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Analysis of Groundwater Data Collected During the Main Installation (MI)-Wide Baseline Groundwater Sampling Event

TO	U.S. Army Engineering and Support Center, Huntsville
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	U S. Environmental Protection Agency (USEPA), Region 4
	Tennessee Department of Environment and Conservation (TDEC)
FROM.	CH2M HILL
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Introduction

The Technical Memorandum, *Baseline Groundwater Sampling Plan for Monitoring Wells Associated with the Main Installation, Memphis Depot* (CH2M HILL, January 2002), which can be found as Appendix A to the *Enhanced Bioremediation Treatment Treatability Study Workplan* (CH2M HILL, May 2002), was prepared to describe groundwater sampling activities needed in preparation for the Enhanced Bioremediation Treatment (EBT) Treatability Study for the MI. This sampling was necessary because the Remedial Design (RD) phase for the MI, which includes the EBT Treatability Study, began with completion of the MI Record of Decision (ROD) in September 2001 (CH2M HILL, September 2001) and no complete, site-wide groundwater study had been performed within the MI since October 1998; more recent groundwater sampling events have only focused on individual sites within the MI. All available onsite and offsite monitoring wells (MW) and piezometers (PZ) associated with the MI were sampled to complete this study and to develop recent groundwater contaminant plume configuration information.

Objectives of the MI-Wide Baseline Groundwater Sampling Event

The primary objective of the baseline groundwater sampling event was to collect groundwater samples from available monitoring well and piezometer locations associated with the MI and analyze these samples for volatile organic compound (VOC) and various geochemical parameters. Figure 1 presents the location of existing monitoring wells and piezometers at the MI during this March 2002 baseline sampling event. Several monitoring wells at the site had been sampled previously during the November/December 2001 Long Term Operational Area (LTOA) investigation (CH2M HILL, July 2002) and were, therefore, not re-sampled during the baseline event. The data resulting from the LTOA event is repeated here only in the context of being part of this site-wide event.

In addition to the objective described above, the groundwater data achieved from this baseline study has been used to: (1) define the chlorinated VOC (CVOC) groundwater contaminant plume configuration, which was used as a basis for locating monitoring and injection wells for the EBT study (Figure 1); (2) define groundwater contaminant concentrations to formulate the final quantity of electron donor substrate material injected into the aquifer for the EBT study; and, (3) provide a baseline geochemical measurement for upgradient and downgradient locations of the EBT Treatability Study areas Also, the groundwater contaminant plume configuration data will be used within the RD to demarcate the area of the aquifer underlying the MI that requires remediation.

Data Quality Objectives

The data quality objectives (DQOs) found below were established to achieve the objective and data needs outlined above

Data Quality Objectives for MI-Wide Baseline Groundwater Sampling Event

Sampling Activity	Data Quality Objective Category	Sampling Purpose
Groundwater samples for volatile organic compounds (VOCs)	Definitive	Define areas of groundwater contamination within the MI and use the data to optimize the EBT study
Groundwater samples for geochemical parameters	Definitive	Use data to optimize the EBT study and serve as a baseline for the MI RD.

Twenty-eight (28) monitoring wells and seven piezometers were selected for sampling of VOCs during the baseline sampling event (Table 1). Eighteen (18) monitoring wells were also sampled for various geochemical parameters, as presented below. Five (5) monitoring wells located on the MI were not included in either the LTOA or this baseline event because of dry conditions (MW-27), sample repetition (MW-18), and well obstructions (MW-17, -25, and -48). In addition, the analytical data from samples of monitoring well MW-63 may be suspect because the ground surface completion of the well casing was repaired prior to sampling using PVC cleaner and glue. The upper portion of the water column was removed by pumping soon after the repair was completed and before the well was sampled.

MW-63 and MW-25 were abandoned in summer 2002 and were reinstalled in September 2002. Two new wells were installed at MW-63 to screen across the thickness of the aquifer at that location All three wells were recently sampled and the results of that sampling will be reported under separate cover

All baseline groundwater samples were analyzed for:

<u>Laboratory</u>

- VOCs (EPA 8260B)
- Manganese (EPA 6010B)
- Total Organic Carbon (EPA 9060)
- Metabolic Acids (EPA 8015M)

- Methane, Ethane, and Ethene (RSK175M)
- Alkalinity (Method 310.1)
- Nitrate/Nitrite (EPA 9056)
- Sulfate/Sulfide (EPA 9056/376.2)
- Chloride (EPA 9056)

Field

- Ferrous Iron (Hach Method 8146)
- Carbon Dioxide (Hach Method 8205)
- Dissolved Oxygen (DO)
- pH
- Temperature
- Specific Conductivity (SC)
- Oxidation-Reduction Potential (ORP)
- Turbidity

In addition to analyzing groundwater for VOCs and geochemical parameters, two monitoring wells, MW-89 and -90, were sampled for semi-volatile organic compounds (SVOCs). These wells were sampled as a result of questions raised by the Memphis Depot BRAC Cleanup Team (BCT) pertaining to a portion of the LTOA groundwater data. Specifically, the question concerned whether contaminants, particularly pentachlorophenol (PCP), in soil at the former PCP Dip Vat on the MI had leached into groundwater beneath that LTOA location. Collection and analysis of groundwater for SVOCs was not part of the original, approved scope for the baseline event.

Investigative Methodology

Groundwater Sampling

Groundwater samples were collected from each monitoring well as described in the January 2002 Technical Memorandum, with variances described below. Monitoring wells were sampled for VOCs using polytethylene diffusion bag samplers (PDBs). Lengths of one, two, or five feet were used in each well depending on the thickness of the aquifer within the screened interval (Table 1). PDB samplers allow for collection of discrete water samples and consist of polyethylene bags filled with distilled water The concentration gradient between the VOCs in the groundwater in the well screen and the water-filled bag results in diffusion of contaminants into the sampler. With the exception of MW-89 and -90, which had two diffusion bags each because of the long screen lengths, one diffusion bag sampler was installed in each well and positioned in the center of the aquifer within the screened zone. Construction, installation, and sampling of PDB samplers followed guidelines established in the *User's Guide for Polyethylene-Based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations In Wells, Part 1: Deployment, Recovery, Data Interpretation, and Quality Control and Assurance,* (USGS, 2001).

The semi-permeable membrane used for the PDB samplers is engineered for VOC collection only Therefore, diffusion bag samplers were not used for collection of SVOCs or geochemical parameters Collection of groundwater samples for these analyses occurred using low-flow techniques, as described in Low-Flow (Minimal Drawdown) Groundwater

Sampling Procedures from the *Environmental Investigations Standard Operating Procedures Quality Assurance Manual* (EISOPQAM), Sections 7.2.2 and 7.3.3, (USEPA, November 2001) and Puls and Barcelona (1996). Before sampling, each well was purged using a bladder pump in order to minimize agitation of the groundwater and sample turbidity. Field measurements of dissolved oxygen (DO), oxidation-reduction potential (ORP), turbidity, pH, temperature, and specific conductance were recorded periodically. These parameters were measured using an airtight flow-through cell. Purging continued until field measurements were stable according to the following standards: plus or minus 0.1 pH, plus or minus ten millivolts ORP, plus or minus 3 percent for specific conductance, and plus or minus 10 percent for turbidity and DO. Samples were then collected via the bladder pump

Collection of groundwater samples from piezometers differed from monitoring wells. The small diameter (0.5 inches) of the casing necessitated the use of a small diameter bailer instead of a bladder pump. Before sampling, each piezometer had at least three well volumes purged using a small-diameter bailer. Field measurements of DO, ORP, turbidity, pH, temperature, and specific conductance were made during the purging process. Piezometers were sampled using the small-diameter bailers, which were discarded after each use.

All samples were preserved as required in the January, 2002, Technical Memorandum and delivered to the fixed-base laboratory within the appropriate holding period.

In addition to the geochemical samples collected for laboratory analysis, water collected during the monitoring well purge process was also analyzed in the field for carbon dioxide and ferrous iron using Hach™ kits.

In addition to groundwater samples, quality assurance/quality control (QA/QC) samples were collected during the field effort. The QA/QC samples included field duplicates, matrix spike/matrix spike duplicates, ambient blanks, equipment blanks, and trip blanks. The quantity of QA/QC samples collected at the site were in accordance with guidelines in Section 5.13.11 and 5.13.12 of the EISOPQAM.

Variances from the Groundwater Sampling Plan

As stated in the previous section, groundwater samples were collected according to the January 2002 Technical Memorandum, however, several samples collected during the March 2002 effort had to be recollected as a result of violation of sample holding times. The samples effected included the EPA Method 9056 sample from MW-85 and the sulfate samples from monitoring wells MW-93, -100B, and -101. MW-85 was resampled approximately 24 hours after the original sample whereas MW-93, -100B, and 101 were resampled approximately two weeks after the original baseline sampled was collected. For each well the re-sampling effort was conducted using a bailer instead of the bladder pump The bailer was slowly lowered into the well to the same depth that had been used for the pump in an effort to avoid mixing water within the water column. Four full bailers were slowly removed from each well prior to sampling. A new, disposable bailer was used for each sample.

Investigation-Derived Waste (IDW)

Development and purge water were containerized in a 55-gallon drum during field activities. Analytical results from the sampling event were within discharge permit requirements for the Dunn Field recovery system; therefore, approximately 50 gallons of IDW were pumped into the Dunn Field disposal system.

Sample Analysis Results

Groundwater samples were collected as described in the previous section. Field parameters collected from the monitoring wells during the low-flow purge process are shown in Table 2. All concentrations of VOCs and SVOCs detected above laboratory reporting limits from both the MI baseline and LTOA sampling events are located in Tables 3 and 4, respectively. Geochemical parameter analysis results are found in Table 5. Detected concentrations of VOCs and SVOCs are spatially shown on Figure 2 Isoconcentration contours are depicted on Figures 3 and 5 through 8 for tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), carbon tetrachloride, and chloroform, respectively.

It is important to note that with installation of new monitoring wells during the LTOA investigation, a limited to no-flow boundary of the fluvial aquifer has been defined in the northwest corner of the MI. The boundary demarcates the intersection of the water table in the fluvial aquifer with the clay that directly underlies the fluvial deposits leaving fluvial deposits unsaturated. As shown in Figure 4, the boundary also demarcates a window into an intermediate aquifer that underlies the fluvial aquifer. This limited to no-flow boundary may also act as a restriction to the flow and migration of contaminant plumes in groundwater of the fluvial aquifer.

Volatile Organic Compounds

Although several VOCs (Tables 3 and 4) were detected within the groundwater samples collected during the baseline and LTOA sampling events, only those that are typically considered biodegradation ("daughter") products of PCE and TCE are discussed in this section. These daughter products include cis-1,2-DCE and vinyl chloride. In addition, carbon tetrachloride and chloroform, which had not been detected at the higher levels revealed during the baseline sampling event, are also discussed below.

PCE

Data from the baseline sampling event indicate five PCE plumes within the MI above the groundwater maximum concentration limit (MCL) of 5 µg/L, with interconnection between two of these plumes (Figure 3). These plumes originate in the vicinity of MW-21/-101 (southwest corner), MW-86/-92 (southeast corner), MW-64 (southeast central), PZ-03 (south central), and MW-63 (north central).

The southwest corner plume had the highest PCE concentrations of 480 µg/L (MW-101) and 90 µg/L (MW-21), and, based on configuration of the plume and the average direction of groundwater flow, as shown in Figure 4, the plume appears to be migrating from the southwest towards the northeast.

The southeastern plume had concentrations of 198 µg/L (MW-86) and 150 µg/L (MW-92), and, based on configuration of the plume and the average direction of groundwater flow, appears to be migrating in a fan-like pattern, southwest and south-southwest away from the source area. The southeast central plume surrounding MW-64 is closely associated with this plume, although these plumes do not appear to have a common source area

The other central plumes have PCE concentrations slightly above the MCL: 7.1 µg/L (PZ-03) and 9.7 µg/L (MW-63).

A possible sixth plume is located in the vicinity of the monitoring well cluster MW-89/-90, where the southwest and north central plumes converge. Samples for VOCs were collected at two different intervals within monitoring wells MW-89 and -90 because each of these wells has a 30 foot screen interval and the aquifer is approximately 57 feet thick in this area. MW-89 is screened in the lower portion of the aquifer while MW-90 is screened in the upper portion, thereby screening the entire watertable. Of the four samples collected from these two wells, PCE was detected only in MW-90 at concentrations of 8.8 µg/L from 125 to 130 feet below top-of-casing [BTOC]) and 60 µg/L from 135 to 140 feet BTOC. Based on a review of soil boring logs for each well, as found in the MI Remedial Investigation Report (CH2M HILL, January 2000), no low permeability layers exist between the top and bottom of each screened interval.

TCE

Data from the baseline sampling event indicate five TCE plumes within the MI and one outside of the MI are present in the aquifer at levels above the groundwater MCL of 5 µg/L (Figure 5). These plumes originate in the vicinity of MW-21/-100B (southwest corner), MW-85/-86 (southeast corner), MW-64 (southeast central), PZ-05 (southeast corner outside the MI), MW-63 (north central), and MW-104 (northeast corner).

The southwest corner plume had the highest TCE concentrations of 79 µg/L (MW-100B) and 76 µg/L (MW-21), and, based on configuration of the plume and the average direction of groundwater flow, as shown in Figure 4, the plume appears to be migrating in a southwest to northeast direction.

The southeastern plume within the MI revealed TCE concentrations of 20 µg/L (MW-86) and 23 µg/L (MW-85), and, based on configuration of the plume and the average direction of groundwater flow, the plume appears to be migrating to the southwest away from the source area. Another plume, centered around MW-64, contained even higher concentrations of TCE at 45 µg/L.

The northeastern plume within the MI had a high concentration of 11 µg/L (MW-104), and, based on configuration of the plume and the average direction of groundwater flow, this plume appears to be migrating from the northeast to southwest

The offsite southeastern plume had a high concentration of 46 µg/L (PZ-05). The potential migration pattern of this plume can not be defined due to limited data in this area; however, its origin appears to be from an offsite source.

TCE plumes located in the southwest and northeast, centered around MW-63, appear to converge in the central portion of the MI near the MW-89/-90 well cluster.

cis-1,2-DCE

Data from the baseline sampling event indicates a cis-1,2-DCE plume in the vicinity of MW-62 (northeast area) with a cis-1,2-DCE concentration of 190 µg/L (Figure 6). This concentration is above the groundwater MCL of 70 µg/L. The movement of this plume can not be determined due to limited contaminant and hydrogeologic data in this area.

This compound also appeared in samples from wells MW-85, -86, and –88 albeit at levels below the MCL. The presence of cis-1,2-DCE could be indicative of degradation of the PCE and TCE in the same area.

Vinyl Chloride

Data from the baseline sampling event revealed the presence of one vinyl chloride plume within the MI above the groundwater MCL of 2 µg/L, also in the vicinity of MW-62 (northeast area). A concentration of 28 µg/L was reported in MW-62. The movement of this plume can not be determined due to contaminant and hydrogeologic limited data in this area. The presence of vinyl chloride in this one particular area indicates that degradation of other "predecessor" VOCs may be occurring.

Carbon Tetrachloride

Baseline sample results indicates one carbon tetrachloride plume is present within the MI above the groundwater MCL of 5 µg/L (Figure 7). The primary plume can be found surrounding the vicinity of MW-85/-86 (southeast corner) The highest average value of carbon tetrachloride to be found in MW-85 and MW-86 is 122 µg/L and 75 µg/L, respectively. Assuming that this plume is migrating along with the predominant groundwater flow direction of this area, then the movement of this plume will be towards the southwest. There may also be two other potential plumes albeit at concentrations below the MCL present around MW-64 (southeast central) and MW-90 and -107.

Chloroform

Data from the baseline sampling event indicate three chloroform plumes within the MI above the groundwater MCL of 80 µg/L, although it is noted that this MCL is currently under review by EPA (EPA, 2002). These plumes originate in the vicinity of MW-85/-86 (southeast corner), MW-63 (north central), and MW-103/-104 (northeast corner) (Figure 8).

The southeastern plume revealed the highest chloroform concentrations of 77 µg/L (MW-86) and 64 µg/L (MW-85), and, based on configuration of the plume and the average direction of groundwater flow for this area, the plume appears to be migrating from the source area toward the west and south. This plume also mirrors the carbon tetrachloride plume at the same location and may be a product from the degradation of carbon tetrachloride.

Samples collected from monitoring wells MW-103 and MW-104 revealed chloroform concentrations of 12 µg/L in MW-103 and 13 µg/L in MW-104 and, based on configuration of the plume and the average direction of groundwater flow for this area, the plume appears to be migrating from the northeast to the southwest.

The third plume can be found surrounding MW-63 and MW-108 in the north central portion of the MI. The highest concentration of chloroform detected in this plume is 12 µg/L in well MW-63.

The plume surrounding monitoring wells MW-85 and MW-86 may have originated from the breakdown of carbon tetrachloride in the same area. The origin of the other two plumes may have been from other unknown previous disposal activities.

Semi-volatile Organic Compounds

SVOCs were collected from monitoring wells MW-89 and -90 only as part of a follow-up action to the LTOA effort. These wells were sampled because of potential concerns over leaching of contaminants from soil to groundwater at the former PCP Dip Vat on the MI. None of the four samples collected from these two monitoring wells contained PCP above the reporting limit of 2.66 µg/L. Within MW-89, bis(2-ethylhexl)phthalate was detected at 152 feet BTOC (4 23J µg/L) and 162 feet BTOC (6.59 µg/L) No other SVOCs were detected.

Geochemical Parameters

Geochemical parameter analysis results are presented in Table 5. Carbon dioxide and ferrous iron field measurements are found in Table 2. Samples were collected from existing monitoring wells located upgradient, within, and downgradient of both of the EBT Treatability Study areas. The samples were analyzed for a variety of geochemical analytes, as described previously. Based on a review of Table 5, the most common analytes detected (not necessarily in order) include: alkalinity, chloride, nitrate, and sulfate These analytes are also discussed below along with carbon dioxide and ferrous iron.

A review of Table 5 indicates that, in addition to the analytes mentioned in the previous paragraph, total organic carbon (TOC) was detected in 5 of 18 samples and usually at levels less than 5 milligrams per liter (mg/L), attesting to the fact that TOC levels are low throughout the aquifer. Metabolic acids, such as formic, acetic, and lactic acid, were also detected in almost all samples, albeit always with a J qualifier, indicating an estimated detection. The CVOC degradation byproduct, acetylene, was also detected in almost every sample albeit never above the concentration of 1.1 mg/L. The reporting limit for acetylene was 0.026 mg/L.

Alkalinity

According to Wiedemeier, et al. (1999), "biologically active portions of a dissolved contaminant plume typically can be identified by an increase in alkalinity" as a result of an increase of carbon dioxide during biodegradation of organic carbon As shown on Figure 9, alkalinity measurements were collected from monitoring wells located across the EBT treatability study sites with values ranging from not detectable above the laboratory reporting limit of 1 mg/L to 160 mg/L. The data revealed that levels of alkalinity in monitoring wells upgradient to the sites appear to be higher than those within and downgradient of the study areas. This difference can be interpreted in several ways: (1) Microbially mediated reactions that would typically cause a higher than normal carbon dioxide content and, subsequently, increased alkalinity level, are suppressed because of the lack of respiration by microorganisms during anaerobic degradation; (2) Differences in the geologic characteristics of the fluvial aquifer with regards to elemental calcium, magnesium, sodium, potassium, or ammonia, and, (3) Low transfer of carbon dioxide from the atmosphere to the aquifer.

CH2M HILL compared alkalinity levels found in the site monitoring wells to values reported for trace inorganic constituents from the fluvial aquifer in the Memphis area by the US Geological Survey (USGS, 1988). The USGS sampled 28 points located in the Memphis area and screened within water-table aquifers for sampling of inorganic constituents. One well, located in the City of Memphis' Allen Well Field that is approximately one mile from the MI, was found to have alkalinity levels at 139 mg/L (as $CaCO_3$). In comparison, the alkalinity levels found in wells at the MI appear to be, on average, much lower.

Chloride

Chloride measurements collected in groundwater samples are shown in Figure 10 with values ranging from 5.1 mg/L to 230 mg/L. The results indicate no distinct pattern, although chloride content appears to be higher upgradient of the treatability study sites than within or downgradient of each site. Chloride is typically released into the surrounding groundwater when chlorinated hydrocarbons are biodegraded. The results found during this sampling event may indicate that there is little biodegradation of the chlorinated hydrocarbons occurring within the outline of the contaminant plumes. The USGS (1988) reported a chloride level of 19 mg/L in a well located very near the MI. This level is comparable to levels detected in wells considered background to the MI EBT Treatability Study sites, but still higher than the level found in wells within the treatability study sites. When compared to the average value for each treatability study site, the USGS reported value is slightly lower than the average 21 mg/L value for Treatability Study Area 1, and is much lower than the 61 mg/L for Treatability Study Area 2.

Nitrate

Nitrate is used by microorganisms as an electron acceptor during biodegradation of organic carbon after dissolved oxygen has been depleted, in a process referred to as denitrification. During the denitrification process, nitrate levels tend to decrease. As Wiedemeier, et al. (1999), state "...nitrate concentrations below background in areas with dissolved contamination provide evidence for denitrification." Figure 11 reveals that nitrate levels are the same or higher than background (upgradient) in both of the study areas. The denitrification process in these areas appears to be limited.

Sulfate

According to Wiedemeier, et al. (1999), "after dissolved oxygen, nitrate, and biologically available Mn(IV) and Fe(III) have been depleted in the microbiological treatment zone, sulfate may be used as an electron acceptor for anaerobic degradation via sulfate reduction." During this process, sulfate levels compared to background should decrease. Importantly, according to Wiedemeier, et al. (1999), sulfate levels greater than 20 mg/L "may cause competitive exclusion of dechlorinating bacteria ..". The data collected during the baseline sampling effort revealed that sulfate levels within the treatability study areas are, in some cases, significantly less than background (Figure 12). Also, several locations upgradient to the treatability study areas have levels of sulfate much higher than 20 mg/L. The USGS (1988) reported a sulfate level of 25 mg/L in a well located near the MI, a value higher than levels found in wells within the treatability study sites

Carbon Dioxide

Microbiologic degradation of chlorinated compounds can lead to the production of carbon dioxide, therefore, increased levels relative to background indicate microbially mediated reactions are occurring. A review of Table 2 indicates that carbon dioxide levels within Treatability Study Area 1 are higher relative to surrounding upgradient and downgradient monitoring wells. This is the opposite case for Study Area 2 where the wells within the study area contained less carbon dioxide than surrounding wells. Carbon dioxide levels detected during the sampling effort range from 63 to 235 mg/L. The USGS (1988) reported a level of 68 mg/L in a well near the MI. This level is very similar to carbon dioxide levels reported in wells outside (both upgradient and downgradient) of the treatability study sites.

Ferrous Iron

Wiedemeier, et al. (1999), state that "When [ferric iron] is used as an electron acceptor during anaerobic biodegradation of organic carbon, it is reduced to [ferrous iron], which is soluble in water." Increased concentrations of ferrous iron relative to background indicates degradation of organic carbon has occurred. At Study Area 1, ferrous iron levels in wells in the study area are less than upgradient and downgradient wells, whereas Study Area 2, the opposite is true. However, none of the levels are above 1 mg/L, except at MW-96, indicating that what ferrous iron is present may be a result of little biodegradation activity.

Comparison of PCE and TCE Plume Configuration Maps to Historical Data

The MI ROD presents two figures (Figures 2-11 and 2-13) that depict the configuration of contaminant plumes of PCE and TCE as of October/November 1998. The plume configurations were based upon comprehensive groundwater sampling efforts from monitoring wells, temporary monitoring wells, and piezometers that existed on- and offsite of the MI In general, as depicted in Figure 2-11, two PCE plumes were found in the aquifer underlying the site. The plume located under the southwest corner of the MI was shown to have a southwest to northeast to east trend. The semicircular PCE plume located under the southeast corner of the MI has no particular trend but the larger portion of that plume appears to be along the western half. The highest concentration of PCE detected in either of these plumes was 120 µg/L at MW-21.

Figure 2-13 from the MI ROD depicts three TCE plumes at the MI, although one plume appears to be located immediately off the southeast corner of the site A plume located under the southwest corner of the site has a southwest to northeast trend but also has northwest vector along the northern edge of the plume. The highest concentration of TCE in this plume was also found to be 37 µg/L at MW-62. The third plume underlying the site was depicted in a semicircular pattern and radiating outward from MW-64. The TCE concentration in this plume was reported at 28 µg/L.

Since completion of the MI ROD, several new wells have been installed within the footprint of the previously known configuration of the plume, as part of the November/December 2001 LTOA effort. In addition, the March 2002 baseline groundwater sampling effort was conducted to provide recent comprehensive data on the configuration of the contaminant plumes. Figures 13 and 14 present comparisons between the PCE and TCE plume configuration maps, respectively, from the MI ROD and the results of the baseline sampling effort. As noted previously, with the installation of new wells during the LTOA investigation, a limited to no-flow boundary of the fluvial aquifer has been defined in the northwest corner of the MI The boundary demarcates the intersection of the water table in the fluvial aquifer with the clay that directly underlies the fluvial deposits leaving fluvial deposits unsaturated. This feature, which was not well defined when the plume maps for the MI ROD was developed, may act as a restriction to the flow and migration of contaminant plumes in groundwater of the fluvial aquifer, and importantly, has changed the mapping of the contaminant plumes.

Figure 13 reveals that the PCE plume in the southwest corner of the MI appears to be longer in length than presented in the MI ROD, and the plume trends southwest to northeast from PZ-04 to MW-63. The greatest concentration of PCE detected has also increased from 120 µg/L to 480 µg/L. The plume in the southeast corner of the site appears to centered around MW-86 and -92 rather than MW-26 as originally depicted. Concentrations in this plume are also higher at 198 µg/L. In addition, two other separate PCE plumes are shown and appear to be centered around MW-64 and PZ-03

Figure 14 reveals that the TCE plume in the southwest corner of the site is much more linear and thinner than previously conceived while trending from MW-21 to MW-63. There is also a northern vector that appears to be centered around MW-62. In addition, the large plume that was shown in the MI ROD within the southeast corner is now configured as two separate plumes centered around monitoring wells MW-85 and -86 as well as MW-64. The highest concentration of TCE within these two plumes ranges from 23 µg/L to 45 µg/L.

As described within the LTOA Technical Memorandum (CH2M HILL, July 2002), several of the monitoring wells installed during the LTOA investigation were located at points anticipated to be within the fluvial aquifer, which underlies the entire MI. Instead, these wells, including MW-98, -99, -101, and -108 were installed within a window into a lower intermediate/confined aquifer. Geologic cross-sections within the LTOA report show that the fluvial aquifer shares water with the intermediate aquifer where there is connection. The MI RI and ROD did not depict this window to the lower aquifer to be as extensive as is now known. In addition, the geologic description of the material from the LTOA wells has revealed the presence of a trough from MW-101 northeast towards MW-108 and extending northwest towards monitoring wells MW-89 and -90. The trough is composed of a mixture of the fluvial and intermediate aquifers, and has been found to have a relatively thick saturated zone along the length of the trough As a result, the contaminant plumes present in the southwest part of the MI, trending from southwest to the northeast, are most likely more extensive vertically than previously thought and, as revealed in this and the LTOA technical memorandum, are present within another, separate aquifer.

Summary and Conclusions

- Twenty-eight monitoring wells and seven piezometers associated with the MI were selected for the baseline sampling event. Seventeen monitoring wells had been sampled earlier during the November/December 2001 LTOA investigation and were included as part of this comprehensive event

- Twenty-eight monitoring wells and 7 piezometers were sampled for VOCs, eighteen monitoring wells were sampled for geochemical parameters, and 2 monitoring wells were sampled for SVOCs.

- Data from the baseline sampling event indicates five PCE plumes are present in the aquifer underlying the MI above the groundwater MCL of 5 µg/L These plumes originate in the vicinity of MW-21/-101 (southwest corner), MW-86/-92 (southeast corner), PZ-03 (south central), MW-63 (north central), and MW-64 (southeast central).

- Data from the baseline sampling event indicates five TCE plumes are present in the aquifer underlying the MI and one TCE plume outside above the groundwater MCL of 5 µg/L. These plumes originate in the vicinity of MW-21/-100B (southwest corner), MW-85/-86 (southeast corner), MW-104 (northeast corner), MW-63 (north central), MW-64 (southeast central), and PZ-05 (southeast corner outside the MI).

- Data from the baseline sampling event indicates a cis-1,2-DCE plume is present in the aquifer underlying the MI above the groundwater MCL of 70 µg/L. This plume originates in the vicinity of MW-62 (northeast area).

- Groundwater samples collected during the baseline sampling event have revealed a vinyl chloride plume within the MI above the groundwater MCL of 2 µg/L. This plume originates in the vicinity of MW-62 (northeast area).

- Data from the baseline sampling event indicates that a carbon tetrachloride plume above the groundwater MCL of 5 µg/L is present in the vicinity of MW-85/-86 (southeast corner).

- Groundwater samples collected during the baseline sampling event have revealed that there are three chloroform plumes within the MI, however, none of these plumes contain concentrations above the groundwater MCL of 80 µg/L. These plumes originate in the vicinity of MW-85/-86 (southeast corner), MW-103/-104 (northeast corner), and MW-63 (north central).

- Bis(2-ethylhexl)phthalate was detected in MW-89; no other SVOCs were detected.

- Although groundwater samples collected during this event have shown presence of PCE degradation daughter products, analytes collected from geochemical samples have shown limited evidence of microbiologic degradation activity. Various analytes, especially sulfate, have shown evidence that this activity may be occurring without enhancement.

- The configuration of the PCE and TCE plumes that were depicted in figures presented in the MI RI and ROD have changed primarily as result of the installation of additional monitoring wells during the LTOA investigation. Although these plumes have changed configuration, they are still in similar locations as previously recognized. One important difference is that the plumes are now believed to be thicker than previously understood as a result of the discovery of a trough that is composed of an intermediate aquifer underlying the fluvial aquifer.

References

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TABLES

Table 1
Sampling Details for Baseline Monitoring Points
Main Installation Baseline Groundwater Sampling Event

#	Identification	Total Depth (ft BTOC)	Depth to Water - 11/01/2001 (ft BTOC)	Length of Riser (ft)	Length of Screen (ft)	Depth to Bottom of Screen (ft BTOC)	Water Column Within Screened Interval (ft)	Groundwater Sample Type: Sample for VOCs Only: Sampled for Yes/No?	Sample Method	Length of Bag (ft)	Depth to Bottom of Bag (ft BTOC)	Distance of Bottom of Bag Above Bottom of Well (ft)	Geochemical Parameters: Sampled for Yes/No?	Sample Method	Distance of Pump Above Bottom of Well (Ft)
1	MW-16	75 00	58 42	57 6	15	72 6	14 2	Yes	Diffusion Bag	5	68 0	7 0	Yes	Low Flow/Bladder Pump	9 5
2	MW-19	95 50	89 65	83 1	10	93 1	3 4	Yes	Diffusion Bag	2	92 4	3 1	No		
3	MW-20	100 50	85 91	83 1	15	98 1	12 2	Yes	Diffusion Bag	5	94 5	6 0	No		
4	MW-21	109 50	95 05	92 1	15	107 1	12 1	Yes	Diffusion Bag	5	103 6	5 9	Yes	Low Flow/Bladder Pump	8 4
5	MW-22	107 80	98 01	95 4	10	105 4	7 4	Yes	Diffusion Bag	5	104 2	3 6	Yes	Low Flow/Bladder Pump	6 1
6	MW-23	113 60	100 42	101 2	10	111 2	10 0	Yes	Diffusion Bag	5	108 7	4 9	No		
7	MW-24	114 70	108 89	97 3	15	112 3	3 4	Yes	Diffusion Bag	2	111 6	3 1	No		
8	MW-26	110 00	100 66	97 6	10	107 6	6 9	Yes	Diffusion Bag	5	106 6	3 4	No		
9	MW-34	156 70	143 31	136 6	20	156 6	13 3	Yes	Diffusion Bag	5	152 5	4 2	No		
10	MW-36	209 40	158 71	192 3	15	207 3	15 0	Yes	Diffusion Bag	5	202 3	7 1	No		
11	MW-38	155 00	137 48	139 9	15	154 9	15 0	Yes	Diffusion Bag	5	149 9	5 1	No		
12	MW-39	115 60	104 39	95 5	20	115 5	11 1	Yes	Diffusion Bag	5	112 4	3 2	No		
13	MW-47	120 00	102 50	110	10	120	10 0	Yes	Diffusion Bag	5	117 5	2 5	Yes	Low Flow/Bladder Pump	5 0
14	MW-50	125 00	86 61	115	10	125	10 0	Yes	Diffusion Bag	5	122 5	2 5	Yes	Low Flow/Bladder Pump	5 0
15	MW-52	104 00	82 01	94	10	104	10 0	Yes	Diffusion Bag	5	101 5	2 5	No		
16	MW-53	82 50	73 71	72 5	10	82 5	8 8	Yes	Diffusion Bag	5	80 6	1 9	No		
17	MW-55	74 00	71 00	64	10	74	3 0	Yes	Diffusion Bag	2	73 5	0 5	No		
18	MW-62	96 00	93 94	86	10	96	2 1	Yes	Diffusion Bag	1	95 5	0 5	No		
19	MW-63[2]	134 50	108 60	124 5	10	134 5	10 0	Yes	Diffusion Bag	5	132 0	2 5	No		
20	MW-64	112 00	107 38	102	10	112	4 6	Yes	Diffusion Bag	2	110 7	1 3	No		
21	MW-66	112 50	80 06	102 5	10	112 5	10 0	Yes	Diffusion Bag	5	110 0	2 5	No		
22	MW-72	121 20	89 20	110 7	10	120 7	10 0	Yes	Diffusion Bag	5	118 2	3 0	Yes	Low Flow/Bladder Pump	5 5
23	MW-81	211 00	144 95	190	20	210	20 0	Yes	Diffusion Bag	5	202 5	8 5	No		
24	MW-82	200 00	140 27	179	20	199	20 0	Yes	Diffusion Bag	5	191 5	8 5	No		
25	MW-83	187 00	146 73	176	10	186	10 0	Yes	Diffusion Bag	5	183 5	3 5	Yes	Low Flow/Bladder Pump	6 0
26	MW-84	89 50	82 70	69	20	89	6 3	Yes	Diffusion Bag	5	88 4	1 2	No		
27	MW-85**	110 90	99 97	95 9	15	110 9	10 9						Yes	Low Flow/Bladder Pump	5 5
28	MW-86**	117 50	98 27	97 5	20	117 5	19 2						Yes	Low Flow/Bladder Pump	9 6
29	MW-88**	97 00	80 98	82	15	97	15 0						Yes	Low Flow/Bladder Pump	7 5
30	MW-89	177 50	120 41	147	30	177	30 0	Yes	Diffusion Bag	(2) 5	(1) 155, (2) 172	(1) 22 5, (2) 5 5	No		
31	MW-90	145 50	120 25	115	30	145	24 8	Yes	Diffusion Bag	(2) 5	(1) 130, (2) 140	(1) 15 5, (2) 5 5	No		
32	MW-92**	108 00	96 75	93	15	108	11 3						Yes	Low Flow/Bladder Pump	5 6
33	MW-93**	107 00	102 45	92	15	107	4 6						Yes	Low Flow/Bladder Pump	2 3
34	MW-94**	110 50	107 07	100 5	10	110 5	3 4						No		
35	MW-96**	95 50	83 02	75 5	20	95 5	12 5						Yes	Low Flow/Bladder Pump	6 2
36	MW-97**	117 50	101 25	97 5	20	117 5	16 3						Yes	Low Flow/Bladder Pump	8 1
37	MW-98**	147 00	102 00	137	10	147	10 0						Yes	Low Flow/Bladder Pump	5 0
38	MW-99**	111 50	89 60	91 5	20	111 5	20 0						No		
39	MW-100B**[1]	127 50	92 95	107 5	20	127 5	20 0						Yes	Low Flow/Bladder Pump	10 0
40	MW-101**	134 00	93 32	89	15	104	10 7						Yes	Low Flow/Bladder Pump	20 5 (middle screen int)
	Middle Interval			5	10	119	10 0						No		
	Lower Interval			5	10	134	10 0						No		
41	MW-102B**[1]	140 50	110 66	120 5	20	140 5	20 0						Yes	Low Flow/Bladder Pump	10 0
42	MW-103**	90 00	69 43	70	20	90	20 0						No		
43	MW-104**	90 50	63 01	70 5	20	90 5	20 0						No		
44	MW-107**	158 00	114 43	128	15	143	15 0						No		
	Lower Interval			5	10	158	10 0						No		
45	MW-108**	170 00	113 21	160	10	170	10 0						No		
1	PZ-01	113 70	105 02	103 7	10	113 7	8 7	Yes	Teflon Bailer				No		
2	PZ-03	118 90	107 04	108 9	10	118 9	10 0	Yes	Teflon Bailer				No		
3	PZ-04	108 30	98 34	98 3	10	108 3	10 0	Yes	Teflon Bailer				No		
4	PZ-05	78 10	59 50	68 1	10	78 1	10 0	Yes	Teflon Bailer				No		
5	PZ-06	99 40	73 52	89 4	10	99 4	10 0	Yes	Teflon Bailer				No		
6	PZ-07	111 30	98 98	101 3	10	111 3	10 0	Yes	Teflon Bailer				No		
7	PZ-08	108 20	84 49	98 2	10	108 2	10 0	Yes	Teflon Bailer				No		

Notes
Five monitoring wells were not sampled during this event, including MW-18 due to sample repitition, MW-27 due to lack of water, and MW-17 and MW-25 due to well obstructions
[1] = Replacement Monitoring Wells for MW-100 and MW-102 Depth-to-water measurements are from MW-100 and MW-102
[2]= MW-63 was sampled after the top of the casing at ground surface had been repaired using PVC glue The well was purged of groundwater at the top of the water column, but the glue may have tainted the groundwater sample
** = Monitoring wells sampled during the LTOA event
Depth-to-water measurement for MW-66 is from the November 12, 1998 gauging event
NA = Not Applicable

Table 2

Field Parameters Collected from Monitoring Wells - March 2002

Main Installation Baseline Groundwater Sampling Event

Well ID	Turbidity (NTU)	pH	Conductivity (uS/cm)	Temperature (°C)	ORP (mV)	Dissolved Oxygen Flow Cell (mg/L)	Carbon Dioxide (mg/L)	Ferrous Iron (mg/L)
MW-16	0	6 40	0 48	19 40	33	2 30	193	NA
MW-21	3 8	5 94	0 223	14 65	162	5 54	68 2	0 08
MW-22	8 5	6 26	0 418	16 28	171	6 59	63 2	0 13
MW-26	0	6 30	0 31	17 40	128	5 30	164	0 01
MW-47	9 2	5 95	0 186	17 37	171	3 21	76 2	0
MW-50	5 5	6 20	0 79	19 60	128	3 70	213	0
MW-72	9 6	6 34	0 334	18 09	260	6 31	74 6	0 03
MW-85	8 8	6 00	0 19	20 60	90	3 40	114 2	0 09
MW-86	63 8	6 10	0 16	20 10	122	9 00	102 4	0 14
MW-88	>999	7 00	0 28	19 80	125	9 90	196	0
MW-89 (152 ft BTOC)	>999	6 00	0 23	18 20	109	3 50	NA	NA
MW-89 (162 ft BTOC)	456	6 00	0 23	18 20	118	3 50	NA	NA
MW-89 (172 ft BTOC)	375	6 00	0 24	17 70	103	3 60	NA	NA
MW-90	203	5 90	0 44	17 50	170	4 40	NA	NA
MW-92	8 3	6 00	0 24	19 20	184	7 40	140 6	0 2
MW-93	8 6	5 80	0 178	11 96	160	6 91	64 4	0 14
MW-96	8 5	6 40	0 55	16 60	-19	2 10	235	3 16
MW-97	9 4	6 09	0 269	16 77	139	4 11	113 6	0 11
MW-98	18 1	6 30	0 24	18 20	180	3 90	139	0 05
MW-100B	5 7	6 30	0 26	18 70	144	2 70	233	0 05
MW-101	0	6 40	0 36	18 30	132	6 60	221	0 01
MW-102B	9 6	6 27	0 472	17 71	226	5 81	78	0 19
PZ-01	>999	6 16	0 189	18 60	103	8 45	NA	NA
PZ-03	>999	6 42	0 25	16 50	120	6 23	NA	NA
PZ-04	>999	6 21	0 253	16 18	157	8 55	NA	NA
PZ-05	>999	6 08	0 379	16 34	202	7 11	NA	NA
PZ-06	468	6 38	0 348	16 40	45	5 35	NA	NA
PZ-07	155	6 51	0 235	16 42	22	6 11	NA	NA
PZ-08	29 7	6 05	0 173	17 87	140	7 58	NA	NA

Notes
NTU = Nephelometric Turbidity Units
uS/cm = microseconds per centimeter
C = Celcius
mV = millivolts
mg/L = milligrams per liter
MW Monitoring Well
PZ Piezometer
ft BTOC Feet Below Top-of Casing
NA Parameter not analyzed for

Table 3

VOC and SVOC PDB and Low-Flow Sample Result Summary - March 2002

Main Installation Baseline Groundwater Sampling Event

Sample Identification	Date of Sample Collection	Parameter	Result	Laboratory Qualifier	Adjusted Minimum Detection Limit	Adjusted Reporting Limit	Dilution
MW20-105-110BL	03/18/2002	CHLOROFORM	0 27	J	0 125	1	1
MW21-98-103BL	03/20/2002	CIS-1,2-DICHLOROETHENE	1 9	=	0 25	1	1
		TETRACHLOROETHENE	**90**	=	0 25	1	1
		TRICHLOROETHENE	**76**	=	0 25	1	1
MW22-99-104BL	03/18/2002	2-BUTANONE	2 5	J	2 5	10	1
		TETRACHLOROETHENE	0 27	J	0 25	1	1
MW23-95-100BL	03/18/2002	ACETONE	7 5	J	2 5	10	1
MW-26-106-BL	03/21/2002	TETRACHLOROETHENE	**8 1**	=	0 25	5	1
		CARBON TETRACHLORIDE	3 7	J	0 25	5	1
		TRICHLOROETHENE	1 6	J	0 25	5	1
MW34-147-152BL	03/18/2002	CHLOROFORM	3	=	0 125	1	1
		CARBON TETRACHLORIDE	0 7	J	0 25	1	1
		TRICHLOROETHENE	0 93	J	0 25	1	1
MW38-145-150BL	03/18/2002	TOLUENE	0 33	J	0 25	1	1
MW39-107-112BL	03/18/2002	TETRACHLOROETHENE	**8 2**	=	0 25	1	1
		TRICHLOROETHENE	3 8	=	0 25	1	1
		1,2 DICHLOROETHANE	0 27	J	0 25	1	1
		CHLOROFORM	0 18	J	0 125	1	1
		CIS-1,2-DICHLOROETHENE	0 48	J	0 25	1	1
MW50-117 5-122 5BL	03/19/2002	TRICHLOROETHENE	1 2	=	0 25	1	1
		CHLOROFORM	0 25	J	0 125	1	1
		CIS-1,2-DICHLOROETHENE	0 48	J	0 25	1	1
MW52-96 5-101 5BL	03/19/2002	TETRACHLOROETHENE	**6 4**	=	0 25	1	1
		CHLOROFORM	0 35	J	0 125	1	1
		CIS-1,2-DICHLOROETHENE	0 53	J	0 25	1	1
		TRICHLOROETHENE	0 59	J	0 25	1	1
MW53-75 80BL	03/18/2002	2-BUTANONE	2 7	J	2 5	10	1
		TETRACHLOROETHENE	0 6	J	0 25	1	1
MW62-94-95BL	03/18/2002	1,1-DICHLOROETHENE	1 3	=	0 5	1	1
		CIS-1,2-DICHLOROETHENE	**190**	=	0 25	1	1
		TRICHLOROETHENE	**6 5**	=	0 25	1	1
		VINYL CHLORIDE	**28**	=	0 25	1	1
		CHLOROFORM	0 18	J	0 125	1	1
		TOLUENE	0 65	J	0 25	1	1
MW63-128-133BL	03/18/2002	CHLOROFORM	12	=	0 125	1	1
		TETRACHLOROETHENE	**9 7**	=	0 25	1	1
		TRICHLOROETHENE	**15**	=	0 25	1	1
		1,1-DICHLOROETHANE	0 65	J	0 125	1	1
		1,1-DICHLOROETHENE	0 7	J	0 5	1	1
		CIS-1,2-DICHLOROETHENE	0 36	J	0 25	1	1
MW64-108-110BL	03/18/2002	1,1,2,2-TETRACHLOROETHANE	3 5	=	0 125	1	1
		CARBON TETRACHLORIDE	3 3	=	0 25	1	1
		TETRACHLOROETHENE	**10**	=	0 25	1	1
		TRICHLOROETHENE	**45**	=	0 25	1	1
		1,2-DICHLOROETHANE	0 51	J	0 25	1	1
		CHLOROFORM	0 85	J	0 125	1	1
		CIS-1,2 DICHLOROETHENE	0 45	J	0 25	1	1
MW83-178 5-183 5BL	03/20/2002	CHLOROMETHANE	**1**	=	0 25	1	1
		TOLUENE	0 47	J	0 25	1	1
MW84-83 88BL	03/18/2002	1,2-DICHLOROETHANE	3 4	=	0 25	1	1
		CARBON TETRACHLORIDE	3 8	=	0 25	1	1
		CHLOROFORM	0 52	J	0 125	1	1
		TETRACHLOROETHENE	0 37	J	0 25	1	1
MW89-150-155BL	03/19/2002	TOLUENE	0 27	J	0 25	1	1
MW-89-152-BL**		BIS(2-ETHYLHEXYL)PHTHALATE	4 23	J	2 66	5 32	1
MW-89-152-BLD**		BIS(2-ETHYLHEXYL)PHTHALATE	3 97	J	2 66	5 32	1
MW-89-162-BL**		BIS(2-ETHYLHEXYL)PHTHALATE	6 59	=	2 66	5 32	1
MW89-167-172BL		TRICHLOROETHENE	0 89	J	0 25	1	1
MW89-167-172BLD		TRICHLOROETHENE	0 84	J	0 25	1	1
MW90-125-130BL	03/19/2002	CHLOROFORM	3 5	=	0 125	1	1
		TETRACHLOROETHENE	**8.8**	=	0 25	1	1
		TRICHLOROETHENE	2 7	=	0 25	1	1
		1,2-DICHLOROPROPANE	0 37	J	0 125	1	1
		CARBON TETRACHLORIDE	0 32	J	0 25	1	1
MW90-135-140BL	03/19/2002	CHLOROFORM	8 9	=	0 125	1	1
		TETRACHLOROETHENE	**58**	=	0 25	1	1
		TRICHLOROETHENE	**10**	=	0 25	1	1
		1,1-DICHLOROETHANE	0 4	J	0 125	1	1
		CARBON TETRACHLORIDE	0 65	J	0 25	1	1
		CIS-1,2-DICHLOROETHENE	0 44	J	0 25	1	1

Table 3

VOC and SVOC PDB and Low-Flow Sample Result Summary - March 2002

Main Installation Baseline Groundwater Sampling Event

Sample Identification	Date of Sample Collection	Parameter	Result	Laboratory Qualifier	Adjusted Minimum Detection Limit	Adjusted Reporting Limit	Dilution
MW90-135-140BLD	03/19/2002	CHLOROFORM	9	=	0 125	1	1
		TETRACHLOROETHENE	**60**	=	0 25	1	1
		TRICHLOROETHENE	**10**	=	0 25	1	1
		1,1-DICHLOROETHANE	0 4	J	0 125	1	1
		CARBON TETRACHLORIDE	0 69	J	0 25	1	1
		CIS-1,2-DICHLOROETHENE	0 41	J	0 25	1	1
PZ03-110 112BL	03/20/2002	TETRACHLOROETHENE	**7.1**	=	0 25	1	1
		CIS-1,2-DICHLOROETHENE	0 55	J	0 25	1	1
		TRICHLOROETHENE	0 86	J	0 25	1	1
PZ04-102-104BL	03/20/2002	TETRACHLOROETHENE	2 7	=	0 25	1	1
		BENZENE	0 3	J	0 125	1	1
PZ04-102-104BLD1		ACETONE	1600	=	25	100	10
PZ05-74-76BL	03/20/2002	TRICHLOROETHENE	**46**	=	0 25	1	1
PZ06-96-98BL	03/20/2002	ACETONE	4	J	2 5	10	1
		TOLUENE	0 37	J	0 25	1	1
		TRICHLOROETHENE	0 31	J	0 25	1	1
PZ07-106-108BL	03/19/2002	CIS-1,2-DICHLOROETHENE	1 9	=	0 25	1	1
		TRICHLOROETHENE	2 4	=	0 25	1	1

All results reported in micrograms per liter

Only detected parameters presented in this table

All samples were analyzed according to EPA Method SW846 8260B unless otherwise noted

**Samples analyzed according to EPA Method SW846 8270

Shading and bold value indicates parameter exceedance of Federal Drinking Water Maximum Contaminant Levels (MCLs) or Maximum Contaminant Level Goal (MCLG)

MW Monitoring Well

PZ Piezometer

J = Evidence of parameter present Parameter detected at or below laboratory detection limit

D = Same sample as predecessor sample with similar sample number however sample diluted to define the concentration of the parameter in the sample

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-100-1	12/11/01	1,1,2,2-Tetrachloroethane	1 7	=	0 09	1
		1,1-Dichloroethene	0 13	J	0 11	1
		1,2-Dichloroethane	0 15	J	0 11	1
		Acetone	49	J	1 1	5
		cis-1,2-Dichloroethene	1 1	=	0 12	1
		Tetrachloroethene	14	=	0 12	1
		trans-1,2-Dichloroethene	0 14	J	0 11	1
MW-100-1DL	12/11/01	Trichloroethene	44	=	0 65	5
MW-100-2	12/11/01	1,1,2,2-Tetrachloroethane	0 38	J	0 09	1
		1,1-Dichloroethene	0 12	J	0 11	1
		1,2-Dichloroethane	0 15	J	0 11	1
		cis-1,2-Dichloroethene	1 1	=	0 12	1
		trans-1,2-Dichloroethene	0 18	J	0 11	1
MW-100-2DL	12/11/01	Tetrachloroethene	41	=	1 2	10
		Trichloroethene	58	=	1 3	10
MW-100-3	12/11/01	1,1,2,2-Tetrachloroethane	0 42	J	0 09	1
		1,1-Dichloroethene	0 14	J	0 11	1
		1,2-Dichloroethane	0 21	J	0 11	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 12	J	0 11	1
MW-100-3DL	12/11/01	Tetrachloroethene	43	=	1 2	10
		Trichloroethene	65	=	1 3	10
MW-100-4	12/11/01	1,1-Dichloroethene	0 28	J	0 11	1
		1,2-Dichloroethane	0 18	J	0 11	1
		Bromomethane	0 2	J	0 18	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 18	J	0 11	1
MW-100-4DL	12/11/01	Tetrachloroethene	63	=	1 2	10
		Trichloroethene	81	=	1 3	10
MW-100-5	12/11/01	1,1,2,2-Tetrachloroethane	0 59	J	0 09	1
		1,1-Dichloroethene	0 29	J	0 11	1
		1,2-Dichloroethane	0 17	J	0 11	1
		cis-1,2-Dichloroethene	1 3	=	0 12	1
		trans-1,2-Dichloroethene	0 15	J	0 11	1
MW-100-5DL	12/11/01	Tetrachloroethene	65	=	1 2	10
		Trichloroethene	97	=	1 3	10
MW-100-6	12/11/01	1,1,2,2-Tetrachloroethane	0 12	J	0 09	1
		1,2-Dichloroethane	0 11	J	0 11	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 15	J	0 11	1
MW-100-6DL	12/11/01	Tetrachloroethene	51	=	1 2	10
		Trichloroethene	75	=	1 3	10
MW-100-7	12/11/01	1,1,2,2-Tetrachloroethane	0 15	J	0 09	1
		1,1-Dichloroethene	0 2	J	0 11	1
		1,2-Dichloroethane	0 16	J	0 11	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 16	J	0 11	1
MW-100-7DL	12/11/01	Tetrachloroethene	55	=	1 2	10
		Trichloroethene	94	=	1 3	10
MW-100-8	12/11/01	1,1,2,2-Tetrachloroethane	0 23	J	0 09	1
		1,1-Dichloroethene	0 21	J	0 11	1
		1,2-Dichloroethane	0 17	J	0 11	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 13	J	0 11	1
MW-100-8DL	12/11/01	Tetrachloroethene	61	=	1 2	10
		Trichloroethene	97	=	1.3	10
MW-100-9	12/11/01	1,1,2,2-Tetrachloroethane	0 13	J	0 09	1
		1,1-Dichloroethene	0 18	J	0 11	1
		1,2-Dichloroethane	0 14	J	0 11	1
		cis-1,2-Dichloroethene	1 2	=	0 12	1
		trans-1,2-Dichloroethene	0 17	J	0 11	1
MW-100-9DL	12/11/01	Tetrachloroethene	63	=	1 2	10
		Trichloroethene	98	=	1 3	10

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-101-109	12/21/01	cis-1,2-Dichloroethene	0 27	J	0 12	1
		Trichloroethene	0 87	J	0 13	1
MW-101-109DL	12/21/01	Tetrachloroethene	450	=	4 8	40
MW-101-124	12/21/01	Chloroform	0 42	J	0 12	1
		cis-1,2-Dichloroethene	0 39	J	0 12	1
		Trichloroethene	0 84	J	0 13	1
MW-101-124DL	12/21/01	Tetrachloroethene	460	=	4 8	40
MW-101-89	12/21/01	Chloroform	0 38	J	0 12	1
		cis-1,2-Dichloroethene	0 34	J	0 12	1
		Trichloroethene	0 95	J	0 13	1
MW-101-89DL	12/21/01	Tetrachloroethene	530	=	4 8	40
MW-102-1	12/11/01	1,1,2,2-Tetrachloroethane	0 23	J	0 09	1
		Carbon disulfide	0 33	J	0 14	1
		Trichloroethene	0 9	J	0 13	1
MW-102-2	12/11/01	1,1,2,2-Tetrachloroethane	0 44	J	0 09	1
		Carbon disulfide	0 28	J	0 14	1
		Trichloroethene	0 33	J	0 13	1
MW-102-3	12/11/01	1,1,2,2-Tetrachloroethane	0 35	J	0 09	1
		Carbon disulfide	0 21	J	0 14	1
		Trichloroethene	0 25	J	0 13	1
MW-102-4	12/11/01	1,1,2,2-Tetrachloroethane	0 3	J	0 09	1
		Trichloroethene	0 22	J	0 13	1
MW-102-5	12/11/01	1,1,2,2-Tetrachloroethane	0 23	J	0 09	1
		Trichloroethene	0 18	J	0 13	1
MW-102-6	12/11/01	1,1,2,2-Tetrachloroethane	0 13	J	0 09	1
MW-103-1	11/30/01	1,1-Dichloroethane	0 21	J	0 14	1
		Acetone	1 5	J	1 4	5
		Chloroform	1 9	=	0 14	1
		Ethylbenzene	0 14	J	0 12	1
		m-,p-Xylene	0 45	J	0 23	2
		o-Xylene	0 13	J	0 13	1
		Toluene	0 18	J	0 11	1
		Trichloroethene	0 3	J	0 12	1
MW-103-2	11/30/01	1,1-Dichloroethane	0 42	J	0 14	1
		Chloroform	4 3	=	0 14	1
		m-,p-Xylene	0 28	J	0 23	2
		Trichloroethene	0 69	J	0 12	1
MW-103-3	11/30/01	1,1-Dichloroethane	1 7	=	0 14	1
		1,1-Dichloroethene	1 4	=	0 23	1
		1,2-Dichloroethane	0 18	J	0 1	1
		Chloroform	16	=	0 14	1
		cis-1,2-Dichloroethene	0 39	J	0 12	1
		Ethylbenzene	0 13	J	0 12	1
		m-,p-Xylene	0 38	J	0 23	2
		Trichloroethene	4 8	=	0 12	1
MW-103-4	11/30/01	1,1-Dichloroethane	1 4	=	0 14	1
		1,1-Dichloroethene	1 1	=	0 23	1
		1,2-Dichloroethane	0 18	J	0 1	1
		Chloroform	14	=	0 14	1
		cis-1,2-Dichloroethene	0 33	J	0 12	1
		Trichloroethene	3 9	=	0 12	1
MW-103-5	11/30/01	1,1-Dichloroethane	1 6	=	0 14	1
		1,1-Dichloroethene	1 5	=	0 23	1
		1,2-Dichloroethane	0 16	J	0 1	1
		Chloroform	15	=	0 14	1
		cis-1,2-Dichloroethene	0 34	J	0 12	1
		Ethylbenzene	0 15	J	0 12	1
		m-,p-Xylene	0 44	J	0 23	2
		Trichloroethene	4 4	=	0 12	1
MW-103-6	11/30/01	1,1-Dichloroethane	1 7	=	0 14	1
		1,1-Dichloroethene	1 2	=	0 23	1
		1,2-Dichloroethane	0 17	J	0 1	1
		Chloroform	16	=	0 14	1
		cis-1,2-Dichloroethene	0 36	J	0 12	1
		Trichloroethene	4 6	=	0 12	1

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
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Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-103-7	11/30/01	1,1-Dichloroethane	1 8	=	0 14	1
		1,1-Dichloroethene	1 4	=	0 23	1
		1,2-Dichloroethane	0 18	J	0 1	1
		Chloroform	17	=	0 14	1
		cis-1,2-Dichloroethene	0 39	J	0 12	1
		Trichloroethene	4 9	=	0 12	1
MW-103-8	11/30/01	1,1-Dichloroethane	1 7	=	0 14	1
		1,1-Dichloroethene	1 2	=	0 23	1
		1,2-Dichloroethane	0 18	J	0 1	1
		Chloroform	16	=	0 14	1
		cis-1,2-Dichloroethene	0 36	J	0 12	1
		Trichloroethene	4 9	=	0 12	1
MW-103-9	11/30/01	1,1-Dichloroethane	1 5	=	0 14	1
		1,1-Dichloroethene	1 1	=	0 23	1
		1,2-Dichloroethane	0 15	J	0 1	1
		Chloroform	17	=	0 14	1
		cis-1,2-Dichloroethene	0 37	J	0 12	1
		m-,p-Xylene	0 27	J	0 23	2
		Trichloroethene	5 8	=	0 12	1
MW-104-1	11/30/01	1,1-Dichloroethane	0 16	J	0 14	1
		Acetone	17	J	1 4	5
		Carbon disulfide	1 3	=	0 22	1
		Chloroform	4	=	0 14	1
		Ethylbenzene	0 61	J	0 12	1
		m-,p-Xylene	1 8	J	0 23	2
		o-Xylene	0 57	J	0 13	1
		Toluene	0 45	J	0 11	1
		Trichloroethene	0 89	J	0 12	1
MW-104-2	11/30/01	Acetone	16	J	1 1	5
		Carbon disulfide	1 7	=	0 14	1
		Chloroform	4 6	=	0 12	1
		Ethylbenzene	0 69	J	0 11	1
		m-,p-Xylene	2 2	=	0 2	2
		Methylene chloride	0 13	J	0 06	1
		o-Xylene	0 69	J	0 1	1
		Trichloroethene	1 1	=	0 13	1
MW-104-3	11/30/01	1,1-Dichloroethane	0 16	J	0 12	1
		Acetone	14	J	1 1	5
		Carbon disulfide	1 5	=	0 14	1
		Chloroform	4 8	=	0 12	1
		Ethylbenzene	0 73	J	0 11	1
		m-,p-Xylene	2 4	=	0 2	2
		o-Xylene	0 74	J	0 1	1
		Trichloroethene	1 1	=	0 13	1
MW-104-4	11/30/01	1,1-Dichloroethane	0 16	J	0 12	1
		Carbon disulfide	1 4	=	0 14	1
		Chloroform	5	=	0 12	1
		Ethylbenzene	0 7	J	0 11	1
		m-,p-Xylene	2 2	=	0 2	2
		o-Xylene	0 68	J	0 1	1
		Trichloroethene	1 3	=	0 13	1
MW-104-5	11/30/01	1,1-Dichloroethane	0 37	J	0 12	1
		1,1-Dichloroethene	0 48	J	0 11	1
		Acetone	3 1	J	1 1	5
		Carbon disulfide	0 94	J	0 14	1
		Chloroform	10	=	0 12	1
		cis-1,2-Dichloroethene	0 22	J	0 12	1
		Ethylbenzene	0 55	J	0 11	1
		m-,p-Xylene	1 6	J	0 2	2
		Methylene chloride	0 21	J	0 06	1
		o-Xylene	0 44	J	0 1	1
		Trichloroethene	6.4	=	0 13	1

Table 4

VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001

Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-104-6	11/30/01	1,1-Dichloroethane	0 55	J	0 12	1
		1,1-Dichloroethene	1 1	=	0 11	1
		Acetone	2 2	J	1 1	5
		Chloroform	17	=	0 12	1
		cis-1,2-Dichloroethene	0 4	J	0 12	1
		Ethylbenzene	0 36	J	0 11	1
		m-,p-Xylene	1 3	J	0 2	2
		Methylene chloride	0 12	J	0 06	1
		o-Xylene	0 3	J	0 1	1
		Trichloroethene	16	=	0 13	1
MW-104-7	11/30/01	1,1-Dichloroethane	0 65	J	0 12	1
		1,1-Dichloroethene	1 4	=	0 11	1
		Chloroform	18	=	0 12	1
		cis-1,2-Dichloroethene	0 47	J	0 12	1
		Ethylbenzene	0 14	J	0 11	1
		m-,p-Xylene	0 39	J	0 2	2
		Trichloroethene	19	=	0 13	1
MW-104-8	11/30/01	1,1-Dichloroethane	0 49	J	0 12	1
		1,1-Dichloroethene	1 2	=	0 11	1
		Bromomethane	1 5	=	0 18	1
		Chloroform	14	=	0 12	1
		cis-1,2-Dichloroethene	0 36	J	0 12	1
		Ethylbenzene	0 18	J	0 11	1
		m-,p-Xylene	0 48	J	0 2	2
		Trichloroethene	19	=	0 13	1
MW-104-9	11/30/01	1,1-Dichloroethane	0 56	J	0 12	1
		1,1-Dichloroethene	1 3	=	0 11	1
		Acetone	2 2	J	1 1	5
		Chloroform	19	=	0 12	1
		cis-1,2-Dichloroethene	0 45	J	0 12	1
		Trichloroethene	20	=	0 13	1
MW-107-125B	12/21/01	Carbon tetrachloride	0 52	J	0 1	1
		Chloroform	0 14	J	0 12	1
		cis-1,2-Dichloroethene	0 34	J	0 12	1
		Tetrachloroethene	0 95	J	0 12	1
		Trichloroethene	2 8	=	0 13	1
MW-107-147	12/21/01	Carbon tetrachloride	0 6	J	0 1	1
		Chloroform	0 16	J	0 12	1
		cis-1,2-Dichloroethene	0 29	J	0 12	1
		Tetrachloroethene	0 67	J	0 12	1
		Trichloroethene	2 6	=	0 13	1
MW-108**	12/21/01	bis(2-Ethylhexyl)phthalate	9	J	0 59	10
		Carbon disulfide	0 28	J	0 14	1
		Chloroform	6 4	=	0 12	1
		cis-1,2-Dichloroethene	0 18	J	0 12	1
		Methylene chloride	0 34	J	0 06	1
		Tetrachloroethene	2 6	=	0 12	1
		Toluene	0 23	J	0 12	1
		Trichloroethene	6 4	=	0 13	1
MW-63	09/27/01	1,1-Dichloroethane	0 5	J	0 28	1
		Chloroform	5 69	=	0 26	1
		cis-1,2-Dichloroethene	0 46	J	0 13	1
		Tetrachloroethene	2 4	=	0 4	1
		Trichloroethene	4 48	=	0 35	1
MW-85-2	11/30/01	1,2-Dichloroethane	1 3	=	0 11	1
		1,2-Dichloropropane	0 45	J	0 11	1
		Bromomethane	0 33	J	0 18	1
		Chlorobenzene	0 27	J	0 1	1
		Chloromethane	0 2	J	0 13	1
		Ethylbenzene	0 15	J	0 11	1
		m-,p-Xylene	0 55	J	0 2	2
		Methylene chloride	0 59	J	0 06	1
		o-Xylene	0 11	J	0 1	1
		trans-1,2-Dichloroethene	0 49	J	0 11	1

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-85-2DL	11/30/01	Carbon tetrachloride	110	=	2	20
		Chloroform	61	=	2 4	20
		cis-1,2-Dichloroethene	25	=	2 4	20
		Tetrachloroethene	45	=	2 4	20
		Trichloroethene	21	=	2 6	20
MW-85-3	11/30/01	1,2-Dichloroethane	1 4	=	0 11	1
		1,2-Dichloropropane	0 58	J	0 11	1
		Benzene	0 12	J	0 12	1
		Chlorobenzene	0 29	J	0 1	1
		Methylene chloride	0 23	J	0 06	1
		trans-1,2-Dichloroethene	0 74	J	0 11	1
MW-85-3DL	11/30/01	Carbon tetrachloride	140	=	2	20
		Chloroform	66	=	2 4	20
		cis-1,2-Dichloroethene	30	=	2 4	20
		Tetrachloroethene	67	=	2 4	20
		Trichloroethene	26	=	2 6	20
MW-85-4	11/30/01	1,2-Dichloroethane	1 3	=	0 11	1
		1,2-Dichloropropane	0 48	J	0 11	1
		Chlorobenzene	0 26	J	0 1	1
		m-,p-Xylene	0 43	J	0 2	2
		trans-1,2-Dichloroethene	0 62	J	0 11	1
MW-85-4DL	11/30/01	Carbon tetrachloride	130	=	2	20
		Chloroform	67	=	2 4	20
		cis-1,2-Dichloroethene	30	=	2 4	20
		Tetrachloroethene	54	=	2 4	20
		Trichloroethene	23	=	2 6	20
MW-85-5	11/30/01	1,2-Dichloroethane	1 3	=	0 11	1
		1,2-Dichloropropane	0 57	J	0 11	1
		Chlorobenzene	0 28	J	0 1	1
		m-,p-Xylene	0 34	J	0 2	2
		Methylene chloride	0 61	J	0 06	1
		trans-1,2-Dichloroethene	0 96	J	0 11	1
MW-85-5DL	11/30/01	Carbon tetrachloride	120	=	2	20
		Chloroform	63	=	2 4	20
		cis-1,2-Dichloroethene	28	=	2 4	20
		Tetrachloroethene	49	=	2 4	20
		Trichloroethene	25	=	2 6	20
MW-85-6	11/30/01	1,2-Dichloroethane	1 2	=	0 11	1
		1,2-Dichloropropane	0 4	J	0 11	1
		Acetone	4 3	J	1 1	5
		Chlorobenzene	0 24	J	0 1	1
		Chloromethane	0 14	J	0 13	1
		Ethylbenzene	0 25	J	0 11	1
		m-,p-Xylene	0 89	J	0 2	2
		Methylene chloride	0 55	J	0 06	1
		o-Xylene	0 21	J	0 1	1
		trans-1,2-Dichloroethene	0 58	J	0 11	1
MW-85-6DL	11/30/01	Carbon tetrachloride	110	=	2	20
		Chloroform	64	=	2 4	20
		cis-1,2-Dichloroethene	28	=	2 4	20
		Tetrachloroethene	31	=	2 4	20
		Trichloroethene	21	=	2 6	20
MW-86-1	11/30/01	1,2-Dichloroethane	7 5	=	0 1	1
		1,2-Dichloropropane	1 1	=	0 08	1
		cis-1,2-Dichloroethene	18	=	0 12	1
		Ethylbenzene	0 22	J	0 12	1
		m-,p-Xylene	0 66	J	0 23	2
		o-Xylene	0 23	J	0 13	1
		Tetrachloroethene	18	=	0 12	1
		Toluene	0 52	J	0 11	1
		trans-1,2-Dichloroethene	0 28	J	0 15	1
		Trichloroethene	5 2	=	0 12	1
MW-86-1DL	11/30/01	Carbon tetrachloride	26	=	0 7	5
		Chloroform	34	=	0 7	5

Table 4
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Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-86-2	11/30/01	1,2-Dichloroethane	6 7	=	0 1	1
		1,2-Dichloropropane	1 5	=	0 08	1
		Chlorobenzene	0 11	J	0 1	1
		trans-1,2-Dichloroethene	0 39	J	0 15	1
MW-86-2DL	11/30/01	Carbon tetrachloride	79	=	1 4	10
		Chloroform	73	=	1 4	10
		cis-1,2-Dichloroethene	47	=	1 2	10
		Tetrachloroethene	190	=	1 2	10
		Trichloroethene	21	=	1 2	10
MW-86-3	11/30/01	1,2-Dichloroethane	2 8	=	0 1	1
		1,2-Dichloropropane	1 3	=	0 08	1
		Chlorobenzene	0 12	J	0 1	1
		trans-1,2-Dichloroethene	0 92	J	0 15	1
MW-86-3DL	11/30/01	Carbon tetrachloride	94	=	2 8	20
		Chloroform	84	=	2 8	20
		cis-1,2-Dichloroethene	58	=	2 4	20
		Tetrachloroethene	280	=	2 4	20
		Trichloroethene	25	=	2 4	20
MW-86-4	11/30/01	1,2-Dichloroethane	2 5	=	0 1	1
		1,2-Dichloropropane	1 3	=	0 08	1
		Chlorobenzene	0 12	J	0 1	1
		trans-1,2-Dichloroethene	1 7	=	0 15	1
MW-86-4DL	11/30/01	Carbon tetrachloride	95	=	2 8	20
		Chloroform	81	=	2 8	20
		cis-1,2-Dichloroethene	59	=	2 4	20
		Tetrachloroethene	280	=	2 4	20
		Trichloroethene	25	=	2 4	20
MW-86 5	11/30/01	1,2-Dichloroethane	2	=	0 1	1
		1,2-Dichloropropane	1 2	=	0 08	1
		Chlorobenzene	0 12	J	0 1	1
		trans-1,2-Dichloroethene	1	=	0 15	1
MW-86-5DL	11/30/01	Carbon tetrachloride	93	=	2 8	20
		Chloroform	80	=	2 8	20
		cis-1,2-Dichloroethene	57	=	2 4	20
		Tetrachloroethene	280	=	2 4	20
		Trichloroethene	25	=	2 4	20
MW-86-6	11/30/01	1,2-Dichloroethane	2 9	=	0 1	1
		1,2-Dichloropropane	1 3	=	0 08	1
		Chlorobenzene	0 11	J	0 1	1
		trans-1,2-Dichloroethene	1 1	=	0 15	1
MW-86-6DL	11/30/01	Carbon tetrachloride	89	=	2 8	20
		Chloroform	80	=	2 8	20
		cis-1,2-Dichloroethene	55	=	2 4	20
		Tetrachloroethene	230	=	2 4	20
		Trichloroethene	23	=	2 4	20
MW-86-7	11/30/01	1,2-Dichloroethane	2 9	=	0 1	1
		1,2-Dichloropropane	1 3	=	0 08	1
		Chlorobenzene	0 11	J	0 1	1
		trans-1,2-Dichloroethene	0 69	J	0 15	1
MW-86-7DL	11/30/01	Carbon tetrachloride	90	=	2 8	20
		Chloroform	78	=	2 8	20
		cis-1,2-Dichloroethene	53	=	2 4	20
		Tetrachloroethene	240	=	2 4	20
		Trichloroethene	24	=	2 4	20
MW-86-8	11/30/01	1,2-Dichloroethane	2 8	=	0 1	1
		1,2-Dichloropropane	1 3	=	0 08	1
		trans-1,2-Dichloroethene	0 63	J	0 15	1
MW-86-8DL	11/30/01	Carbon tetrachloride	89	=	2 8	20
		Chloroform	83	=	2 8	20
		cis-1,2-Dichloroethene	56	=	2 4	20
		Tetrachloroethene	200	=	2 4	20
		Trichloroethene	24	=	2 4	20

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
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Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-86-9	11/30/01	1,2-Dichloroethane	2 1	=	0 11	1
		1,2-Dichloropropane	0 97	J	0 11	1
		Ethylbenzene	0 22	J	0 11	1
		m-,p-Xylene	0 56	J	0 2	2
		Methylene chloride	7 9	=	0 06	1
		o-Xylene	0 16	J	0 1	1
		Toluene	0 22	J	0 12	1
		Trichloroethene	12	=	0 13	1
MW-86-9DL	11/30/01	Carbon tetrachloride	37	=	1	10
		Chloroform	98	=	1 2	10
		cis-1,2-Dichloroethene	76	=	1 2	10
		Tetrachloroethene	60	=	1 2	10
MW-88-1	11/30/01	Carbon tetrachloride	3 2	=	0 14	1
		Chloroform	1 1	=	0 14	1
		cis-1,2-Dichloroethene	2 1	=	0 12	1
		Ethylbenzene	0 48	J	0 12	1
		m-,p-Xylene	1 3	J	0 23	2
		o-Xylene	0 41	J	0 13	1
		Tetrachloroethene	8 1	=	0 12	1
		Toluene	0 68	J	0 11	1
		Trichloroethene	1 1	=	0 12	1
MW-88-2	11/30/01	Carbon tetrachloride	2 9	=	0 14	1
		Chloroform	1	=	0 14	1
		cis-1,2-Dichloroethene	1 8	=	0 12	1
		Ethylbenzene	0 42	J	0 12	1
		m-,p-Xylene	0 7	J	0 23	2
		o-Xylene	0 22	J	0 13	1
		Tetrachloroethene	5 3	=	0 12	1
		Toluene	0 64	J	0 11	1
		Trichloroethene	0 97	J	0 12	1
MW-88-3	11/30/01	Carbon tetrachloride	1 8	=	0 14	1
		Chloroform	0 64	J	0 14	1
		cis-1,2-Dichloroethene	1 1	=	0 12	1
		Ethylbenzene	0 26	J	0 12	1
		m-,p-Xylene	0 26	J	0 23	2
		Tetrachloroethene	2 5	=	0 12	1
		Toluene	0 53	J	0 11	1
		Trichloroethene	0 71	J	0 12	1
MW-88-4	11/30/01	Carbon tetrachloride	1 3	=	0 14	1
		Chloroform	0 51	J	0 14	1
		cis-1,2-Dichloroethene	0 81	J	0 12	1
		Ethylbenzene	0 46	J	0 12	1
		m-,p-Xylene	0 82	J	0 23	2
		o-Xylene	0 29	J	0 13	1
		Tetrachloroethene	2 3	=	0 12	1
		Toluene	0 57	J	0 11	1
		Trichloroethene	0 58	J	0 12	1
MW-88-5	11/30/01	Carbon tetrachloride	1	=	0 14	1
		Chloroform	0 42	J	0 14	1
		cis-1,2-Dichloroethene	0 63	J	0 12	1
		Ethylbenzene	0 31	J	0 12	1
		m-,p-Xylene	0 61	J	0 23	2
		o-Xylene	0 18	J	0 13	1
		Tetrachloroethene	2 2	=	0 12	1
		Toluene	0 29	J	0 11	1
		Trichloroethene	0 52	J	0 12	1
MW-88-6	11/30/01	Carbon tetrachloride	3 1	=	0 14	1
		Chloroform	1 2	=	0 14	1
		cis-1,2-Dichloroethene	0 94	J	0 12	1
		Ethylbenzene	0 16	J	0 12	1
		m-,p-Xylene	0 28	J	0 23	2
		Tetrachloroethene	8 8	=	0 12	1
		Trichloroethene	3 8	=	0 12	1
MW-88-7	11/30/01	Carbon tetrachloride	5.2	=	0 14	1
		Chloroform	1 9	=	0 14	1
		cis-1,2-Dichloroethene	1 4	=	0 12	1
		Trichloroethene	5.6	=	0 12	1
MW-88-7DL	11/30/01	Tetrachloroethene	29	=	0 24	2

Table 4

VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001

Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-88-8	11/30/01	Carbon tetrachloride	5.8	=	0 14	1
		Chloroform	1 9	=	0 14	1
		cis-1,2-Dichloroethene	1 5	=	0 12	1
		Trichloroethene	8 1	=	0 12	1
MW-88-8DL	11/30/01	Tetrachloroethene	27	=	0 24	2
MW-92-2	11/30/01	1,2-Dichloroethane	0 14	J	0 1	1
		1,2-Dichloropropane	0 095	J	0 08	1
		Carbon tetrachloride	20	=	0 14	1
		Chloroform	6 9	=	0 14	1
		cis-1,2-Dichloroethene	7	=	0 12	1
		Trichloroethene	4 5	=	0 12	1
MW-92-2DL	11/30/01	Tetrachloroethene	150	=	1 2	10
MW-92-3	11/30/01	1,2-Dichloroethane	0 14	J	0 1	1
		1,2-Dichloropropane	0 087	J	0 08	1
		Carbon tetrachloride	20	=	0 14	1
		Chloroform	6 7	=	0 14	1
		cis-1,2-Dichloroethene	7	=	0 12	1
		Trichloroethene	4 5	=	0 12	1
MW-92-3DL	11/30/01	Tetrachloroethene	160	=	1 2	10
MW-92-4	11/30/01	1,2-Dichloroethane	0 12	J	0 1	1
		Carbon tetrachloride	18	=	0 14	1
		Chloroform	6 1	=	0 14	1
		cis-1,2-Dichloroethene	6 2	=	0 12	1
		Trichloroethene	4 2	=	0 12	1
MW-92-4DL	11/30/01	Tetrachloroethene	150	=	1 2	10
MW-92-5	11/30/01	1,2-Dichloroethane	0 11	J	0 1	1
		1,2-Dichloropropane	0 082	J	0 08	1
		Carbon tetrachloride	19	=	0 14	1
		Chloroform	6 5	=	0 14	1
		cis-1,2-Dichloroethene	6 6	=	0 12	1
		trans-1,2-Dichloroethene	0 19	J	0 15	1
		Trichloroethene	4 5	=	0 12	1
MW-92-5DL	11/30/01	Tetrachloroethene	160	=	1 2	10
MW-92-6	11/30/01	1,2-Dichloroethane	0 14	J	0 1	1
		1,2-Dichloropropane	0 089	J	0 08	1
		Carbon tetrachloride	18	=	0 14	1
		Chloroform	6 2	=	0 14	1
		cis-1,2-Dichloroethene	6 1	=	0 12	1
		Toluene	0 12	J	0 11	1
		trans-1,2-Dichloroethene	0 21	J	0 15	1
		Trichloroethene	4 3	=	0 12	1
MW-92-6DL	11/30/01	Tetrachloroethene	130	=	1 2	10
MW-93-6	11/30/01	Acetone	8	J	1 1	5
MW-93-7	11/30/01	Carbon disulfide	0 45	J	0 14	1
		Chloroform	0 69	J	0 12	1
		Ethylbenzene	0 36	J	0 11	1
		m-,p-Xylene	1 2	J	0 2	2
		o-Xylene	0 29	J	0 1	1
		Toluene	0 3	J	0 12	1
MW-93-7DL	11/30/01	Acetone	220	J	4 4	20
MW-94-2	12/11/01	Carbon disulfide	0 21	J	0 14	1
		Ethylbenzene	0 2	J	0 11	1
		m-,p-Xylene	0 48	J	0 2	2
		o-Xylene	0 13	J	0 1	1
MW-94-2DL	12/11/01	Acetone	2700	=	44	200
MW-96-1	11/30/01	Carbon tetrachloride	1 8	=	0 1	1
		Chloroform	2	=	0 12	1
		cis-1,2-Dichloroethene	0 23	J	0 12	1
		Ethylbenzene	0 3	J	0 11	1
		m-,p-Xylene	0 82	J	0 2	2
		Methylene chloride	0 31	J	0 06	1
		o-Xylene	0 23	J	0 1	1
		Tetrachloroethene	19	=	0 12	1
		Toluene	0 18	J	0 12	1
		Trichloroethene	0 19	J	0 13	1
MW-96-1DL	11/30/01	Acetone	2200	J	44	200

Table 4

VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001

Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-96-2	11/30/01	Chloroform	2 7	=	0 12	1
		Ethylbenzene	0 71	J	0 11	1
		m-,p-Xylene	2 1	=	0 2	2
		Methylene chloride	0 49	J	0 06	1
		o-Xylene	0 6	J	0 1	1
		Tetrachloroethene	0 88	J	0 12	1
		Toluene	0 57	J	0 12	1
MW-96-2DL	11/30/01	Acetone	2500	J	44	200
MW-96-3	11/30/01	Chloroform	3 8	=	0 12	1
		Chloromethane	0 13	J	0 13	1
		Ethylbenzene	0 7	J	0 11	1
		m-,p-Xylene	2	=	0 2	2
		Methylene chloride	1 2	=	0 06	1
		o-Xylene	0 56	J	0 1	1
		Tetrachloroethene	0 21	J	0 12	1
		Toluene	0 76	J	0 12	1
MW-96-3DL	11/30/01	Acetone	1900	J	44	200
MW-96-4	11/30/01	Carbon disulfide	0 17	J	0 14	1
		Chloroform	5 6	=	0 12	1
		Chloromethane	0 15	J	0 13	1
		Ethylbenzene	0 59	J	0 11	1
		m-,p-Xylene	1 7	J	0 2	2
		Methylene chloride	1 8	=	0 06	1
		o-Xylene	0 42	J	0 1	1
		Tetrachloroethene	0 3	J	0 12	1
		Toluene	0 83	J	0 12	1
MW-96-4DL	11/30/01	Acetone	1300	J	44	200
MW-96-5	11/30/01	Chloroform	6 3	=	0 12	1
		Ethylbenzene	0 81	J	0 11	1
		m-,p-Xylene	2 7	=	0 2	2
		Methylene chloride	1 9	=	0 06	1
		o-Xylene	0 75	J	0 1	1
		Tetrachloroethene	0 13	J	0 12	1
		Toluene	0 6	J	0 12	1
MW-96-5DL	11/30/01	Acetone	1200	J	44	200
MW-96-6	11/30/01	Chloroform	5 9	=	0 12	1
		Ethylbenzene	0 78	J	0 11	1
		m-,p-Xylene	2 5	=	0 2	2
		Methylene chloride	1 6	=	0 06	1
		o-Xylene	0 76	J	0 1	1
		Tetrachloroethene	0 14	J	0 12	1
		Toluene	0 49	J	0 12	1
MW-96-6DL	11/30/01	Acetone	840	J	44	200
MW-97-1	11/30/01	Acetone	4 6	J	1 1	5
		Carbon disulfide	0 31	J	0 14	1
		Chloromethane	0 13	J	0 13	1
		Trichloroethene	0 14	J	0 13	1
MW-97-2	11/30/01	Acetone	4 8	J	1 1	5
		Chloromethane	0 18	J	0 13	1
MW-97-3	11/30/01	Acetone	7 2	J	1 4	5
MW-97-4	11/30/01	Acetone	6 2	J	1 4	5
MW-97-5	11/30/01	Acetone	10	J	1 4	5
MW-97-6	11/30/01	Acetone	13	J	1 4	5
		Methylene chloride	0 12	J	0 11	1
MW-97-7	11/30/01	Acetone	12	J	1 4	5
MW-97-8	11/30/01	Ethylbenzene	0 19	J	0 12	1
		m-,p-Xylene	0 42	J	0 23	2
		Methylene chloride	0 15	J	0 11	1
		o-Xylene	0 14	J	0 13	1
MW-97-8DL	11/30/01	Acetone	73	J	2 7	10
MW-98-1	11/30/01	2-Butanone	2 2	J	0 77	5
		Chloroform	0 24	J	0 14	1
		Ethylbenzene	0 37	J	0 12	1
		m-,p-Xylene	1 2	J	0 23	2
		o-Xylene	0 38	J	0 13	1
		Tetrachloroethene	4 4	=	0 12	1
		Toluene	0 26	J	0 11	1
		Trichloroethene	0 83	J	0 12	1

Table 4
VOC and SVOC PDB and Low-Flow Sample Result Summary - November/December 2001
Main Installation LTOA Sampling Event

Field Identification	Date of Sample Collection	Analyte	Result	Laboratory Qualifier	Detection Limit	Reporting Limit
MW-98-1DL	11/30/01	Acetone	150	J	2 7	10
MW-98-2	11/30/01	2-Butanone	1 4	J	0 77	5
		Chloroform	0 26	J	0 14	1
		Ethylbenzene	0 32	J	0 12	1
		m-,p-Xylene	1 2	J	0 23	2
		o-Xylene	0 34	J	0 13	1
		Tetrachloroethene	5 5	=	0 12	1
		Toluene	0 24	J	0 11	1
		Trichloroethene	0 89	J	0 12	1
MW-98-2DL	11/30/01	Acetone	100	J	2 7	10
MW-98-3	11/30/01	2-Butanone	1 7	J	0 77	5
		Acetone	98	J	1 4	5
		Carbon disulfide	0 24	J	0 22	1
		Chloroform	0 24	J	0 14	1
		Ethylbenzene	0 21	J	0 12	1
		m-,p-Xylene	0 97	J	0 23	2
		o-Xylene	0 28	J	0 13	1
		Tetrachloroethene	7.7	=	0 12	1
		Toluene	0 15	J	0 11	1
		Trichloroethene	0 88	J	0 12	1
MW-98-4	11/30/01	2-Butanone	1 7	J	0 77	5
		Acetone	98	J	1 4	5
		Chloroform	0 26	J	0 14	1
		Ethylbenzene	0 4	J	0 12	1
		m-,p-Xylene	1 3	J	0 23	2
		o-Xylene	0 39	J	0 13	1
		Tetrachloroethene	3 7	=	0 12	1
		Toluene	0 19	J	0 11	1
		Trichloroethene	0 9	J	0 12	1
MW-98-5	11/30/01	2-Butanone	2 5	J	0 77	5
		Chloroform	0 23	J	0 14	1
		Ethylbenzene	0 41	J	0 12	1
		m-,p-Xylene	1 1	J	0 23	2
		o-Xylene	0 32	J	0 13	1
		Tetrachloroethene	1 5	=	0 12	1
		Toluene	0 71	J	0 11	1
		Trichloroethene	0 46	J	0 12	1
MW-98-5DL	11/30/01	Acetone	100	J	2 7	10
MW-99-1	11/30/01	Acetone	4	J	1 1	5
		Carbon disulfide	0 25	J	0 14	1
		m-,p-Xylene	0 38	J	0 2	2
		Trichloroethene	0 58	J	0 13	1
MW-99 2	11/30/01	Trichloroethene	0 38	J	0 13	1
MW-99-3	11/30/01	Trichloroethene	0 28	J	0 13	1
MW-99-4	11/30/01	Chloroform	0 13	J	0 12	1
MW-99-5	11/30/01	Chloroform	0 15	J	0 12	1
		Trichloroethene	0 14	J	0 13	1
MW-99-7	11/30/01	Chloroform	0 15	J	0 12	1
MW-99-8	11/30/01	Chloroform	0 13	J	0 12	1
MW-99-9	11/30/01	Chloroform	0 14	J	0 12	1

NOTES
All results reported in micrograms per liter
Only detected parameters presented in this table
All samples were analyzed according to EPA Method SW846 8260B unless otherwise noted
**Samples analyzed according to EPA Method SW846 8270
Shading and bold value indicates parameter value at or above Federal Drinking Water Maximum Contaminant Levels (MCLs) or Max. Contaminant Level Goal (MCLG)
Current MCL for Chloroform is 80 ug/L however this level is under review by EPA (EPA, 2002)
MW Monitoring Well
PZ Piezometer
J = Estimated detection Parameter detected at or below laboratory detection limit
DL = Same sample as predecessor sample with similar sample number, however sample diluted to define the concentration of the parameter in the sample
Example Sample No - MW 98 6 where 6 represents the 6th diffusion bag sample from the top of the water column

Table 5
Geochemical Parameters Low-Flow Sampling Summary - March 2002
Main Installation Baseline Groundwater Sampling Event

Well Identification	Location to EBT Treatability Study Area	Sample Identification	Analysis Method	Sample Date	Analyte	Result	Laboratory Qualifier	Adjusted Minimum Detection Limit	Adjusted Reporting Limit	Dilution Factor
MW-72	Upgradient to Study Area 1	MW72-BL	RSK175M	03/21/2002	Acetylene	1	=	0	0 026	1
			8015M		Acetic Acid	0 9	J	0 08	1	1
			8015M		Formic Acid	0 3	J	0 05	1	1
			8015M		Lactic Acid	0 5	J	0 06	1	1
			E310 2		Alkalinity	120	=	5	10	1
			SW9056		Nitrate	3 2	=	0 067	0 6	1
			SW9056		Sulfate	24	=	0 5	1	1
		MW72 BLD	8015M	03/21/2002	Acetic Acid	1	=	0 08	1	1
			RSK175M		Acetylene	0 9	=	0	0 026	1
			8015M		Formic Acid	0 4	J	0 05	1	1
			8015M		Lactic Acid	0 6	J	0 06	1	1
			E310 2		Alkalinity	120	=	5	10	1
			SW9056		Nitrate	3 2	=	0 067	0 6	1
			SW9056		Sulfate	24	=	0 5	1	1
		MW-72-BLDDL1	SW9056	03/21/2002	Chloride	14	=	0 2	0 4	2
		MW-72-BLDL1	SW9056	03/21/2002	Chloride	13	=	0 2	0 4	2
MW-47	Upgradient to Study Area 1	MW47 BL	RSK175M	03/21/2002	Acetylene	1 1	=	0	0 026	1
			8015M		Acetic Acid	0 9	J	0 08	1	1
			8015M		Formic Acid	0 3	J	0 05	1	1
			8015M		Lactic Acid	0 6	J	0 06	1	1
			E310 2		Alkalinity	83	=	5	10	1
			SW9056		Nitrate	1 5	=	0 067	0 6	1
			SW9056		Sulfate	14	=	0 5	1	1
		MW-47-BLDL1	SW9056	03/21/2002	Chloride	18	=	0 2	0 4	2
MW-102B	Upgradient to Study Area 1	MW102B-BL	RSK175M	03/21/2002	Acetylene	1 1	=	0	0 026	1
			8015M		Acetic Acid	0 8	J	0 08	1	1
			8015M		Formic Acid	0 3	J	0 05	1	1
			8015M		Lactic Acid	0 5	J	0 06	1	1
			E310 2		Alkalinity	140	=	5	10	1
			SW9056		Nitrate	5 6	=	0 067	0 6	1
			SW9056		Sulfate	53	=	0 5	1	1
		MW-102B BLDL1	SW9056	03/21/2002	Chloride	35	=	0 5	1	5
MW 22	Upgradient to Study Area 1	MW22-BL	8015M	03/21/2002	Acetic Acid	1 1	=	0 08	1	1
			RSK175M		Acetylene	1 1	=	0	0 026	1
			8015M		Formic Acid	0 3	J	0 05	1	1
			8015M		Lactic Acid	0 6	J	0 06	1	1
			E310 2		Alkalinity	160	=	5	10	1
			SW9056		Nitrate	4 9	=	0 067	0 6	1
			SW9056		Sulfate	26	=	0 5	1	1
		MW-22-BLDL1	SW9056	03/21/2002	Chloride	38	=	0 5	1	5
MW-21	Upgradient to Study Area 1	MW21-BL	RSK175M	03/21/2002	Acetylene	1	=	0	0 026	1
			8015M		Acetic Acid	0 6	J	0 08	1	1
			8015M		Formic Acid	0 3	J	0 05	1	1
			8015M		Lactic Acid	0 5	J	0 06	1	1
			E310 2		Alkalinity	70	=	5	10	1
			SW9056		Nitrate	3 5	=	0 067	0 6	1
			SW9056		Sulfate	8 1	=	0 5	1	1
		MW 21-BLDL1	SW9056	03/21/2002	Chloride	13	=	0 2	0 4	2
MW-100B	Within Study Area 1	MW100B 117-BL	E310 2	03/22/2002	Alkalinity	85	=	5	10	1
			RSK175M		Acetylene	1 1	=	0	0 026	1
			8015M		Acetic Acid	0 8	J	0 08	1	1
			8015M		Formic Acid	0 5	J	0 05	1	1
			8015M		Lactic Acid	0 7	J	0 06	1	1
			SW9056		Bromide*	0 58	=	0 1	0 2	1
			SW9056		Chloride*	5 1	=	0 1	0 2	1
			SW9056		Sulfate*	6 4	=	0 5	1	1
			E415 1		Total Organic Carbon	0 79	J	0 5	1	1
MW-101	Lateral Gradient to Study Area 1	MW101-117-BL	E310 2	03/22/2002	Alkalinity	110	=	5	10	1
			E415 1		Total Organic Carbon	1 2	=	0 5	1	1
			RSK175M		Acetylene	1	=	0	0 026	1
			8015M		Acetic Acid	0 1	J	0 08	1	1
			8015M		Lactic Acid	0 1	J	0 06	1	1
			SW9056		Bromide*	0 28	=	0 1	0 2	1
			SW9056		Nitrate*	4 3	=	0 067	0 6	1
			SW9056		Sulfate*	19	=	0 5	1	1
			SW9056		Chloride*	21	=	0 2	0 4	2

Table 5

Geochemical Parameters Low-Flow Sampling Summary - March 2002

Main Installation Baseline Groundwater Sampling Event

Well Identification	Location to EBT Treatability Study Area	Sample Identification	Analysis Method	Sample Date	Analyte	Result	Laboratory Qualifier	Adjusted Minimum Detection Limit	Adjusted Reporting Limit	Dilution Factor
MW 97	Downgradient to Study Area 1	MW97-BL	RSK175M	03/20/2002	Acetylene	0.9	=	0	0.026	1
			8015M		Formic Acid	0.3	J	0.05	1	1
			8015M		Lactic Acid	0.7	J	0.06	1	1
			E310.2		Alkalinity	90	=	5	10	1
			SW6010B		Manganese	0.14	=	0.001	0.01	1
			SW9056		Nitrate	3	=	0.067	0.6	1
			SW9056		Sulfate	8.8	=	0.5	1	1
		MW-97-BLDL1	SW9056	03/20/2002	Chloride	19	=	0.2	0.4	2
MW 98	Downngradient to Study Area 1	MW98-140-BL	RSK175M	03/20/2002	Acetylene	1	=	0	0.026	1
			8015M		Lactic Acid	0.1	J	0.06	1	1
			E310.2		Alkalinity	58	=	5	10	1
			SW6010B		Managanese	0.0447	=	0.001	0.01	1
			SW9056		Sulfate	5.9	=	0.5	1	1
			SW9056		Nitrate	3.5	J	0.067	0.6	1
		MW-98-140-BLDL1	SW9056	03/20/2002	Chloride	24	=	0.5	1	5
MW-16	Upgradient to Study Area 2	MW16-64-BL	8015M	03/21/2002	Acetic Acid	1.1	=	0.08	1	1
			RSK175M		Acetylene	1	=	0	0.026	1
			8015M		Formic Acid	0.5	J	0.05	1	1
			8015M		Lactic Acid	0.8	J	0.06	1	1
			E310.2		Alkalinity	100	=	5	10	1
			SW6010B		Manganese	0.322	=	0.001	0.01	1
			SW9056		Nitrate	1.7	=	0.067	0.6	1
		MW-16 64-BLDL1	SW9056	03/21/2002	Chloride	49	=	1	2	10
			SW9056		Sulfate	67	=	5	10	10
MW-88	Upgradient to Study Area 2	MW88-BL	8015M	03/21/2002	Acetic Acid	1.4	=	0.08	1	1
			RSK175M		Acetylene	1	=	0	0.026	1
			8015M		Formic Acid	0.3	J	0.05	1	1
			8015M		Lactic Acid	0.7	J	0.06	1	1
			E415.1		Total Organic Carbon	4.3	=	0.5	1	1
			SW6010B		Manganese	0.143	=	0.001	0.01	1
			SW9056		Nitrate	1.6	=	0.067	0.6	1
			SW9056		Sulfate	14	=	0.5	1	1
		MW-88-BLDL1	SW9056	03/21/2002	Chloride	48	=	1	2	10
MW-50	Upgradient to Study Area 2	MW50-119-BL	RSK175M	03/21/2002	Acetylene	1.1	=	0	0.026	1
			8015M		Acetic Acid	0.6	J	0.08	1	1
			8015M		Formic Acid	0.2	J	0.05	1	1
			8015M		Lactic Acid	0.5	J	0.06	1	1
			E310.2		Alkalinity	62	=	5	10	1
			SW9056		Nitrate	3	=	0.067	0.6	1
			SW9056		Sulfate	29	=	0.5	1	1
		MW-50-119-BLDL1	SW9056	03/21/2002	Chloride	230	=	5	10	50
MW-92	Within Study Area 2	MW92-99-BL	RSK175M	03/20/2002	Acetylene	1	=	0	0.026	1
			8015M		Acetic Acid	0.8	J	0.08	1	1
			8015M		Formic Acid	0.3	J	0.05	1	1
			8015M		Lactic Acid	0.6	J	0.06	1	1
			SW9056		Sulfate	9.3	=	0.5	1	1
			SW9056		Nitrate	3	J	0.067	0.6	1
		MW 92 99-BLDL1	SW9056	03/20/2002	Chloride	33	=	0.5	1	5
MW-85	Within Study Area 2	MW85-102-BL	RSK175M	03/19/2002	Acetylene	1	=	0	0.026	1
			8015M		Acetic Acid	0.8	J	0.08	1	1
			8015M		Formic Acid	0.4	J	0.05	1	1
			8015M		Lactic Acid	0.7	J	0.06	1	1
		MW 85-105-BL	SW6010B	03/19/2002	Manganese	0.439	=	0.001	0.01	1
		MW-85-BAIL-BL	SW9056	03/21/2002	Nitrate	2.5	=	0.067	0.6	1
			SW9056		Sulfate	16	=	0.5	1	1
		MW-85-BAIL-BLDL1	SW9056	03/21/2002	Chloride	27	=	0.5	1	5
MW-86	Within Study Area 2	MW86-108-BL	RSK175M	03/21/2002	Acetylene	1	=	0	0.026	1
			SW6010B		Manganese	0.0506	=	0.001	0.01	1
			SW9056		Sulfate	7.8	=	0.5	1	1
			SW9056		Nitrate	2.2	J	0.067	0.6	1
		MW 86-108-BLDL1	SW9056	03/20/2002	Chloride	13	=	0.2	0.4	2
MW-96	Lateral Gradient to Study Area 2	MW96-92 BL	8015M	03/21/2002	Acetic Acid	17.2	=	0.08	1	1
			RSK175M		Acetylene	1	=	0	0.026	1
			8015M		Formic Acid	0.3	J	0.05	1	1
			8015M		Lactic Acid	0.6	J	0.06	1	1
			E310.2		Alkalinity	110	=	5	10	1
			E415.1		Total Organic Carbon	20	=	2	4	4
			SW6010B		Manganese	0.536	=	0.001	0.01	1
			SW9056		Nitrate	2.8	=	0.067	0.6	1
			SW9056		Sulfate	25	=	0.5	1	1
		MW-96-92-BLDL1	SW9056	03/21/2002	Chloride	83	=	1	2	10

Table 5

Geochemical Parameters Low-Flow Sampling Summary - March 2002

Main Installation Baseline Groundwater Sampling Event

Well Identification	Location to EBT Treatability Study Area	Sample Identification	Analysis Method	Sample Date	Analyte	Result	Laboratory Qualifier	Adjusted Minimum Detection Limit	Adjusted Reporting Limit	Dilution Factor
MW-26	Downgradient to Study Area 2	MW26-106-BL	RSK175M	03/21/2002	Acetylene	1	=	0	0 026	1
			8015M		Acetic Acid	0 1	J	0 08	1	1
			E310 2		Alkalinity	50	=	5	10	1
			SW9056		Nitrate	2 6	=	0 067	0 6	1
			SW9056		Sulfate	16	=	0 5	1	1
		MW-26-106-BLDL1	SW9056	03/21/2002	Chloride	51	=	1	2	10
MW 93	Downgradient to Study Area 2	MW93-BL	E310 2	03/22/2002	Alkalinity	61	=	5	10	1
			E415 1		Total Organic Carbon	1 5	=	0 5	1	1
			RSK175M		Acetylene	1 1	=	0	0 026	1
			8015M		Acetic Acid	0 9	J	0 08	1	1
			8015M		Formic Acid	0 4	J	0 05	1	1
			8015M		Lactic Acid	0 7	J	0 06	1	1
			SW9056		Bromide*	0 23	=	0 1	0 2	1
			SW9056		Chloride*	12	=	0 1	0 2	1
			SW9056		Nitrate*	1 1	=	0 067	0 6	1
			SW9056		Sulfate*	7 8	=	0 5	1	1

Notes

* sample collected on April 15 2002

All concentrations reported in micrograms per liter (mg/L)

EBT Enhanced Bioremediation Treatment

BL Baseline Sampling Event

MW Monitoring Well

= Detected concentration

J Estimated detection Contaminant detected at or below laboratory detection limit

D Same sample as predecessor sample with similar sample number however sample diluted to define the concentration of the parameter in the sample

FIGURES

LEGEND

- RW03 RECOVERY WELL
- MW53 FLUVIAL AQUIFER MONITORING WELL
- MW63 INTERMEDIATE AQUIFER MONITORING WELL
- PZ06 PIEZOMETER
- ---- MEMPHIS DEPOT BOUNDARY

NOTE

(1) MONITORING WELLS 105 106, 109, 110, 111, 112, 113 114 115 116, 117, 118, 119, 120, 121, 122, 123 124, AND 125 WERE INSTALLED AFTER THE DATE OF THE MI BASELINE GROUNDWATER SAMPLING EVENT, AS PART OF THE MI EBT TREATABILITY STUDY

(2) FIVE MONITORING WELLS WERE NOT SAMPLED DURING THIS EVENT, INCLUDING MW-18 DUE TO SAMPLE REPETITION, MW-27 DUE TO LACK OF WATER, AND, MW-17, MW-25, AND MW-48 DUE TO WELL OBSTRUCTIONS

(3) MONITORING WELLS MW-25 AND MW-63 WERE ABANDONED AFTER THE MI BASELINE GROUNDWATER SAMPLING EVENT THE PREVIOUS LOCATIONS ARE SHOWN

FIGURE 1
MEMPHIS DEPOT - MONITORING WELL, RECOVERY WELL, AND PIEZOMETER LOCATIONS
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOVEMBER-2002 8071fig1 dgn

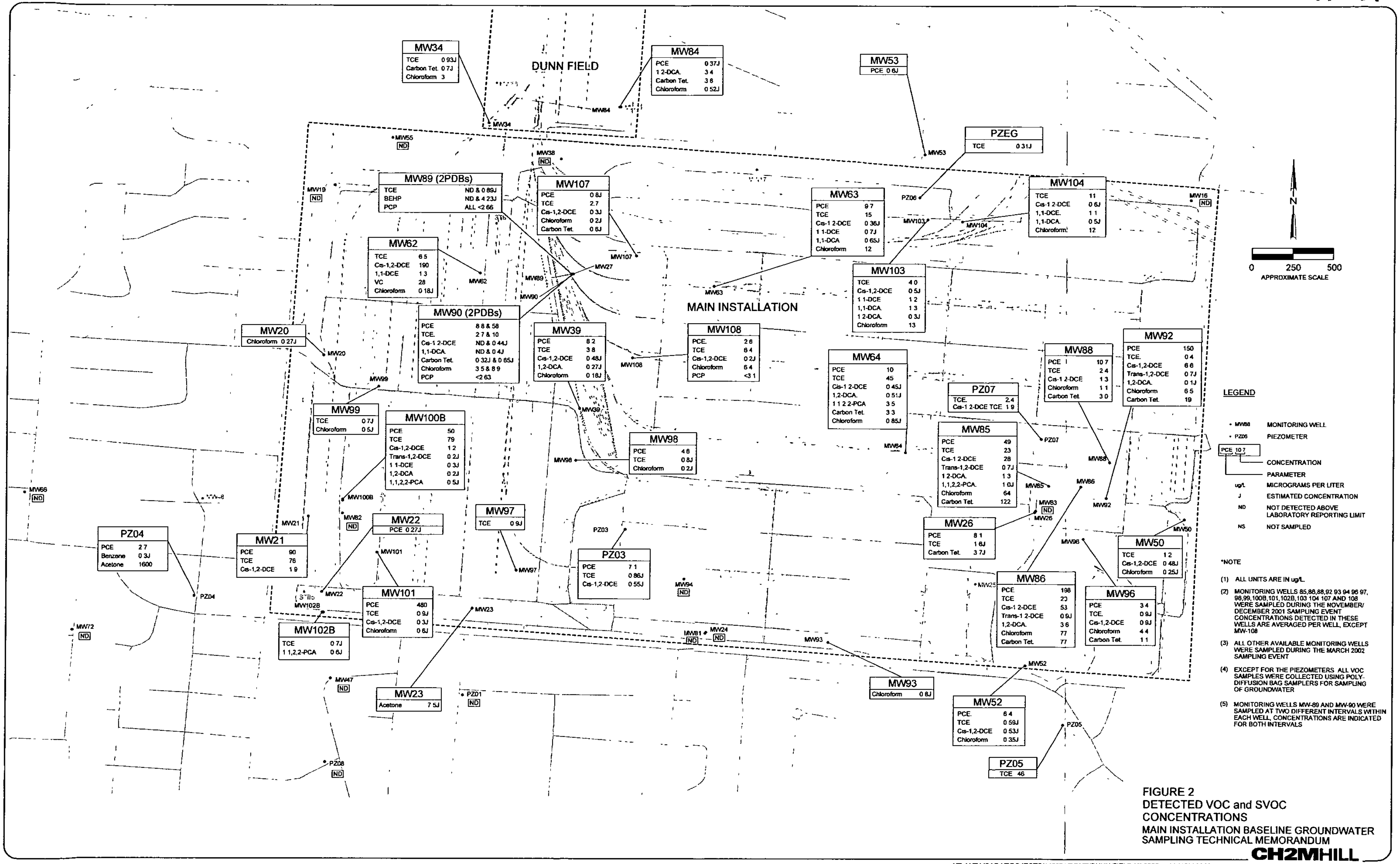


FIGURE 2
DETECTED VOC and SVOC CONCENTRATIONS
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig2 dgn

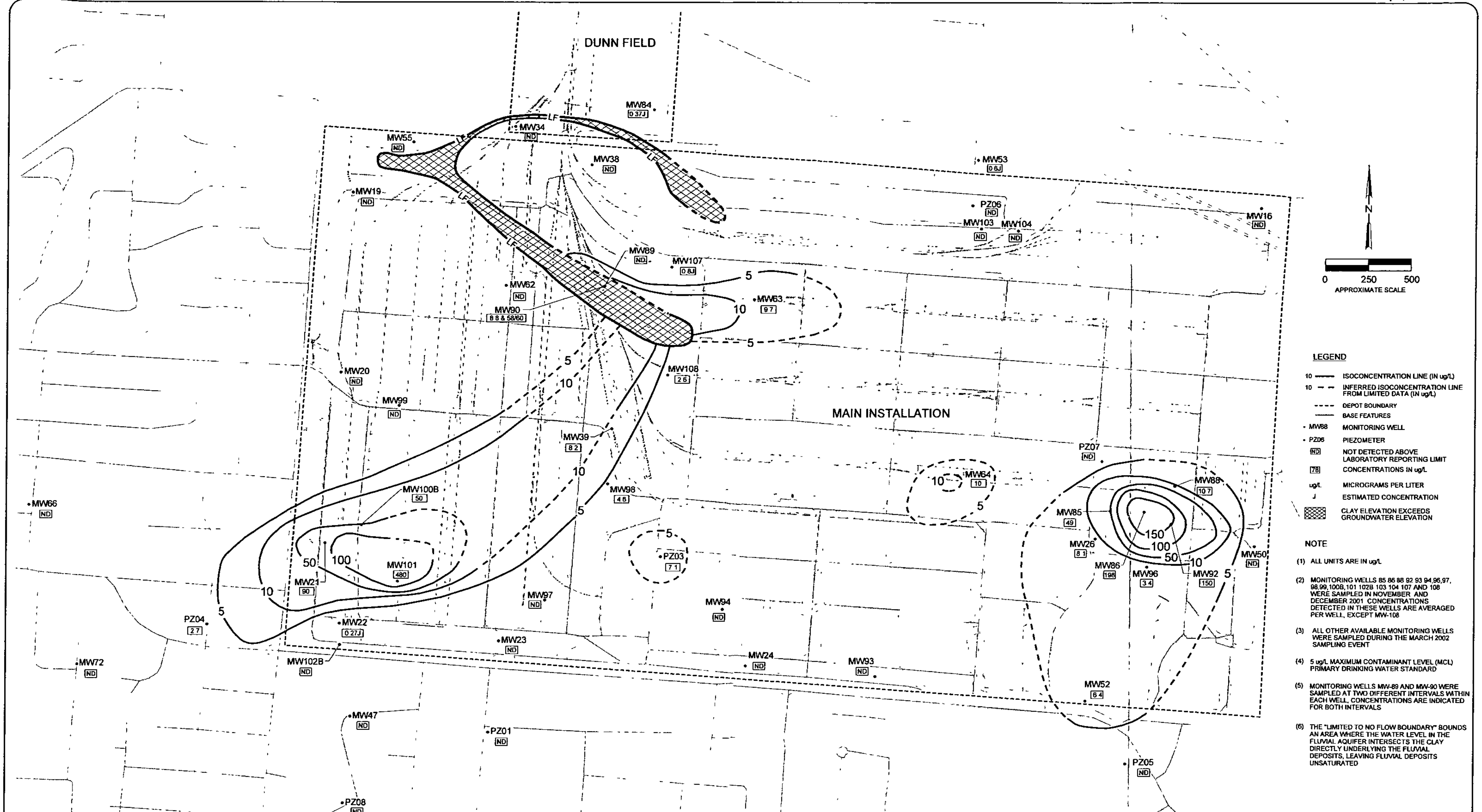


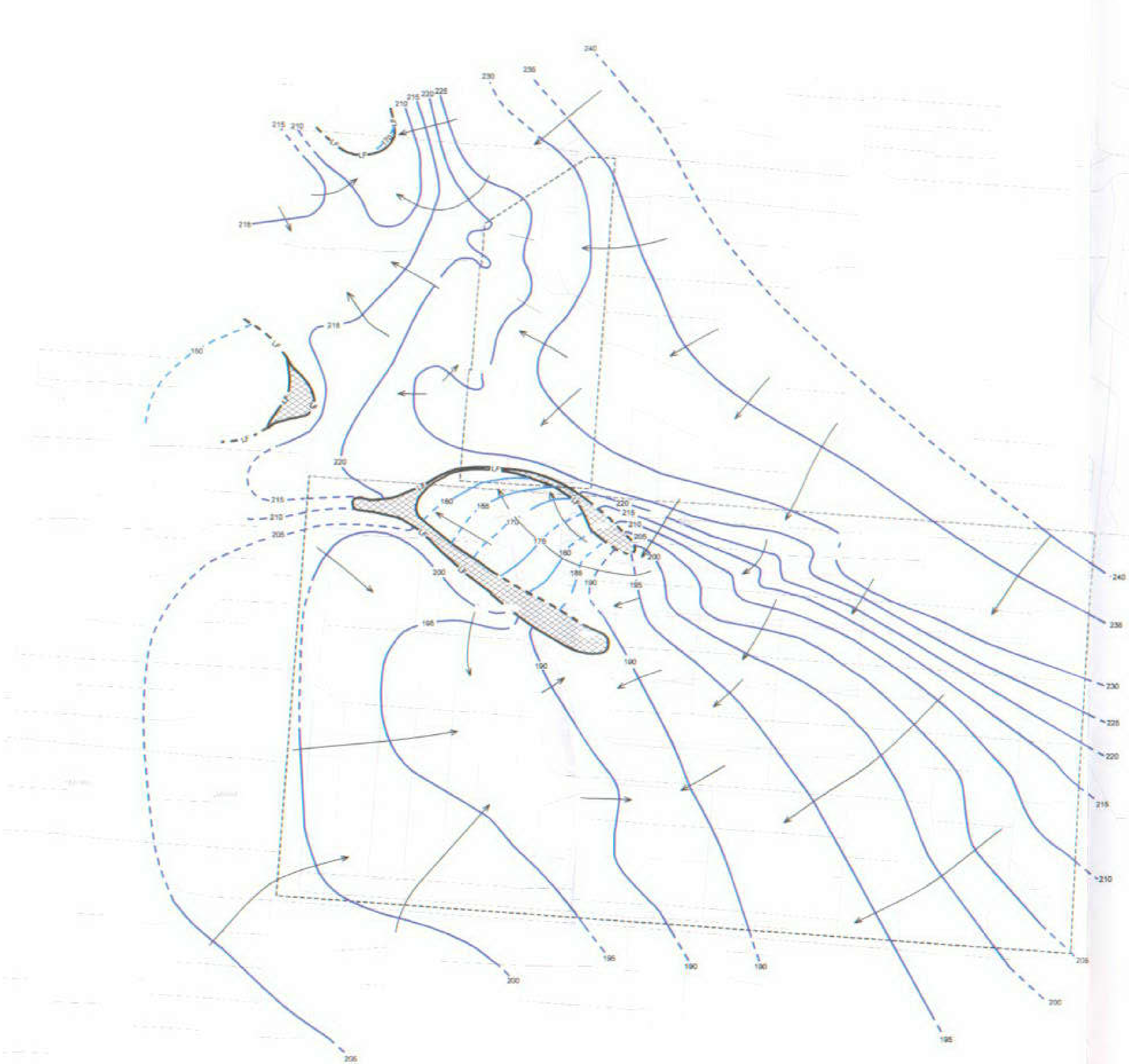
FIGURE 3
TETRACHLOROETHENE (PCE) CONCENTRATION IN GROUNDWATER-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig3.dgn

Well ID	Water Level Elevation (feet MSL)
MW03	221.66
MW04	224.84
MW06	224.00
MW07	226.71
MW08	228.86
MW09	226.43
MW10	223.18
MW11	222.66
MW12	224.11
MW13	224.81
MW14	227.22
MW15	224.49
MW16	241.44
MW18	175.20
MW19	200.92
MW20	199.30
MW21	199.96
MW22	200.03
MW23	198.57
MW24	190.62
MW26	203.03
MW27	DRY
MW28	233.86
MW29	233.52
MW30	226.59
MW31	218.34
MW32	221.41
MW33	224.18
MW34	156.66
MW35	222.34
MW36	151.53
MW37	151.12
MW38	169.97
MW39	191.89
MW40	171.06
MW41	217.86
MW42	217.70
MW43	152.75
MW44	212.97
MW45	236.86
MW46	232.05
MW47	203.89
MW49	230.56
MW50	212.21
MW51	234.62
MW52	197.26
MW53	232.67
MW54	213.60
MW55	221.06
MW56	225.61
MW57	224.97
MW58	226.29
MW59	223.92
MW60	224.15
MW61	224.73
MW62	199.71
MW63	197.46

Well ID	Water Level Elevation (feet MSL)
MW64	196.83
MW65	252.65
MW67	151.59
MW68	221.79
MW69	222.44
MW70	223.06
MW71	222.43
MW72	205.91
MW73	223.87
MW74	223.36
MW75	222.99
MW76	217.04
MW77	221.42
MW78	225.11
MW79	212.63
MW80	212.64
MW81	154.67
MW82	151.50
MW83	157.48
MW84	228.46
MW85	204.16
MW86	206.08
MW87	223.70
MW88	224.17
MW89	183.57
MW90	183.94
MW91	223.76
MW92	207.66
MW93	191.63
MW94	189.87
MW95	228.82
MW96	206.00
MW97	196.19
MW98	192.43
MW99	195.73
MW100	198.21
MW101	198.38
MW102	200.68
MW103	231.92
MW104	232.75
MW107	190.49
MW108	189.86
PZ01	202.74
PZ02	241.91
PZ03	191.47
PZ04	203.96
PZ05	196.54
PZ06	229.22
PZ07	205.74
PZ08	204.86
RW04	223.38
RW06	220.82
RW08	219.24
RW09	221.89
SB105	DRY
SB106	DRY



N

0 500 1000
SCALE IN FEET

LEGEND

- DEPOT BOUNDARY
- BASE FEATURES
- 215 WATER TABLE ELEVATION IN THE FLUVIAL AQUIFER (FEET MSL)
- 215 INFERRED WATER TABLE ELEVATION IN THE FLUVIAL AQUIFER FROM LIMITED DATA (FEET MSL)
- 185 WATER TABLE ELEVATION IN THE INTERMEDIATE AQUIFER (FEET MSL)
- 185 INFERRED WATER TABLE ELEVATION IN THE INTERMEDIATE AQUIFER FROM LIMITED DATA (FEET MSL)
- LF LIMITED TO NO FLOW BOUNDARY (SEE NOTE)
- LF INFERRED LIMITED TO NO FLOW BOUNDARY (SEE NOTE)
- MW53 MONITORING WELL
- PZ08 PIEZOMETER
- SOIL BORING
- GROUNDWATER FLOW DIRECTION
- CLAY ELEVATION EXCEEDS GROUNDWATER ELEVATION

NOTE:

(1) THE "LIMITED TO NO FLOW BOUNDARY" BOUNDS AN AREA WHERE THE WATER LEVEL IN THE FLUVIAL AQUIFER INTERSECTS THE CLAY DIRECTLY UNDERLYING THE FLUVIAL DEPOSITS, LEAVING FLUVIAL DEPOSITS UNSATURATED.

(2) MW18, 34, 36, 37, 38, 40, 43, 81, 82, 83, 89, AND 90 ARE WELLS SCREENED WITHIN THE INTERMEDIATE AQUIFER.

(3) MW107 AND 108 ARE LOCATED IN A TRANSITION ZONE BETWEEN THE FLUVIAL AQUIFER AND THE INTERMEDIATE AQUIFER.

(4) MW18, 36, 37, 81, 82, 83, 89 AND 90 ARE NOT INCLUDED IN THIS POTENTIOMETRIC SURFACE MAP.

(5) MW67 IS SCREENED IN THE MEMPHIS AQUIFER AND THEREFORE NOT INCLUDED IN THIS POTENTIOMETRIC SURFACE MAP.

(6) NO MEASUREABLE WATER LEVELS WERE RECORDED IN MW2, 5, 17, AND 27.

(7) DEPTH TO WATER MEASUREMENTS WERE NOT COLLECTED IN MW25, 48 AND 66.

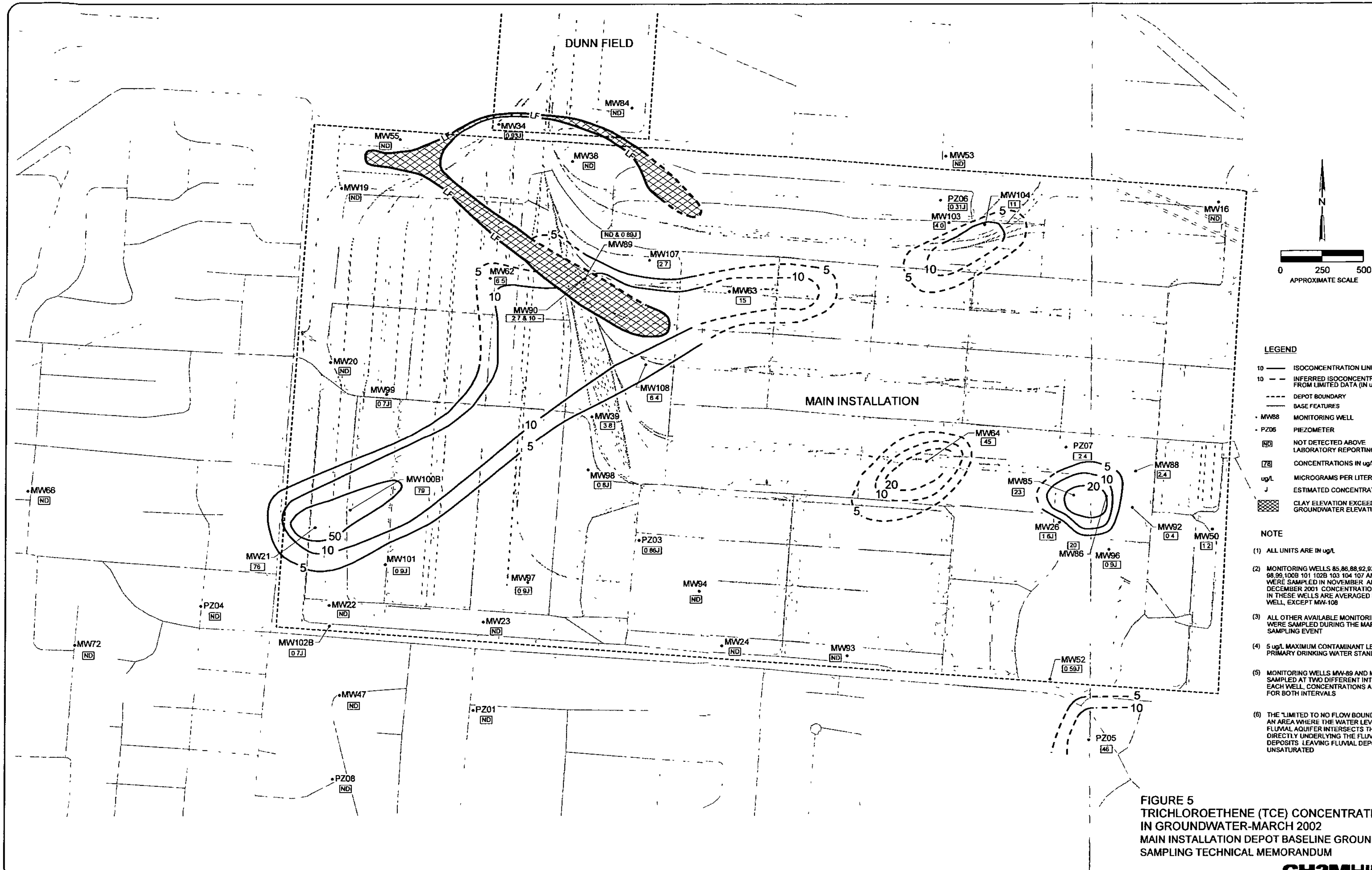
(8) SB-105 AND 106 WERE MEASURED ON OCTOBER 16, 2001 AND OCTOBER 17, 2001, RESPECTIVELY.

(9) EXCLUDES MW-66 GROUNDWATER ELEVATION DATA.

FIGURE 4
Potentiometric Surface
Map of the Fluvial Aquifer,
Including Intermediate Aquifer
November 01, 2001
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071 DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig4.dgn



LEGEND

- 10 ——— ISOCONCENTRATION LINE (IN ug/L)
- 10 – – – INFERRED ISOCONCENTRATION LINE FROM LIMITED DATA (IN ug/L)
- – – – – DEPOT BOUNDARY
- ——— BASE FEATURES
- • MW88 MONITORING WELL
- • PZ06 PIEZOMETER
- ND NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- 78 CONCENTRATIONS IN ug/L
- ug/L MICROGRAMS PER LITER
- J ESTIMATED CONCENTRATION
- CLAY ELEVATION EXCEEDS GROUNDWATER ELEVATION

NOTE

(1) ALL UNITS ARE IN ug/L

(2) MONITORING WELLS 85,86,88,92,93,94,96,97, 98,99,100B 101 102B 103 104 107 AND 108 WERE SAMPLED IN NOVEMBER AND DECEMBER 2001 CONCENTRATIONS DETECTED IN THESE WELLS ARE AVERAGED PER WELL, EXCEPT MW-108

(3) ALL OTHER AVAILABLE MONITORING WELLS WERE SAMPLED DURING THE MARCH 2002 SAMPLING EVENT

(4) 5 ug/L MAXIMUM CONTAMINANT LEVEL (MCL) PRIMARY DRINKING WATER STANDARD

(5) MONITORING WELLS MW-89 AND MW-90 WERE SAMPLED AT TWO DIFFERENT INTERVALS WITHIN EACH WELL, CONCENTRATIONS ARE INDICATED FOR BOTH INTERVALS

(6) THE "LIMITED TO NO FLOW BOUNDARY" BOUNDS AN AREA WHERE THE WATER LEVEL IN THE FLUVIAL AQUIFER INTERSECTS THE CLAY DIRECTLY UNDERLYING THE FLUVIAL DEPOSITS LEAVING FLUVIAL DEPOSITS UNSATURATED

FIGURE 5
TRICHLOROETHENE (TCE) CONCENTRATION IN GROUNDWATER-MARCH 2002
MAIN INSTALLATION DEPOT BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig5.dgn

LEGEND

- 10 —— ISOCONCENTRATION LINE (IN ug/L)
- 10 – – INFERRED ISOCONCENTRATION LINE FROM LIMITED DATA (IN ug/L)
- ---- DEPOT BOUNDARY
- —— BASE FEATURES
- • MW88 MONITORING WELL
- • PZ06 PIEZOMETER
- ND NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- 78 CONCENTRATIONS IN ug/L
- ug/L MICROGRAMS PER LITER
- J ESTIMATED CONCENTRATION
- CLAY ELEVATION EXCEEDS GROUNDWATER ELEVATION

NOTE

(1) ALL UNITS ARE IN ug/L

(2) MONITORING WELLS 85,86,88 92 93,94,96,97 98,99 100B 101 102B 103,104,107 AND 108 WERE SAMPLED IN NOVEMBER AND DECEMBER 2001 CONCENTRATIONS DETECTED IN THESE WELLS ARE AVERAGED PER WELL, EXCEPT MW-108

(3) ALL OTHER AVAILABLE MONITORING WELLS WERE SAMPLED DURING THE MARCH 2002 SAMPLING EVENT

(4) 70 ug/L MAXIMUM CONTAMINANT LEVEL (MCL) PRIMARY DRINKING WATER STANDARD

(5) MONITORING WELLS MW-89 AND MW-90 WERE SAMPLED AT TWO DIFFERENT INTERVALS WITHIN EACH WELL, CONCENTRATIONS ARE INDICATED FOR BOTH INTERVALS

(6) THE "LIMITED TO NO FLOW BOUNDARY" BOUNDS AN AREA WHERE THE WATER LEVEL IN THE FLUVIAL AQUIFER INTERSECTS THE CLAY DIRECTLY UNDERLYING THE FLUVIAL DEPOSITS, LEAVING FLUVIAL DEPOSITS UNSATURATED

FIGURE 6
CIS 1,2-DCE CONCENTRATION
IN GROUNDWATER-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER
SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig6 dgn

LEGEND

10 —— ISOCONCENTRATION LINE (IN ug/L)
10 – – INFERRED ISOCONCENTRATION LINE FROM LIMITED DATA (IN ug/L)
DEPOT BOUNDARY
BASE FEATURES
• MW88 MONITORING WELL
• PZ06 PIEZOMETER
ND NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
78 CONCENTRATIONS IN ug/L
ug/L MICROGRAMS PER LITER
J ESTIMATED CONCENTRATION
CLAY ELEVATION EXCEEDS GROUNDWATER ELEVATION

NOTE

(1) ALL UNITS ARE IN ug/L

(2) MONITORING WELLS 85,86,88,92,93,94,96,97, 98,99 100B 101,102B,103 104,107 AND 108 WERE SAMPLED IN NOVEMBER AND DECEMBER 2001 CONCENTRATIONS DETECTED IN THESE WELLS ARE AVERAGED PER WELL, EXCEPT MW-108

(3) ALL OTHER AVAILABLE MONITORING WELLS WERE SAMPLED DURING THE MARCH 2002 SAMPLING EVENT

(4) 5 ug/L MAXIMUM CONTAMINANT LEVEL (MCL) PRIMARY DRINKING WATER STANDARD

(5) MONITORING WELLS MW-89 AND MW-90 WERE SAMPLED AT TWO DIFFERENT INTERVALS WITHIN EACH WELL. CONCENTRATIONS ARE INDICATED FOR BOTH INTERVALS

(6) THE "LIMITED TO NO FLOW BOUNDARY" BOUNDS AN AREA WHERE THE WATER LEVEL IN THE FLUVIAL AQUIFER INTERSECTS THE CLAY DIRECTLY UNDERLYING THE FLUVIAL DEPOSITS LEAVING FLUVIAL DEPOSITS UNSATURATED

FIGURE 7
CARBON TETRACHLORIDE CONCENTRATION IN GROUNDWATER-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 80716g7 dgn

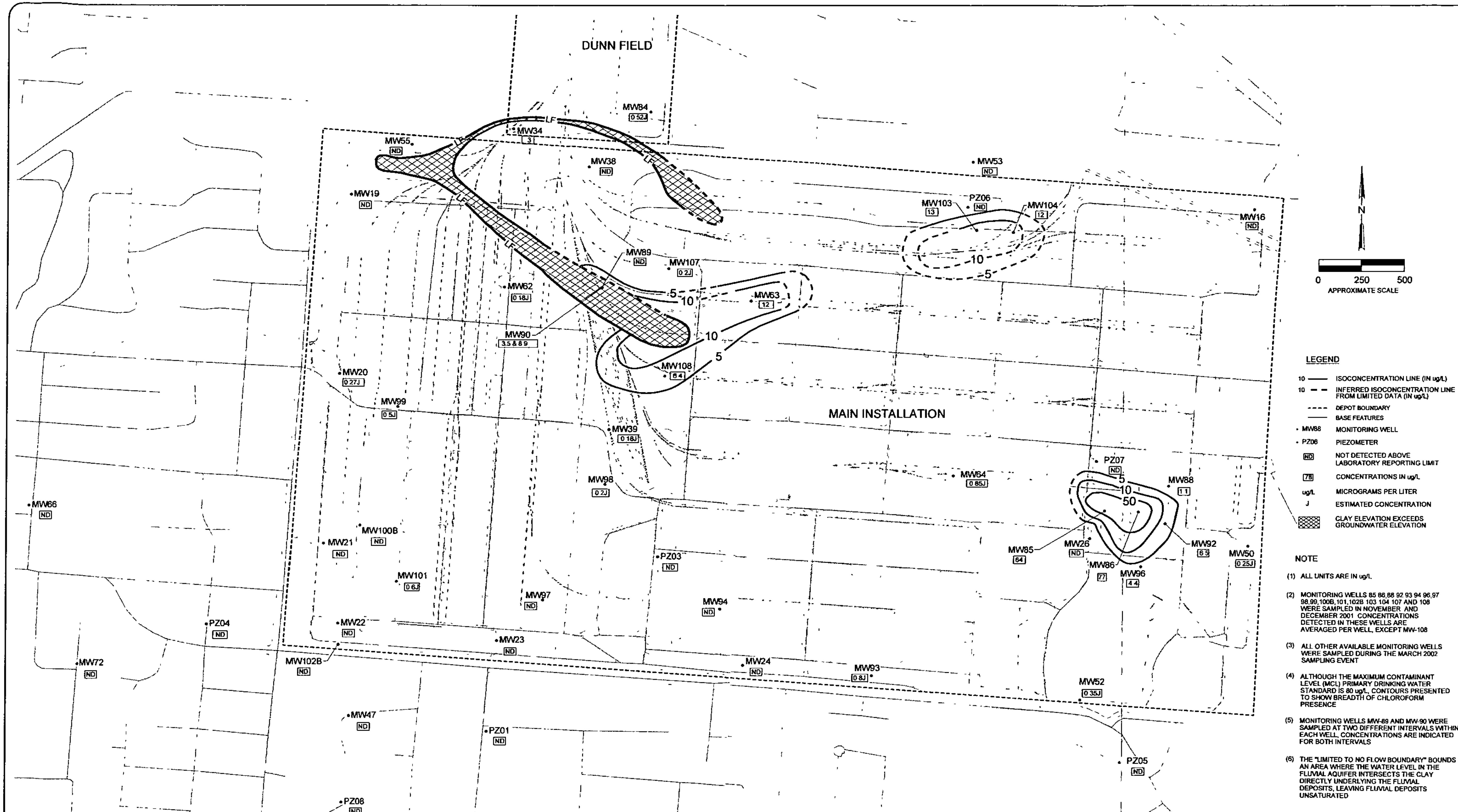


FIGURE 8
CHLOROFORM CONCENTRATION
IN GROUNDWATER-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER
SAMPLING TECHNICAL MEMORANDUM

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig8.dgn

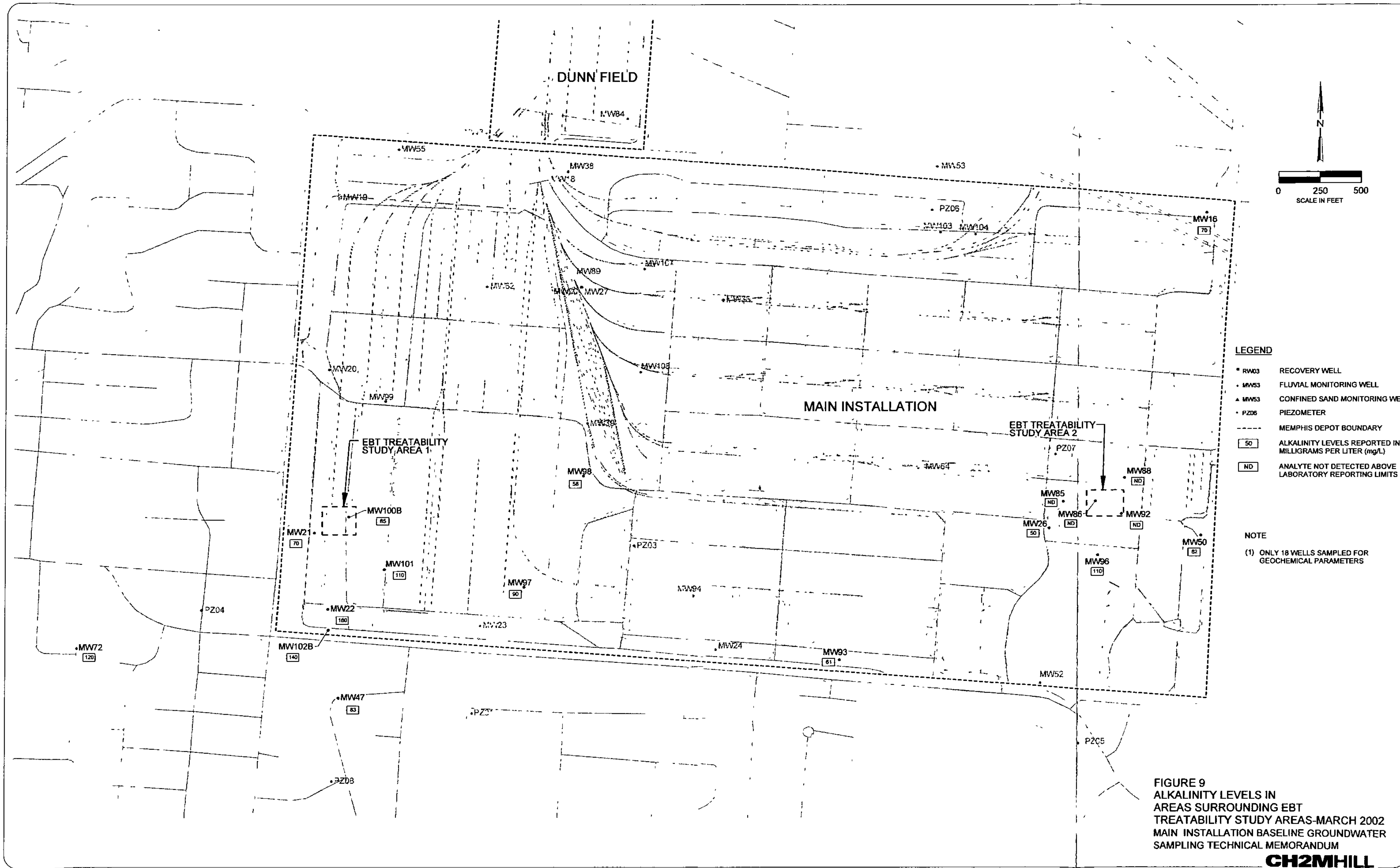
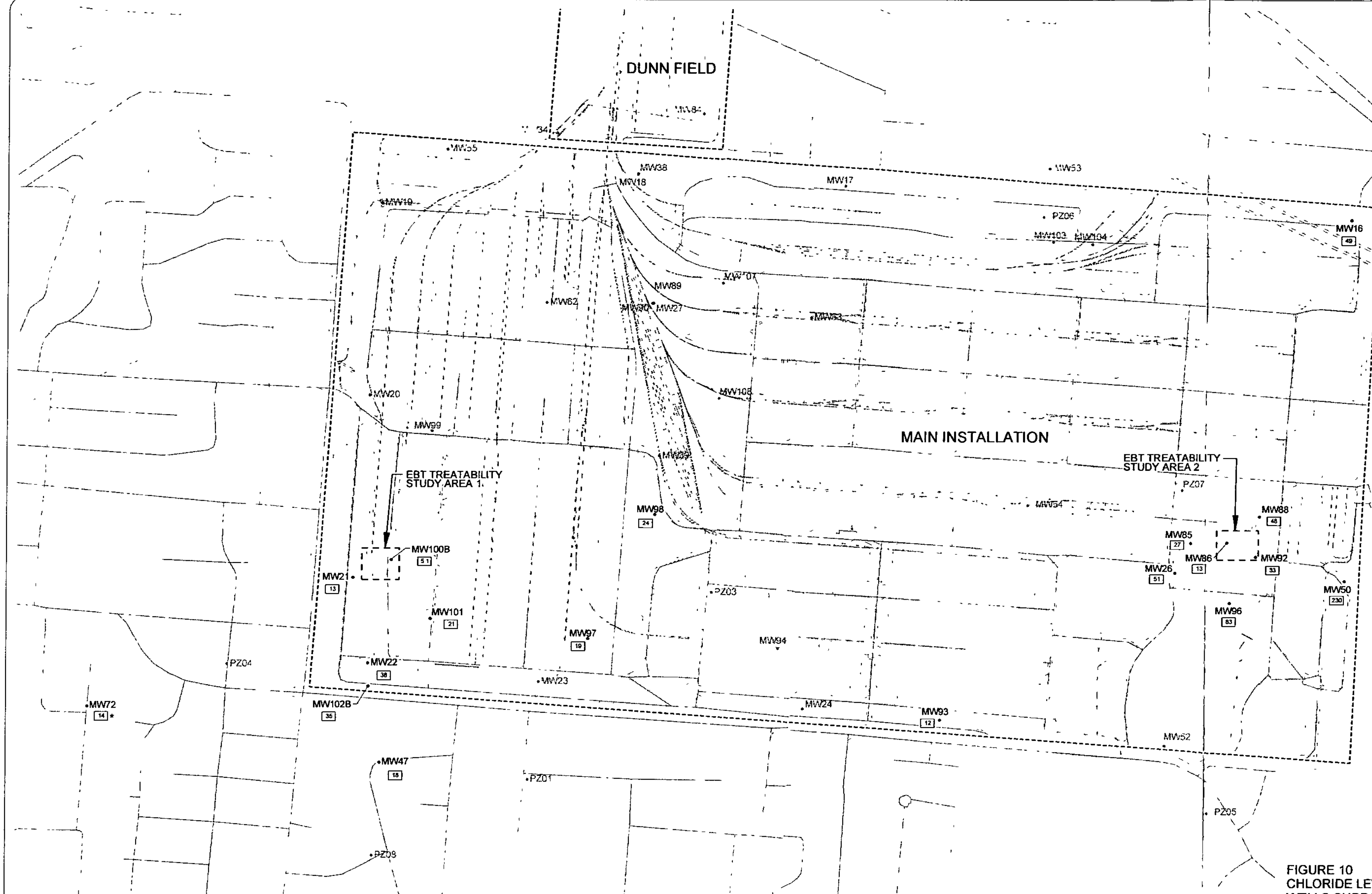


FIGURE 9
ALKALINITY LEVELS IN
AREAS SURROUNDING EBT
TREATABILITY STUDY AREAS-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER
SAMPLING TECHNICAL MEMORANDUM



LEGEND

- RW03 RECOVERY WELL
- MW53 FLUVIAL MONITORING WELL
- MW53 CONFINED SAND MONITORING WELL
- PZ06 PIEZOMETER
- MEMPHIS DEPOT BOUNDARY
- 24 CHLORIDE LEVELS REPORTED IN MILLIGRAMS PER LITER (mg/L)
- ND ANALYTE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- * DUPLICATE SAMPLE RESULT

NOTE

(1) ONLY 18 WELLS SAMPLED FOR GEOCHEMICAL PARAMETERS

FIGURE 10
CHLORIDE LEVELS IN WELLS SURROUNDING EBT TREATABILITY STUDY AREAS-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig10.dgn

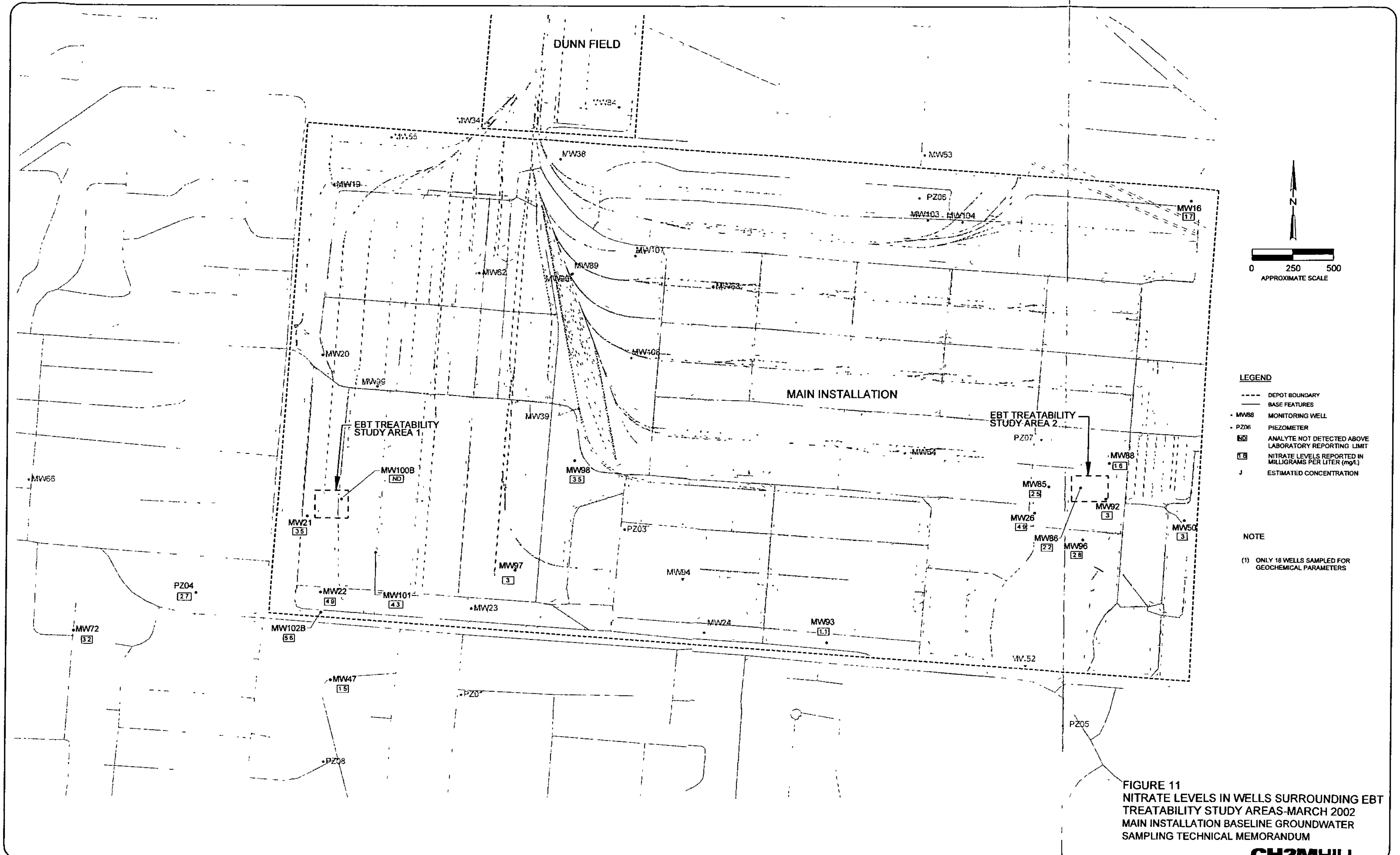


FIGURE 11
NITRATE LEVELS IN WELLS SURROUNDING EBT TREATABILITY STUDY AREAS-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

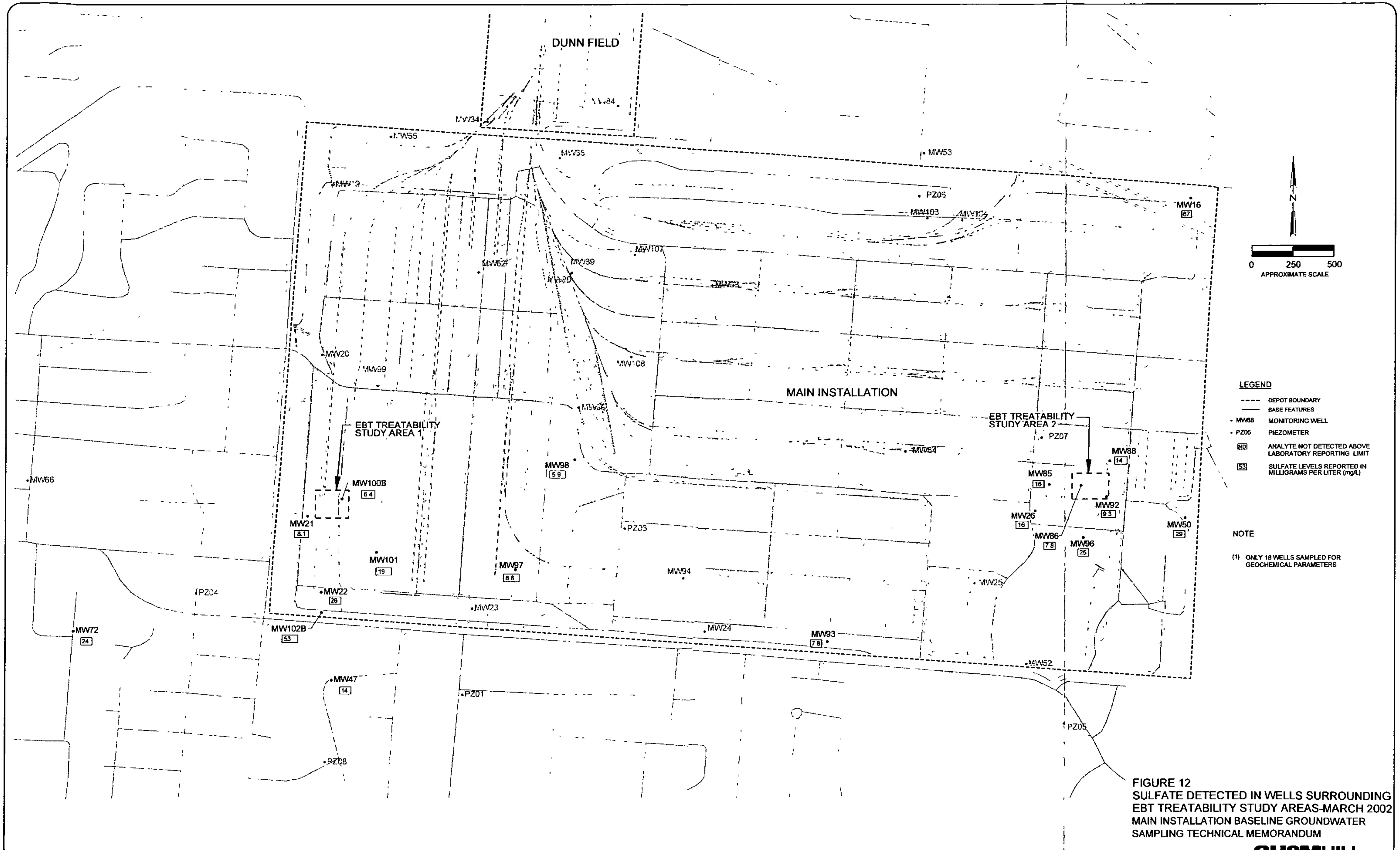
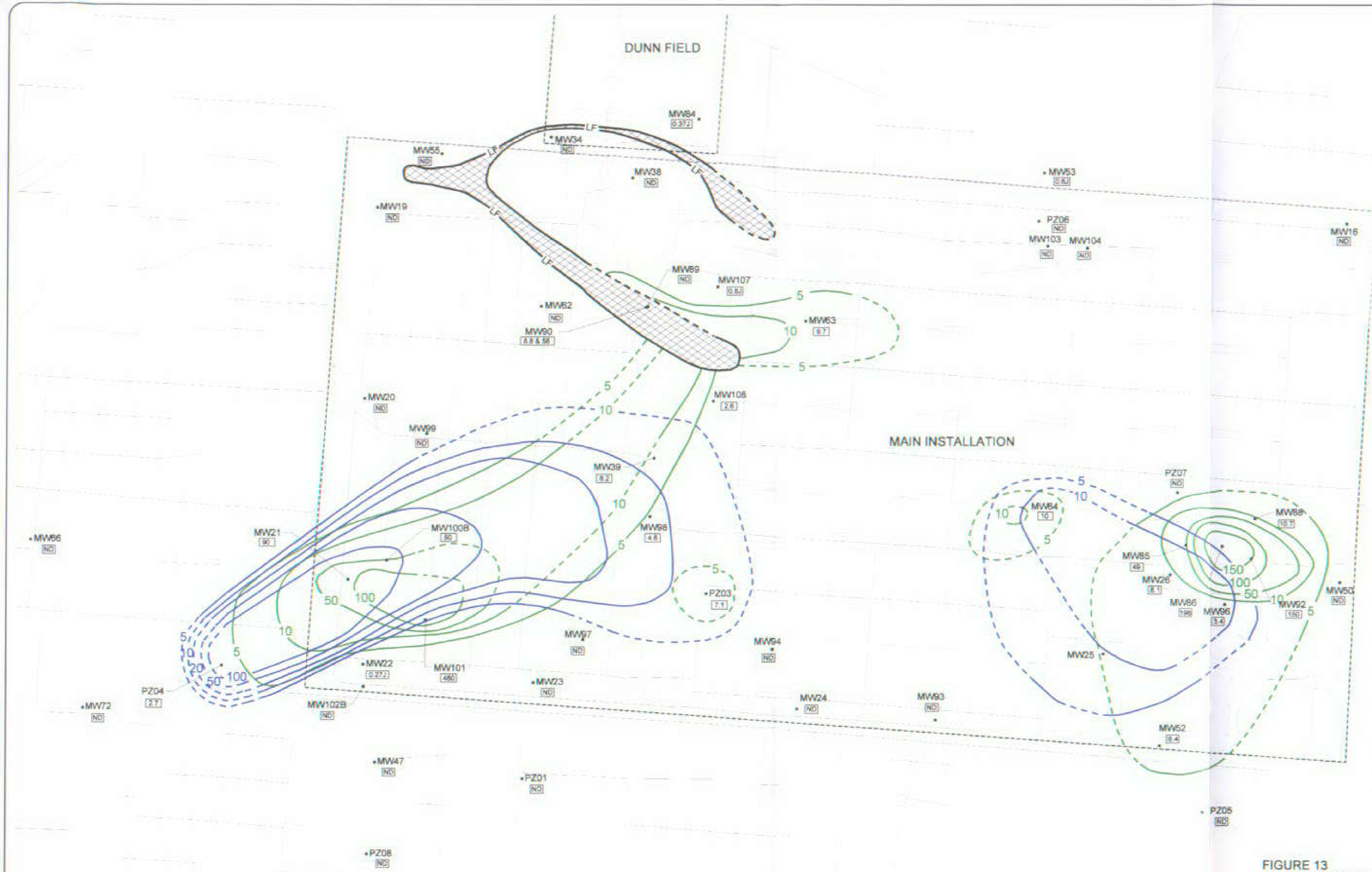


FIGURE 12
SULFATE DETECTED IN WELLS SURROUNDING EBT TREATABILITY STUDY AREAS-MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

CH2MHILL

ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig12.dgn



LEGEND

- 100 — ISOCONCENTRATION LINE FROM OCTOBER/NOVEMBER 1998 (IN ug/L)
- 100 – – INFERRED ISOCONCENTRATION LINE FROM OCTOBER/NOVEMBER 1998 (IN ug/L)
- 10 — ISOCONCENTRATION LINE FROM MARCH 2002 (IN ug/L)
- 10 – – INFERRED ISOCONCENTRATION LINE FROM MARCH 2002 (IN ug/L)
- DEPOT BOUNDARY
- BASE FEATURES
- • MW88 MONITORING WELL
- • PZ06 PIEZOMETER
- ND NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- 78 CONCENTRATIONS IN ug/L
- ug/L MICROGRAMS PER LITER
- J ESTIMATED CONCENTRATION
- CLAY ELEVATION EXCEEDS GROUNDWATER ELEVATION

NOTE:

(1) ALL UNITS ARE IN ug/L.

(2) MONITORING WELLS 85,86,88,92,93,94,96,97, 98,99,100B,101,102B,103,104,107 AND 108 WERE SAMPLED IN NOVEMBER AND DECEMBER 2001. CONCENTRATIONS DETECTED IN THESE WELLS ARE AVERAGED PER WELL, EXCEPT MW-108.

(3) ALL OTHER AVAILABLE MONITORING WELLS WERE SAMPLED DURING THE MARCH 2002 SAMPLING EVENT.

(4) 5 ug/L MAXIMUM CONTAMINANT LEVEL (MCL) PRIMARY DRINKING WATER STANDARD.

(5) MONITORING WELLS MW-89 AND MW-90 WERE SAMPLED AT TWO DIFFERENT INTERVALS WITHIN EACH WELL. CONCENTRATIONS ARE INDICATED FOR BOTH INTERVALS.

(6) THE "LIMITED TO NO FLOW BOUNDARY" BOUNDS AN AREA WHERE THE WATER LEVEL IN THE FLUVIAL AQUIFER INTERSECTS THE CLAY DIRECTLY UNDERLYING THE FLUVIAL DEPOSITS, LEAVING FLUVIAL DEPOSITS UNSATURATED.

FIGURE 13
COMPARISON OF TETRACHLOROETHENE (PCE) LEVELS IN GROUNDWATER BETWEEN OCTOBER/ NOVEMBER 1998 AND MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

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ATLANTA/CAD1/PROJECTS/148071/DDMT/DUNN FIELD MI 2002 11-NOV-2002 8071fig13.dgn

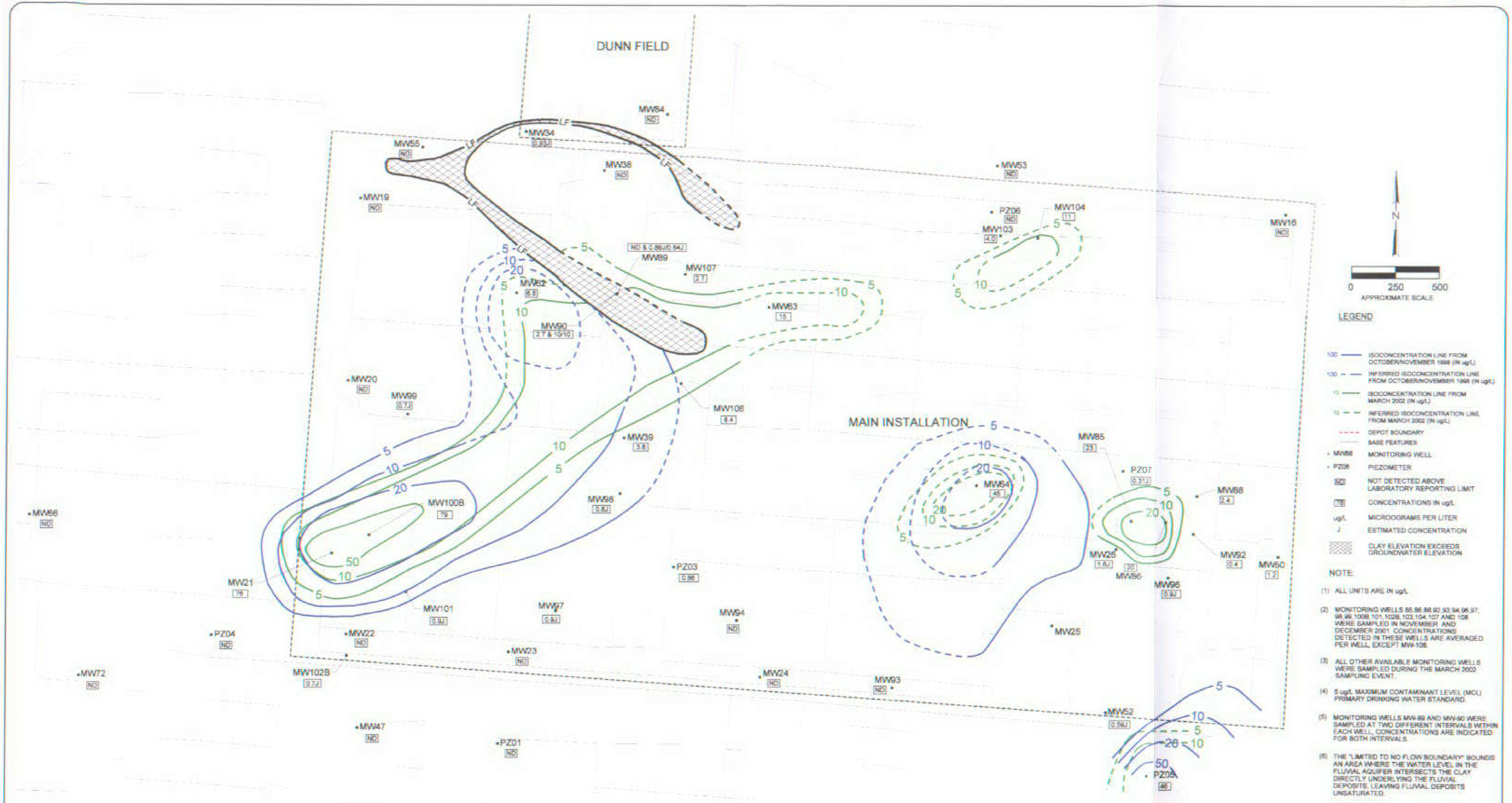

FIGURE 14
COMPARISON OF TRICHLOROETHENE (TCE) LEVELS IN GROUNDWATER BETWEEN OCTOBER/ NOVEMBER 1998 AND MARCH 2002
MAIN INSTALLATION BASELINE GROUNDWATER SAMPLING TECHNICAL MEMORANDUM

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