL

1440 Begin purging at 400 mL/min | AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

OVER →

TIME	1445	1450	1455	1500	1505
DEPTH TO WATER (ft)	7.01	7.01	7.01	7.01	7.01
PURGE VOLUME (~~gallons~~) Rate mL/min	0.400	0.250	0.250	0.250	0.250
TEMPERATURE (degrees C)	13.4	13.2	13.1	13.0	13.0
pH (units)	7.13	7.21	7.22	7.22	7.22
TURBIDITY (ntu)	0	0	0	0	0
SPEC. COND. (~~umhos~~ mS/cm)	0.390	0.389	0.389	0.390	0.391
DISSOLVED OXYGEN (mg/L)	2.15	0	0	0	0
REDOX POTENTIAL	-128	-141	-148	-158	-164

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒

- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER

DECON FLUIDS USED:
- METHANOL
- LIQUINOX
- POTABLE WATER
- ☒ DEIONIZED WATER
- HEXANE
- NITRIC ACID
- ☒ Dedicated disposable tubing used

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- FLOAT ACTIVATED
- KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260	N	HCl	120 mL	☒	

NOTES

Additional purge data on reverse page

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale manor | JOB NUMBER: 51226.32 | DATE: 10-22-02

WELL ID: MW-02M | ACTIVITY | TIME START: 1510 END: 1550 | BOTTLE TIME: 1550

SAMPLE ISIS ID: CMS-GW-MW02M-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: \ | MS ID: \ | MSD ID: \

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	32.8 FT (TOR)	HISTORICAL WELL DEPTH	30.0 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	2.78 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.5 FT
DEPTH TO WATER	6.79 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 23.21 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 5.8 GAL/VOL | TOTAL VOLUME PURGED: 5.1 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1510	1520	1530	1535	1540	1545	1550
DEPTH TO WATER (ft)	6.91	6.86	6.90	6.86	6.84	6.81	S
PURGE VOLUME (gallons)							A
TEMPERATURE (degreesC)	14.6	13.6	13.9	13.8	13.8	13.8	M
pH (units)	6.43	6.31	5.85	5.85	5.85	5.85	P
TURBIDITY (ntu)	0	0	0.6	0.1	0	0	L
SPEC. COND. (uMHOS/cm)	.629	.639	.889	.883	.890	.889	I
DISSOLVED OXYGEN (mg/L)	5.89	2.47	0.56	0.51	0.51	0.47	N
REDOX POTENTIAL	268	271	276	269	264	263	G

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☐

SAMPLING: ☐
- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER
- _____

DECON FLUIDS USED:
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☐ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- _____

WATER LEVEL EQUIPMENT USED:
- ☐ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒	8260C	N	HCL	3x40	☒	

NOTES

- Pump intake @ 27.5' B.T.O.R.
- Dedicated tubing
- Pump purge @350 ml/min

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/22/02

WELL ID: MW02S | ACTIVITY | TIME START 1445 END 1615 | BOTTLE TIME 1600

SAMPLE ISIS ID: CMS-GW-MW02S-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH: MJP 11.20 / 3.96 FT (TOR) | HISTORICAL WELL DEPTH: 8.00 FT (from BSG) | PROTECTIVE CASING STICKUP (FROM GROUND): 3.51 FT | PROTECTIVE CASING / WELL DIFFERENCE: -0.17 FT

DEPTH TO WATER: 3.96 FT (TOR) | SCREEN LENGTH: 4 FT | WELL DIAMETER: 2 IN | WELL MATERIAL: PVC

HEIGHT OF WATER COLUMN: 7.24 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.16 GAL/VOL | TOTAL VOLUME PURGED: ≈ 3.5 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1505	1515	1525	1535	1545	1555	1600
DEPTH TO WATER (ft)	4.02	4.02	4.02	4.02	4.02	4.02	
PURGE VOLUME (gallons) ≈	0.2	1.0	1.5	2.5	3	3.5	
TEMPERATURE (degrees C)	14.45	14.67	14.91	14.91	14.91	14.88	
pH (units)	6.91	7.10	7.10	7.12	7.12	7.12	
TURBIDITY (ntu)	4	0	0	0	0	0	
SPEC. COND. (mS/cm)	0.687	0.690	0.690	0.690	0.691	0.691	
DISSOLVED OXYGEN (mg/L)	0.2	0.0	0.0	0.0	0.0	0.0	
REDOX POTENTIAL	-74	-136	-159	-188	-192	-192	

Rate ml/min 220

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☒ CLOUDY slightly
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

Dedicated tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260B	No	HCl/ice	3x40ml	☒	

NOTES

Water has very slight cloudy look to it. No hdspc. or sheen, poured water out Approx 40-45' West of well on capped area.

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/22/02

WELL ID: MW13S | ACTIVITY | TIME START: 1635 END: 1745 | BOTTLE TIME: 1725

SAMPLE ISIS ID: CMS-GW-MW13S-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	≈14.0 FT (TOR)	HISTORICAL WELL DEPTH	14.0 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.23 FT
DEPTH TO WATER	6.43 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 7.57 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.21 GAL/VOL

TOTAL VOLUME PURGED: ~2.8 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1645	1655	1705	1715	1720	1725
DEPTH TO WATER (ft)	6.45	6.45	6.70	6.71	6.74	C
PURGE VOLUME (gallons) ~	0.2	1.0	1.7	2.0	2.8	O
TEMPERATURE (degrees C)	15.84	15.85	15.91	15.97	15.98	L
pH (units)	6.66	6.68	6.70	6.73	6.74	E
TURBIDITY (ntu)	6.2	1.2	0	0	0	C T S
SPEC. COND. (mS/cm)	0.608	0.605	0592	0.592	0.592	A M P L E
DISSOLVED OXYGEN (mg/L)	2.64	1.92	0.64	0	0	
REDOX POTENTIAL	-92	-105	-118	-131	-131	
Rate ml/min	260	260	260	260	260	

SAMPLE OBSERVATIONS:
- ☐ CLEAR
- ☐ CLEAR
- ☒ COLORED light yellow
- ☐ COLORED
- ☐ CLOUDY
- ☐ TURBID
- ☐ ODOR
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; ☐ _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; ☐ _____

dedicated tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; ☐ _____

NUMBER OF FILTERS USED: _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260B	No	HCL	3x40ml	☒	

NOTES: No hdspc or sheen on water, poured approx 2.8 gal out 10' west of MW13S.

SIGNATURE: [signature]

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/22/02

WELL ID: MW-13B | ACTIVITY | BOTTLE TIME: 1730

TIME START: 1615 END: 1745

SAMPLE ISIS ID: CMS-GW-MW13B-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	80 FT (TOR)	HISTORICAL WELL DEPTH	80 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	6.00 FT (TOR)	SCREEN LENGTH	30 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 74 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 11.84 GAL/VOL

TOTAL VOLUME PURGED: 2.5 GAL

16:30 begin purging @ 150 mL/min

AMBIENT AIR: 0 PPM | WELL MOUTH: 21.4 PPM

PURGE DATA

OVER ⇒

TIME	1640	1645	1650	1655	1700
DEPTH TO WATER (ft)	7.35	7.63	7.66	8.21	8.33
PURGE VOLUME (gallons) RATE 150 mL/min	150	150	150	150	150
TEMPERATURE (degrees C)	14.1	14.1	14.0	13.8	13.7
pH (units)	7.54	7.68	7.71	7.73	7.74
TURBIDITY (ntu)	0	0	0	0	0
SPEC. COND. (mS/cm)	0.396	0.395	0.395	0.395	0.395
DISSOLVED OXYGEN (mg/L)	0.76	0	0	0	0
REDOX POTENTIAL	66	57	55	52	51

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒

- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER

DECON FLUIDS USED:
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☒ NITRIC ACID

none

dedicated, disposable equipment

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒	VOC	8260	N	HCl	120mL	☒	

NOTES: add'l purge data on reverse

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale Manor | JOB NUMBER: 51226.82 | DATE: 10-22-02

WELL ID: MW-13D | ACTIVITY | BOTTLE

TIME: START 1640 END 1740 | BOTTLE TIME: 1740

SAMPLE ISIS ID: CMS-BW-MW13D-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	46.01 FT (TOR)	HISTORICAL WELL DEPTH	45.5 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	NA FT
DEPTH TO WATER	6.05 FT (TOR)	SCREEN LENGTH	5.5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 39.55 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 7.90 GAL/VOL

TOTAL VOLUME PURGED: 6.1 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 19.5 PPM

PURGE DATA

TIME	1640	1650	1700	1705	1710	1715	1720	1725	1730	1735
DEPTH TO WATER (ft)	6.08	6.06	6.06	6.05	6.06	6.07	6.09	6.08	6.09	6.09
PURGE VOLUME (gallons)										
TEMPERATURE (degreesC)	14.3	14.1	13.8	13.7	13.6	13.6	13.6	13.6	13.6	13.6
pH (units)	6.46	6.20	6.36	6.39	6.38	6.21	6.34	6.33	6.33	6.32
TURBIDITY (ntu)	4.5	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
SPEC. COND. (uhmos/cm)	.036	.033	.061	0.073	0.076	0.046	.682	.709	.711	.713
DISSOLVED OXYGEN (mg/L)	4.40	0.53	2.45	0.43	0.42	0.45	2.12	2.00	2.01	1.99
REDOX POTENTIAL	91	54	-40	-49	-49	12	18	42	45	60

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☒ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ V.O.C.	8260C	N	HCL	3x40	☒	

NOTES

- Dedicated tubing used
- 300 mL/min purge volume
- Pump intake @ 42' B.T.O.R.

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Cartredale Manor | JOB NUMBER: 5126.32 | DATE: 10-23-02

WELL ID: MW-14M | ACTIVITY | BOTTLE

TIME: START 805 END 855 | TIME: 855

SAMPLE ISIS ID: CMS-GW-MW14M-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	L FT (TOR)	HISTORICAL WELL DEPTH	34 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	4.41 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 29.5 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 4.91 GAL/VOL

TOTAL VOLUME PURGED: 5.0 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	808	818	828	838	848	850	855
DEPTH TO WATER (ft)	4.50	4.47	4.42	4.43	4.43	4.43	S
PURGE VOLUME (gallons)	400	350	350	350	350	350	M
TEMPERATURE (degrees C)	12.2	11.9	11.9	12.3	12.4	12.3	M
pH (units)	5.18	5.05	5.10	5.12	5.12	5.12	M
TURBIDITY (ntu)	9.4	8	2.1	5.0	5.0	5.0	P
SPEC. COND. (~~uS~~ mS/cm)	.150	.134	0.222	0.223	0.223	0.223	L
DISSOLVED OXYGEN (mg/L)	7.50	7.33	7.80	7.87	7.89	7.91	E
REDOX POTENTIAL	321	330	338	341	345	346	

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☑

SAMPLING: ☑ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☑ POTABLE WATER; ☑ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

WATER LEVEL EQUIPMENT USED: ☑ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☑ VOC	8260	N	HCl	3 x 40 ML	☑	

NOTES
- Dedicated tubing
- Pump intake @ 32' B.T.O.R.
- flow is 350 mL/min

SIGNATURE: _____

RECEIVED BY: _____

g:\[illegible]

HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 57226-32 | DATE: 10/23/02

WELL ID: GEC-6 | ACTIVITY | BOTTLE

TIME: START 0745 END 0930 | TIME: 0915

SAMPLE ISIS ID: CMS-GW-GEC6-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	11 FT (TOR)	HISTORICAL WELL DEPTH	11 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	4.89 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 6 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.96 GAL/VOL | TOTAL VOLUME PURGED: 10 GAL

0805 BEGIN PURGING @ 300 mL/min | AMBIENT AIR: 6 PPM | WELL MOUTH: 0 PPM

PURGE DATA

OVER ⇒

TIME	0815	0825	0835	0845	0855
DEPTH TO WATER (ft)	4.89	4.89	4.89	4.89	4.89
PURGE VOLUME RATE (gallons) mL/min	300	300	300	300	300
TEMPERATURE (degrees C)	16.6	17.1	17.2	17.3	17.3
pH (units)	6.08	6.10	6.12	6.13	6.13
TURBIDITY (ntu)	4.6	0	0	0	0
SPEC. COND. (~~uhmos~~ mS/cm)	0.496	0.493	0.490	0.488	0.492
DISSOLVED OXYGEN (mg/L)	0.72	0.49	0.53	0.44	0.33
REDOX POTENTIAL	-39	-26	-17	-1	14

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING	SAMPLING	
☐	☒	PERISTALTIC PUMP
☐	☐	SUBMERSIBLE PUMP
☐	☐	BLADDER PUMP
☐	☐	PVC/SILICON TUBING
☐	☐	TEFLON/SILICON TUBING
☐	☐	WATTERA
☐	☐	IN LINE FILTER
☐	☐	PRESS/VAC FILTER

DECON FLUIDS USED
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- ☒ dedicated, disposable Nalgene used

WATER LEVEL EQUIPMENT USED
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120 mL	☒	

NOTES: add'l purge data on reverse

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT [redacted] Centre Dale Manor | JOB NUMBER 57226 | DATE 10-23-02

WELL ID [redacted] GEC1 - [redacted] | ACTIVITY | TIME START 940 END 1035 | BOTTLE TIME 1035

SAMPLE ISIS ID CMS-GW-GEC1-03

☐ QC SAMPLES COLLECTED — DUPLICATE ID / MS ID / MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	14.21 FT (TOR)	HISTORICAL WELL DEPTH	15.0 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	7.81 FT (TOR)	SCREEN LENGTH	10.0 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN 7.19 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = ~1.45 GAL/VOL

TOTAL VOLUME PURGED 4.9 GAL

AMBIENT AIR 0.0 PPM | WELL MOUTH 0.0 PPM

PURGE DATA

TIME	940	950	1000	1010	1020	1025	1030	1035		
DEPTH TO WATER (ft)	7.98	7.91	7.88	7.82	7.83	7.82	7.84	S		
PURGE VOLUME (gallons)	460	350	350	350	350	350	350	A		
TEMPERATURE (degrees C)	14.5	14.7	14.5	14.8	14.7	14.8	14.9	M		
pH (units)	6.64	6.65	6.64	6.60	6.54	6.53	6.55	P		
TURBIDITY (ntu)	715	[illegible]	22.0	14.2	9.6	Ø	Ø	L		
SPEC. COND. (mS/cm)	.714	698	.697	.692	.691	.688	.687	I		
DISSOLVED OXYGEN (mg/L)	0.56	.46	.44	.44	.42	.42	.42	N		
REDOX POTENTIAL	-86	-75	-72	-64	-57	-58	-55	G		

SAMPLE OBSERVATIONS:

- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☑ PERISTALTIC PUMP, ☐ SUBMERSIBLE PUMP, ☐ BLADDER PUMP, ☑ PVC/SILICON TUBING, ☐ TEFLON/SILICON TUBING, ☐ WATTERA, ☐ IN LINE FILTER, ☐ PRESS/VAC FILTER

SAMPLING: ☑ PERISTALTIC PUMP, ☐ SUBMERSIBLE PUMP, ☐ BLADDER PUMP, ☑ PVC/SILICON TUBING, ☐ TEFLON/SILICON TUBING, ☐ WATTERA, ☐ IN LINE FILTER, ☐ PRESS/VAC FILTER

DECON FLUIDS USED: ☐ METHANOL, ☐ LIQUINOX, ☑ POTABLE WATER, ☑ DEIONIZED WATER, ☐ HEXANE, ☐ NITRIC ACID, _____

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE, ☐ FLOAT ACTIVATED, ☐ KECK INTERFACE PROBE, _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☑ VOC	8260C	N	HCL	3x40ML	☒	

NOTES

- Dedicated tubing
- pump intake @ 10.0'
- flow rate 350 ML/min

SIGNATURE: [signature]

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Castaic | JOB NUMBER: 31226-32 | DATE: 10/23/02

WELL ID: CMS-GW-GEC5-03 | ACTIVITY TIME START: 0955 END: 1105 | BOTTLE TIME: 1050

SAMPLE ISIS ID: GEC-5

☐ QC SAMPLES COLLECTED — DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	215 FT (TOR)	HISTORICAL WELL DEPTH	15 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	8.50 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 6.5 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.04 GAL/VOL | TOTAL VOLUME PURGED: 5 GAL

1005 Begin purging @ 300mL/min | AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

OVER →

TIME	1015	1025	1030	1035	1040
DEPTH TO WATER (ft)	8.55	8.55	8.55	8.55	8.55
PURGE ~~VOLUME (gallons)~~ RATE mL/min	300	300	300	300	300
TEMPERATURE (degrees C)	18.4	18.7	18.6	18.5	18.5
pH (units)	6.98	7.02	7.01	7.01	7.01
TURBIDITY (ntu)	62.8	31.4	12.2	4.5	4.8
SPEC. COND. ~~(ohms/cm)~~ mS	0.477	0.478	0.480	0.480	0.480
DISSOLVED OXYGEN (mg/L)	2.22	2.38	0.79	0.88	0.86
REDOX POTENTIAL	-66	-66	-67	-70	-72

SAMPLE OBSERVATIONS:
- ☐ CLEAR
- ☐ CLEAR
- ☐ COLORED: _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☒ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING	SAMPLING	
☒	☒	PERISTALTIC PUMP
☐	☐	SUBMERSIBLE PUMP
☐	☐	BLADDER PUMP
☐	☐	PVC/SILICON TUBING
☐	☐	TEFLON/SILICON TUBING
☐	☐	WATTERA
☐	☐	IN LINE FILTER
☐	☐	PRESS/VAC FILTER
		_____

DECON FLUIDS USED:
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☒ NITRIC ACID

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

dedicated, disposable equipment used

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120mL	☒	

NOTES: acid'l purge data on reverse

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centralia | JOB NUMBER: 51226 | DATE: 10/23/02

WELL ID: GEC-7 | ACTIVITY | BOTTLE

SAMPLE ISIS ID: CMS-GW-GEC7-03 GMS-GW-GEC-7 MJA | TIME START 0930 END 1125 | BOTTLE TIME 1055

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	10.11 FT (TOR)	HISTORICAL WELL DEPTH	12.0 FT (BGS)	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.15 FT
DEPTH TO WATER	3.93 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 6.18 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.98 GAL/VOL | TOTAL VOLUME PURGED: ~3.5 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1000	1010	1020	1025	1030	1040	1050	1055
DEPTH TO WATER (ft)	3.99	3.99	3.98	3.98	3.98	3.98	3.98	C
PURGE VOLUME (gallons) ~	0.1	0.8	1.5	2	2.5	3	3.5	O
TEMPERATURE (degrees C) (MS)	5.80 12.7	13.6	13.7	13.8	14.1	14.1	14.3	L S
pH (units)	5.80	6.14	6.25	6.34	6.45	6.49	6.48	L A
TURBIDITY (ntu)	16	0	0	0	0	0	0	E M
SPEC. COND. (umhos/cm)	0.209	0.438	0.566	0.616	0.637	0.638	0.638	C P
DISSOLVED OXYGEN (mg/L)	0.65	0.0	0.0	0.0	0.0	0.0	0.0	T L
REDOX POTENTIAL mV	91	73	32	-43	-89	-89	-90	E
~12±6 ml/min	250	250						

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

dedicated tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260B	No	HCl/ice	3x40ml	☒	

NOTES

No hdspc. or sheen on water poured water approx 15' south of well on grassed Dep area.

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Cortlandale Manor | JOB NUMBER: 51226.82 | DATE: 10-23-02

WELL ID: GEC-2. | ACTIVITY | TIME START: 1100 END: 1140 | BOTTLE TIME: 1140

SAMPLE ISIS ID: CMS-GW-GEC2-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	15.09 FT (TOR)	HISTORICAL WELL DEPTH	14.5 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT
PROTECTIVE CASING / WELL DIFFERENCE	N/A FT	DEPTH TO WATER	8.90 FT (TOR)	SCREEN LENGTH	10 FT
WELL DIAMETER	2 IN	WELL MATERIAL	PVC.	HEIGHT OF WATER COLUMN	6.6 FT (w/o boiler)

☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) x = N 1.12 GAL/VOL

TOTAL VOLUME PURGED: 3.95 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1100	1110	1120	1125	1130	1135	1140
DEPTH TO WATER (ft)	8.89	9.18	8.99	8.96	8.92	8.91	S
PURGE VOLUME (gallons)	400	350	350	350	350	350	A
TEMPERATURE (degrees C)	17.5	18.3	18.0	18.0	18.1	18.0	M
pH (units)	6.99	6.97	6.94	6.94	6.93	6.93	P
TURBIDITY (ntu)	51.0	31.0	22.1	2.9	0.7	3.0	L
SPEC. COND. (mS/cm)	.843	.902	.896	.893	.890	.892	I
DISSOLVED OXYGEN (mg/L)	1.92	.81	.60	.57	.54	.53	N
REDOX POTENTIAL	-65	-72	-73	-74	-74	-74	G

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ ☐ ☒ ☐ ☐ ☐ ☐ ☐

SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☒ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☒ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260C	N	HCL	3 x 40mL	☒	

NOTES

- Dedicated tubing
- Flow Rate = 350mL
- Pump intake at 9.5' BTOR.

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centralia | JOB NUMBER: 57226-32 | DATE: 10/23/02

WELL ID: GEC-4 | ACTIVITY | BOTTLE TIME: 1335

TIME: START 1240 END 1355

SAMPLE ISIS ID: CNS-GW-GEC4-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	14.5 FT (TOR)	HISTORICAL WELL DEPTH	15 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	7.55 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 7 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.12 GAL/VOL | TOTAL VOLUME PURGED: 6 GAL

1250 Begin purging at 400 mL/min

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1300	1310	1320	1325	1330
DEPTH TO WATER (ft)	7.57	7.57	7.57	7.57	7.57
PURGE RATE (mL/min)	400	400	400	400	400
TEMPERATURE (degrees C)	17.5	18.2	18.4	18.4	18.5
pH (units)	6.90	7.00	6.99	6.99	6.98
TURBIDITY (ntu)	210	21.6	4.9	4.6	4.5
SPEC. COND. (mS/cm)	0.511	0.512	0.510	0.510	0.510
DISSOLVED OXYGEN (mg/L)	2.51	1.31	0.19	0.16	0.17
REDOX POTENTIAL	-51	-73	-72	-74	-74

SAMPLE OBSERVATIONS:
- ☐ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ | SAMPLING: ☒

- ☐ PERISTALTIC PUMP
- ☐ SUBMERSIBLE PUMP
- ☐ BLADDER PUMP
- ☐ PVC/SILICON TUBING
- ☐ TEFLON/SILICON TUBING
- ☐ WATTERA
- ☐ IN LINE FILTER
- ☐ PRESS/VAC FILTER _____

DECON FLUIDS USED:
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID _____

Dedicated, disposable tubing used

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120 mL	☒	

NOTES

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/23/02

WELL ID: MW06S | ACTIVITY | TIME START: 1240 END: 1400 | BOTTLE TIME: 1350

SAMPLE ISIS ID: CMS-GW-MW06S-03

[X] QC SAMPLES COLLECTED | DUPLICATE ID: CMS-DU-102302A-03 | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	8.85 FT (TOR)	HISTORICAL WELL DEPTH	9.0 FT (TOR) 8/03	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.36 FT
DEPTH TO WATER	5.94 FT (TOR)	SCREEN LENGTH*	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 2.91 FT x [X] 0.16 GAL/FT (2 IN) [ ] 0.65 GAL/FT (4 IN) [ ] 1.5 GAL/FT (6 IN) = 0.47 GAL/VOL | TOTAL VOLUME PURGED: ≈ 3 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 8.1 PPM

PURGE DATA

TIME	1305	1315	1325	1335	1340	1345	1350
DEPTH TO WATER (ft)	6.01	6.01	6.01	6.01	6.01	6.01	C
PURGE VOLUME (gallons) ≈	0.1	1.0	1.5	2.0	2.5	3.0	O
TEMPERATURE (degrees C)	14.58	14.84	14.97	15.75	15.76	15.77	L S
pH (units)	6.82	7.00	7.07	7.24	7.23	7.23	E A
TURBIDITY (ntu)	0	0	0	0	0	0	C M
SPEC. COND. (mS/cm) (umhos/cm)	0.756	0.800	0.815	0.829	0.821	0.824	P
DISSOLVED OXYGEN (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	L
REDOX POTENTIAL	-156	-171	-171	-176	-177	-177	E
RATE ml/min	260	260	260	260	260	260	

SAMPLE OBSERVATIONS:
- [X] CLEAR to slight yellow
- [ ] CLEAR
- [ ] COLORED _____
- [ ] COLORED _____
- [ ] CLOUDY _____
- [ ] TURBID _____
- [ ] ODOR _____
- [ ] OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: [X]

SAMPLING: [X] PERISTALTIC PUMP; [ ] SUBMERSIBLE PUMP; [ ] BLADDER PUMP; [ ] PVC/SILICON TUBING; [ ] TEFLON/SILICON TUBING; [ ] WATTERA; [ ] IN LINE FILTER; [ ] PRESS/VAC FILTER; _____

DECON FLUIDS USED: [ ] METHANOL; [ ] LIQUINOX; [ ] POTABLE WATER; [X] DEIONIZED WATER; [ ] HEXANE; [ ] NITRIC ACID; _____

dedicated tubing

WATER LEVEL EQUIPMENT USED: [X] ELECTRIC COND. PROBE; [ ] FLOAT ACTIVATED; [ ] KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
[X] VOCs	8260B	No	HCl	3X40 ml	[X]	
Field Dup →	8260B	No	HCl	3 X 40 ml	[X]	

NOTES

* NOTE this is a Flush well, it is noted as being a stick up well on the MW summary table.
Hdspc = 11.2, NO sheen, drummed water.

SIGNATURE: [signature]

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Castredale Manor | JOB NUMBER: 51226.32 | DATE: 10-23-02

WELL ID: [redacted] - [redacted] - MW15D | ACTIVITY TIME: START 1255 END 1400 | BOTTLE TIME: 1400

SAMPLE ISIS ID: CMS-GW-MW15D-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	53.18 FT (TOR)	HISTORICAL WELL DEPTH	53.1 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT
PROTECTIVE CASING / WELL DIFFERENCE	N/A FT	DEPTH TO WATER	7.42 FT (TOR)	SCREEN LENGTH	5 FT
WELL DIAMETER	2 IN	WELL MATERIAL	PVC	HEIGHT OF WATER COLUMN	45.68 FT

☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = ~7.61 GAL/VOL

TOTAL VOLUME PURGED: 7.81 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1255	1305	1315	1325	1335	1340	1345	1350	1355	1400
DEPTH TO WATER (ft)	7.49	7.53	7.51	7.41	9.39	7.41	7.41	7.41	7.41	S
PURGE VOLUME (Rate mL/min)	450	450	450	350	350	350	350	350	350	A
TEMPERATURE (degrees C)	14.1	14.2	13.5	13.0	13.2	13.2	13.3	13.3	13.2	M
pH (units)	6.89	6.74	6.56	5.92	5.81	5.77	5.70	5.61	5.60	P
TURBIDITY (ntu)	10.6	5.2	0.7	Ø	Ø	Ø	Ø	Ø	Ø	L
SPEC. COND. (mS/cm)	.399	.383	.380	.378	.380	.380	.387	.397	.394	I
DISSOLVED OXYGEN (mg/L)	7.71	6.98	7.14	4.81	4.61	4.05	4.09	4.19	4.16	N
REDOX POTENTIAL	161	178	192	235	249	255	267	270	277	G

** Rate changed to 350 mL/min

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☐
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☒ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCL	3x40 mL	☒	

NOTES

- Dedicated tubing only
- Pump intake @ 50.0' BTOR
- Flow rate 450 mL/min. - reduced to 350 mL/min at **

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/23/02

WELL ID: MW-07S | ACTIVITY | BOTTLE

TIME: START 1400 END 1530 | TIME: 1520

SAMPLE ISIS ID: CMS-GW-MW07S-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	7.8 FT (TOR)	HISTORICAL WELL DEPTH	7.8 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	4.25 FT (TOR)	SCREEN LENGTH	4 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 3.5 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.56 GAL/VOL

TOTAL VOLUME PURGED: 6 GAL

1410 BEGIN PURGING @ 250 mL/min

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1420	1430	1440	1450	1500
DEPTH TO WATER (ft)	4.30	4.30	4.30	4.31	4.30
PURGE RATE (mL/min)	250	250	250	250	250
TEMPERATURE (degrees C)	15.0	15.1	15.2	15.2	15.2
pH (units)	6.65	6.62	6.59	6.57	6.56
TURBIDITY (ntu)	72.0	66.9	18.9	3.1	1.0
SPEC. COND. (mS/cm)	1.39	1.03	0.723	1.548	0.572
DISSOLVED OXYGEN (mg/L)	1.49	1.47	0.21	0.05	0.01
REDOX POTENTIAL	-93	-72	-70	-67	-65

SEE BACK

SAMPLE OBSERVATIONS:

- ☐ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☒ TURBID Slightly
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

RURGING: ☒

SAMPLING: ☒

- ☐ PERISTALTIC PUMP
- ☐ SUBMERSIBLE PUMP
- ☐ BLADDER PUMP
- ☐ PVC/SILICON TUBING
- ☐ TEFLON/SILICON TUBING
- ☐ WATTERA
- ☐ IN LINE FILTER
- ☐ PRESS/VAC FILTER
- _____

DECON FLUIDS USED:

- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☒ NITRIC ACID
- _____

WATER LEVEL EQUIPMENT USED:

- ☒
- ☐ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120 mL	☒	

NOTES: add'l purge data on reverse

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale Manor | JOB NUMBER: 51226.22 | DATE: 10-23-02

WELL ID: MW-07D | ACTIVITY | TIME START: 1425 END: 1530 | BOTTLE TIME: 1530

SAMPLE ISIS ID: CMS-GW-MW07D-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	57.3 FT (TOR)	HISTORICAL WELL DEPTH	58 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	3.68 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 54.32 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 9.05 GAL/VOL

TOTAL VOLUME PURGED: 7.05 GAL

AMBIENT AIR: 0.0 PPM | WELL MOUTH: 0.0 PPM

PURGE DATA

TIME	1425	1435	1445	1455	1505	1515	1520	1525	1530
DEPTH TO WATER (ft)	3.76	3.82	3.76	3.76	3.77	3.79	3.79	3.79	S
PURGE VOLUME (Diff. flow rate)	450	350	350	350	350	350	350	350	M
TEMPERATURE (degrees C)	12.5	12.2	12.1	11.9	11.9	11.9	11.9	11.9	M
pH (units)	6.33	6.29	6.24	6.05	5.93	5.87	5.89	5.93	P
TURBIDITY (ntu)	4.5	0.6	0.7	1.1	8.0	2.7	2.9	4.7	C
SPEC. COND. (uhmos/cm)	.238	.238	.237	.235	.227	.227	.225	.224	I
DISSOLVED OXYGEN (mg/L)	6.88	6.68	6.61	6.71	6.86	6.84	6.85	6.91	N
REDOX POTENTIAL	245	250	254	269	278	286	284	283	G

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ PERISTALTIC PUMP
☐ SUBMERSIBLE PUMP
☐ BLADDER PUMP
☐ PVC/SILICON TUBING
☐ TEFLON/SILICON TUBING
☐ WATTERA
☐ IN LINE FILTER
☐ PRESS/VAC FILTER
_____

DECON FLUIDS USED:
☐ METHANOL
☐ LIQUINOX
☒ POTABLE WATER
☐ DEIONIZED WATER
☐ HEXANE
☐ NITRIC ACID
_____

WATER LEVEL EQUIPMENT USED:
☒ ELECTRIC COND. PROBE
☐ FLOAT ACTIVATED
☐ KECK INTERFACE PROBE
_____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	3 x 40ml	☒	

NOTES

- Dedicated tubing only
- Flow rate purge 350 ml/min
- Pump intake at 55'

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/23/02

WELL ID: MW11B | ACTIVITY | BOTTLE TIME: 1700

TIME: START 1530 END 1735

SAMPLE ISIS ID: CMS-GW-MW11B-03

[X] QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: CMS-GW-MW11B-03 | MSD ID: CMS-GW-MW11B-03

* 9 total VOAs all same ID, w/ Note on chain indicating MS/MSD

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	89.85 FT (TOR)	HISTORICAL WELL DEPTH	89.5 FT (TOR) BGS	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT
PROTECTIVE CASING / WELL DIFFERENCE	-0.1 FT	DEPTH TO WATER	24.03 FT (TOR)	SCREEN LENGTH	No Screen open 89.5 FT
WELL DIAMETER	2" IN	WELL MATERIAL	PVC	HEIGHT OF WATER COLUMN	65.62 FT

[X] 0.16 GAL/FT (2 IN) [ ] 0.65 GAL/FT (4 IN) [ ] 1.5 GAL/FT (6 IN) = 10.53 GAL/VOL

TOTAL VOLUME PURGED: 4.2 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	1600	1610	1620	1630	1640	1650	1655	1700
DEPTH TO WATER (ft)	24.12	24.12	24.12	24.12	24.12	24.12	24.12	C
PURGE VOLUME (gallons)	~0.3	0.9	2.1	2.7	3	3.5	4.2	O
TEMPERATURE (degrees C)	12.10	11.73	11.66	11.71	11.75	11.72	11.79	L L S
pH (units)	5.56	5.30	5.29	5.55	5.71	5.61	5.65	E A
TURBIDITY (ntu)	0	0	0	0	0	0	0	C M
SPEC. COND. mS/cm	0.037	0.035	0.034	0.097	0.099	0.099	0.105	T P
DISSOLVED OXYGEN (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L
REDOX POTENTIAL	106	116	111	-56	-67	-67	-68	E
RATE ml/min	300	300	300	300	300	300	300	

SAMPLE OBSERVATIONS:
- [ ] CLEAR
- [X] CLEAR
- [ ] COLORED
- [ ] COLORED
- [ ] CLOUDY
- [ ] TURBID
- [ ] ODOR
- [ ] OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING / SAMPLING:
- [X] [X] PERISTALTIC PUMP
- [ ] [ ] SUBMERSIBLE PUMP
- [ ] [ ] BLADDER PUMP
- [ ] [ ] PVC/SILICON TUBING
- [ ] [ ] TEFLON/SILICON TUBING
- [ ] [ ] WATTERA
- [ ] [ ] IN LINE FILTER
- [ ] [ ] PRESS/VAC FILTER

DECON FLUIDS USED:
- [ ] METHANOL
- [ ] LIQUINOX
- [X] POTABLE WATER
- [ ] DEIONIZED WATER
- [ ] HEXANE
- [ ] NITRIC ACID

dedicated tubing

WATER LEVEL EQUIPMENT USED:
- [X] ELECTRIC COND. PROBE
- [ ] FLOAT ACTIVATED
- [ ] KECK INTERFACE PROBE

NUMBER OF FILTERS USED:

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
[X] Study Sample [X] MS [X] MSD	8260B	N	HCl/ice	9x40ml	[X]	

NOTES

Hdspc 280ppm, No screen, containerize water. Note: PID may be malfunct. ~~passed water 15' North of well on grass.~~ (WNP) Recalibrated, but inconsistent readings may be due to cold temps.

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Will still containerize the 4 gallons.

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HARDING ESE, INC. PAGE 1 OF 2

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-72 | DATE: 10/23/02

WELL ID: MW-11M | ACTIVITY | BOTTLE

TIME: START 1545 END 1730 | TIME: 1705

SAMPLE ISIS ID: LMS-GW-MW11M-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	~42 FT (TOR)	HISTORICAL WELL DEPTH	42 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	23.62 FT (TOR)	SCREEN LENGTH	6 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 18 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 2.88 GAL/VOL | TOTAL VOLUME PURGED: 6 GAL

1600 BEGIN PURGING @ 350mL/min | AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

SEE BACK →

TIME	1610	1620	1630	1635	1640
DEPTH TO WATER (ft)	23.64	23.64	23.64	23.64	23.64
PURGE ~~VOLUME (gallons)~~	350	350	350	350	350
TEMPERATURE (degrees C)	12.0	11.8	11.8	11.8	11.8
pH (units)	6.21	5.30	5.20	5.19	5.18
TURBIDITY (ntu)	0	0	0	0	0
SPEC. COND. ~~(µmhos/cm)~~ mS/cm	0.256	0.325	0.329	0.328	0.330
DISSOLVED OXYGEN (mg/L)	12.48	12.75	12.47	12.46	12.44
REDOX POTENTIAL	146	256	288	297	307

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING	SAMPLING	
☒	☒	PERISTALTIC PUMP
☐	☐	SUBMERSIBLE PUMP
☐	☐	BLADDER PUMP
☐	☐	PVC/SILICON TUBING
☐	☐	TEFLON/SILICON TUBING
☐	☐	WATTERA
☐	☐	IN LINE FILTER
☐	☐	PRESS/VAC FILTER
		_____

DECON FLUIDS USED
- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID
- ☐ _____

dedicated, disposable tubing used

WATER LEVEL EQUIPMENT USED
- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒	VOCs	8260	N	HCl	120 mL	☒	

NOTES: Add'l purge data on back

Containerized purge water had PID headspace of 28.3 ppm. Transported to CRS & added to liquid drum

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/24/02

WELL ID: MW-12D | ACTIVITY TIME START: 0730 END: 0900 | BOTTLE TIME: 0825

SAMPLE ISIS ID: CMS-GW-MW12D-03

☒ QC SAMPLES COLLECTED — DUPLICATE ID: | MS ID: CMS-GW-MW12D-03 | MSD ID: CMS-GW-MW12D-03

SAME SAMPLE ID, 3x VOLUME

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	47.5 FT (TOR)	HISTORICAL WELL DEPTH	44 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	2.75 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.35 FT
DEPTH TO WATER	14.36 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 30 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 4.80 GAL/VOL

TOTAL VOLUME PURGED: 7 GAL

0740 Begin purging at 400 mL/min

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	0750	0800	0810	0815	0820
DEPTH TO WATER (ft)	14.36	14.36	14.36	14.36	14.36
PURGE ~~VOLUME (gallons)~~ RATE mL/min	400	400	400	400	400
TEMPERATURE (degrees C)	11.4	11.8	11.9	11.9	11.9
pH (units)	5.19	5.51	5.57	5.55	5.53
TURBIDITY (ntu)	0	0	0	0	0
SPEC. COND. (~~uhmos/cm~~ mS)	0.327	0.361	0.366	0.366	0.366
DISSOLVED OXYGEN (mg/L)	5.31	6.49	6.83	7.00	7.11
REDOX POTENTIAL	324	314	316	318	322

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒ 1 PERISTALTIC PUMP
☐ SUBMERSIBLE PUMP
☐ BLADDER PUMP
☐ PVC/SILICON TUBING
☐ TEFLON/SILICON TUBING
☐ WATTERA
☐ IN LINE FILTER
☐ PRESS/VAC FILTER
_____

DECON FLUIDS USED:
☐ METHANOL
☐ LIQUINOX
☐ POTABLE WATER
☒ DEIONIZED WATER
☐ HEXANE
☐ NITRIC ACID
_____

dedicated, disposable tubing used

WATER LEVEL EQUIPMENT USED:
☒ ELECTRIC COND. PROBE
☐ FLOAT ACTIVATED
☐ KECK INTERFACE PROBE
_____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120 mL	☒	

NOTES

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/24/02

WELL ID: MW-12B | ACTIVITY | TIME START: 0730 END: 0850 | BOTTLE TIME: 0835

SAMPLE ISIS ID: CMS-GW-MW12B-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	105.00 FT (TOR)	HISTORICAL WELL DEPTH	102.5 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	2.35 FT
PROTECTIVE CASING / WELL DIFFERENCE	-0.73 FT	DEPTH TO WATER	14.14 FT (TOR)	SCREEN LENGTH	No screen open 92.5-102.5
WELL DIAMETER	2" IN	WELL MATERIAL	PVC	HEIGHT OF WATER COLUMN	90.86 FT

☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) × = 14.5 GAL/VOL

TOTAL VOLUME PURGED: GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	0740	0750	0800	0810	0820	0830	0835
DEPTH TO WATER (ft)	14.58	14.67	14.68	14.67	14.67	14.69	C
PURGE VOLUME (gallons) ≈	0.1	1	1.4	2.3	3	3.1	O
TEMPERATURE (degrees C)	10.28	12.09	12.06	11.90	11.99	11.98	L
pH (units)	7.29	7.70	7.67	7.89	8.14	8.15	E
TURBIDITY (ntu)	0	0	0	0	0	0	A
SPEC. COND. (mS/cm)	0.320	0.310	0.312	0.311	0.306	0.306	T
DISSOLVED OXYGEN (mg/L)	1.95	0.11	0.09	0.0	0.0	0.0	
REDOX POTENTIAL	91	6	3	-40	-94	-93	E
RATE ml/min	180	230	230	230			

SAMPLE OBSERVATIONS:
- ☒ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☑
SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

Dedicated tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260B	No	HCl/ice	3x40ml	☒	

NOTES

Hdspc = 0 ppm, poured water out Approx 10' South of well in leaves.
No sheen, Volume ≈ 3-3.5 gals.

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226-32 | DATE: 10/24/02

WELL ID: GEC-3 | ACTIVITY | TIME START: 0925 END: 1030 | BOTTLE TIME: 1020

SAMPLE ISIS ID: CMS-GW-GEC3-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	10 FT (TOR)	HISTORICAL WELL DEPTH	15 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	8.18 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 7 FT × ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.12 GAL/VOL | TOTAL VOLUME PURGED: 4 GAL

0935 BEGIN PURGING @ 300mL/min | AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	0945	0955	1000	1005	1010
DEPTH TO WATER (ft)	8.18	8.18	8.18	8.18	8.18
PURGE VOLUME (gallons)	300	300	300	300	300
TEMPERATURE (degrees C)	16.5	16.6	16.6	16.7	16.7
pH (units)	7.00	7.02	7.02	7.03	7.04
TURBIDITY (ntu)	3.9	3.4	2.9	2.8	2.9
SPEC. COND. (uhmos/cm)	0.647	0.648	0.650	0.650	0.650
DISSOLVED OXYGEN (mg/L)	7.63	4.77	4.18	3.67	3.69
REDOX POTENTIAL	-51	-54	-55	-57	-58

SAMPLE OBSERVATIONS:
- ☐ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☒ CLOUDY slightly
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ | SAMPLING: ☒

- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER

DECON FLUIDS USED:
- METHANOL
- LIQUINOX
- POTABLE WATER
- ☒ DEIONIZED WATER
- HEXANE
- ☒ NITRIC ACID

dedicated, disposable tubing

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- FLOAT ACTIVATED
- KECK INTERFACE PROBE

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120mL	☒	

NOTES	dtw	RATE	TEMP	pH	TURB	COND	DO	REDOX
1015	8.18	300	16.7	7.04	2.8	0.649	3.66	-57

PID headspace of purge water = 15.5 ppm
water trimmed

SIGNATURE: _____

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HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale | JOB NUMBER: 51226 | DATE: 10/24/02

WELL ID: MW01S | ACTIVITY | BOTTLE

TIME: START 0925 END 1045 | BOTTLE TIME: 1035

SAMPLE ISIS ID: CMS-GW-MW01S

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	11.02 FT (TOR)	HISTORICAL WELL DEPTH	8.1 FT (TOR) 8.15	PROTECTIVE CASING STICKUP (FROM GROUND)	3.26 FT
PROTECTIVE CASING / WELL DIFFERENCE	-0.24 FT	DEPTH TO WATER	4.33 FT (TOR)	SCREEN LENGTH	≈ 4.5 FT
WELL DIAMETER	2 IN	WELL MATERIAL	PVC	HEIGHT OF WATER COLUMN	6.69 FT

☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.07 GAL/VOL

TOTAL VOLUME PURGED: ~~4.8~~ 4.8 (MSD) GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

TIME	0940	0960	1000	1010	1020	1030	1035
DEPTH TO WATER (ft)	4.36	4.36	4.36	4.36	4.36	4.36	C
PURGE VOLUME (gallons) ~	0.3	1.0	2.0	2.8	3.8	4.8	O
TEMPERATURE (degrees C)	13.80	13.79	14.08	14.08	14.08	14.07	L
pH (units)	6.54	6.51	6.60	6.63	6.75	6.75	E A
TURBIDITY (ntu)	6	1	0	0	0	0	L M
SPEC. COND. (mS/cm)	0.511	0.586	0.589	0.593	0.596	0.596	P
DISSOLVED OXYGEN (mg/L)	1.33	1.36	1.10	1.06	0.97	0.98	L
REDOX POTENTIAL	-131	-138	-157	-170	-195	-194	E
RATE ml/min	300	310					

SAMPLE OBSERVATIONS:

- ☐ CLEAR
- ☐ CLEAR
- ☒ COLORED RUSTY COLORED
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒

SAMPLING: ☒ PERISTALTIC PUMP; ☐ SUBMERSIBLE PUMP; ☐ BLADDER PUMP; ☐ PVC/SILICON TUBING; ☐ TEFLON/SILICON TUBING; ☐ WATTERA; ☐ IN LINE FILTER; ☐ PRESS/VAC FILTER; _____

DECON FLUIDS USED: ☐ METHANOL; ☐ LIQUINOX; ☐ POTABLE WATER; ☒ DEIONIZED WATER; ☐ HEXANE; ☐ NITRIC ACID; _____

dedicated tubing

WATER LEVEL EQUIPMENT USED: ☒ ELECTRIC COND. PROBE; ☐ FLOAT ACTIVATED; ☐ KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260B	No	HCl / ice	3 X 40 ml	☒	

NOTES

SIGNATURE: Mike Thuf

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centralia | JOB NUMBER: 51226-32 | DATE: 10/24/02

WELL ID: MW-115 | ACTIVITY | BOTTLE

TIME: START 1045 END 1200 | TIME: 1145

SAMPLE ISIS ID: CMS-GW-MW115-03

☐ QC SAMPLES COLLECTED | DUPLICATE ID | MS ID | MSD ID

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	26 FT (TOR)	HISTORICAL WELL DEPTH	25 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	24.32 FT (TOR)	SCREEN LENGTH	5 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 1.7 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 0.272 GAL/VOL

TOTAL VOLUME PURGED: 3 GAL

1100 BEGIN PURGING @ 150 mL/min

AMBIENT AIR: 0 PPM | WELL MOUTH: 5.7 PPM

PURGE DATA

TIME	1110	1120	1130	1135	1140
DEPTH TO WATER (ft)	24.38	24.37	24.37	24.37	24.37
PURGE RATE (mL/min)	150	150	150	150	150
TEMPERATURE (degrees C)	12.8	12.7	12.7	12.7	12.7
pH (units)	5.67	5.60	5.59	5.59	5.59
TURBIDITY (ntu)	5.0	0	0	0	0
SPEC. COND. (mS/cm)	0.404	0.393	0.393	0.392	0.392
DISSOLVED OXYGEN (mg/L)	13.96	13.81	13.88	13.83	13.86
REDOX POTENTIAL	255	280	291	297	294

SAMPLE OBSERVATIONS:
- ☑ CLEAR
- ☐ CLEAR
- ☐ COLORED _____
- ☐ COLORED _____
- ☐ CLOUDY _____
- ☐ TURBID _____
- ☐ ODOR _____
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒
SAMPLING: ☒

- PERISTALTIC PUMP
- SUBMERSIBLE PUMP
- BLADDER PUMP
- PVC/SILICON TUBING
- TEFLON/SILICON TUBING
- WATTERA
- IN LINE FILTER
- PRESS/VAC FILTER

DECON FLUIDS USED:
- METHANOL
- LIQUINOX
- POTABLE WATER
- ☒ DEIONIZED WATER
- HEXANE
- NITRIC ACID
- ☒ _____

WATER LEVEL EQUIPMENT USED:
- ☒ ELECTRIC COND. PROBE
- FLOAT ACTIVATED
- KECK INTERFACE PROBE
- _____

NUMBER OF FILTERS USED _____

disposable, dedicated tubing used

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOC	8260	N	HCl	120mL	☒	

NOTES

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centre Isle | JOB NUMBER: 51226 | DATE: 10/29/02

WELL ID: MW05S | ACTIVITY | BOTTLE

TIME: START 1120 END 1400 | TIME: 1345

SAMPLE ISIS ID: CMS-GW-MW05S-03

[X] QC SAMPLES COLLECTED | DUPLICATE ID: CMS-DU-102902A-03 3x40ml | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	9.15 FT (TOR)	HISTORICAL WELL DEPTH	8 FT (TOR) Bgs	PROTECTIVE CASING STICKUP (FROM GROUND)	Flush FT	PROTECTIVE CASING / WELL DIFFERENCE	-0.75 FT
DEPTH TO WATER	7.43 FT (TOR)	SCREEN LENGTH	4.9 FT	WELL DIAMETER	2" IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 1.72 FT x [X] 0.16 GAL/FT (2 IN) [ ] 0.65 GAL/FT (4 IN) [ ] 1.5 GAL/FT (6 IN) = 0.28 GAL/VOL

TOTAL VOLUME PURGED: 1.1 litres ~~GAL~~

AMBIENT AIR: 0 PPM | WELL MOUTH: 341 PPM

PURGE DATA

TIME	1145	1220	1345		
DEPTH TO WATER (ft)	Dried up	8.99	C		
PURGE VOLUME (~~gallons~~) x	1/3 litre	.8 litre	O		
TEMPERATURE (degrees C)	14.92	16.59	L		
pH (units)	7.52	7.55	L		
TURBIDITY (ntu)	0	0	E		
SPEC. COND. (~~ubmhos/cm~~ mS/cm)	0.288	0.288	F		
DISSOLVED OXYGEN (mg/L)	11.39	8.64			
REDOX POTENTIAL	-93	-109			
RATE ml/min	90ml/Min	90ml/Min			

SAMPLE OBSERVATIONS:
- [X] CLEAR
- [ ] CLEAR
- [ ] COLORED _____
- [ ] COLORED _____
- [ ] CLOUDY _____
- [ ] TURBID _____
- [ ] ODOR _____
- [ ] OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: [X]

SAMPLING: [X] PERISTALTIC PUMP; [ ] SUBMERSIBLE PUMP; [ ] BLADDER PUMP; [ ] PVC/SILICON TUBING; [ ] TEFLON/SILICON TUBING; [ ] WATTERA; [ ] IN LINE FILTER; [ ] PRESS/VAC FILTER; _____

DECON FLUIDS USED: [ ] METHANOL; [ ] LIQUINOX; [ ] POTABLE WATER; [X] DEIONIZED WATER; [ ] HEXANE; [ ] NITRIC ACID; _____ dedicated tubing

WATER LEVEL EQUIPMENT USED: [X] ELECTRIC COND. PROBE; [ ] FLOAT ACTIVATED; [ ] KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED: _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
[X] VOCs	8260B	No	HCl/ice	6x40ml (includes duplicate)	[X]	

NOTES: ★ Began purging, well purged dry @ 120ml/min. Well recovered to 7.87' BTOR, purged @ 90ml/min (approx. lower limit of pump) and well purged dry again.. Again Well purged dry, Intake is @ bottom of well @ 9.15' BTOR.

~~Resp~~

SIGNATURE: _____

RECEIVED BY: _____

HARDING ESE, INC. PAGE 1 OF 2

OVER

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: CMJ | JOB NUMBER: 51226 R1 | DATE: 11/21/02

WELL ID: CMS-GW-MW035-03 | ACTIVITY | BOTTLE

TIME: START 0900 END 1100 | TIME: 1040

SAMPLE ISIS ID:

☐ QC SAMPLES COLLECTED | DUPLICATE ID: | MS ID: | MSD ID:

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	11.8 FT (TOR)	HISTORICAL WELL DEPTH	12 FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	3.1 FT	PROTECTIVE CASING / WELL DIFFERENCE	0.13 FT
DEPTH TO WATER	4.29 FT (TOR)	SCREEN LENGTH	10 FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 7.5 FT x ☒ 0.16 GAL/FT (2 IN) ☐ 0.65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) = 1.2 GAL/VOL

TOTAL VOLUME PURGED: 2.8 GAL

AMBIENT AIR: 0 PPM | WELL MOUTH: 0 PPM

PURGE DATA

BEGIN PURGE AT 0925

TIME	0930	0935	0940	0945	0950
DEPTH TO WATER (ft)	4.52	4.51	4.52	4.52	4.52
PURGE ~~VOLUME (gallons)~~ RATE mL/min	200	200	200	200	200
TEMPERATURE (degrees C)	8.91	9.02	9.07	9.23	9.28
pH (units)	6.41	6.49	6.53	6.57	6.62
TURBIDITY (ntu)	2.9	2.2	2.4	2.3	2.6
SPEC. COND. (~~mhos~~/cm) mS	0.133	0.127	0.128	0.129	0.132
DISSOLVED OXYGEN (mg/L)	0.96	0.70	0.64	0.59	0.69
REDOX POTENTIAL	-5	-64	-75	-90	-95

SAMPLE OBSERVATIONS:

- ☐ CLEAR
- ☐ CLEAR
- ☐ COLORED
- ☐ COLORED
- ☐ CLOUDY
- ☒ TURBID Slightly
- ☐ ODOR
- ☐ OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: ☒ | SAMPLING: ☒

- ☐ PERISTALTIC PUMP
- ☐ SUBMERSIBLE PUMP
- ☐ BLADDER PUMP
- ☐ PVC/SILICON TUBING
- ☐ TEFLON/SILICON TUBING
- ☐ WATTERA
- ☐ IN LINE FILTER
- ☐ PRESS/VAC FILTER

DECON FLUIDS USED:

- ☐ METHANOL
- ☐ LIQUINOX
- ☐ POTABLE WATER
- ☒ DEIONIZED WATER
- ☐ HEXANE
- ☐ NITRIC ACID

WATER LEVEL EQUIPMENT USED:

- ☒ ELECTRIC COND. PROBE
- ☐ FLOAT ACTIVATED
- ☐ KECK INTERFACE PROBE

NUMBER OF FILTERS USED:

DEDICATED, DISPOSABLE TUBING USED

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☒ VOCs	8260	N	HCl	120 mL	☒	

NOTES

SIGNATURE:

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→ OVER

HARDING ESE, INC. PAGE 1 OF 1

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT: Centredale Manor | JOB NUMBER: 51226-R1 | DATE: 11/21/02

WELL ID: CMS-MW05S-03 | ACTIVITY TIME START: 1140 END: 1400 | BOTTLE TIME: 1220

SAMPLE ISIS ID:

[X] QC SAMPLES COLLECTED — DUPLICATE ID: CMS-GW-MW05S-DU; MS ID: CMS-GW-MW05S-MS; MSD ID: CMS-GW-MW05S-MSD

WATER LEVEL / WELL DATA

MEASURED WELL DEPTH	9.25 FT (TOR)	HISTORICAL WELL DEPTH	— FT (TOR)	PROTECTIVE CASING STICKUP (FROM GROUND)	N/A FT	PROTECTIVE CASING / WELL DIFFERENCE	N/A FT
DEPTH TO WATER	6.33 FT (TOR)	SCREEN LENGTH	— FT	WELL DIAMETER	2 IN	WELL MATERIAL	PVC

HEIGHT OF WATER COLUMN: 3 FT x [ ] 0.16 GAL/FT (2 IN) [ ] 0.65 GAL/FT (4 IN) [ ] 1.5 GAL/FT (6 IN) = 0.48 GAL/VOL

TOTAL VOLUME PURGED: 0.9 GAL

AMBIENT AIR: PPM | WELL MOUTH: PPM

PURGE DATA

BEGIN PURGING AT 1155

TIME	1205	1210	1215		
DEPTH TO WATER (ft)	6.50	6.96	7.14		
PURGE ~~VOLUME (gallons)~~ RATE mL/min	150	150	150		
TEMPERATURE (degrees C)	13.63	14.03	14.19		
pH (units)	7.03	7.03	7.03		
TURBIDITY (ntu)	0	0	0		
SPEC. COND. (mS ~~umhos/cm~~)	0.258	0.268	0.264		
DISSOLVED OXYGEN (mg/L)	10.41	7.62	7.64		
REDOX POTENTIAL	89	81	83		

SAMPLE OBSERVATIONS:
- [X] CLEAR
- [ ] CLEAR
- [ ] COLORED
- [ ] COLORED
- [ ] CLOUDY
- [ ] TURBID
- [ ] ODOR
- [ ] OTHER (see notes)

EQUIPMENT DOCUMENTATION

PURGING: [X]
SAMPLING: [ ] PERISTALTIC PUMP; [ ] SUBMERSIBLE PUMP; [ ] BLADDER PUMP; [ ] PVC/SILICON TUBING; [ ] TEFLON/SILICON TUBING; [ ] WATTERA; [ ] IN LINE FILTER; [ ] PRESS/VAC FILTER; [ ] _____

DECON FLUIDS USED: [ ] METHANOL; [ ] LIQUINOX; [ ] POTABLE WATER; [X] DEIONIZED WATER; [ ] HEXANE; [ ] NITRIC ACID; [ ] _____

WATER LEVEL EQUIPMENT USED: [X] ELECTRIC COND. PROBE; [ ] FLOAT ACTIVATED; [ ] KECK INTERFACE PROBE; _____

NUMBER OF FILTERS USED: _____

DEDICATED DISPOSABLE TUBING USED

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
~~8260 VOCs~~	~~8260~~	~~N~~	~~HCl~~	~~120mL~~	[X]	
DIOXIN/FURAN		N		2500mL	[X]	DU / MS / MSD

DIOXIN/FURAN ONLY!

NOTES: WELL IS DRAWING DOWN, AND ~2 WELL VOLUMES PURGED. BEGIN SAMPLING TO AVOID PUMPING WELL DRY

SIGNATURE: [signature]

RECEIVED BY: _____