Interim Remedial Measure
Work Plan

Midler Avenue Brownfield Cleanup Program

NYSDEC Site # C734103
Syracuse, Onondaga County, New York

Prepared for
Pioneer Midler Avenue, LLC

Prepared by

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INTERIM REMEDIAL MEASURE WORK PLAN

SECTION 1 INTRODUCTION

1.1 Introduction

This Interim Remedial Measure (IRM) Work Plan has been prepared for Pioneer Midler Avenue, LLC (PMA LLC, the Owner), volunteer for the Midler Avenue Redevelopment Brownfield Cleanup Program (BCP) Project. This IRM Work Plan addresses several areas of the site that, based on field and laboratory data generated during the New York State Department of Environmental Conservation (NYSDEC) approved Remedial Investigation (RI), appear to be source areas of chlorinated hydrocarbons detected within the soil and groundwater.

It is important to emphasize that this project is an Interim Remedial Measure (IRM) to address high levels of soil contamination in source areas. The soil contamination occurred decades ago when the facility was a manufacturing operation. PMA LLC is a volunteer and the cost to PMA LLC of the proposed IRM will exceed the benefits received from the BCP by a factor of approximately four. While all parties agree that the IRM will significantly improve soil and groundwater quality at the site, the completion of the IRM does not preclude the need to complete the Remedy Selection process or to conduct future monitoring of natural attenuation under the State's Brownfields Cleanup Program.

1.2 Background

An RI Data Report (C&S Engineers, November 2005) for the site summarized data generated during a year-long multi-phase RI. Subsequent to the submittal of the RI Data Report, additional investigative activities were conducted. These activities included:

- Additional soil borings and laboratory analysis of soil samples
- Installation of additional groundwater monitoring wells
- Additional slug tests at groundwater monitoring wells
- Additional groundwater sample collection and laboratory analysis

- Additional water level measurements
- Completion of a soil vapor survey

Data from the above activities have been provided to the NYSDEC and New York State Department of Health (NYSDOH).

In addition to those investigative activities, the buildings on the site were demolished and the concrete slab was removed. During demolition, a major fire destroyed portions of several buildings. As part of the demolition activities, various areas of shallow contamination and several subsurface structures were discovered. Consistent with the Environmental Response Plan for the project, these areas were excavated and disposed of off-site.

Following completion of the IRM, two additional project documents will be generated:

1. An IRM Construction Certification Report, which will document the IRM activities, present the analytical data verifying post IRM conditions in the IRM work areas, and assess the effectiveness of the IRM; and
2. An RI Report, which will provide an assessment of overall site conditions following the IRM. The RI Report will include a Qualitative Exposure Assessment which will evaluate actual or potential exposures to site contaminants. The RI Report will also include an Alternatives Analysis assessing the feasibility of a full range of remedial alternatives.

1.3 IRM Process Background

The process for conducting an IRM is described in the NYSDEC's *Technical and Guidance Memorandum (TAGM) 4048*. As stated in TAGM 4048, an IRM "can be undertaken without extensive investigation and evaluation, to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site." An IRM can be part of the final remediation of a contaminated site or it can constitute the full remedy for a site. One clear advantage of IRMs is that they accelerate remediation of contaminated sites through the early removal of source areas that would need to be remediated eventually.

SECTION 2 SITE CHARACTERIZATION

Attached Figure IRM -1 identifies all sample locations at the Midler site. Table 1 provides a summary of CVOCs in soil samples collected from the site. As used in this work plan, the term *chlorinated volatile organic compounds* (CVOCs) refers to the suite of compounds consisting of tetrachloroethene (PCE), trichloroethene (TCE), vinyl chloride, cis-1,2-dichloroethene, and trans-1,2-dichloroethene. Table 2 attached presents RI groundwater data; concentrations of VOCs that exceed NYSDEC's Class GA Groundwater Standards are highlighted in the table.

2.1 Background Information

2.1.1 Constituents of Interest

Tetrachloroethene and trichloroethene are industrial solvents and are the principal VOCs affecting soil and groundwater at the site. Since the site has not been used for manufacturing for several decades, and based on the manufacturing history at the site, the PCE is most likely from spills of the solvent that occurred many decades ago. The presence of TCE could be from degradation of the PCE or a spill of the TCE itself.

NYSDEC's TAGM 4046 provides Recommended Soil Cleanup Objectives (RSCOs) for contaminated sites. Two other chlorinated organic compounds (vinyl chloride and trans-1,2-dichloroethene) are also present at concentrations exceeding RSCOs and one chlorinated compound (cis-1,2-dichloroethene) is present at multiple locations (the NYSDEC does not provide a TAGM 4046 RSCO for that compound). It has been documented on many occasions that the co-detection of the highly chlorinated compounds (PCE and TCE) with the other chlorinated compounds is due to degradation (dechlorination) of the more highly chlorinated compounds. The completeness of, and time required for, dechlorination in the environment is affected by a number of factors including organic carbon content of soils, soil pH, the presence of soil microbes that are capable of metabolizing the compounds, and a subsurface environment conducive to the growth of the beneficial microbes. Figure IRM-2 shows the progression of the reductive dehalogenation of chlorinated ethenes.

Both PCE and TCE have a specific gravity greater than that of water (approximately 1.62 for PCE and 1.46 for TCE) and limited water solubility (approximately 0.02% for PCE and 0.1% for

TCE). These factors affect migration patterns within the subsurface. The compounds tend to migrate vertically through saturated soils until dense soils or bedrock are encountered; migration would then follow the slope of the denser materials or follow preferential pathways such as layers of less dense soil materials (e.g., sand or gravel), man-made conduits (e.g., utility trenches or monitoring wells), or bedrock fractures (not applicable to this site).

The USEPA's *OnSite OnLine Tools for Site Assessment* was utilized to estimate CVOC transport within the subsurface at the site. That information indicates probable rates of migration for the CVOCs ranging from 140 times slower (PCE) to 10 times slower (vinyl chloride) than the rate of groundwater flow.

In addition to the chlorinated compounds, several sample locations exhibit the presence of petroleum-related VOCs (B-1, TP-14, and B-10).

2.1 2 Relevant Site Conditions

The principal site conditions that appear to have affected the distribution of CVOCs in the subsurface and that are relevant to determining feasible IRM remedial technologies are:

- The shallow depth of overburden groundwater at the site, averaging approximately two to four feet below the ground surface, greatly increases the complexity and associated costs of excavating soils for off-site disposal or treatment.
- Soils within the shallow saturated overburden, comprised of peat and marl, appear to be associated with zones of greatest CVOC impacts. The high carbon content of the peat soils in particular would have a significant inhibitory impact on the mobility of CVOCs and on the partitioning of CVOCs to groundwater.
- The presence beneath the site of a discernable clay unit. This unit is thin or discontinuous in the northern portion of site and becomes notably thicker and apparently continuous in the southern portion, particularly thick to the southwest (profile A-A', Figure 14 of the RI Data Report).
- Minimal CVOC impacts have been detected within groundwater beneath the clay layer and in shallow groundwater above the clay layer at the downgradient (southern) site boundary.

- Minimal soil vapor impacts from the CVOC contamination at the site, particularly at the southern (downgradient) edge of the site.

2.1.3 Groundwater and Contaminant Movement

GeoLogic, Inc. of Cortland, New York assisted C&S in developing site hydrogeology and subsurface CVOC transport characteristics for the Pioneer Midler Avenue site. The GeoLogic report, provided in Appendix A, documents the field and desk-top work conducted to derive:

- Direction of groundwater flow in the upper peat/marl unit and the lower sand unit, and associated hydraulic gradients within those units.
- Estimated hydraulic conductivity of the peat/marl unit.
- Estimated rate of groundwater flow in the peat/marl unit.
- Probable rates of contaminant migration in the peat/marl unit.

Relevant conclusions regarding site hydrogeology include:

- A general north to south direction of groundwater flow within the peat/marl unit with an average horizontal hydraulic gradient of 0.0122.
- An average hydraulic conductivity for the peat/marl unit of 3.25 x10-1 feet per day or 1.15 x10-4 centimeters per second.
- An average estimated linear velocity of groundwater flow in the peat/marl unit of 3.6 feet per year.
- Limited movement of groundwater between the peat/marl unit and deeper sand unit, controlled to some extent by a clay layer aquitard.
- A southeasterly direction of groundwater flow in the sand unit with an estimated horizontal hydraulic gradient of between 0.001 and 0.005.

The USEPA's *OnSite OnLine Tools for Site Assessment* was utilized to estimate CVOC transport within the subsurface at the site. That assessment, presented in detail in Appendix A, indicates probable rates of migration for the CVOCs ranging from 140 times slower (PCE) to 10 times slower (vinyl chloride) than the rate of groundwater flow.

The hydrogeologic and contaminant transport characteristics identified in the GeoLogic report are consistent with the site CVOC analytical data, which indicate distinct PCE/TCE source areas where concentrations of those constituents are present at concentrations several orders of magnitude greater than in surrounding areas. Outside of these source areas degradation compounds predominate at concentrations that decline with distance from the source areas. These summary characteristics support a source removal IRM targeting areas where PCE/TCE are present at the greatest concentrations.

SECTION 3 PROPOSED IRM

3.1 IRM Remedial Goal

The goal for the IRM is to remove CVOCs from the subsurface source areas where those constituents are present in the greatest concentrations, so that CVOC impacts to groundwater may be mitigated. The heterogeneous nature of CVOC detections at the site indicates the presence of multiple potential source areas. The co-location of PCE/TCE with degradation compounds in some areas, and the predominance of only degradation compounds in other areas, indicate that the releases responsible for these chemicals took place over a relatively long period of time and that some degree of natural attenuation is occurring.

3.2 Applicable Remedial Objectives with IRM Boundaries

NYSDEC's TAGM 4046 provides Recommended Soil Cleanup Objectives for contaminated sites. The TAGM also provides a methodology for modifying RSCOs for site-specific conditions such as groundwater elevations and total organic carbon (TOC) content of soils.

As indicated by the NYSDEC, the TAGM 4046 RSCOs were developed based on an assumed soil TOC content of one percent. Soil samples were collected from the Midler site and analyzed for TOC. From the TOC data, C&S calculated an average TOC above the clay unit of approximately eight percent. Utilizing the NYSDEC formula for calculating recommended soil clean-up objectives for protection of groundwater in Section 3, Part A of TAGM 4046, the resulting objectives based on site TOC levels would be 11,200 µg/kg for PCE , 5,600 µg/kg for TCE, 2,400 µg/kg for trans-1,2-dichloroethene, and 1,600 µg/kg for vinyl chloride.

The TAGM 4046 methodology for establishing RSCOs also utilizes a correction factor of 100 to account for soils above the groundwater table. The shallow groundwater conditions and the thickness of the saturated zone at the Midler site would indicate that the correction factor of 100 utilized in the NYSDEC formula could result in site-specific soil cleanup objectives (SSCOs) that would be too high. Therefore, given the need to improve groundwater quality, we have utilized a more conservative correction factor of 50. As shown in the table below, the resulting site-specific soil cleanup objectives within the boundary of each proposed IRM area are 5,600 µg/kg for PCE; 2,800 µg/kg for TCE; 1,200 µg/kg for trans-1,1-dichloroethene; and 800 µg/kg for vinyl chloride. This is the average concentration of each individual CVOC that would need to be met within each of the IRM treatment areas for the IRM remediation to be considered complete. This is summarized in the table below.

CVOC Parameter	TAGM 4046 RSCO	Midler SSCO
PCE	1,400	5,600
TCE	700	2,800
Vinyl chloride	200	800
trans-1,2-Dichloroethene	300	1,200
cis-1,2-Dichloroethene	NA	NA
Total CVOCs	2,600	10,400

All units in µg/kg

3.3 Identification of Areas to be Addressed

Areas at the site identified through research of historical facility information were investigated during the RI as potential sources of CVOC impacts. As data became available during the early stages of field work, other areas of concern became evident and were further investigated.

NYSDEC has requested that concentrations of cis-1,2-dichloroethene be included in the assessment of areas to be addressed by the IRM. As indicated above, the term CVOCs, as used in the work plan, refers to the suite of compounds consisting of PCE, TCE, vinyl chloride, cis-1,2-dichloroethene, and trans-1,2-dichloroethene.

The source areas to be addressed in the IRM are areas where soil sampling data showed the CVOC concentration was above three times the SSCO developed above (i.e., 3 x 10,400 µg/kg = 31,200 µg/kg). Inspection of the site data, along with the body of knowledge associated with CVOC degradation in the environment indicates that increasing concentrations of degradation products are likely to be associated with decreasing concentrations of PCE/TCE. Therefore, targeting areas based on total CVOCs provides a conservative approach to identifying the areas of maximum CVOC impacts.

Figure IRM-1 shows the areas to be addressed during the IRM. The following provides a description of those areas.

- **B-3 Area**: Located generally along the eastern edge of former Building 7, this area includes two apparently separate sources of CVOCs. In both of these source areas, maximum CVOC concentrations in soil are two to three orders of magnitude greater than the concentrations detected at other sampling locations in the surrounding area. CVOC impacts of that magnitude are present to a maximum depth of 26 feet (GPD-3) in these source areas. As indicated above, the areas proposed for source area treatment under the IRM are those areas where RI sample results for CVOCs (total) in soils exceeds 31,200 µg/kg.

- **B-1 Area**: Located along the northern edge of former Building 13, this area includes two apparently separate source areas defined by the PCE/TCE analytical data for boring B-1 and test pit TP-14 (westernmost source area), and borings DW-4 and GPD-26 (easternmost source area). The CVOC impacts in these areas are relatively shallow (<15 ft. below the ground surface). As stated previously, treatment under the IRM is for those areas where RI sample results for CVOCs in soils exceeds 31,200 µg/kg.

- **B-5 Area**: Located east of Building 12, the IRM work in this area addresses one area (characterized by soil samples B-5 and GPD-14), where the data indicate CVOC concentrations exceed 31,200 µg/kg to a depth of approximately ten feet. This area will be excavated.

- **MW-3D area:** The soil sample from this boring did not exhibit significant CVOC impacts during initial investigations, but the groundwater sample from this location exceeded Class GA standards for several parameters. During October 2005, a dense non-aqueous phase liquid (DNAPL) exhibiting the olfactory characteristics of PCE was observed in this MW-3D. Subsequent laboratory analysis confirmed that the DNAPL was PCE. Additional borings in this area have confirmed the presence of elevated levels of CVOCs in a small area around MW-3D.

3.4 IRM Approach

3.4.1 Introduction

Pioneer Midler Avenue, LLC proposes to address the B-1, B-3, and MW-3D source areas utilizing in-situ thermal treatment. We have initiated discussions with several thermal treatment contractors who have successfully remediated CVOC-impacted sites utilizing in-situ thermal treatment. Two specific variants of in-situ thermal treatment being considered differ in the manner in which the soils are heated; one technology induces an electrical current between pairs of electrodes placed in the subsurface and another technology installs electrical resistance heating elements within vertical wells. Application of either of these technologies at the site would include a vapor extraction and treatment system and associated collection and disposal/destruction of non-aqueous phase liquids.

In-situ thermal treatment has been selected as the preferred technology for addressing the most significantly impacted CVOC source areas based on the shallow depth to groundwater and the generally deeper occurrences of CVOC impacts in those areas. Those conditions result in the majority of CVOC impacts being well below the water table. The alternative technology of excavation and off-site disposal or treatment would be anticipated to be less cost-effective as a source area IRM due to difficulties and expenses associated with sheeting, dewatering, water treatment, excavating, characterizing, segregating, disposing, and providing backfill for dispersed areas, some more than twenty feet below the water table. The groundwater treatment options (e.g., pump and treat, reaction walls) known to be applicable to CVOC-impacted sites would require an extended time period to implement and are thus not appropriate

IRM options. A significant factor in the selection of in-situ thermal treatment is the relatively short timeframe needed to complete remediation.

The proposed IRM approach also includes excavation in the B-5 area. Excavated materials will be moved into a thermal heating zone for on-site treatment. The maximum depth for excavation is anticipated to approximately eight to ten feet, but excavation may be conducted deeper if required to meet cleanup objectives. Groundwater generated during excavation activity may be managed via containment within excavations or via pumping from excavations with associated containerization, characterization, treatment (if required), and disposal consistent with the ERP.

3.4.2 Comparative Analysis of Potential IRM Treatment Areas

The proposed treatment areas for the IRM are based on a target concentration of 31,200 µg/kg total CVOCs in soil. Total CVOCs in soil is the sum of the detectable concentrations of PCE, TCE, vinyl chloride, cis-1,2-dichloroethene, and trans-1,2-dichloroethene. The target concentration of 31,200 µg/kg total CVOCs was initially selected based on detailed inspection of data trends for the site. These trends are characterized by extreme heterogeneity, with total CVOC concentrations varying by many orders of magnitude within relatively small spatial intervals at the site. Data from the two largest source areas (referred to as the “B-1” and “B-3” treatment areas in the IRM Work Plan), were further analyzed as follows:

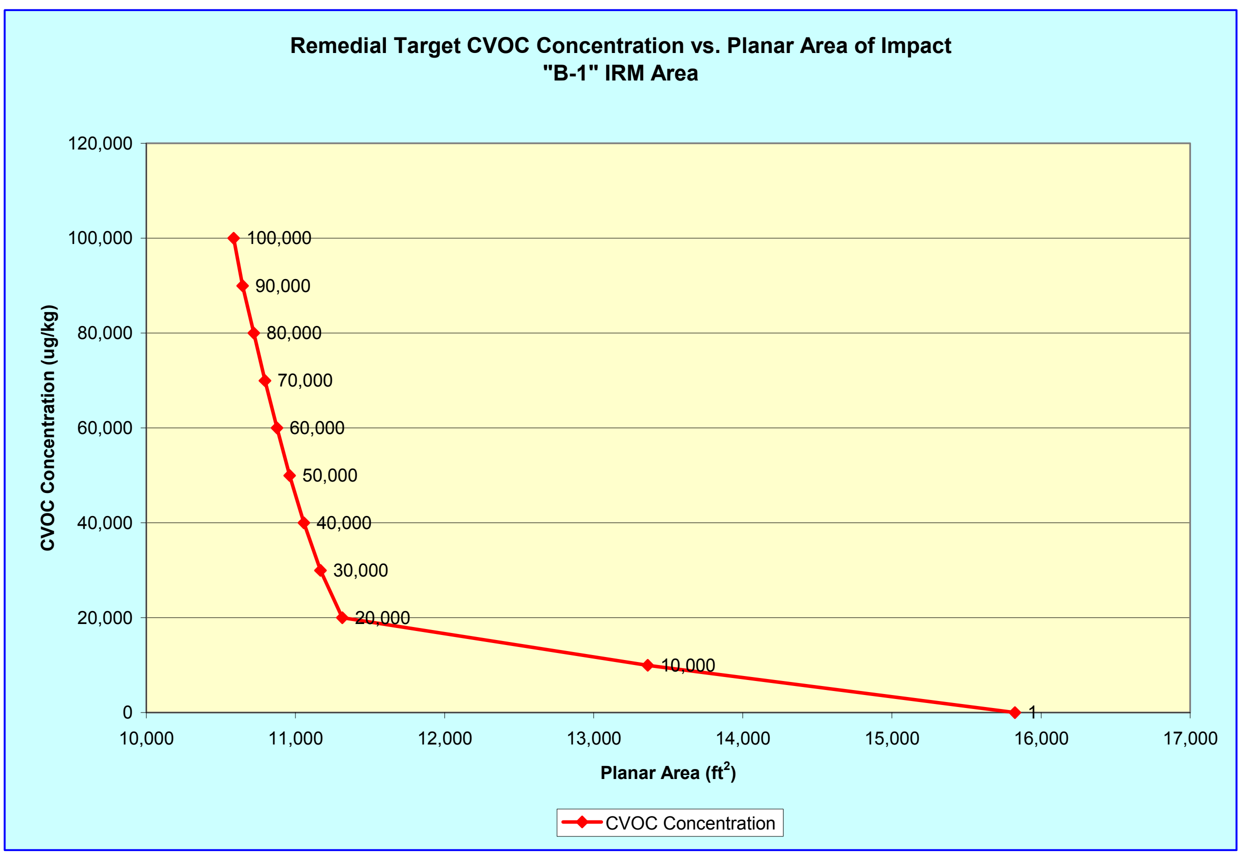
1. Alternative planar areas of impact (treatment areas) were compared based on total CVOCs data; and
2. Mass CVOC removals were calculated and compared for the alternative treatment areas defined in 1 above.

Descriptions of the methods used in the two analyses are provided below, along with a discussion of necessary assumptions, analytical limitations, and conclusions associated with each analysis.

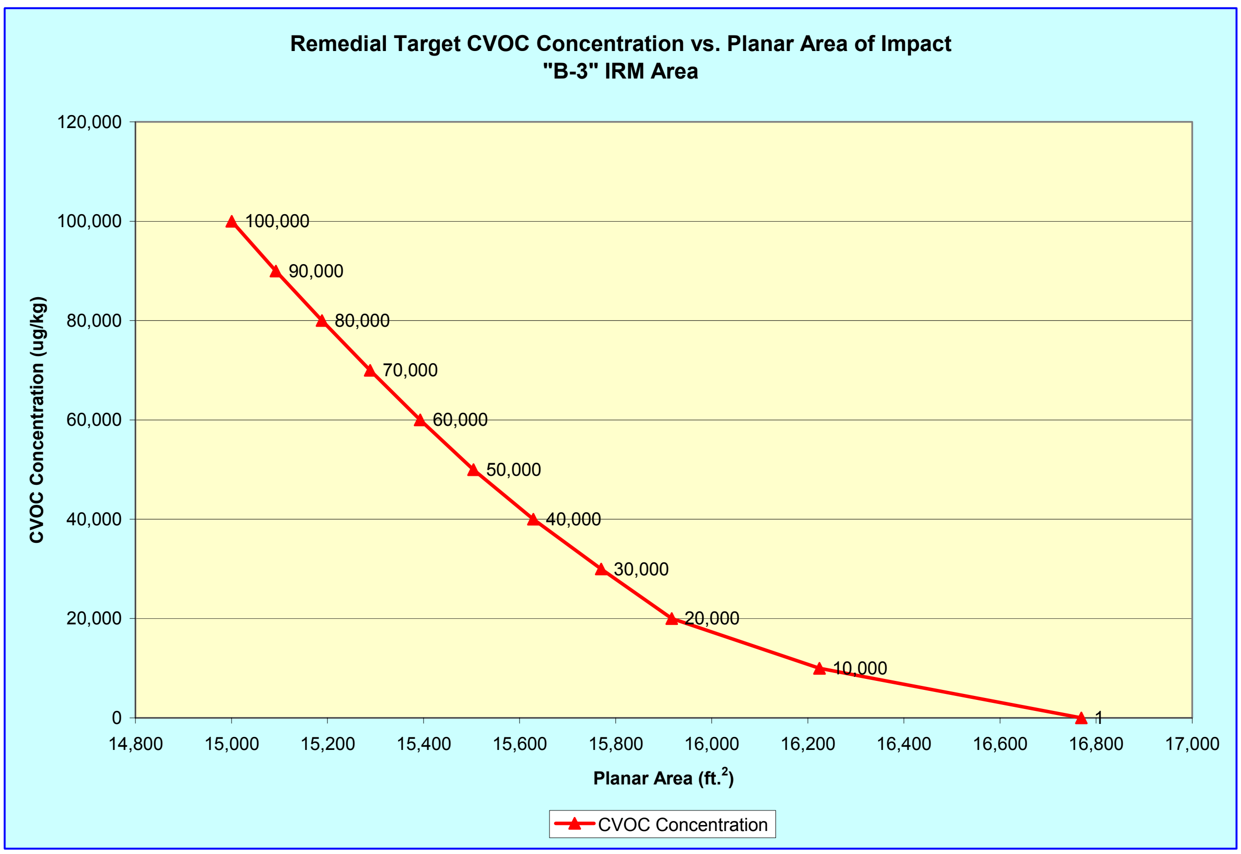
Analysis of Planar Area versus Total CVOCs

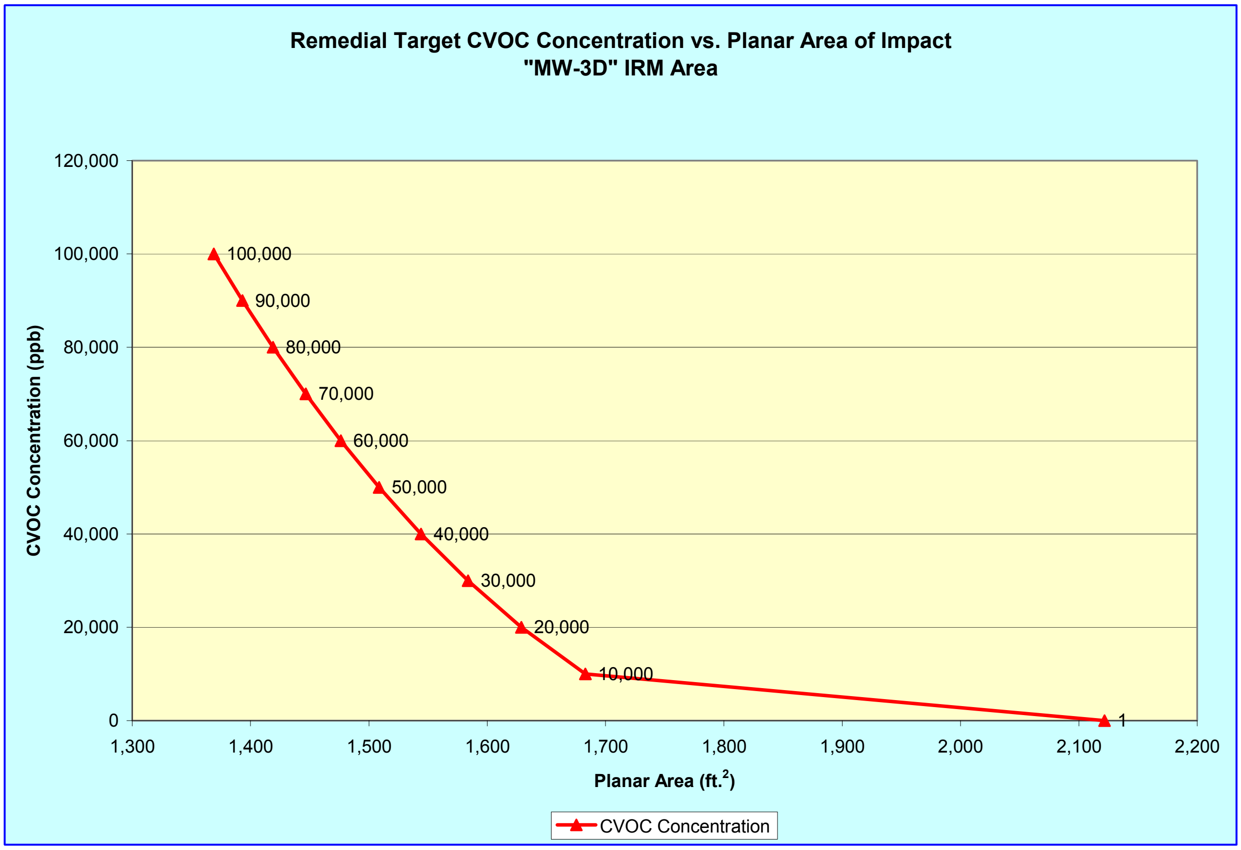
For this analysis, Surfer™ was used to develop a series of total CVOC isopleth maps for an array of potential target concentrations ranging from 10,000 µg/kg to 100,000 µg/kg. The Surfer™ "Grid Planar Area" function was then used to estimate areas that would need to be addressed for each of the alternative target concentrations. Those resulting areas were then graphed versus total CVOCs. The resulting graphs were inspected for trends (e.g., changes in slope or "knee of curve") that would indicate a target concentration that might offer maximum efficiency. The actual thermal treatment areas (approximate) are as follows: B-1 = 8,400 feet^2, B-3 = 12,700 feet^2, MW-3D = 1,200 feet^2.

Due to the extreme heterogeneity of CVOC concentrations, the isopleth contours generated by Surfer™ tend to overestimate areas when compared to traditional delineation methods. The extreme high concentrations exhibited at points within the center of a source area tend to "push" the contours through gaps between low concentration points further from the source area, resulting in multiple "bulges" and greater areas than would be anticipated. Therefore this analysis should be considered a reasonable way to compare a range of target concentrations, not an empirical assessment of the treatment area for any given target concentration.

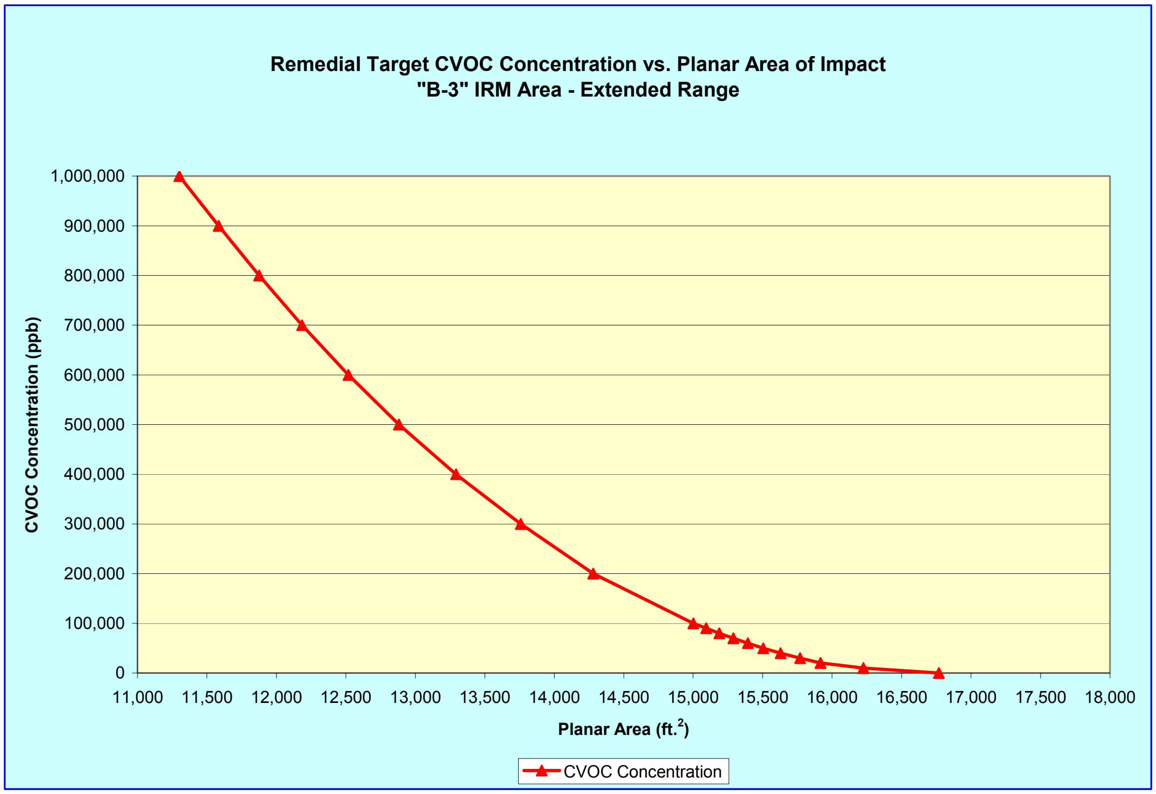


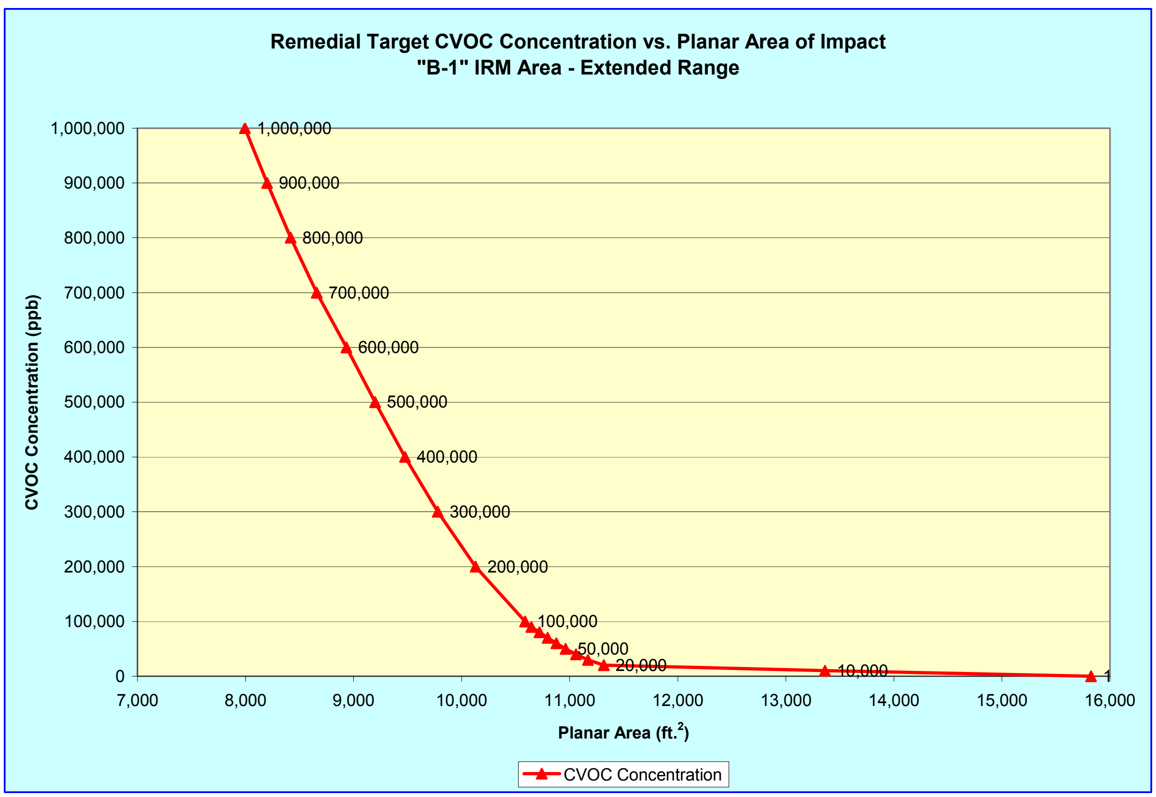
Inspection of the graph for the “B-1” Treatment Area indicates a discernible change of slope between 30,000 µg/kg and 20,000 µg/kg which becomes more pronounced at 20,000 µg/kg. At that point, the treatment area increases at a much greater rate than is exhibited at the higher target concentrations. For instance, the increase in area between the target concentrations of 40,000 µg/kg and 30,000 µg/kg is approximately 111 square feet, which increases to 146 square feet between target concentrations of 30,000 µg/kg and 20,000 µg/kg, and to 2,048 square feet between 20,000 µg/kg and 10,000 µg/kg. This point of change in slope indicates that the target concentration of 31,200 µg/kg is near a point of efficiency for the “B-1” area. The “B-3” and “MW-3D” graphs below exhibits a more subtle, although still discernible, slope change under this analysis.





Within the range of concentrations analyzed (10,000 µg/kg through 100,000 µg/kg) the change in area versus target concentration is more uniform, with the slope resembling the "lower" area of the "B-1" graph, and a discernible decrease in slope taking place in the 20,000 µg/kg to 30,000 µg/kg range ("B-3" graph). When the range of target concentrations was extended to include an additional order of magnitude (i.e., 1,000,000 µg/kg), a decreased slope in the lower portion of the graph became more obvious, indicating a point of maximum efficiency in that extended range. However, points of efficiency in this range have minimal relevance since target concentrations greater than 100,000 µg/kg are not in the realm being considered for this project.


Remedial Target CVOC Concentration vs. Planar Area of Impact
"B-3" IRM Area - Extended Range
CVOC Concentration (ppb)
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
11,000
11,500
12,000
12,500
13,000
13,500
14,000
14,500
15,000
15,500
16,000
16,500
17,000
17,500
18,000
Planar Area (ft.^{2})
CVOC Concentration


Remedial Target CVOC Concentration vs. Planar Area of Impact
"B-1" IRM Area - Extended Range
CVOC Concentration (ppb)
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
50,000
20,000
10,000
0
7,000
8,000
9,000
10,000
11,000
12,000
13,000
14,000
15,000
16,000
Planar Area (ft.^{2})
CVOC Concentration

Since cost of thermal treatment generally corresponds with area (and associated volume) treated, this analysis would appear to confirm that treatment areas with total CVOCs of 31,200 µg/kg ("B-1" area) or greater ("B-3" and "MW-3D" areas) would represent cost-efficient alternatives for this site.

Analysis of Mass Removals

This analysis utilizes the areas identified by the first analysis and the associated CVOC concentrations to calculate kilograms (kg) of CVOCs that would be removed under the alternative treatment area scenarios. Again, the objective of this analysis is to identify trends (i.e., changes in slope or "knee of curve") that would indicate points of maximum efficiency or declining returns to expansion of treatment areas. Assumptions, correction factors, and advisories need to be employed in this type of analysis, including:

- Where more than one sample was collected at a boring location, the sample result exhibiting the highest total CVOCs was used (conservative approach that would result in greater CVOC mass than would actually be present). One exception to this was for the "B-3" sample GPD-3, the average of three samples collected from that boring was used to avoid data biasing based on the extreme result for PCE (one billion parts-per-billion) that was reported for one of the samples.
- A soil density of 1,364 kg per cubic yard and a uniform treatment depth of 20 feet were assumed.
- It was assumed that each sample represents an equal fraction of the mass of soil present within the base (10,000 µg/kg) treatment area. When a sample is removed from an alternative treatment area based on an increased target concentration, the original mass of soil represented by that sample is removed from the reduced treatment area. This would be expected to yield a more normalized mass result than recalculating each reduced area for only the samples remaining in that area, which would assign an increasing fraction of total mass to the remaining "high concentration" samples.
- A correction factor of 0.35 was applied to all mass calculations. The correction factor accounts for dry weight of samples (assumed to be 0.7) and for sample biasing based on the tendency to analyze "hot" sample intervals (additional 0.5 correction).
- This analysis may be relevant to comparing CVOC masses for different treatment areas, but should not be considered as an empirical prediction of masses that would be removed.

The tables below show the samples and total CVOC concentrations that correspond to the 10,000 µg/kg isopleth “B-3” and “B-1” treatment areas, respectively. The respective table for the “MW-3D” area is provided in Appendix B. The tables below indicate CVOC mass removal within the 10,000 µg/kg target area, which serves as the maximum total removals (baseline condition) for this analysis. Mass removals for other target cleanup concentrations were calculated for increments of 10,000 µg/kg. The mass removal data were then graphed versus the target concentrations (see the figures below).

B-3 Area Base Scenario
(10,000 µg/kg treatment area)

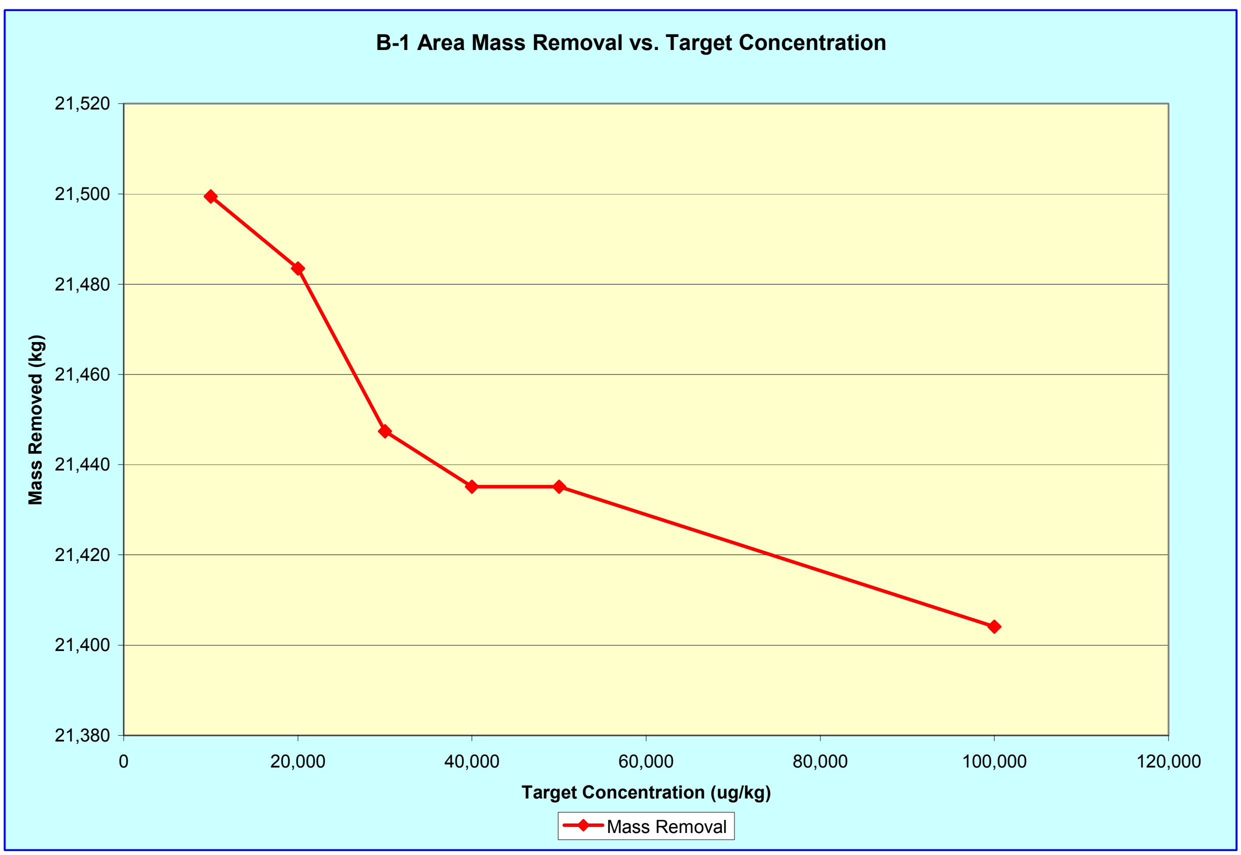
Boring ID	**Total CVOCs** µg/kg	**Mass Removed** (kg**)**
B-3	408,000	120
MW-11D	13,650	4
GPB3-2	686,000	202
GPB3-3	388,000	114
GPB3-5	98,400	29
GPB3-7	278,900	73
GPB3-9	7,410,000	1,932
GPB3-10	16,200	4
GPB3-11	10,400	3
GPB3-12	29,100	8
GPB3-13	25,000	7
GPB3-14	12,000	3
GPB3-16	12,820	3
GPB3-17	1,376,000	359
GPB3-18	2,126,000	554
GPB3-22	1,460,000	381
GPD-3	345,226,700	90,032
GPD-51	43,000,000	11,214
GPD-52	46,800	12
GPD-57	14,000	4
GP-3	13,250,000	3,455
GP-15	513,200	134
Avg. Concentration	18,927,326	

B-1 Area Base Scenario
(10,000 µg/kg treatment area)

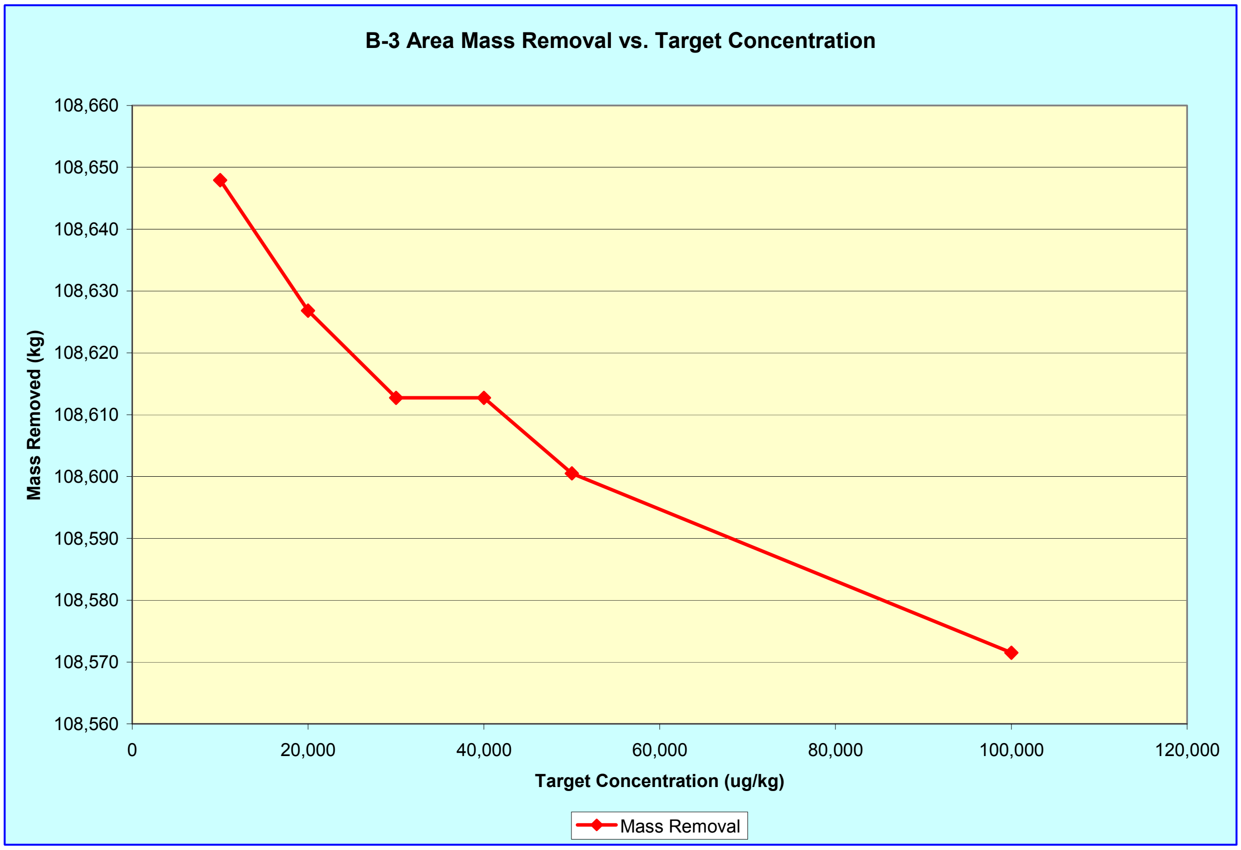
Boring ID	**Total CVOCs** µg/kg	**Mass Removed** (kg)
B-1	38,900	12
TP-14	98,200	31
GPD-19	20,300	6
GPD-26	2,500,000	790
GPD-32	27,700	9
GPD-33	20,530	6
GPD-37	10,860	2
GPD-38	22,000	4
GPD-41	17,400	3
GPD-42	11,800	2
GPD-44	11,600	2
GPB1-1	324,900	64
GPB1-2	6,300,000	1,240
GPB1-3	6,900,000	1,359
GPB1-4	4,479,000	882
GPB1-6	4,810,000	947
GPB1-7	19,300	4
GPB1-8	2,858,000	563
GPB1-9	9,940,000	1,957
GPB1-10	68,440,000	13,475
GPB1-11	28,030	6
GPB1-12	10,100	2
DW-4	646,000	127
SB-13-2	23,200	5
Avg. Concentration	4,481,576	

Inspection of the data in these tables indicates that the majority of the mass removed under all treatment scenarios is associated with the few samples from the heart of each source area. In the "B-3" area, approximately 93% (101,246 kg) of the total CVOC mass (108,648 kg) is accounted for by samples GPD-3 and GPD-51. In the "B-1" area, approximately 72% (15,432 kg) of the total CVOC mass (21,499 kg) is accounted for by samples GPB1-9 and GPB1-10. The "MW-3D" area exhibits the most extreme situation in this regard, with all of the CVOC mass removed accounted for by samples GP3-8 and GP3-9; no other samples from this area exhibit total CVOC concentrations exceeding 10,000 ug/kg (baseline condition for this analysis).

The mass removal data indicate that, for the "B-3" area, approximately 99.93% of the CVOC mass would be removed if the target concentration were 100,000 µg/kg. By lowering the target concentration to 30,000 µg/kg, an additional 41 kg, representing 0.04% of the total mass would be removed. For the "B-1" area, 99.56 % of the total mass would be removed under a 100,000 µg/kg treatment area scenario, with an additional 43 kg, or 0.2 % of the total mass then removed by lowering the target concentration to 30,000 µg/kg.



The figures for B-1 (above) and B-3 (below) indicate slight variations in the slope of the mass removal versus target concentration within the range analyzed. As discussed above, a similar graph for the MW-3D area would be a horizontal line, illustrating that the same mass (approximately 155 kg.) would be removed under any scenario between 10,000 ug/kg and 100,000 ug/kg.



The salient point in this analysis is the apparent result that the vast majority of CVOC mass would be removed under any scenario targeting any value of 100,000 µg/kg or less. Therefore, the proposed target concentration of 31,400 ug/kg represents an extremely conservative approach with respect to mass CVOC removals within the identified source areas.

It is important to note that the conceptual design for the thermal treatment provides for a fairly significant "halo effect" so that the areal extent of thermal treatment will extend beyond the proposed treatment area shown in Figure IRM-1.

3.5 Summary

In addition to remediating the source areas at the Midler site, the proposed IRM will be protective of the environment and human health. This is based on the following factors.

- An average estimated linear velocity of groundwater flow in the peat/marl unit of 3.6 feet per year.
- Estimated linear velocities for the CVOC flow ranging from 0.026 feet/year for PCE to 0.36 feet/year for vinyl chloride.
- Minimal soil vapor impacts from the pre-remediation CVOC contamination at the site, particularly at the southern edge.
- No residential properties adjacent to the site.
- Deed restrictions will be utilized to control future use of the site.
- There is no groundwater usage in the general vicinity of the site.
- There will be reduced infiltration at the site due to the significant increase in impervious surfaces compared to historical usage.
- The commercial buildings to be constructed at the site will be under positive pressure.
- Soil vapor barriers, if needed, can be installed as part of the building construction.
- In excess of 99% of the CVOC mass will be removed during the IRM.
- The halo effect from the thermal treatment will result in reductions of CVOC levels beyond the targeted treatment area.

Section 4 Other IRM Parameters

4.1 IRM Design Documents

The efficacy of any thermal treatment technology depends on achieving target temperatures throughout the entire treatment area and continuing to apply those temperatures until the vaporization of the target compounds is sufficient to achieve the clean-up objective. The contract with the thermal treatment firm can be structured as a standard fixed price contract or as a guaranteed fixed price contract. In either case, the treatment would not be considered complete until, under the verification sampling plan outlined in this proposal and agreed to by all parties, the treatment goals are reached. According to literature and vendor assessments, applied thermal treatment times of three to six months would be needed to achieve the required CVOC removals

4.2 IRM Verification Sampling

The verification sampling program was designed to monitor the effectiveness of the interim remedial measure in reducing the levels of soil contamination to be protective of groundwater. NYSDEC Region 7 has provided both written comments (March 15, 2006) and verbal comments (March 31, 2006) regarding verification sampling in the thermal treatment areas. In addition, Draft DER-10, *Technical Guidance for Site Investigation and Remediation*, provides guidance for post-remediation sampling frequencies for excavations.

The thermal treatment verification sampling will consist of soil grab samples utilizing a GeoProbe® sampling system from designated areas and depths within each of the treatment areas. Figure IRM-3 provides the verification sample grid, which is based on a 25-foot sampling grid. The verification sampling grid extends to the treatment area boundaries to address the NYSDEC's concern that boundary areas be sampled. At several locations, boundary samples are less than 25 feet from adjacent sample locations to provide verification samples near the boundary. In all situations, the outermost verification samples will be located within the IRM thermal treatment area. Verification sample depths (Table 3) were determined to provide comparability with RI sample data. Exact sample locations will need to be adjusted in the field to avoid treatment system infrastructure while sampling. The following table provides the number of samples to be collected from each thermal treatment area.

Thermal Treatment Area ID	Number of Verification Samples
B-3	26
B-1	20
MW-3D	5

The B-5 area will be remediated by excavation and the CVOC-impacted materials will be placed within one of the thermal treatment areas for treatment. At the limits of the B-5 area excavation, soil verification samples will be collected prior to backfill. Four separate excavation sidewall verification samples (N, S, E, and W) and two bottom samples will be collected. If a trench box or sheet piles are utilized for excavating the B-5 area, collection of sidewall samples may be accomplished through the use of a GeoProbe® unit.

When the remedial contractor determines that adequate treatment has been applied, verification samples will be collected. If the average concentration of each individual CVOC within a thermal treatment area is less than the SSCO for that CVOC (listed in the table in Section 2.1.5), the IRM will be considered complete for that treatment area.

Verification samples from all areas will be submitted for laboratory analysis of VOCs consistent with the NYSDEC's Analytical Services Protocol. The verification sampling data will be provided to a certified data validator for preparation of a Data Usability Summary Report to confirm that the IRM verification sample results meet the Brownfield Cleanup Program requirements for quality control/quality assurance.

4.3 Other IRM Requirements

In designing the IRM the following special project conditions will be specified:

- Community air monitoring consistent with NYSDOH guidance and site-specific action levels will be conducted by the Remedial Contractor throughout the IRM. The NYSDOH-approved Community Air Monitoring Plan (CAMP) is provided as Appendix C.
- The Remedial Contractor(s) will be required to prevent site soils from becoming airborne, or from otherwise migrating from the site via storm water, on the wheels of vehicles, or by any other means.
- The Contractor(s) will be required to provide a secure site during the IRM to protect the public from entering the site or otherwise being exposed to VOC-impacted soils.
- The Contractor will be required to provide a site-specific Health and Safety Plan (see Appendix D) and an Emergency Response Contingency Plan for his employees to protect the employees from exposure to site contaminants as well as general worksite hazards.

4.4 IRM Construction Certification Report

Following completion of the IRMs, C&S will prepare an IRM Construction Certification Report that will, at a minimum, include:

- A summary of the IRMs including areas of concern, problems encountered during construction, changes to the design documents, and volumes of soil removed or treated.
- A comparison of post-IRM soil quality data with applicable remediation standards.
- A listing of the source and quality of any fill materials used.
- Record Drawings.
- Waste Transport Manifests.
- A review of Community Air Monitoring and public involvement activities.

The IRM Construction Certification Report will include an analysis of the total volume of VOCs removed from the site via thermal treatment and via excavation/off-site disposal, and the relative costs per unit volume for the two technologies. Those data may then be utilized, along with the summary site data generated during the RI and IRMs, to complete the Qualitative Human Health Risk Assessment and the Remedial Alternatives Assessment for the site.

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TABLES

Table 1   Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total	VC		TCE		PCE		cis		trans	
		TAGM 4046 RSCOs ->	CVOCs	200		700		1,400		NA		300	
		Proposed SSCOs ->		800		2,800		5,600		NA		1,200	
B-1	4 - 6	11/12/04	38,900	8,100		5,800		14,000		11,000		1,800	U
B-2	5 - 7	11/12/04	55	11	J	5	J	21		18		16	U
B-3	14 - 16	11/11/04	408,000	16,000	U	68,000		310,000		30,000		16,000	U
B-3	2 - 4	11/11/04	22	11	U	2	J	20		11	U	11	U
B-4	2 - 4	11/11/04	11	12	U	3	J	8	J	12	U	12	U
B-5	6 - 8	11/12/04	52,590	3,800		490	J	1,200	J	44,000	E	3,100	
B-5 DL	6 - 8	11/12/04	63,800	3,700	DJ	5,800	U	2,300	DJ	54,000	D	3,800	DJ
B-6	2 - 4	11/11/04	0	10	U	10	U	10	U	10	U	10	U
B-7	2 - 4	11/12/04	0	11	U	11	U	11	U	11	U	11	U
B-8	2 - 4	11/11/04	0	11	U	11	U	11	U	11	U	11	U
B-9	2 - 4	11/11/04	17	11	U	11	U	17		11	U	11	U
B-10	3 - 6	11/12/04	0	1,700	U	1,700	U	1,700	U	1,700	U	1,700	U
LB-8	4 - 6	11/09/04	0	15	U	15	U	15	U	15	U	15	U
PB-3	2 - 4	11/22/04	0	12	U	12	U	12	U	12	U	12	U
PB-4	2 - 4	11/18/04	0	12	U	12	U	12	U	12	U	12	U
PB-7	2 - 4	11/19/04	0	12	U	12	U	12	U	12	U	12	U
PB-12	18 - 20	11/24/04	0	17	U	17	U	17	U	17	U	17	U
MW-1	4 - 6	11/17/04	0	11	U	11	U	11	U	11	U	11	U
MW-2	2 - 4	11/18/04	0	12	U	12	U	12	U	12	U	12	U
MW-3	2 - 4	11/18/04	46	14	U	14	U	46		14	U	14	U
MW-4	2 - 4	11/17/04	0	14	U	14	U	14	U	14	U	14	U
MW-5	2 - 4	11/17/04	10	12	U	12	U	10	J	12	U	12	U
MW-6	4 - 7	11/16/04	0	13	U	13	U	13	U	13	U	13	U
MW-7	4 - 6	11/16/04	0	11	U	11	U	11	U	11	U	11	U
MW-8	2 - 5	11/18/04	0	18	U	18	U	18	U	18	U	18	U
MW-2D	16-18	01/27/05	0	18	U	18	U	18	U	18	U	18	U
MW-3D	20-22	01/25/05	1,415	160		3	J	12	J	1,100	E	140	
MW-3D DL	20-22	01/25/05	2,000	4,300	U	4,300	U	4,300	U	2,000	DJ	4,300	U
MW-3D	24-26	01/25/05	2	14	U	14	U	2	J	14	U	14	U
MW-4D	14-16	01/26/05	0	13	U	13	U	13	U	13	U	13	U
MW-9D	16-18	01/27/05	0	16	U	16	U	16	U	16	U	16	U
MW-9D	18-20	01/27/05	0	15	U	15	U	15	U	15	U	15	U
MW-10D	16-18	01/26/05	54	7	J	18	U	18	U	45		2	J
MW-11D	20-22	01/24/05	5,948	11	U	550	E	5,300	E	96		2	J
MW-11D DL	20-22	01/24/05	13,650	1,300	U	650	DJ	13,000	D	1,300	U	1,300	U
GP-2	12 - 16	03/17/05	2,552	820	E	12	J	80		1,400	E	240	
GP-2 DL	12 - 16	03/17/05	2,560	500	DJ	2,000	U	360	DJ	1,700	DJ	2,000	U
GP-2	16 - 19	03/17/05	897	24	J	92		82		660	E	39	
GP-2 DL	16 - 19	03/17/05	2,310	3,500	U	3,500	U	710	DJ	1,600	DJ	3,500	U
GP-3	16 - 19	03/17/05	13,250,000	980,000	U	250,000	J	13,000,000		980,000	U	980,000	U
GP-3	19 - 19.5	03/17/05	6,140,000	360,000	U	240,000	J	5,900,000		360,000	U	360,000	U
GP-4	10-12	03/17/05	254,400	80,000		16,000	U	4,400	J	170,000		16,000	U
GP-7	8 - 12	03/18/05	49	5	J	20	U	2	BJ	37		5	J
GP-7	16 - 18.9	03/18/05	109	3	J	3	J	4	BJ	89		10	J
GP-9	8 - 10.5	03/18/05	1,804	1,200	E	33	U	6	BJ	530		68	
GP-9 DL	8 - 10.5	03/18/05	4,900	2,700	DJ	3,900	U	3,900	U	2,200	DJ	3,900	U
GP-9	16 - 18.5	03/18/05	115	4	J	14	J	15	BJ	69		13	J
GP-10	9 - 10	03/18/05	56	10	J	29	U	3	BJ	32		11	J
GP-10	14 - 16	03/21/05	61	34	U	34	U	22	J	32	J	7	J
GP-11	15 - 16	03/21/05	34	28	U	28	U	14	J	20	J	28	U
GP-11	16 - 18	03/21/05	31	29	U	29	U	4	J	20	J	7	J
GP-12	8 - 12	03/21/05	4,100	1,300	J	1,900	U	1,900	U	2,800		1,900	U
GP-14	18.5 - 19.5	03/21/05	4,126	6	J	2,000	E	1,100	E	790	E	230	
GP-14 DL	18.5 - 19.5	03/21/05	1,370	2,700	U	710	DJ	660	DJ	2,700	U	2,700	U
GP-15	24 - 25	03/21/05	513,200	38,000	U	13,200	J	500,000		38,000	U	38,000	U

Table 1 Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total CVOCs	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->			200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
SB 2-1	5 - 7	03/16/05	0	15	U	15	U	15	U	15	U	15	U
SB 2-1 RE	5 - 7	03/16/05	0	15	U	15	U	15	U	15	U	15	U
SB 2-1	8 - 10	03/16/05	0	18	U	18	U	18	U	18	U	18	U
SB 3-1	2 - 4	03/16/05	0	34	U	34	U	34	U	34	U	34	U
SB 3-1	12 - 14	03/16/05	0	19	U	19	U	19	U	19	U	19	U
SB 7-1	2 - 4	03/17/05	278	20	U	18	J	260		20	U	20	U
SB 7-1	16 - 18	03/17/05	0	29	U	29	U	29	U	29	U	29	U
SB 9-1	4 - 6	03/17/05	169	15	U	39		130		15	U	15	U
SB 9-1	16 - 18	03/17/05	553	21	U	240		64		160		89	
SB 12-1	0 - 2	03/18/05	236	12	U	220		12	B	4	J	12	U
SB 12-1	16 - 18	03/18/05	6,800	1,600	U	1,800		5,000		2,700	U	1,600	U
SB 13-2	12 - 14	03/21/05	4,164	1,100	E	18	U	4	BJ	3,000	E	60	
SB 13-2 DL	12 - 14	03/21/05	23,200	3,200	D	2,100	U	2,100	U	20,000	D	2,100	U
SB 13-2	20 - 22	03/21/05	16,700	2,700		2,100	U	2,100	U	14,000		2,100	U
SB 13-4	4 - 6	03/18/05	184	120		14		3	BJ	45		2	J
SB 13-4	20 - 22	03/18/05	3	1	J	13	U	2	BJ	13	U	13	U
DW-1	16-18	07/27/05	0	12	U	12	U	12	U	12	U	12	U
DW-1	20-24	07/27/05	0	12	U	12	U	12	U	12	U	12	U
DW-2	20-22	07/26/05	0	14	U	14	U	14	U	14	U	14	U
DW-2	24-26	07/26/05	0	12	U	12	U	12	U	12	U	12	U
DW-2R	24-26	07/26/05	0	12	U	12	U	12	U	12	U	12	U
DW-2	40-43	07/26/05	103	12	U	17		86		12	U	12	U
DW-2R	40-43	07/26/05	175	12	U	25		150		12	U	12	U
DW-3	16-18.5	07/27/05	0	19	U	19	U	19	U	19	U	19	U
DW-4	6-8	07/28/05	1,214	210		52	U	52	U	990		14	J
DW-4 RI	6-8	07/28/05	1,202	190	J	51	U	51	U	1,000		12	J
DW-4	16-18.5	07/28/05	635,210	910	J	42,000	E	560,000	E	32,000	E	300	J
DW-4 DL	16-18.5	07/28/05	646,000	60,000	U	26,000	DJ	600,000	D	20,000	DJ	60,000	U
DW-4	24-28.5	07/28/05	4	12	U	12	U	2	J	2	J	12	U
GPD-1	7 - 9	09/06/05	11	4	J	14	U	14	U	5	J	2	J
GPD-1 DL	7 - 9	09/06/05	0	69	U	69	U	69	U	69	U	69	U
GPD-1	11 - 14	09/06/05	7	13	U	13	U	7	J	13	U	13	U
GPD-1 DL	11 - 14	09/06/05	0	64	U	64	U	64	U	64	U	64	U
GPD-2	15.8 - 17.5	09/06/05	4,078	60	U	2,300	E	1,400	E	340		38	J
GPD-2 DL	15.8 - 17.5	09/06/05	4,530	1,500	U	2,200	D	2,100	D	230	DJ	1,500	U
GPD-3	4 - 8	09/06/05	2,340,330	1,600	U	110,000	E	2,200,000	E	30,000		330	J
GPD-3 DL	4 - 8	09/06/05	1,000,000,000	2.E+09	U	2.E+09	U	1.E+09	DJ	2.E+09	U	2.E+09	U
GPD-3	15 - 17	09/06/05	112,700	1,400	U	2,700		110,000	E	1,400	U	1,400	U
GPD-3 DL	15 - 17	09/06/05	12,310,000	1,400,000	U	310,000	DJ	12,000,000	BD	1,400,000	U	1,400,000	U
GPD-3	17 - 20	09/06/05	254,100	1,300	U	4,100		250,000	E	1,300	U	1,300	U
GPD-3 DL	17 - 20	09/06/05	23,370,000	2,600,000	U	370,000	DJ	23,000,000	BD	2,600,000	U	2,600,000	U
GPD-3	23 - 26	09/06/05	8,200	1,400	U	1,500		6,700	B	1,400	U	1,400	U
GPD-5	14 - 15.2	09/07/05	6,550	1,500	U	1,500		4,500		550	J	1,500	U
GPD-5	16 - 18	09/07/05	1,983	57	U	1,500	E	11	J	410		62	
GPD-5 DL	16 - 18	09/07/05	5,540	1,500	U	2,800	D	2,400	D	340	DJ	1,500	U
GPD-6	4 - 8	09/07/05	1,900	1,500	U	1,500	U	1,900		1,500	U	1,500	U
GPD-6	12 - 13	09/07/05	1,646	59	U	260		8	J	1,300	E	78	
GPD-6 DL	12 - 13	09/07/05	2,620	1,500	U	260	DJ	1,600	D	760	DJ	1,500	U
GPD-6	13 - 15	09/07/05	7,800	1,600	U	3,400		2,800		1,600		1,600	U
GPD-7	4 - 8	09/07/05	7	7	J	11	U	11	U	11	U	11	U
GPD-8	4 - 7.6	09/08/05	7	7	J	11	U	11	U	11	U	11	U
GPD-8	11.5-15	09/19/05	70	18	U	14	J	2	J	44		10	J
GPD-10	4 - 7.6	09/08/05	962	70		2	J	12	U	710	E	180	
GPD-10 DL	4 - 7.6	09/08/05	4,380	1,400	U	1,400	U	180	DJ	3,200	D	1,000	DJ
GPD-10	17 - 19	09/08/05	0	14	U	14	U	14	U	14	U	14	U

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Sample ID	Depth	Date	Total CVOCs	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->			200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
GPD-12	4 - 7	09/08/05	844	180	U	12	U	12	U	820	E	24	
GPD-12 DL	4 - 7	09/08/05	2,180	180	DJ	1,400	U	1,400	U	2,000	D	1,400	U
GPD-12	15 - 16	09/08/05	148	4	J	20		26		92		6	J
GPD-12	16 - 19	09/08/05	5	2	J	12	U	12	U	3	J	12	U
GPD-13	4 - 7	09/08/05	226	120		4	J	13	U	100		2	J
GPD-14	7 - 9.8	09/08/05	62,900	5,000		5,800		7,100		33,000		12,000	
GPD-14	15 - 17.5	09/08/05	499	14		84		110		270	E	21	
GPD-14 DL	15 - 17.5	09/08/05	2,010	1,300	U	480	DJ	740	DJ	790	DJ	1,300	U
GPD-16	4 - 7	09/09/05	46	27		12	U	12	U	19		12	U
GPD-16	11 - 15	09/09/05	13	1	J	12	U	12	U	10	J	2	J
GPD-17	7 - 11	09/09/05	0	19	U	19	U	19	U	19	U	19	U
GPD-18	4 - 7	09/09/05	825	200		11	U	11	U	610	E	15	
GPD-18 DL	4 - 7	09/09/05	1,300	1,300	U	1,300	U	1,300	U	1,300	D	1,300	U
GPD-18	11 - 15	09/09/05	1,111	100		120		5	J	830	E	56	
GPD-18 DL	11 - 15	09/09/05	2,580	1,700	U	480	DJ	1,700	U	2,100	D	1,700	U
GPD-19	3 - 4	09/09/05	5,790	1,600	U	440	J	4,500		850	J	1,600	U
GPD-19	7 - 11	09/09/05	20,300	9,100		1,300	U	1,300	U	11,000		200	J
GPD-20	2 - 4	09/09/05	1	12	U	12	U	1	J	12	U	12	U
GPD-20	15 - 17.7	09/09/05	2	11	U	11	U	11	U	2	J	11	U
GPD-20	17.7 - 19	09/09/05	0	14	U	14	U	14	U	14	U	14	U
GPD-21	3.3 - 4	09/09/05	0	1,300	U	1,300	U	1,300	U	1,300	U	1,300	U
GPD-21	15 - 18.2	09/09/05	5,660	660	J	1,300	U	1,300	U	5,000		1,300	U
GPD-21	19 - 21	09/09/05	0	14	U	14	U	14	U	14	U	14	U
GPD-24	2 - 4	09/12/05	0	11	U	11	U	11	U	11	U	11	U
GPD-24	11 - 15	09/12/05	0	11	U	11	U	11	U	11	U	11	U
GPD-24	16 - 17	09/12/05	0	12	U	12	U	12	U	12	U	12	U
GPD-25	3 - 3.4	09/12/05	0	12	U	12	U	12	U	12	U	12	U
GPD-25	11 - 15	09/12/05	0	11	U	11	U	11	U	11	U	11	U
GPD-26	4 - 7	09/12/05	341,600	3,200		38,000	E	260,000	E	40,000	E	400	J
GPD-26 DL	4 -7	09/12/05	269,200	2,200	DJ	29,000	D	210,000	D	28,000	D	15,000	U
GPD-26	11 - 15	09/12/05	953,000	1,400	U	32,000	E	910,000	E	11,000		1,400	U
GPD-26 DL	11 - 15	09/12/05	2,500,000	1,400,000	U	1,400,000	U	2,500,000	D	1,400,000	U	1,400,000	U
GPD-26	17.5 - 19	09/12/05	500	1,700	U	1,700	U	500	J	1,700	U	1,700	U
GPD-27	0 - 4	09/12/05	62	51	U	23	J	39	J	51	U	51	U
GPD-27	7 - 11	09/12/05	2,995	1,400		110	U	110	U	1,500		95	J
GPD-28	0.5-4	09/13/05	93	2	J	9	J	58		20		4	J
GPD-28	11 - 15	09/13/05	0	22	U	22	U	22	U	22	U	22	U
GPD-29	0.5 - 4	09/13/05	327	84	U	24	J	280		23	J	84	U
GPD-29	12 - 16	09/13/05	23	23	U	3	J	4	J	8	J	8	J
GPD-30	0.3 - 4	09/13/05	68	13	U	9	J	28		24		7	J
GPD-30	11 - 15	09/13/05	25	4	J	21	U	2	J	15	J	4	J
GPD-32	11-15	09/14/05	27,700	3,700		2,800	U	2,800	U	24,000		2,800	U
GPD-33	15 - 18	09/14/05	20,530	930	J	1,600	J	3,000	U	17,000		1,000	J
GPD-34	7 - 11	09/14/05	3,350	2,000	J	2,100	U	350	J	1,000	J	2,100	U
GPD-34	15-17	09/14/05	5,340	2,700		2,200	U	310	J	1,900	J	430	J
GPD-36	4 - 7	09/15/05	0	11	U	11	U	11	U	11	U	11	U
GPD-36	11 - 15	09/15/05	8,840	1,200	J	1,400	U	1,400	U	7,100		540	J
GPD-37	7 - 11	09/15/05	10,860	2,800		1,400	U	1,400	U	7,800		260	J
GPD-37	15-18.3	09/15/05	8,310	1,600	U	910	J	1,600	U	7,400		1,600	U
GPD-38	4 - 7	09/15/05	38	13	U	13	U	13	U	38		13	U
GPD-38 DL	4 - 7	09/15/05	357	27	J	67	U	67	U	330		67	U
GPD-38	15 -17	09/15/05	7,880	170	J	230	J	1,600	U	7,200		280	J
GPD-38	17 -19	09/15/05	22,000	1,700	U	1,700	U	22,000		1,700	U	1,700	U
GPD-41	7 - 11	09/16/05	17,400	4,400		2,200	U	2,200	U	13,000		2,200	U
GPD-42	11 - 15	09/16/05	11,800	2,200		2,000	U	2,000	U	9,600		2,000	U

Table 1 Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->		CVOCs	200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
GPD-43	11 - 15	09/16/05	8,500	1,700		1,400	U	1,400	U	6,800		1,400	U
GPD-44	4 - 7	09/16/05	11,600	1,800		1,500	U	1,500	U	9,800		1,500	U
GPD-44	15 -17.9	09/16/05	3,700	1,600	U	1,600	U	1,600	U	3,700		1,600	U
GPD-45	2 - 4	09/19/05	61	33		11	U	1	J	27		11	U
GPD-45	15-18.3	09/19/05	21	9	J	13	U	13	U	12	J	13	U
GPD-45	19-22	09/19/05	0	14	U	14	U	14	U	14	U	14	U
GPD-47	4 - 7	09/19/05	575	170		15	U	15	U	400	E	5	J
GPD-47	4 - 7	09/19/05	537	97	D	60	U	60	U	430	D	10	DJ
GPD-47	11 - 15	09/19/05	6,700	1,300		1,100	U	1,100	U	5,400		1,100	U
GPD-47	18 -19	09/19/05	206	2	J	32		2	J	140		30	
GPD-48	7 - 11	09/19/05	264	63		18	U	18	U	190		11	J
GPD-48	15 - 17.3	09/19/05	8	2	J	11	U	11	U	6	J	11	U
GPD-49	11 - 15	09/19/05	1,920	5	J	990	E	740	E	85		100	
GPD-49 DL	11 - 15	09/19/05	3,300	1,400	U	1,500	D	1,800	D	1,400	U	1,400	U
GPD-49 DL	15 -17	09/19/05	1,192	13	U	270	E	910	E	12	J	13	U
GPD-49 DL	15 -17	09/19/05	5,910	1,600	U	810	DJ	5,100	D	1,600	U	1,600	U
GPD-49	7 - 11	09/19/05	2	19	U	19	U	19	U	2	J	19	U
GPD-49	17 - 19	09/19/05	0	14	U	14	U	14	U	14	U	14	U
GPD-50	4 - 7	09/19/05	115	96		12	U	12	U	9	J	10	J
GPD-50	11 - 14	09/19/05	35	12	U	8	J	2	J	21		4	J
GPD-50	14 - 15	09/19/05	95	1	J	4	J	12	U	60		30	
GPD-50	15 -19	09/19/05	130	11	U	75		54		1	J	11	U
GPD-51	15-18.2	09/20/05	43,000,000	3,200,000	U	1,000,000	J	42,000,000		3,200,000	U	3,200,000	U
GPD-51	19-23	09/20/05	195	4	J	6	J	180		5	J	12	U
GPD-52	15-17.5	09/20/05	46,800	1,600	U	4,800		29,000		13,000		1,600	U
GPD-55	4 - 7	09/21/05	12	12	U	12	U	9	J	3	J	12	U
GPD-55	15-18	09/21/05	579	32		32		25		370	E	120	
GPD-55 DL	15-18	09/21/05	290	58	U	53	DJ	9	DJ	200	D	28	DJ
GPD-57	0.5-4	09/21/05	14,000	2,400	U	2,400	U	14,000		2,400	U	2,400	U
GPD-57	11-14.5	09/21/05	17	12	U	2	J	2	J	7	J	6	J
GPD-58	15-18.5	09/22/05	0	11	U	11	U	11	U	11	U	11	U
GPD-59	7 - 11	09/22/05	522	12	U	240	E	6	J	210		66	
GPD-59 DL	7 - 11	09/22/05	220	52	U	45	DJ	52	U	150	D	25	DJ
GPD-59	11-14.3	09/22/05	1,701	2	J	1,400	E	120		130		49	
GPD-59 DL	11-14.3	09/22/05	2,080	1,400	U	880	DJ	780	DJ	420	DJ	1,400	U
GPD-59	14.3-15	09/22/05	2,685	920	E	2	J	2	J	1,700	E	61	
GPD-59 DL	14.3-15	09/22/05	7,880	1,400	U	5,300	D	2,400	D	180	DJ	1,400	U
GPD-60	4 - 7	09/22/05	311	46		6	J	11	U	200		59	
GPD-61	15-17.8	09/22/05	491	250		5	J	13	U	180		56	
GPD-62	11 - 15	09/22/05	14	10	J	14	U	14	U	4	J	14	U
GPD-62	15-16.5	09/22/05	0	12	U	12	U	12	U	12	U	12	U
GPD-62	16.5-19	09/22/05	51	35		15	U	15	U	16		15	U
GPD-63	1 - 4	09/23/05	0	14	U	14	U	14	U	14	U	14	U
GPD-63	15-16.6	09/23/05	20	12	U	12	U	20		12	U	12	U
GPD-64	11 - 15	09/23/05	1,619	550	E	2	J	4	J	990	E	73	
GPD-64 DL	11 - 15	09/23/05	600	1,500	U	1,500	U	600	DJ	1,500	U	1,500	U
GPD-65	11 - 15	09/23/05	3	2	J	11	U	11	U	1	J	11	U
GPD-65	17.2-19	09/23/05	0	14	U	14	U	14	U	14	U	14	U
GPD-66	11 - 15	09/23/05	4,310	11	U	2,600	E	11	U	510	E	1,200	E
GPD-66 DL	11 - 15	09/23/05	370	1,300	U	1,300	U	370	DJ	1,300	U	1,300	U
GPD-67	11 - 15	09/23/05	3,360	11	U	2,000	E	11	U	410	E	950	E
GPD-67 DL	11 - 15	09/23/05	8,340	1,300	U	5,800	D	340	DJ	600	DJ	1,600	D
GP3-1	10 - 14	02/27/06	936	340		17	U	17	U	520	E	76	
GP3-1 DL	10 - 14	02/27/06	1,630	600	D	73	U	73	U	900	D	130	D
GP 3-1	14 - 18	02/27/06	804	160		17	J	19	U	530	E	97	

Table 1 Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total CVOCs	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->			200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
GP 3-1 DL	14 - 18	02/27/06	1,943	340	D	43	DJ	91	U	1,300	D	260	D
GP 3-2	10 - 14	02/27/06	655	260		18	U	18	U	300		95	
GP 3-2	14 - 17.3	02/27/06	1,470	140		270		20	U	800	E	260	
GP 3-2 DL	14 - 17.3	02/27/06	2,640	240	D	550	D	90	U	1,400	D	450	D
GP 3-3	10 -14	02/27/06	4,140	2,200	E	18	U	18	U	1,800	E	140	
GP 3-3 DL	10 -14	02/27/06	2,500	2,100	U	2,100	U	2,100	U	2,500	D	2,100	U
GP 3-3	14 - 17.5	02/27/06	1,587	210		48		9	J	1,200	E	120	
GP 3-3 DL	14 - 17.5	02/27/06	2,700	2,300	U	2,300	U	2,300	U	2,700	D	2,300	U
GP 3-4	10 -14	02/28/06	588	480	E	17	U	17	U	94		14	J
GP 3-4	10 -14	02/28/06	1,096	890	D	84	U	84	U	180	D	26	DJ
GP 3-4	14 - 17.7	02/28/06	833	92		210		11	J	370	E	150	
GP 3-4 DL	14 -17.7	02/28/06	2,035	220	D	560	D	35	DJ	860	D	360	D
GP 3-5	10 -14	02/28/06	1,300	420	E	100		18	U	540	E	240	
GP 3-5 DL	10 -14	02/28/06	2,460	1,000	D	150	D	80	U	920	D	390	D
GP 3-5	14 - 17.7	02/28/06	207	42		20	J	21	U	91		54	
GP 3-6	10 -14	02/28/06	705	280		15	J	18	U	240		170	
GP 3-6	14 -17	02/28/06	138	28		2	J	20	U	75		33	
GP 3-7	14 - 16.7	03/02/06	15	4	J	18	U	18	U	8	J	3	J
GP 3-8	10 -14	02/28/06	17,950	1,200	E	3,300	E	9,000	E	4,300	E	150	
GP 3-8	10- 14	02/28/06	181,000	11,000	U	10,000	DJ	150,000	D	21,000	D	11,000	U
GP 3-8	14 -18	02/28/06	10,759	27		1,500	E	8,900	E	320		12	J
GP 3-8 DL	14 -18	02/28/06	193,200	12,000	U	3,200	DJ	190,000	D	12,000	U	12,000	U
GP 3-9	10 -14	02/28/06	355,600	2,200	U	3,400		350,000	E	2,200		2,200	U
GP 3-9 DL	10 -14	02/28/06	830,000	44,000	U	44,000	U	830,000	BD	44,000	U	44,000	U
GP 3-9	14 -18	02/28/06	952,200	2,500	U	2,200	J	950,000	E	2,500	U	2,500	U
GP 3-9	14-18	02/28/06	4,200,000	620,000	U	620,000	U	4,200,000	D	620,000	U	620,000	U
GP 3-10	14 - 18	03/01/06	1,328	240		6	J	42		860	E	180	
GP 3-10 DL	14 18	03/01/06	2,610	2,400	U	2,400	U	2,400	U	2,100	DJ	510	DJ
GP 3-11	14 - 17.5	03/01/06	1,210	650	E	2	J	15	J	470	E	73	
GP 3-11 DL	14 - 17.5	03/01/06	2,080	1,100	D	100	U	100	U	860	D	120	D
GP 3-12	14 - 17.5	03/01/06	830	320		19	U	8	J	460	E	42	
GP 3-12 DL	14 - 17.5	03/01/06	1,656	660	D	96	U	96	U	910	D	86	DJ
GP 3-13	10 - 14	03/01/06	586	430	E	19	U	6	J	130		20	
GP 3-13 DL	10 - 14	03/01/06	725	530	D	85	U	85	U	170	D	25	DJ
GP 3-13	14 - 17	03/01/06	80	50		18	U	18	U	30		18	U
GPB 1-1	14 - 17	03/02/06	307,400	2,600	U	28,000		270,000	E	9,400		2,600	U
GPB 1-1 DL	14 - 17	03/02/06	324,900	52,000	U	27,000	DJ	290,000	D	7,900	DJ	52,000	U
GPB 1-2	14 - 18	03/02/06	1,458,360	630	J	21,000		1,400,000	E	36,000		730	J
GPB 1-2 DL	14 - 18	03/02/06	6,300,000	550,000	U	550,000	U	6,300,000	BD	550,000	U	550,000	U
GPB 1-3	10 - 11.8	03/03/06	6,700,000	310,000	U	310,000	U	6,700,000	E	310,000	U	310,000	U
GPB 1-3 DL	10 - 11.8	03/03/06	6,900,000	620,000	U	620,000	U	6,900,000	BD	620,000	U	620,000	U
GPB 1-4	14 - 17.6	03/03/06	4,479,000	290,000	U	290,000	U	4,400,000		79,000	J	290,000	U
GPB 1-5	14 - 17	03/03/06	280	21	U	25		42		200		13	J
GPB 1-6	14 - 17.7	03/03/06	4,810,000	260,000	U	110,000	J	4,700,000	B	260,000	U	260,000	U
GPB 1-7	14 - 18	03/06/06	19,300	2,300	J	2,500	U	2,500	U	17,000		2,500	U
GPB 1-8	14 - 18	03/06/06	2,858,000	260,000	U	260,000	U	2,800,000		58,000	J	260,000	U
GPB 1-9	14 - 17.4	03/09/06	71,170	510	E	8,100	E	58,000	E	4,300	E	260	
GPB 1-9 DL	14 - 17.4	03/09/06	9,940,000	610,000	U	140,000	DJ	9,800,000	D	610,000	U	610,000	U
GPB 1-10	14 - 16.8	03/09/06	68,440,000	1,800,000	U	440,000	J	68,000,000	E	1,800,000	U	1,800,000	U
GPB 1-10 DL	14 - 16.8	03/09/06	67,000,000	3,700,000	U	3,700,000	U	67,000,000	D	3,700,000	U	3,700,000	U
GPB 1-11	14 - 17	03/09/06	13,060	1,400	E	2,400	E	4,900	E	4,100	E	260	
GPB 1-11 DL	14 - 17	03/09/06	28,030	1,500	DJ	5,900	D	2,200	D	18,000	D	430	DJ
GPB 1-12	2.5 - 4	03/09/06	9,690	960	J	730	J	2,800		5,200		1,800	U
GPB 1-12	10 - 14	03/09/06	10,100	1,900	J	2,100	U	2,100	U	8,200		2,100	U
GPB 1-12	14 - 18	03/09/06	1,753	490	E	20	U	14	BJ	1,200	E	49	

Table 1 Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total CVOCs	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->			200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
GPB 1-12 DL	14 - 18	03/09/06	1,197	130	D	100	U	52	BDJ	990	D	25	DJ
GPB 1-13	6 - 10	03/10/06	2,743	1,200		100	U	17	BJ	1,500		26	J
GPB 1-13	14 - 17.2	03/10/06	72	3	J	24	U	10	BJ	48		11	J
GPB 1-14	6 - 10	03/10/06	46	31		22	U	6	BJ	6	J	3	J
GPB 1-15	14 - 17	03/13/06	5	20	U	20	U	5	BJ	20	U	20	U
GPB 3-1	14 - 18	03/06/06	410	13	J	49		3	J	310		35	
GPB 3-2	14 - 18	03/06/06	663,000	23,000	U	69,000		580,000	E	14,000	J	23,000	U
GPB 3-2 DL	14 - 18	03/06/06	686,000	47,000	U	73,000	D	600,000	D	13,000	DJ	47,000	U
GPB 3-3	14 - 17.5	03/06/06	388,000	12,000	U	100,000		260,000	E	28,000		12,000	U
GPB 3-3 DL	14 - 17.5	03/06/06	347,000	30,000	U	93,000	D	230,000	D	24,000	DJ	30,000	U
GPB 3-4	14 - 17.6	03/06/06	37	22	U	4	J	22	U	24		9	J
GPB 3-5	6 - 10	03/06/06	98,400	1,400	J	18,000		31,000		48,000		2,700	U
GPB 3-5	14 - 16.7	03/06/06	15,300	3,600	U	12,000		1,900	J	1,400	J	3,600	U
GPB 3-6	0.5 - 4	03/06/06	2,440	1,300	U	640	J	1,800		1,300	U	1,300	U
GPB 3-6	10 - 14	03/06/06	3,623	31	J	350		1,700	E	1,500	E	42	J
GPB 3-6 DL	10 - 14	03/06/06	4,090	1,900	U	390	DJ	1,900	D	1,800	DJ	1,900	U
GPB 3-7	6 - 10	03/07/06	278,900	5,900	J	160,000		38,000		75,000		9,500	U
GPB 3-7	14 - 17	03/07/06	34,500	2,800	U	3,800		27,000		3,700		2,800	U
GPB 3-8	14 - 17	03/07/06	493,700	2,300	U	50,000	E	440,000	E	3,700		2,300	U
GPB 3-8 DL	14 - 17	03/07/06	673,000	110,000	U	53,000	DJ	620,000	D	110,000	U	110,000	U
GPB 3-9	14 - 17.5	03/07/06	7,350,000	30,000	U	150,000		7,200,000	E	30,000	U	30,000	U
GPB 3-9 DL	14 - 17.5	03/07/06	7,410,000	600,000	U	110,000	DJ	7,300,000	D	600,000	U	600,000	U
GPB 3-10	14 - 17.5	03/07/06	16,200	2,200	U	3,400		8,800		4,000		2,200	U
GPB 3-11	14 - 18	03/08/06	10,400	2,400	U	530	J	570	J	9,300		2,400	U
GPB 3-12	14 - 17.5	03/08/06	29,100	3,100	U	2,100	J	19,000		8,000		3,100	U
GPB 3-13	6 - 10	03/08/06	25,000	3,200		3,100	U	3,100	U	20,000		1,800	J
GPB 3-14	14 - 17	03/08/06	12,000	2,800	U	2,800	U	2,200	J	9,800		2,800	U
GPB 3-16	6 - 10	03/08/06	2,588	70		210		870	E	1,400	E	38	
GPB 3-16 DL	6 - 10	03/08/06	11,690	2,400	U	690	DJ	6,400	D	4,600	D	2,400	U
GPB 3-16	14 - 17	03/08/06	3,500	26	U	2,100	E	1,000	E	340		60	
GPB 3-16 DL	14 - 17	03/08/06	12,820	3,200	U	6,000	D	6,100	D	720	DJ	3,200	U
GPB 3-17	14 - 18	03/08/06	25,980	340		3,000	E	18,000	E	4,300	E	340	
GPB 3-17 DL	14 - 18	03/08/06	1,376,000	110,000	U	53,000	DJ	1,300,000	D	23,000	DJ	110,000	U
GPB 5-1	14 - 18	03/09/06	2,834	330		450	E	190		1,800	E	64	
GPB 5-1 DL	14 - 18	03/09/06	5,990	2,400	U	1,300	DJ	990	DJ	3,700	D	2,400	U
GPB 5-2	14 - 17.5	03/09/06	2,934	480	E	330		54		1,900	E	170	
GPB 5-2 DL	14 - 17.5	03/09/06	4,220	2,600	U	620	DJ	2,600	U	3,600	D	2,600	U
GPB 5-3	6 - 10	03/09/06	1,044	140	U	83	U	26	BJ	1,000		18	J
GPB 5-3	10 -14	03/09/06	441	170		17	U	6	BJ	260		5	J
GPB 5-3	14 - 17	03/09/06	1,198	54		170		320	B	630	E	24	
GPB 5-3 DL	14 - 17	03/09/06	1,608	88	U	230	D	670	BD	690	D	18	DJ
GPS 1-1	10 - 14	03/02/06	10	20	U	3	J	20	U	7	J	20	U
GPS 1-4	10 - 14	03/02/06	21	26	U	9	J	5	J	7	J	26	U
GPCS-1	2 - 4	03/13/06	2	15	U	15	U	2	BJ	15	U	15	U
GPCS-1	4.8 - 10	03/13/06	53	31		19	U	2	BJ	20		19	U
GPCS-1	14 - 18	03/13/06	35	10	J	21	U	3	BJ	22		21	U
GPCS-2	1.3 - 4	03/13/06	2	11	U	11	U	2	BJ	11	U	11	U
GPCS-2	14 - 18	03/13/06	22	5	J	19	U	4	BJ	13	J	19	U
GPCS-3	14 - 18	03/13/06	21	8	J	18	U	3	BJ	10	J	18	U
GPCS-4	14 - 18	03/13/06	14	4	J	22	U	5	BJ	5	J	22	U
GPCS-5	2 - 4	03/13/06	99	12	U	11	J	65		21		2	J
GPCS-6	4 - 6	03/13/06	17	21	U	21	U	14	BJ	3	J	21	U
TP-4	3.5-4.2	12/03/04	0	14	U	14	U	14	U	14	U	14	U
TP-5	4.6-5.2	12/07/04	0	15	U	15	U	15	U	15	U	15	U
TP-7	4-7	12/03/04	15	13	J	15	U	15	U	2	J	15	U

Table 1 Midler Site Soil Boring and Test Pit Data Summary - CVOCs only

Sample ID	Depth	Date	Total	VC		TCE		PCE		cis		trans	
	TAGM 4046 RSCOs ->		CVOCs	200		700		1,400		NA		300	
	Proposed SSCOs ->			800		2,800		5,600		NA		1,200	
TP-12	3.1-5.1	12/07/04	0	12	U	12	U	12	U	12	U	12	U
TP-13	3.5-5.3	12/07/04	189	37		36		67		23		26	
TP-14	4-5	12/03/04	3,820	300		310		2,600	E	610	E	16	U
TP-14 DL	4-5	12/03/04	98,200	1,800	DJ	6,000	DJ	83,000	D	7,400	D	7,200	U
GPB1-16	15.5 - 17	04/19/06	7,280	680	J	2,600	U	2,600	U	6,600		2,600	U
GPB1-16	17 - 18	04/19/06	290	170		14	U	14	U	120		14	U
GPB3-18	14 - 16.9	04/18/06	391,000	17,000	U	46,000		260,000		85,000		17,000	U
GPB3-18	6 - 10	04/18/06	2,126,000	150,000	U	160,000		1,900,000		66,000	J	150,000	U
GPB3-19	14 - 18	04/18/06	0	23	U	23	U	23	U	23	U	23	U
GPB3-21	14 - 16	04/18/06	480	19	J	23	J	6	J	360		72	
GPB3-21	6 - 10	04/18/06	605	410		22	U	22	U	180		15	J
GPB3-22	6 - 10	04/18/06	1,459,000	58,000	U	29,000	J	1,400,000	E	30,000	J	58,000	U
GPB3-22	6 - 10 DL	04/18/06	1,460,000	120,000	U	31,000	DJ	1,400,000	D	29,000	DJ	120,000	U
GPB3-24	15.5 - 17	04/19/06	62	28	U	28	U	28	U	52		10	J
GPB3-24	6 - 10	04/18/06	0	21	U	21	U	21	U	21	U	21	U

Total CVOCs >31,000 ug/kg

Any single CVOC > Site specific cleanup objective

Clean (i.e., all CVOCs < site specific cleanup objective)

Table 2 - Pioneer Midler Avenue LLC - Remedial Investigation
Groundwater Data

Parameter	Units	NYSDEC Class GA Standard	NYSDEC Class GA Guidance	MW-1 11/29/04	MW-1 05/03/06	MW-2 11/29/04	MW-2 05/02/06	MW-3 11/29/04	MW-3 Dup 11/29/04	MW-3 05/03/06	MW-3 DL 05/03/06	MW-4 11/29/04	MW-4 05/02/06	MW-5 11/29/04	MW-6 11/29/04	MW-6 05/03/06	MW-7 11/29/04	MW-7 05/03/06	MW-8 11/29/04	MW-8 05/03/06
Vinyl chloride	ug/l	2		10 U	10 U	10 U	10 U	**55**	**28**	**1,100 E**	**1,100 D**	10 U	**2 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	ug/l	5		10 U	10 U	10 U	10 U	10 U	**3 J**	**4 J**	**18 BD**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	ug/l	5		10 U	10 U	10 U	10 U	**430**	**180**	**440 E**	**440 D**	**2 J**	10 U	**3 J**	10 U	10 U	**3 J**	**5 J**	10 U	10 U
trans-1,2-Dichloroethene	ug/l	5		10 U	10 U	10 U	10 U	**13**	**7 J**	**34**	**33 DJ**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	ug/l		50	10 U	10 U	10 U	10 U	10 U	10 U	**4 J**	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	ug/l	60		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MEK(2-Butanone)	ug/l		50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	ug/l	7		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	ug/l	0.6		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	ug/l		50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	ug/l	1		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	ug/l	0.4		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	ug/l	1		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	ug/l	0.4		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	ug/l		50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MIBK(4-Methyl-2-pentanone)	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	ug/l		50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dichlorodifluoromethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Tricloro-1,2,2,-triflouroethane	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl tert butyl ether	ug/l	10		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyclohexane	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	ug/l	3		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	ug/l	3		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	ug/l	3		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	ug/l	0.04		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	ug/l	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl acetate	ug/l			10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Table 2 - Pioneer Midler Avenue LLC - Remedial Investigation
Groundwater Data

Parameter	Units	NYSDEC Class GA Standard	NYSDEC Class GA Guidance	MW-2D 01/31/05	MW-2D 05/02/06	MW-3D 01/31/05	MW-3D DL 01/31/05	MW-3D 05/03/06	MW-3D DL 05/03/06	MW-4D 01/31/05	MW-4D 05/02/06	MW-9D 01/31/05	MW-9D 05/02/06	MW-10D 01/31/05	MW-10D DL 01/31/05	MW-10D 05/02/06	MW-10D DL 05/02/06	MW-11D 01/31/05	MW-11D DL 01/31/05	MW-12D 05/03/06
Vinyl chloride	ug/l	2		10 U	50 U	**170**	800 U	**580 E**	**600 DJ**	10 U	10 U	**6 J**	**6 J**	**32 J**	**32 DJ**	**60**	**58 D**	**830**	**830 D**	**120**
Trichloroethene	ug/l	5		10 U	50 U	**8 J**	800 U	**1,200 E**	**1,700 DJ**	10 U	10 U	10 U	20 U	10 U	80 U	**2 J**	40 U	**2,200**	**2,200 D**	**200 E**
Tetrachloroethene	ug/l	5		10 U	50 U	**8,800**	**8,800 D**	**7,000 E**	**38,000 BD**	10 U	10 U	**3 J**	20 U	**4 J**	80 U	10 U	40 U	**6,800**	**6,800 D**	**3,200 E**
cis-1,2-Dichloroethene	ug/l	5		10 U	50 U	**3,700**	**3,700 D**	**1,300 E**	**1,800 DJ**	10 U	10 U	**9 J**	**9 J**	**700**	**700 D**	**400 E**	**420 D**	**6,700**	**6,700 D**	**180**
trans-1,2-Dichloroethene	ug/l	5		10 U	50 U	**71**	800 U	**30**	2,000 U	10 U	10 U	10 U	20 U	**26**	**46 DJ**	**25**	**22 DJ**	**130**	**150 DJ**	**24**
Acetone	ug/l		50	10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	**8 J**	80 U	10 U	40 U	10 U	500 U	10 U
Carbon disulfide	ug/l	60		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	**1 J**	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1-Dichloroethene	ug/l	5		10 U	50 U	**10 J**	800 U	**24**	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	**26**	500 U	**2 J**
MEK(2-Butanone)	ug/l		50	**15**	50 U	20 U	800 U	10 U	2,000 U	**13**	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1,2-Trichloroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	**2 J**	500 U	10 U
Toluene	ug/l	5		10 U	50 U	20 U	800 U	**37**	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Ethylbenzene	ug/l	5		10 U	50 U	20 U	800 U	**2 J**	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Total Xylenes	ug/l	5		10 U	50 U	20 U	800 U	**19**	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Methylcyclohexane	ug/l			10 U	50 U	20 U	800 U	**7 J**	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Chloromethane	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Bromomethane	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Chloroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Methylene chloride	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1-Dichloroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Chloroform	ug/l	7		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2-Dichloroethane	ug/l	0.6		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1,1-Trichloroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Carbon tetrachloride	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Bromodichloromethane	ug/l		50	10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2-Dichloropropane	ug/l	1		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
cis-1,3-Dichloropropene	ug/l	0.4		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Dibromochloromethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Benzene	ug/l	1		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
trans-1,3-Dichloropropene	ug/l	0.4		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Bromoform	ug/l		50	10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
MIBK(4-Methyl-2-pentanone)	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
2-Hexanone	ug/l		50	10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1,2,2-Tetrachloroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Chlorobenzene	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Styrene	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Dichlorodifluoromethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Trichlorofluoromethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,1,2-Tricloro-1,2,2,-triflouroethane	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Methyl tert butyl ether	ug/l	10		10 UJ	50 U	20 U	800 U	10 U	2,000 U	10 UJ	10 U	10 UJ	20 U	10 UJ	80 U	10 U	40 U	10 UJ	500 U	10 U
Cyclohexane	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2-Dibromoethane	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
Isopropylbenzene	ug/l	5		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,3-Dichlorobenzene	ug/l	3		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,4-Dichlorobenzene	ug/l	3		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2-Dichlorobenzene	ug/l	3		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2-Dibromo-3-chloropropane	ug/l	0.04		10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U
1,2,4-Trichlorobenzene	ug/l	5		10 UJ	50 U	20 UJ	800 U	10 U	2,000 U	10 UJ	10 U	10 UJ	20 U	10 UJ	80 U	10 U	40 U	10 UJ	500 U	10 U
Methyl acetate	ug/l			10 U	50 U	20 U	800 U	10 U	2,000 U	10 U	10 U	10 U	20 U	10 U	80 U	10 U	40 U	10 U	500 U	10 U

Table 2 - Pioneer Midler Avenue LLC - Remedial Investigation
Groundwater Data

Parameter	Units	NYSDEC Class GA		MW-12D DL	MW-13D	MW-13D DL	MW-13D Re	DAW-1	DAW-1	DAW-2	DAW-2	DAW-3	DAW-3	DAW-4
		Standard	Guidance	05/03/06	05/03/06	05/03/06	05/04/06	08/30/05	05/03/06	08/30/05	05/03/06	08/30/05	05/03/06	05/03/06
Vinyl chloride	ug/l	2		**140 DJ**	**860 E**	**900 D**	720 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	ug/l	5		**200 DJ**	**8 J**	100 U	50 U	10 U	10 U	**3 J**	**2 J**	10 U	10 U	10 U
Tetrachloroethene	ug/l	5		**5,900 BD**	**24**	**36 BD**	**15 BJ**	10 U	10 U	**10**	**5 J**	10 U	**1 BJ**	10 U
cis-1,2-Dichloroethene	ug/l	5		**170 DJ**	**680 E**	**750 D**	**630**	10 U	10 U	**24**	**43**	10 U	10 U	10 U
trans-1,2-Dichloroethene	ug/l	5		**24**	**13**	**13 DJ**	**13 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	ug/l		50	500 U	**10**	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	**1 J**
Carbon disulfide	ug/l	60		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	ug/l	5		500 U	**2 J**	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MEK(2-Butanone)	ug/l		50	500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	ug/l	7		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	ug/l	0.6		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	ug/l		50	500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	ug/l	1		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	ug/l	0.4		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	ug/l	1		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	ug/l	0.4		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	ug/l		50	500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MIBK(4-Methyl-2-pentanone)	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	ug/l		50	500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dichlorodifluoromethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Tricloro-1,2,2,-triflouroethane	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl tert butyl ether	ug/l	10		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyclohexane	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	ug/l	3		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	ug/l	3		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	ug/l	3		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	ug/l	0.04		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	ug/l	5		500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl acetate	ug/l			500 U	10 U	100 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

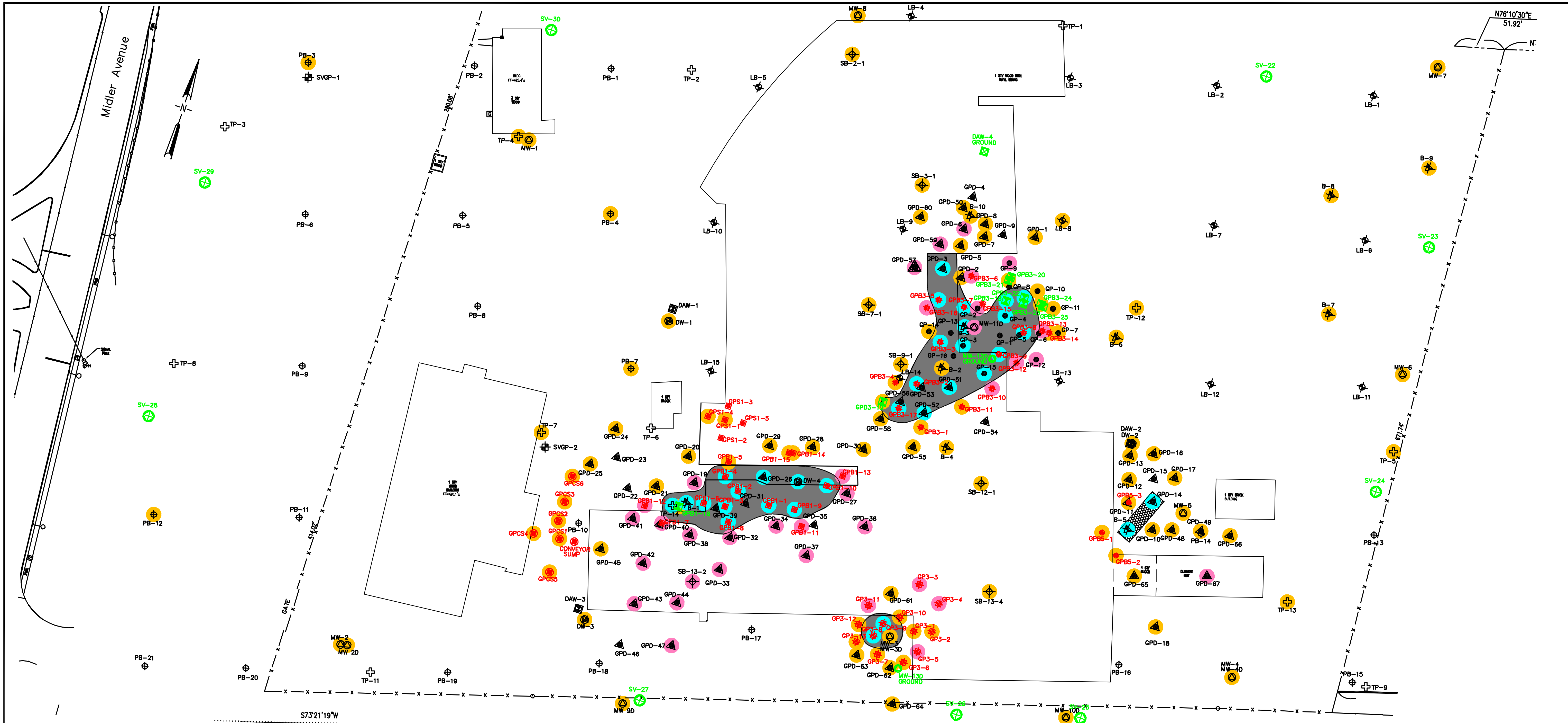
Pioneer-Midler Avenue, LLC
IRM Work Plan
Table 3 - Verification Sample Depths and RI Reference Samples

Sample ID	Sample Depth (ft)[1]	RI Reference Sample(s)
B-3 Thermal Treatment Area Samples		
VB3-1	4-8	GPD-3
VB3-2	15-17	GPD-3
VB3-3	17-20	GPD-3
VB3-4	8-10	GPD-2
VB3-5	6-10	GPB 3-5
VB3-6	6-10	GPB 3-7
VB3-7	6-10	GPB 3-18
VB3-8	6-10	GPB 3-22
VB3-9	8-10	GP-13
VB3-10	14-16	B-3
VB3-11	10-12	GP-4
VB3-12	14-17	GPB 3-8
VB3-13	6-10	GPB 3-13
VB3-14	14-17	GPB 3-3
VB3-15	16-19	GP-3; GP-16
VB3-16	14-16	GP-3
VB3-17	14-17	GPB 3-9
VB3-18	14-17	GPB 3-12
VB3-19	14-18	GPB 3-2; GPD-53
VB3-20	15-18	GPD-51
VB3-21	23-25	GP-15
VB3-22	23-25	GP-15
VB3-23	15-19	GPD-56
VB3-24	15-18	GPD-52
VB3-25	15-18	GPD-51
VB3-26	14-18	GPB 3-17
B-1 Thermal Treatment Area Samples		
VB1-1	14-18	GPB 1-4
VB1-2	11-15	GPD-26
VB1-3	4-7	GPD-26
VB1-4	16-18	DW-4
VB1-5	14-17	GPB 1-10
VB1-6	4-6	B-1; TP-14
VB1-7	14-18	GPB 1-6
VB1-8	14-18	GPB 1-2
VB1-9	10-14	GPB 1-2
VB1-10	11-15	GPD-26
VB1-11	16-18	DW-4
VB1-12	14-17	GPB 1-10
VB1-13	14-18	GPB 1-7
VB1-14	17-19	GPD-38
VB1-15	10-12	GPB 1-3
VB1-16	7-10	GPD-31
VB1-17	14-17	GPB 1-1
VB1-18	14-18	GPB 1-9
VB1-19	7-11	GPD-27; GPD-35
VB1-20	11-15	GPD-32
MW-3D Thermal Treatment Area Samples		
V3D-1	14-18	GP3-9
V3D-2	10-14	GP3-8
V3D-3	14-18	GP3-9
V3D-4	10-14	GP3-9
V3D-5	14-18	GP3-8

See Figure IRM-3 for verification sample locations.

1. Verification sample depths are from the surveyed ground surface elevations of the RI Reference Samples and will require adjustment based on surface elevations within the installed thermal treatment areas.

FIGURES



LEGEND:

MW-10 MW-10D		PERMANENT MONITORING WELL
TP-14		TEST PITS
B-5		B SERIES COMPLETED NOV. 2004
GPD-44		GPD SERIES COMPLETED SEPT. 2005
GP-12		GP SERIES COMPLETED MARCH 2005
SB-13-4		INTERIOR SOIL BORING COMPLETED AS TEMPERARY MONITORING WELLS MARCH 2005
DW-1		DW SERIES COMPLETED JULY 2005
DAW-1		DAW SERIES COMPLETED AUG. 2005
PB-18		PB SERIES COMPLETED NOV. 2004
LB-1		LB SERIES COMPLETED NOV. 2004
SVGP-1		SVOC SAMPLES COMPLETED SEPT. 2005
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA
		CONVEYOR SUMP INVESTIGATION COMPLETED MARCH 2006
		MW3/3D INVESTIGATION COMPLETED MARCH 2006
		IRM DESIGN B-5 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-3 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-1 SOURCE AREA COMPLETED MARCH 2006
MW-10 MW-10D		MW SERIES COMPLETED APRIL 2006
DAW-1		DAW SERIES COMPLETED APRIL 2006
GPB3-18		GPB SERIES COMPLETED APRIL 2006
GPD-44		GPD SERIES COMPLETED APRIL 2006
SV		SOIL VAPOR SAMPLING LOCATIONS COMPLETED APRIL 2006

LEGEND:

- TOTAL CVOC > = 31,000 ug/kg
- SINGLE CVOC > SSCO
- SAMPLED; BELOW SINGLE SSCO

50' 25' 0 50'

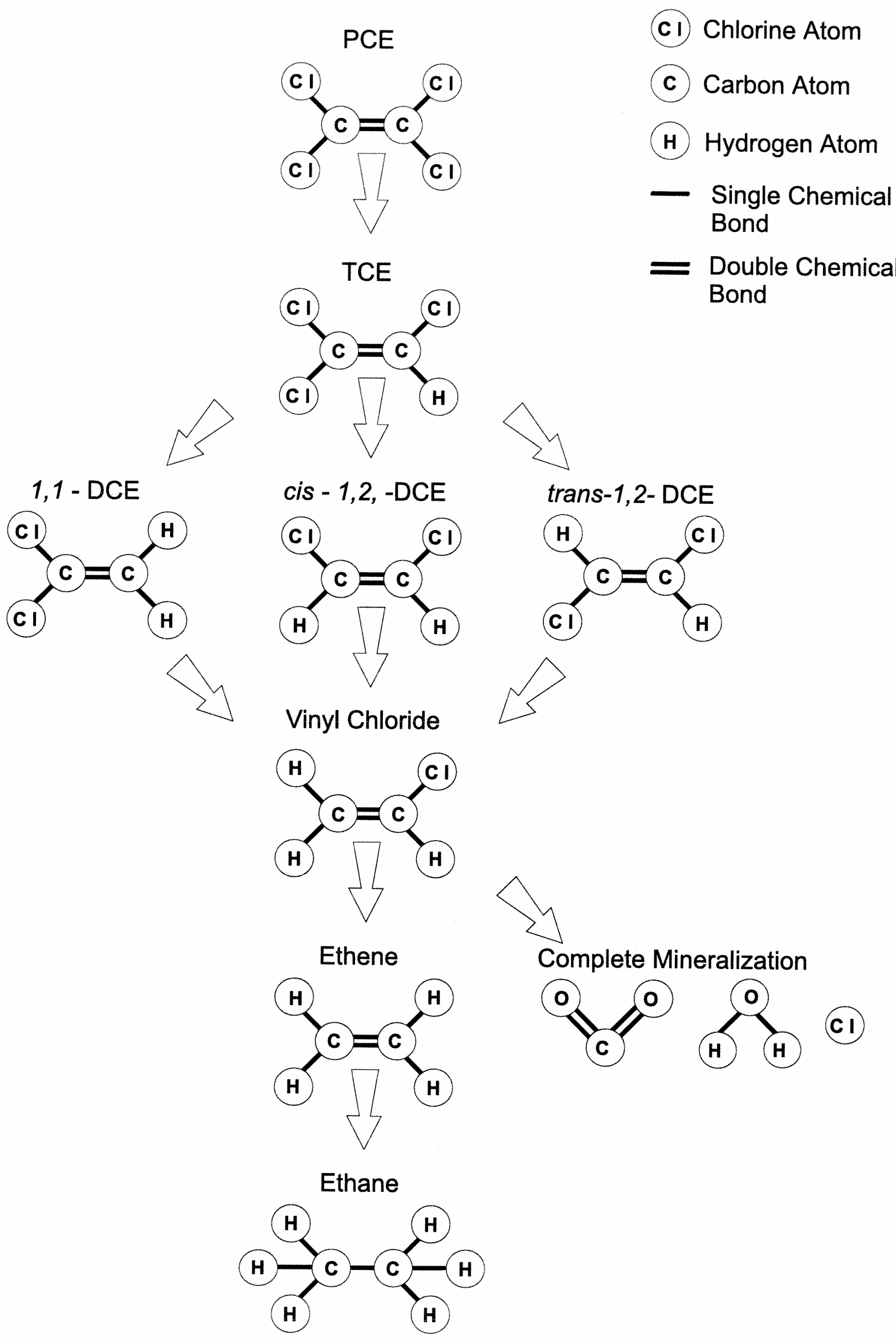
C&S ENGINEERS, INC.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
Toll Free: 1-877 CS SOLVE
WWW. CSCOS.COM

DATE: APRIL 2006
SCALE: AS SHOWN
FILE NO. C81.002.001

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

Pioneer Midler Avenue LLC
Interim Remedial Measure
Proposed Thermal Treatment Areas

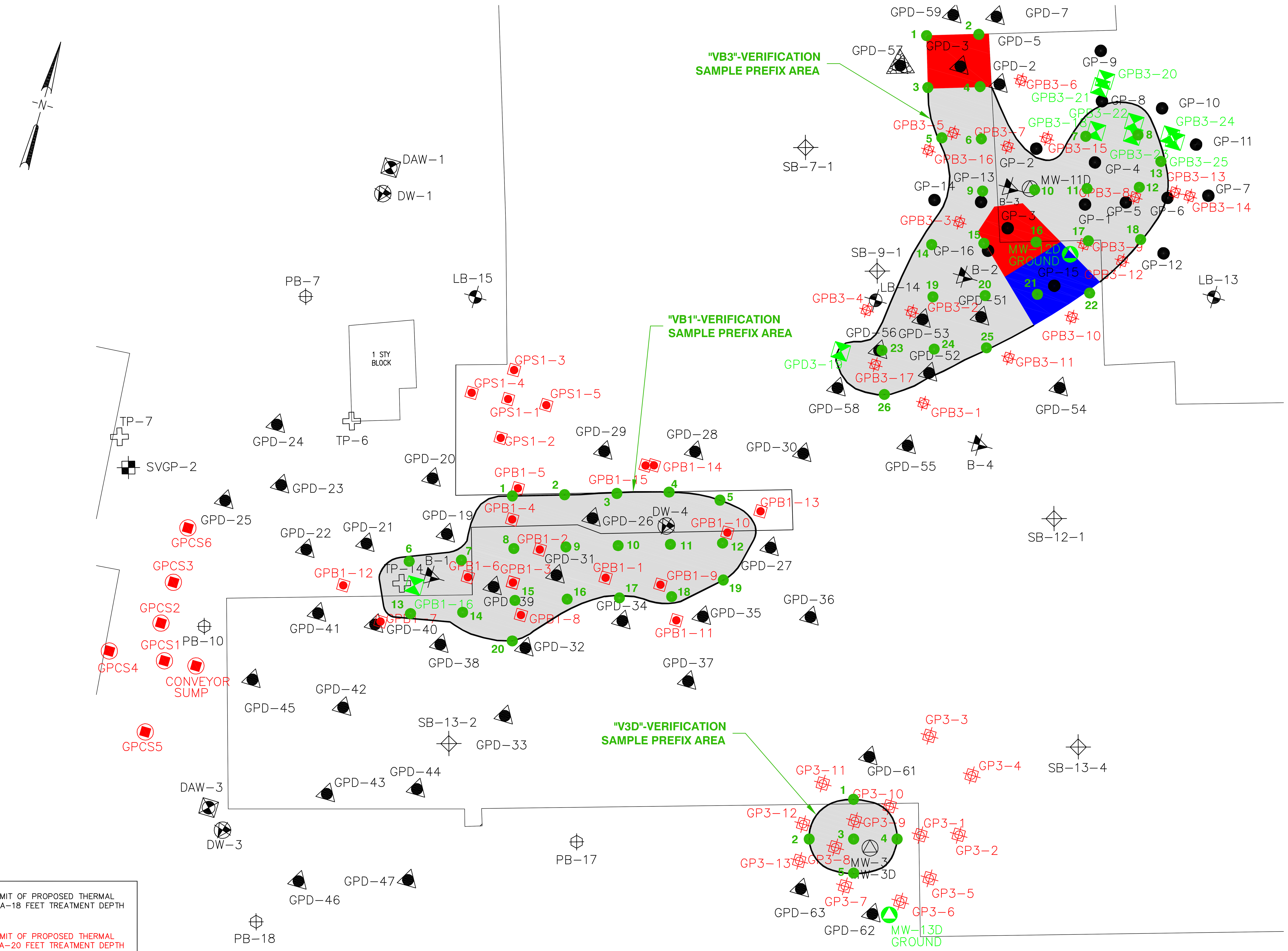
Figure IRM-1



Source: Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, USEPA, EPA/600/R-98/128

Figure IRM - 2
Reductive Dehalogenation of Chlorinated Ethenes

C&S ENGINEERS



LEGEND:

MW-10 MW-10D		PERMANENT MONITORING WELL
TP-14		TEST PITS
B-5		B SERIES COMPLETED NOV. 2004
GPD-44		GPD SERIES COMPLETED SEPT. 2005
GP-12		GP SERIES COMPLETED MARCH 2005
SB-13-4		INTERIOR SOIL BORING COMPLETED AS TEMPERARY MONITORING WELLS MARCH 2005
DW-1		DW SERIES COMPLETED JULY 2005
DAW-1		DAW SERIES COMPLETED AUG. 2005
PB-18		PB SERIES COMPLETED NOV. 2004
LB-1		LB SERIES COMPLETED NOV. 2004
SVGP-1		SVOC SAMPLES COMPLETED SEPT. 2005
		CONVEYOR SUMP INVESTIGATION COMPLETED MARCH 2006
		MW3/3D INVESTIGATION COMPLETED MARCH 2006
		IRM DESIGN B-5 SOURCE AREA COMPLETED MARCH 2006
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA-18 FEET TREATMENT DEPTH
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA-20 FEET TREATMENT DEPTH
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA-25 FEET TREATMENT DEPTH
		IRM DESIGN B-3 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-1 SOURCE AREA COMPLETED MARCH 2006
MW-10 MW-10D		MW SERIES COMPLETED APRIL 2006
DAW-1		DAW SERIES COMPLETED APRIL 2006
GPB3-18		GPB SERIES COMPLETED APRIL 2006
GPD-44		GPD SERIES COMPLETED APRIL 2006
SV		SOIL VAPOR SAMPLING LOCATIONS COMPLETED APRIL 2006
1		VERIFICATION SAMPLE LOCATION

NOTE: SEE TABLE 3 FOR VERIFICATION SAMPLE DEPTHS

C&S ENGINEERS, INC.
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DATE: APRIL 2006
SCALE: AS SHOWN
FILE NO. C81.002.001

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Pioneer Midler Avenue LLC
Interim Remedial Measure
Proposed Verification Sample Locations & Treatment Depths

Figure IRM-3

APPENDIX A

GEOLOGIC GROUNDWATER AND CONTAMINANT FLOW REPORT

GeoLogic

GeoLogic NY, Inc. P.O. Box 350 • 37 Copeland Ave. • Homer, NY 13077 • 607.749.5000 • Fax: 607.749.5063

May 25, 2006

Mr. Steve Vinci
C & S Engineers, Inc.
499 Colonel Eileen Collins Blvd.
Syracuse, NY 13212

Reference: Site Hydrogeology
Midler Avenue Brownfield Clean-Up
NYSDEC Brownfield Site # C734103
Midler Avenue
Syracuse, NY

Dear Mr. Vinci:

This report summarizes our analysis of the site-specific hydrogeologic characteristics of the Midler Avenue site. Our analysis is based on data obtained by C & S personnel and GeoLogic personnel; and addresses direction of groundwater flow in the upper peat/marl unit and the lower sand unit, hydraulic conductivity of the peat/marl unit, estimated rate of groundwater flow in the peat/marl unit and probable rates of contaminant migration in the peat/marl unit.

The unconsolidated deposits at the site can generally be described as a sequence of surficial fill, peat/marl, clay, sand and glacial till (C & S, Remedial Investigation Data Report, November 2005). The peat/marl unit and the deeper sand unit are the primary water bearing units at the site.

Fifteen groundwater monitoring wells have been installed in the peat/marl unit. Groundwater elevations from depth to water measurements made on May 16, 2006 are presented on Drawing No. 1. The depth to water in the peat/marl unit is less than 5 feet across most of the site. Groundwater contours as interpolated from the May 16, 2006 data are also presented on Drawing No. 1. The data demonstrates a general north to south direction of groundwater flow. This is consistent with the local topography in the vicinity of the site. The average horizontal hydraulic gradient based on the data is 0.0122.

Artesian conditions (water level rising above the ground surface) have been observed in DAW-3. DAW-3 is screened in the deep sand unit. The presence of artesian conditions at DAW-3 indicates that the clay unit is acting as an aquitard limiting the movement of groundwater between the peat/marl unit and deeper sand unit.

Four groundwater monitoring wells have been completed at the top of the till unit in the deep sand unit. Groundwater elevations in the deep wells as indicated by May 16, 2006 water level measurements are presented on Drawing No. 2 along with the interpolated groundwater contours. The elevations suggest radial flow towards a "trough" in the center of the site with groundwater discharging to the east. An average horizontal hydraulic gradient of between 0.001 and 0.005 is suggested by the May 16, 2006 data from the deep wells.

In-situ hydraulic conductivity tests (slug tests) were conducted in wells MW-3D, MW-9D, MW-10D and MW-12D on April13 and 27, 2006. NYSDEC personnel were on site on April 13, 2006 for the tests conducted in MW-3D, MW-9D and MW-10D. These four wells are completed in the peat/marl unit. Each test was conducted using different length slugs (2.5 feet and 5 feet at MW-

3D, MW-9D and MW-10D and, 2.5 feet, 5 feet and 7 feet at MW-12D). The change in water level versus time was recorded after the slug was inserted (falling head test) and after the slug was withdrawn (rising head test). Water levels were allowed to return to within at least 95% of the initial water level between tests.

The slug test data was analyzed using an Excel spreadsheet program developed by the United States Geologic Survey (USGS). Spreadsheet analysis follows the Bouwer and Rice methodology. The results of the data analyses are attached. It should be noted that the program requires the selection of an "aquifer material". The choices offered by the program are limited. The classification of "silt, loess" was judged to be the closest to the peat/marl unit; therefore, it was selected. Because the selected aquifer material and the actual material are not the same, the comments on some of the results that K (hydraulic conductivity) is greater than the likely maximum for "silt, loess" should be ignored.

The results of the analyses are summarized on the attached table. The results from the tests in each individual well are consistent between tests (the data from the 5 ft. falling head test in MW-9D are very erratic and therefore not included). The average results from wells MW-3D, MW-9D and MW-10D are also similar.

The average hydraulic conductivity for the peat/marl unit using all of the results from wells MW-3D, MW-9D and MW-10D is 3.25×10^{-1} Feet/Day or 1.15×10^{-4} Cm/Sec.

The hydraulic conductivity indicated by the data from MW-12D is one to two orders of magnitude higher than the other wells and is consistent with a fine to medium sand. A review of the stratigraphy indicates the fill is 4 to 6 feet thick in the area of MW-12D. The filter pack at MW-12D extends up to a depth of about 6.5 feet. Given that the depth of the fill unit in the area of MW-12D and the depth to the top of the filter sand are similar, it is our opinion that the hydraulic conductivity test results from MW-12D are reflective of a connection between the fill unit and filter pack and are not indicative of the hydraulic conductivity in the peat/marl unit. Therefore the results from MW-12D are not included in the peat/marl unit average.

Using the average hydraulic conductivity (K = 3.25×10^{-1} Feet/Day), the average horizontal hydraulic gradient (i = 0.0122) and an assumed porosity (n = 40%), an average linear velocity for groundwater flow in the peat/marl unit can be estimated:

$$\text{ave. linear velocity } (v) = (K/n) \times i$$

$$= (3.25 \times 10^{-1} \text{ Feet/Day}/0.40) \times 0.0122$$

$$v = 9.9 \times 10^{-3} \text{ Feet/Day}$$

$$v = 3.6 \text{ Feet/Year}$$

The contaminants of concern at the site are tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2 dichloroethene and vinyl chloride. The migration of environmental contaminants can vary from the rate of groundwater flow as a result of the site geology and the contaminant physical and chemical properties. In an effort to gauge whether or not the contaminants of concern would be expected to move slower than the estimated rate of groundwater flow, the retardation factor for each of the contaminants was estimated using the USEPA On-Line Tools Site Assessment.

The USEPA calculation requires an estimate of the porosity of the geologic unit and an estimate of the fraction of organic carbon present in the unit. The porosity used in the calculation was again 40%. The value used for fraction organic carbon was 8%. This value represents the mean percentage (minus the highest and lowest value) as reported for 12 samples from the site (C & S letter report dated December 9, 2005). Print outs of the Retardation Factor calculations are attached and summarized below:

PCE, R = 140

TCE, R = 42

Dichloroethene (undifferentiated isomers)
R = 41

Vinyl Chloride, R = 10

Applying the retardation factors to the average linear velocity calculated above results in the following projected rates of migration for the contaminants of concern:

Groundwater, v = 3.6 Feet/Year

PCE, v = 2.6 x 10^{-2} Feet/Year

TCE, v = 8.6 x10^{-21} Feet/Year

Dichloroethene (undifferentiated isomers)
v = 8.8 x10^{-2} Feet/Year

Vinyl Chloride, v = 3.6 x10^{-1} Feet/Year

Thus, it is anticipated that the average rate of migration for the contaminants of concern will be between 140 times slower (PCE) and 10 times slower (vinyl chloride) than the rate of groundwater flow.

We trust we have addressed the issues required for the IRM. Please feel free to call should you have any questions or require any additional information.

Sincerely;

GeoLogic NY, Inc.

Forrest Earl
Principal Hydrogeologist/Vice President

Enc.: (Drawing Nos. 1 & 2, Summary of Hydraulic Conductivity, Slug Analyses, Retardation Factor Calculations)

Cc: File 205006B\Report\Hydro Report

Summary of In-Situ Hydraulic Conductivity Testing
Midler City
NYSDEC Brown Field Site # C734103
Midler Avenue
Syracuse, NY
April 2006

Test	MW-3D	MW-9D	MW-10D	MW-12D	Average w/ MW-12D	Average w/o MW-12D
	Feet/Day	Feet/Day	Feet/Day	Feet/Day		
5 Ft. Slug Falling Head	1.60E-01		5.50E-01	1.40E+01		
5 Ft. Slug Rising Head	9.40E-02	3.50E-01	3.50E-01	1.40E+01		
2.5 Ft. Slug Falling Head	1.00E-01	8.80E-01	2.90E-01			
2.5 Ft. Slug Rising Head	1.10E-01	2.70E-01	2.50E-01			
7 Ft. Slug Falling Head				1.10E+01		
7 Ft. Slug Rising Head				1.40E+01		
K = Feet/Day Average	**1.16E-01**	**5.00E-01**	**3.60E-01**	**1.33E+01**	3.56E+00	**3.25E-01**
K = Cm/Sec Average	**4.09E-05**	**1.76E-04**	**1.27E-04**	**4.67E-03**	1.25E-03	**1.15E-04**
Screened Unit	Marl	Marl	Marl	?Marl? - data is consistent with fine to medium sand and indicates communication between well screen filter pack and overlying fill unit		

WELL ID: MW-3D

Local ID: 5 Ft Falling Manual
Date: 4/13/2006
Time: 14:57

INPUT

Construction:

Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet

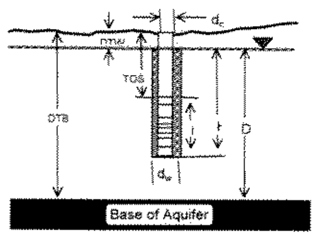
Depths to:

water level (DTW)	2.5 Feet
top of screen (TOS)	15 Feet
Base of Aquifer (DTB)	25 Feet

Annular Fill:

across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

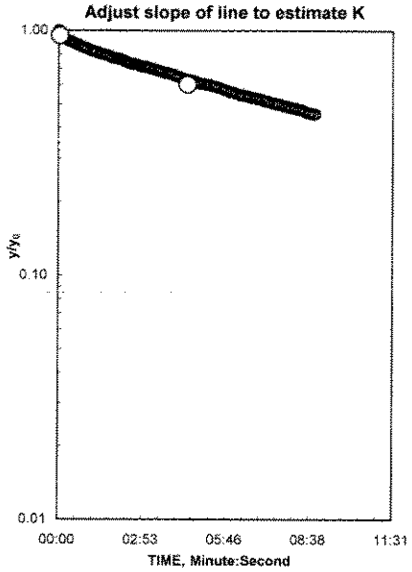
L_{wetted}	10 Feet
D =	22.45 Feet
H =	22.45 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	2.00 Feet
$y_{0\text{-SLUG}}$ =	2.38 Feet

From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	3.000
Re =	6.90 Feet
Slope =	0.000753 $\log_{10}$/sec
$t_{90\%}$ recovery =	1329 sec

Input is consistent.

K = 0.16 Feet/Day



K= 0.16 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:10.0	0.50
2	1:00:30.0	0.69
3	1:00:40.0	0.72
4	1:00:50.0	0.75
5	1:01:00.0	0.79
6	1:01:10.0	0.82
7	1:01:20.0	0.85
8	1:01:30.0	0.87
9	1:01:40.0	0.90
10	1:01:50.0	0.92
11	1:02:00.0	0.95
12	1:02:10.0	0.96
13	1:02:20.0	0.98
14	1:02:30.0	1.01
15	1:02:40.0	1.04
16	1:02:50.0	1.05
17	1:03:00.0	1.07
18	1:03:10.0	1.08
19	1:03:20.0	1.10
20	1:03:30.0	1.12
21	1:03:40.0	1.14
22	1:03:50.0	1.16
23	1:04:00.0	1.17
24	1:04:10.0	1.19
25	1:04:20.0	1.21
26	1:04:30.0	1.25
27	1:04:40.0	1.25
28	1:04:50.0	1.26
29	1:05:00.0	1.28
30	1:05:10.0	1.29
31	1:05:20.0	1.30
32	1:05:30.0	1.32
33	1:05:40.0	1.33
34	1:05:50.0	1.35
35	1:06:00.0	1.37
36	1:06:10.0	1.38
37	1:06:20.0	1.40
38	1:06:30.0	1.41
39	1:06:40.0	1.42
40	1:06:50.0	1.44
41	1:07:00.0	1.45
42	1:07:10.0	1.46
43	1:07:20.0	1.47
44	1:07:30.0	1.49
45	1:07:40.0	1.50

WELL ID: MW-3D

Local ID: 5 Ft Rising Manual
Date: 4/13/2006
Time: 16:00

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

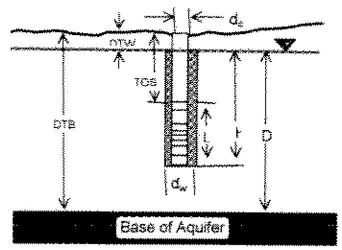
Depths to:

water level (DTW)	2.5	Feet
top of screen (TOS)	15	Feet
Base of Aquifer (DTB)	25	Feet

Annular Fill:

across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

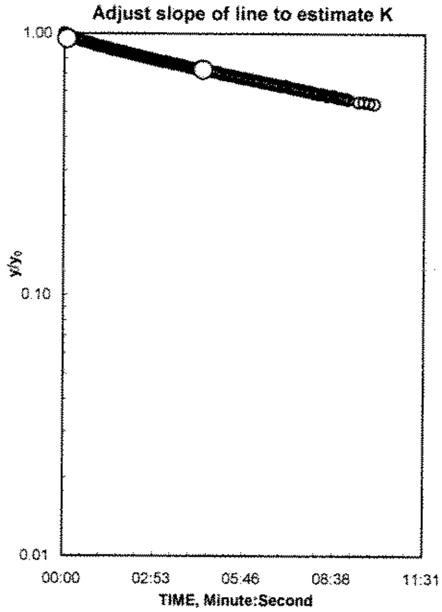
L_{wetted}	10	Feet
D =	22.5	Feet
H =	22.5	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	2.20	Feet
$y_{0\text{-SLUG}}$ =	2.38	Feet

From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	3.001	
Re =	6.91	Feet
Slope =	0.000452	$\log_{10}$/sec
$t_{90\%}$ recovery =	2211	sec

Input is consistent.

K = 0.094 Feet/Day



REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

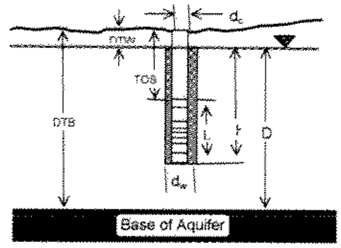
Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	4.70
2	1:00:15.0	4.63
3	1:00:25.0	4.61
4	1:00:35.0	4.57
5	1:00:45.0	4.54
6	1:00:55.0	4.52
7	1:01:05.0	4.48
8	1:01:15.0	4.46
9	1:01:25.0	4.44
10	1:01:35.0	4.41
11	1:01:45.0	4.39
12	1:01:55.0	4.37
13	1:02:05.0	4.35
14	1:02:15.0	4.33
15	1:02:25.0	4.31
16	1:02:35.0	4.29
17	1:02:45.0	4.27
18	1:02:55.0	4.25
19	1:03:05.0	4.23
20	1:03:15.0	4.21
21	1:03:25.0	4.20
22	1:03:35.0	4.18
23	1:03:45.0	4.17
24	1:03:55.0	4.15
25	1:04:05.0	4.13
26	1:04:15.0	4.12
27	1:04:25.0	4.10
28	1:04:35.0	4.09
29	1:04:45.0	4.08
30	1:04:55.0	4.06
31	1:05:05.0	4.04
32	1:05:15.0	4.03
33	1:05:25.0	4.02
34	1:05:35.0	4.00
35	1:05:45.0	3.98
36	1:05:55.0	3.97
37	1:06:05.0	3.96
38	1:06:15.0	3.95
39	1:06:25.0	3.93
40	1:06:35.0	3.92
41	1:06:45.0	3.90
42	1:06:55.0	3.89
43	1:07:05.0	3.88
44	1:07:15.0	3.87
45	1:07:25.0	3.85

WELL ID: MW-3D

Local ID: 2.5 Ft Falling Manual
Date: 4/13/2006
Time: 17:26

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	2.6 Feet
top of screen (TOS)	15 Feet
Base of Aquifer (DTB)	25 Feet
Annular Fill:	
across screen -- Medium Sand	
above screen -- Bentonite	
Aquifer Material -- Silt, Loess	



COMPUTED

L_{wetted}	10 Feet
D =	22.4 Feet
H =	22.4 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	1.00 Feet
$y_{0\text{-SLUG}}$ =	1.19 Feet

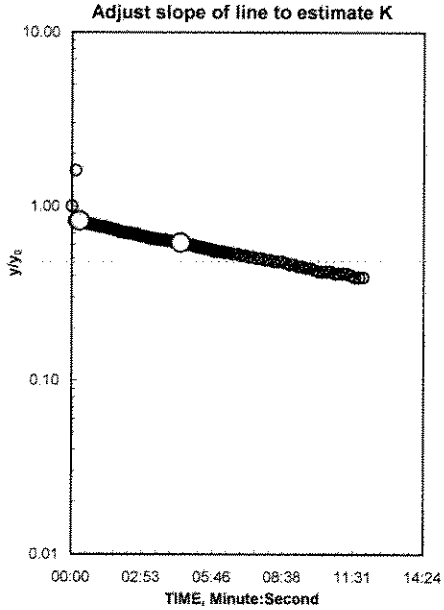
From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	2.998
Re =	6.89 Feet
Slope =	0.000506 $\log_{10}$/sec
$t_{90\%}$ recovery =	1977 sec

Input is consistent.

K = 0.1 Feet/Day

Adjust slope of line to estimate K



REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	1.60
2	1:00:15.0	1.00
3	1:00:25.0	1.79
4	1:00:35.0	1.80
5	1:00:45.0	1.81
6	1:00:55.0	1.82
7	1:01:05.0	1.83
8	1:01:15.0	1.84
9	1:01:25.0	1.84
10	1:01:35.0	1.85
11	1:01:45.0	1.86
12	1:01:55.0	1.87
13	1:02:05.0	1.89
14	1:02:15.0	1.89
15	1:02:25.0	1.90
16	1:02:35.0	1.91
17	1:02:45.0	1.91
18	1:02:55.0	1.93
19	1:03:05.0	1.93
20	1:03:15.0	1.94
21	1:03:25.0	1.95
22	1:03:35.0	1.95
23	1:03:45.0	1.96
24	1:03:55.0	1.96
25	1:04:05.0	1.97
26	1:04:15.0	1.98
27	1:04:25.0	1.99
28	1:04:35.0	1.99
29	1:04:45.0	2.00
30	1:05:00.0	2.00
31	1:05:10.0	2.01
32	1:05:20.0	2.02
33	1:05:30.0	2.03
34	1:05:40.0	2.03
35	1:05:50.0	2.04
36	1:06:00.0	2.05
37	1:06:10.0	2.05
38	1:06:20.0	2.06
39	1:06:40.0	2.07
40	1:07:00.0	2.08
41	1:07:20.0	2.09
42	1:07:40.0	2.10
43	1:08:00.0	2.11
44	1:08:20.0	2.12
45	1:08:40.0	2.12

WELL ID: MW-3D

Local ID: 2.5 Ft Rising Manual
Date: 4/13/2006
Time: 18:18

INPUT

Construction:

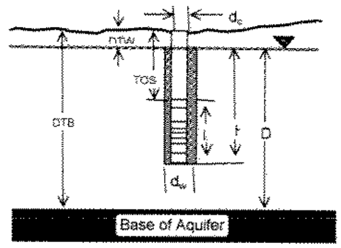
Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	2.54	Feet
top of screen (TOS)	15	Feet
Base of Aquifer (DTB)	25	Feet

Annular Fill:
across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

L_{wetted}	10	Feet
D =	22.46	Feet
H =	22.46	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	0.97	Feet
$y_{0\text{-SLUG}}$ =	1.19	Feet

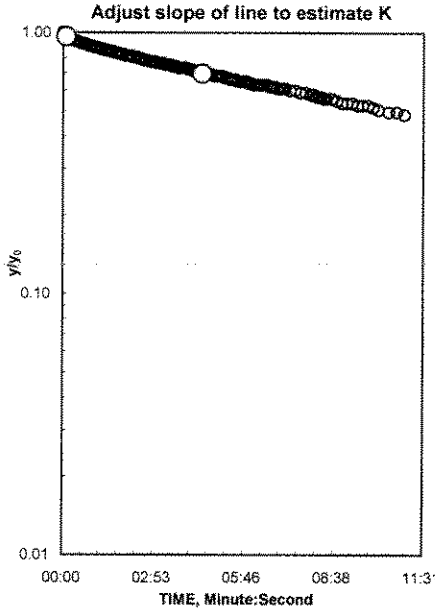
From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	3.000	
Re =	6.90	Feet
Slope =	0.00054	$\log_{10}$/sec
$t_{90\%}$ recovery =	1851	sec

Input is consistent.

K = 0.11 Feet/Day

Adjust slope of line to estimate K



K= 0.11 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

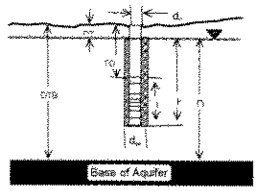
Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	3.51
2	1:00:15.0	3.46
3	1:00:25.0	3.44
4	1:00:35.0	3.43
5	1:00:45.0	3.42
6	1:00:55.0	3.40
7	1:01:05.0	3.39
8	1:01:15.0	3.38
9	1:01:25.0	3.37
10	1:01:35.0	3.36
11	1:01:45.0	3.35
12	1:01:55.0	3.34
13	1:02:05.0	3.33
14	1:02:15.0	3.33
15	1:02:25.0	3.32
16	1:02:35.0	3.31
17	1:02:45.0	3.30
18	1:02:55.0	3.29
19	1:03:05.0	3.28
20	1:03:15.0	3.28
21	1:03:25.0	3.27
22	1:03:35.0	3.26
23	1:03:45.0	3.25
24	1:03:55.0	3.25
25	1:04:05.0	3.24
26	1:04:15.0	3.23
27	1:04:25.0	3.22
28	1:04:35.0	3.22
29	1:04:45.0	3.21
30	1:04:55.0	3.20
31	1:05:05.0	3.20
32	1:05:15.0	3.19
33	1:05:25.0	3.18
34	1:05:35.0	3.18
35	1:05:45.0	3.17
36	1:05:55.0	3.17
37	1:06:05.0	3.16
38	1:06:15.0	3.15
39	1:06:25.0	3.15
40	1:06:35.0	3.15
41	1:06:45.0	3.14
42	1:06:55.0	3.13
43	1:07:05.0	3.13
44	1:07:20.0	3.12
45	1:07:40.0	3.11

WELL ID: MW-9D

Local ID: 5 Ft Rising Manual
Date: 4/13/2006
Time: 8:51

INPUT

Construction:		
Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet
Depths to:		
water level (DTW)	6.58	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	18	Feet
Annular Fill:		
across screen -- Medium Sand		
above screen -- Bentonite		
Aquifer Material -- Silt, Loess		



COMPUTED

L_{wetted}	10	Feet
D =	11.42	Feet
H =	11.42	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	2.20	Feet
$y_{0\text{-SLUG}}$ =	2.38	Feet

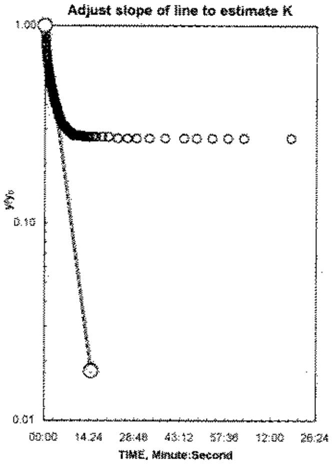
From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	2.603	
Re =	4.64	Feet
Slope =	0.001946	$\log_{10}$/sec
$t_{90\%}$ recovery =	514	sec

Input is consistent.

K = 0.35 Feet/Day

Adjust slope of line to estimate K



K= 0.35 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

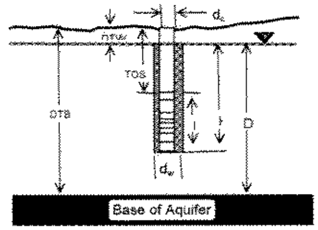
Entry	Time, Hr:Min:Sec	Water Level	Entry	Time, Hr:Min:Sec	Water Level
1	8:51:40.0	8.28	51	8:55:50.0	6.88
2	8:51:45.0	8.25	52	8:55:55.0	6.87
3	8:51:50.0	8.07	53	8:56:00.0	6.86
4	8:51:55.0	7.87	54	8:56:05.0	6.85
5	8:52:00.0	7.81	55	8:56:10.0	6.84
6	8:52:05.0	7.96	56	8:56:15.0	6.84
7	8:52:10.0	7.70	57	8:56:20.0	6.83
8	8:52:15.0	7.63	58	8:56:25.0	6.83
9	8:52:20.0	7.60	59	8:56:30.0	6.82
10	8:52:25.0	7.55	60	8:56:35.0	6.82
11	8:52:30.0	7.53	61	8:56:40.0	6.82
12	8:52:35.0	7.48	62	8:56:45.0	6.80
13	8:52:40.0	7.44	63	8:56:55.0	6.79
14	8:52:45.0	7.41	64	8:57:05.0	6.79
15	8:52:50.0	7.39	65	8:57:15.0	6.78
16	8:52:55.0	7.36	66	8:57:25.0	6.77
17	8:53:00.0	7.34	67	8:57:35.0	6.77
18	8:53:05.0	7.31	68	8:57:45.0	6.76
19	8:53:10.0	7.30	69	8:57:55.0	6.76
20	8:53:15.0	7.28	70	8:58:05.0	6.75
21	8:53:20.0	7.26	71	8:58:15.0	6.75
22	8:53:25.0	7.24	72	8:58:25.0	6.75
23	8:53:30.0	7.22	73	8:58:35.0	6.74
24	8:53:35.0	7.19	74	8:58:45.0	6.74
25	8:53:40.0	7.17	75	8:58:55.0	6.73
26	8:53:45.0	7.15	76	8:59:05.0	6.73
27	8:53:50.0	7.14	77	8:59:15.0	6.72
28	8:53:55.0	7.13	78	8:59:25.0	6.72
29	8:54:00.0	7.11	79	8:59:35.0	6.72
30	8:54:05.0	7.10	80	8:59:45.0	6.71
31	8:54:10.0	7.09	81	9:00:00.0	6.71
32	8:54:15.0	7.07	82	9:00:15.0	6.71
33	8:54:20.0	7.06	83	9:00:30.0	6.70
34	8:54:25.0	7.05	84	9:00:45.0	6.69
35	8:54:30.0	7.04	85	9:01:00.0	6.69
36	8:54:35.0	7.02	86	9:01:15.0	6.69
37	8:54:40.0	7.01	87	9:01:30.0	6.69
38	8:54:45.0	7.00	88	9:01:45.0	6.69
39	8:54:50.0	6.99	89	9:02:00.0	6.69
40	8:54:55.0	6.98	90	9:02:30.0	6.69
41	8:55:00.0	6.96	91	9:03:00.0	6.69
42	8:55:05.0	6.96	92	9:03:30.0	6.69
43	8:55:10.0	6.95	93	9:04:00.0	6.68
44	8:55:15.0	6.95	94	9:05:00.0	6.66
45	8:55:20.0	6.94	95	9:06:00.0	6.68
46	8:55:25.0	6.94	96	9:07:00.0	6.68
47	8:55:30.0	6.93	97	9:08:00.0	6.66
48	8:55:35.0	6.92	98	9:10:00.0	6.68
49	8:55:40.0	6.90	99	9:12:00.0	6.68
50	8:55:45.0	6.89	100	9:15:00.0	6.67

WELL ID: MW-9D

Local ID: 2.5 Ft Falling Manual
Date: 4/13/2006
Time: 10:18

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	6.7 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet
Annular Fill:	
across screen --	Medium Sand
above screen --	Bentonite
Aquifer Material --	Silt, Loess



COMPUTED

L_{wetted}	10 Feet
D =	11.3 Feet
H =	11.3 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	1.00 Feet
$y_{0\text{-SLUG}}$ =	1.19 Feet

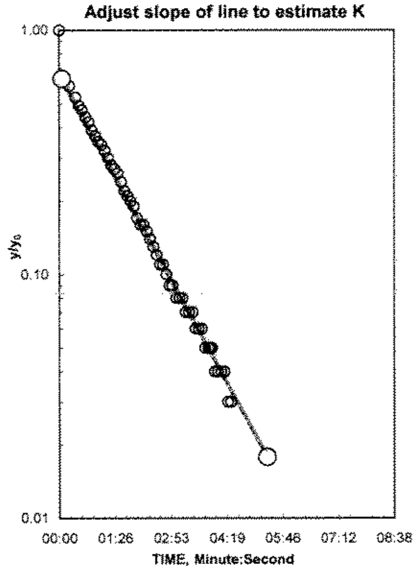
From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	2.597
Re =	4.61 Feet
Slope =	0.004888 $\log_{10}$/sec
$t_{90\%}$ recovery =	205 sec

Input is consistent.

K = 0.88 Feet/Day

Adjust slope of line to estimate K



K= 0.88 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	5.70
2	1:00:20.0	6.11
3	1:00:30.0	6.17
4	1:00:35.0	6.21
5	1:00:40.0	6.23
6	1:00:45.0	6.26
7	1:00:50.0	6.28
8	1:00:55.0	6.31
9	1:01:00.0	6.33
10	1:01:05.0	6.35
11	1:01:10.0	6.36
12	1:01:15.0	6.38
13	1:01:20.0	6.40
14	1:01:25.0	6.42
15	1:01:30.0	6.43
16	1:01:35.0	6.44
17	1:01:40.0	6.46
18	1:01:45.0	6.48
19	1:01:50.0	6.49
20	1:01:55.0	6.50
21	1:02:00.0	6.51
22	1:02:05.0	6.53
23	1:02:10.0	6.54
24	1:02:15.0	6.54
25	1:02:20.0	6.55
26	1:02:25.0	6.56
27	1:02:30.0	6.57
28	1:02:35.0	6.58
29	1:02:40.0	6.59
30	1:02:45.0	6.59
31	1:02:50.0	6.60
32	1:02:55.0	6.61
33	1:03:00.0	6.61
34	1:03:05.0	6.62
35	1:03:10.0	6.62
36	1:03:15.0	6.62
37	1:03:20.0	6.63
38	1:03:25.0	6.63
39	1:03:30.0	6.63
40	1:03:35.0	6.64
41	1:03:40.0	6.64
42	1:03:45.0	6.64
43	1:03:50.0	6.65
44	1:03:55.0	6.65
45	1:03:58.0	6.65

WELL ID: MW-9D

Local ID: 2.5 Ft Rising Manual
Date: 4/13/2006
Time: 10:40

INPUT

Construction:

Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet

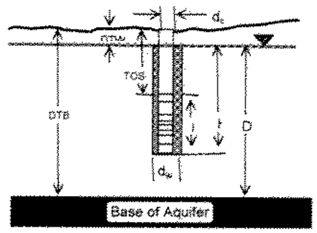
Depths to:

water level (DTW)	6.7 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet

Annular Fill:

across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

L_{wetted}	10 Feet
D =	11.3 Feet
H =	11.3 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	1.30 Feet
$y_{0\text{-SLUG}}$ =	1.19 Feet

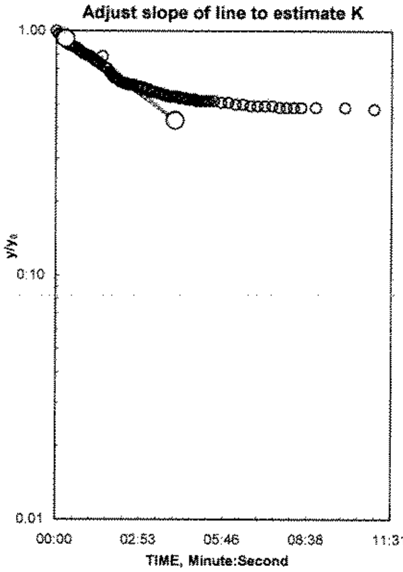
From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	2.597
Re =	4.61 Feet
Slope =	0.001486 log_{10}/sec
$t_{90\%}$ recovery =	673 sec

Input is consistent.

K = 0.27 Feet/Day

Adjust slope of line to estimate K



K= 0.27 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	7.38
2	1:00:10.0	7.34
3	1:00:15.0	7.30
4	1:00:20.0	7.28
5	1:00:25.0	7.24
6	1:00:30.0	7.22
7	1:00:35.0	7.21
8	1:00:40.0	7.20
9	1:00:45.0	7.19
10	1:00:50.0	7.17
11	1:00:55.0	7.15
12	1:01:00.0	7.13
13	1:01:05.0	7.12
14	1:01:10.0	7.11
15	1:01:15.0	7.10
16	1:01:20.0	7.08
17	1:01:25.0	7.06
18	1:01:30.0	7.05
19	1:01:35.0	7.03
20	1:01:40.0	7.10
21	1:01:45.0	7.00
22	1:01:50.0	6.99
23	1:01:55.0	6.96
24	1:01:58.0	6.95
25	1:02:00.0	6.94
26	1:02:03.0	6.92
27	1:02:05.0	6.92
28	1:02:08.0	6.91
29	1:02:10.0	6.91
30	1:02:15.0	6.89
31	1:02:20.0	6.88
32	1:02:25.0	6.87
33	1:02:30.0	6.87
34	1:02:35.0	6.86
35	1:02:40.0	6.86
36	1:02:45.0	6.86
37	1:02:50.0	6.85
38	1:02:55.0	6.85
39	1:03:00.0	6.84
40	1:03:05.0	6.84
41	1:03:10.0	6.83
42	1:03:15.0	6.83
43	1:03:20.0	6.81
44	1:03:25.0	6.81
45	1:03:30.0	6.81

WELL ID: MW-10D

Local ID: 5 Ft Falling Manual
Date: 4/13/2006
Time: 11:37

INPUT

Construction:

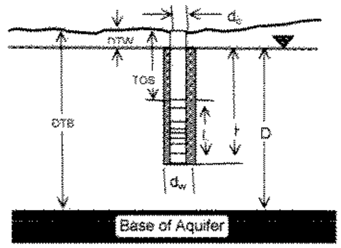
Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	6.77	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	18	Feet

Annular Fill:
across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

L_{wetted}	10	Feet
D =	11.23	Feet
H =	11.23	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	1.97	Feet
$y_{0\text{-SLUG}}$ =	2.38	Feet

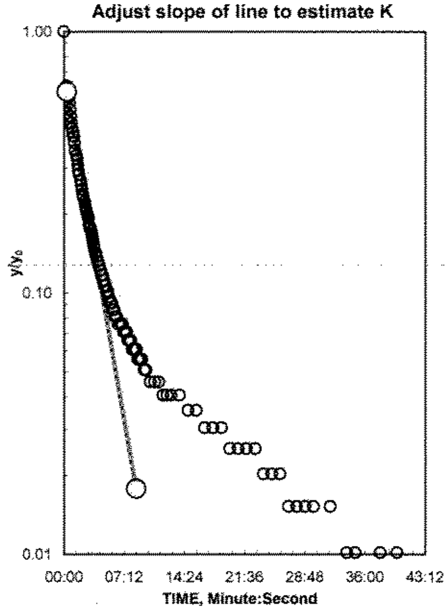
From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	2.593	
Re =	4.60	Feet
Slope =	0.003047	log_{10}/sec
$t_{90\%}$ recovery =	328	sec

Input is consistent.

K = 0.55 Feet/Day

Adjust slope of line to estimate K



K= 0.55 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

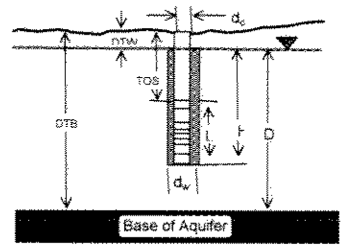
Entry	Time, Hr:Min:Sec	Water Level
1	1:00:10.0	4.80
2	1:00:35.0	5.60
3	1:00:45.0	5.67
4	1:00:55.0	5.78
5	1:01:05.0	5.89
6	1:01:15.0	5.96
7	1:01:25.0	6.03
8	1:01:40.0	6.11
9	1:01:50.0	6.16
10	1:02:00.0	6.21
11	1:02:15.0	6.26
12	1:02:25.0	6.30
13	1:02:40.0	6.33
14	1:02:50.0	6.36
15	1:03:00.0	6.38
16	1:03:10.0	6.41
17	1:03:20.0	6.42
18	1:03:30.0	6.44
19	1:03:40.0	6.46
20	1:03:50.0	6.48
21	1:04:00.0	6.49
22	1:04:10.0	6.51
23	1:04:20.0	6.52
24	1:04:30.0	6.53
25	1:04:40.0	6.54
26	1:04:50.0	6.55
27	1:05:00.0	6.56
28	1:05:10.0	6.56
29	1:05:20.0	6.57
30	1:05:30.0	6.58
31	1:05:40.0	6.59
32	1:05:50.0	6.59
33	1:06:00.0	6.60
34	1:06:10.0	6.60
35	1:06:20.0	6.61
36	1:06:30.0	6.61
37	1:06:50.0	6.62
38	1:07:10.0	6.62
39	1:07:30.0	6.63
40	1:07:50.0	6.64
41	1:08:10.0	6.64
42	1:08:30.0	6.65
43	1:08:50.0	6.65
44	1:09:15.0	6.66
45	1:09:45.0	6.67

WELL ID: MW-10D

Local ID: 5 Ft Rising Manual
Date: 4/13/2006
Time: 12:21

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	6.77 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet
Annular Fill:	
across screen -- Medium Sand	
above screen -- Bentonite	
Aquifer Material -- Silt, Loess	



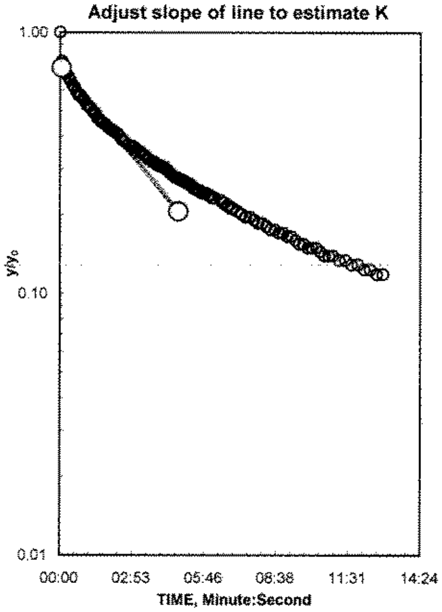
COMPUTED

L_{wetted}	10 Feet
D =	11.23 Feet
H =	11.23 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	1.94 Feet
$y_{0\text{-SLUG}}$ =	2.38 Feet
From look-up table using L/r_w	
Fully penetrate C =	2.041
ln(Re/rw) =	2.593
Re =	4.60 Feet
Slope =	0.001959 $\log_{10}$/sec
$t_{90\%}$ recovery =	511 sec

Input is consistent.

K = 0.35 Feet/Day

Adjust slope of line to estimate K



K= 0.35 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	8.71
2	1:00:15.0	8.17
3	1:00:25.0	8.08
4	1:00:35.0	7.99
5	1:00:45.0	7.92
6	1:00:55.0	7.88
7	1:01:05.0	7.83
8	1:01:15.0	7.78
9	1:01:25.0	7.73
10	1:01:35.0	7.68
11	1:01:45.0	7.65
12	1:01:55.0	7.63
13	1:02:05.0	7.60
14	1:02:15.0	7.58
15	1:02:25.0	7.56
16	1:02:35.0	7.52
17	1:02:50.0	7.49
18	1:03:00.0	7.48
19	1:03:10.0	7.46
20	1:03:20.0	7.44
21	1:03:30.0	7.42
22	1:03:40.0	7.40
23	1:03:50.0	7.39
24	1:04:00.0	7.37
25	1:04:10.0	7.36
26	1:04:20.0	7.35
27	1:04:30.0	7.33
28	1:04:40.0	7.31
29	1:04:50.0	7.30
30	1:05:00.0	7.29
31	1:05:10.0	7.28
32	1:05:20.0	7.27
33	1:05:30.0	7.26
34	1:05:40.0	7.25
35	1:05:50.0	7.24
36	1:06:00.0	7.23
37	1:06:10.0	7.22
38	1:06:30.0	7.21
39	1:06:40.0	7.20
40	1:06:50.0	7.19
41	1:07:00.0	7.18
42	1:07:20.0	7.16
43	1:07:40.0	7.15
44	1:08:00.0	7.13
45	1:08:20.0	7.12

WELL ID: MW-10D

Local ID: 2.5 Ft Falling Manual
Date: 4/13/2006
Time: 13:01

INPUT

Construction:

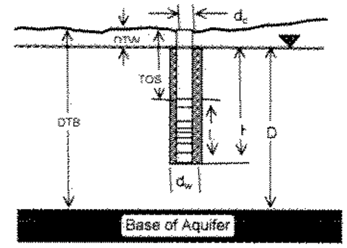
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet

Depths to:

water level (DTW)	6.84 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet

Annular Fill:
across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Silt, Loess



COMPUTED

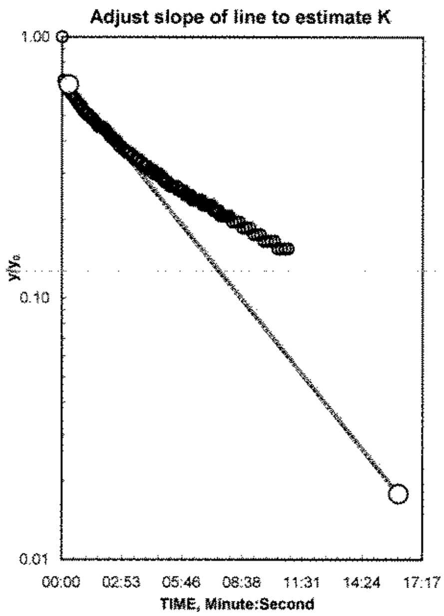
L_{wetted}	10 Feet
D =	11.16 Feet
H =	11.16 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	0.97 Feet
$y_{0\text{-SLUG}}$ =	1.19 Feet

From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	2.589
Re =	4.58 Feet
Slope =	0.001649 $\log_{10}$/sec
$t_{90\%}$ recovery =	606 sec

Input is consistent.

K = 0.29 Feet/Day



K= 0.29 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

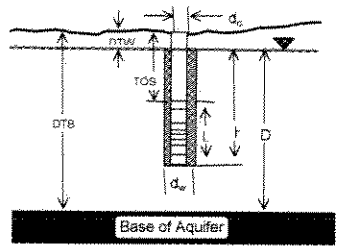
Entry	Time, Hr:Min:Sec	Water Level
1	1:00:10.0	5.87
2	1:00:20.0	6.20
3	1:00:30.0	6.23
4	1:00:40.0	6.26
5	1:00:50.0	6.28
6	1:01:00.0	6.31
7	1:01:10.0	6.33
8	1:01:20.0	6.35
9	1:01:30.0	6.36
10	1:01:40.0	6.37
11	1:01:50.0	6.39
12	1:02:00.0	6.40
13	1:02:10.0	6.41
14	1:02:20.0	6.42
15	1:02:30.0	6.44
16	1:02:40.0	6.45
17	1:02:50.0	6.46
18	1:03:00.0	6.47
19	1:03:10.0	6.48
20	1:03:20.0	6.49
21	1:03:30.0	6.50
22	1:03:40.0	6.51
23	1:03:50.0	6.51
24	1:04:00.0	6.52
25	1:04:10.0	6.53
26	1:04:20.0	6.54
27	1:04:30.0	6.54
28	1:04:40.0	6.55
29	1:04:50.0	6.55
30	1:05:00.0	6.56
31	1:05:10.0	6.57
32	1:05:15.0	6.57
33	1:05:25.0	6.58
34	1:05:40.0	6.58
35	1:05:50.0	6.59
36	1:06:00.0	6.59
37	1:06:10.0	6.60
38	1:06:20.0	6.60
39	1:06:30.0	6.61
40	1:06:40.0	6.61
41	1:06:50.0	6.61
42	1:07:00.0	6.62
43	1:07:10.0	6.62
44	1:07:20.0	6.62
45	1:07:30.0	6.63

WELL ID: MW-10D

Local ID: 2.5 Ft Rising Manual
Date: 4/13/2006
Time: 13:33

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	6.77 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet
Annular Fill:	
across screen -- Medium Sand	
above screen -- Bentonite	
Aquifer Material -- Silt, Loess	

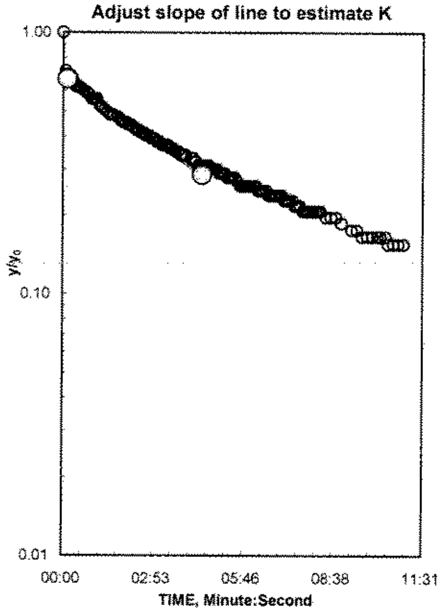


COMPUTED

L_{wetted}	10 Feet
D =	11.23 Feet
H =	11.23 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	0.97 Feet
$y_{0\text{-SLUG}}$ =	1.19 Feet
From look-up table using L/r_w	
Fully penetrate C =	2.041
ln(Re/rw) =	2.593
Re =	4.60 Feet
Slope =	0.001421 $\log_{10}$/sec
$t_{90\%}$ recovery =	704 sec

Input is consistant.

K = 0.25 Feet/Day



K= 0.25 is greater than likely maximum of 0.1 for Silt, Loess

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	1:00:05.0	7.74
2	1:00:15.0	7.44
3	1:00:22.0	7.42
4	1:00:30.0	7.37
5	1:00:40.0	7.36
6	1:00:50.0	7.34
7	1:01:00.0	7.31
8	1:01:10.0	7.31
9	1:01:20.0	7.27
10	1:01:30.0	7.25
11	1:01:40.0	7.24
12	1:01:55.0	7.22
13	1:02:05.0	7.21
14	1:02:15.0	7.20
15	1:02:25.0	7.18
16	1:02:35.0	7.17
17	1:02:45.0	7.16
18	1:02:55.0	7.15
19	1:03:05.0	7.14
20	1:03:15.0	7.13
21	1:03:25.0	7.13
22	1:03:35.0	7.12
23	1:03:45.0	7.11
24	1:03:55.0	7.10
25	1:04:10.0	7.09
26	1:04:20.0	7.08
27	1:04:30.0	7.07
28	1:04:40.0	7.07
29	1:04:50.0	7.06
30	1:05:00.0	7.06
31	1:05:10.0	7.05
32	1:05:20.0	7.04
33	1:05:30.0	7.04
34	1:05:40.0	7.03
35	1:05:50.0	7.02
36	1:06:00.0	7.02
37	1:06:10.0	7.02
38	1:06:20.0	7.01
39	1:06:30.0	7.01
40	1:06:40.0	7.00
41	1:06:50.0	7.00
42	1:07:00.0	7.00
43	1:07:10.0	6.99
44	1:07:20.0	6.99
45	1:07:30.0	6.98

WELL ID: MW-12D

Local ID: 7 Ft. Falling Head
Date: 4/27/2006
Time: 14:51

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

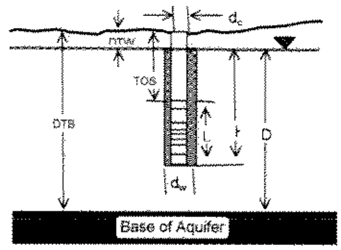
Depths to:

water level (DTW)	4.21	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	18	Feet

Annular Fill:

across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Fine Sand



COMPUTED

L_{wetted}	10	Feet
D =	13.79	Feet
H =	13.79	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	3.97	Feet
$y_{0\text{-SLUG}}$ =	3.33	Feet

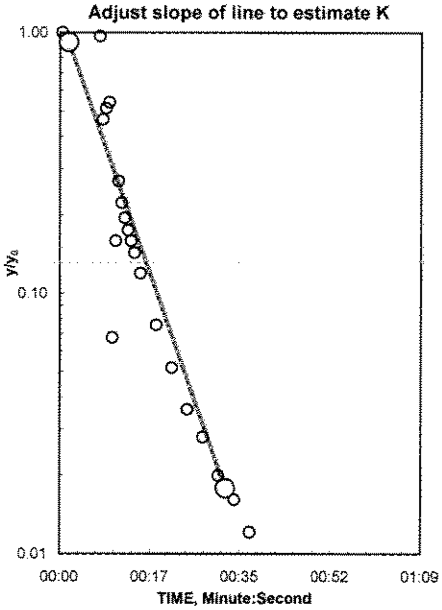
From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	2.717	
Re =	5.20	Feet
Slope =	0.056939	$\log_{10}$/sec
$t_{90\%}$ recovery =	18	sec

Input is consistent.

K = 11 Feet/Day

Adjust slope of line to estimate K



Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	0:00:06.0	0.24
2	0:00:13.2	0.37
3	0:00:13.8	2.37
4	0:00:14.4	2.18
5	0:00:15.0	2.07
6	0:00:15.6	3.94
7	0:00:16.2	3.58
8	0:00:16.8	3.14
9	0:00:17.4	3.33
10	0:00:18.0	3.44
11	0:00:18.6	3.52
12	0:00:19.2	3.58
13	0:00:19.8	3.64
14	0:00:21.0	3.74
15	0:00:24.0	3.91
16	0:00:27.0	4.01
17	0:00:30.0	4.07
18	0:00:33.0	4.10
19	0:00:36.0	4.13
20	0:00:39.0	4.15
21	0:00:42.0	4.16
22	0:00:45.0	4.18
23	0:00:48.0	4.18
24	0:00:51.0	4.18
25	0:00:54.0	4.19
26	0:00:57.0	4.18
27	0:01:00.0	4.19

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

WELL ID: MW-12D

Local ID: 7 Ft. Rising Head
Date: 4/27/2006
Time: 14:51

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	4.21	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	18	Feet

Annular Fill:
across screen -- Medium Sand
above screen -- Bentonite

Aquifer Material -- Fine Sand

COMPUTED

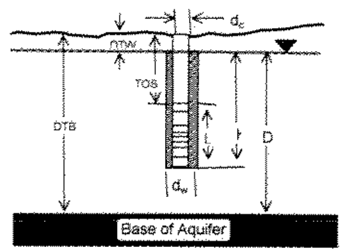
L_{wetted}	10	Feet
D =	13.79	Feet
H =	13.79	Feet
L/r_w =	29.09	
$y_{0\text{-DISPLACEMENT}}$ =	2.89	Feet
$y_{0\text{-SLUG}}$ =	3.33	Feet

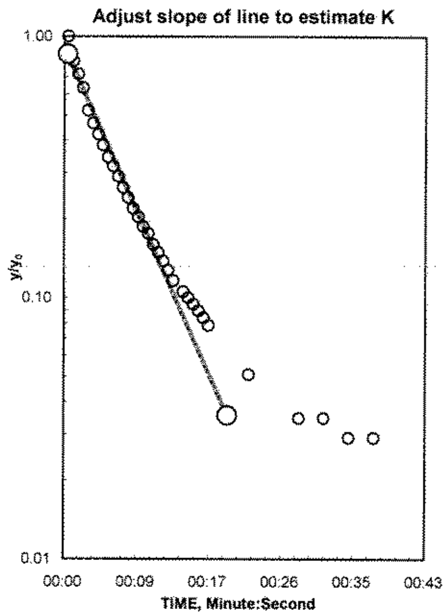
From look-up table using L/r_w

Fully penetrate C =	2.041	
ln(Re/rw) =	2.717	
Re =	5.20	Feet
Slope =	0.072377	$\log_{10}$/sec
$t_{90\%}$ recovery =	14	sec

Input is consistent.

K = 14 Feet/Day





Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	0:00:02.4	7.10
2	0:00:03.0	6.53
3	0:00:03.6	6.28
4	0:00:04.2	6.04
5	0:00:04.8	5.71
6	0:00:05.4	5.55
7	0:00:06.0	5.43
8	0:00:06.6	5.32
9	0:00:07.2	5.21
10	0:00:07.8	5.13
11	0:00:08.4	5.05
12	0:00:09.0	4.97
13	0:00:09.6	4.91
14	0:00:10.2	4.85
15	0:00:10.8	4.80
16	0:00:11.4	4.75
17	0:00:12.0	4.72
18	0:00:12.6	4.67
19	0:00:13.2	4.64
20	0:00:13.8	4.61
21	0:00:14.4	4.58
22	0:00:15.0	4.55
23	0:00:16.2	4.52
24	0:00:16.8	4.50
25	0:00:17.4	4.48
26	0:00:18.0	4.47
27	0:00:18.6	4.45
28	0:00:19.2	4.44
29	0:00:24.0	4.36
30	0:00:30.0	4.31
31	0:00:33.0	4.31
32	0:00:36.0	4.29
33	0:00:39.0	4.29

REMARKS:

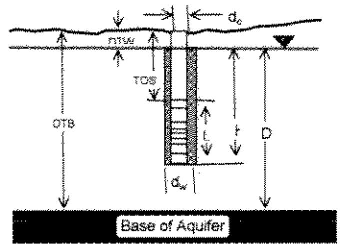
Bouwer and Rice analysis of slug test, WRR 1976

WELL ID: MW-12D

Local ID: 5 Ft. Falling Head
Date: 4/27/2006
Time: 15:12

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	4.21 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet
Annular Fill:	
across screen --	Medium Sand
above screen --	Bentonite
Aquifer Material --	Fine Sand



COMPUTED

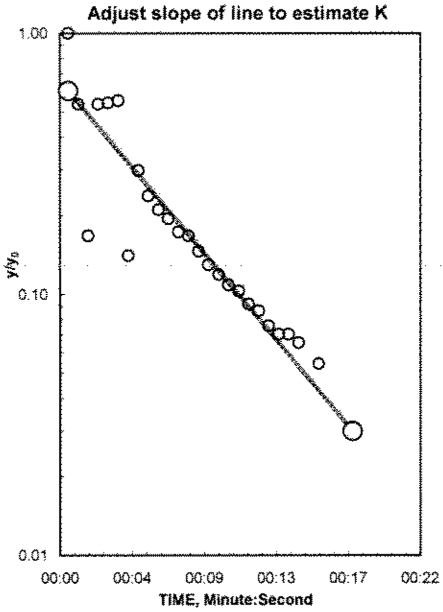
L_{wetted}	10 Feet
D =	13.79 Feet
H =	13.79 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	2.91 Feet
$y_{0\text{-SLUG}}$ =	2.38 Feet

From look-up table using L/r_w

Fully penetrate C =	2.041
ln(Re/rw) =	2.717
Re =	5.20 Feet
Slope =	0.076612 $\log_{10}$/sec
$t_{90\%}$ recovery =	13 sec

Input is consistent.

K = 14 Feet/Day



Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	0:00:06.0	1.30
2	0:00:06.6	2.65
3	0:00:07.2	3.72
4	0:00:07.8	2.65
5	0:00:08.4	2.63
6	0:00:09.0	2.60
7	0:00:09.6	3.80
8	0:00:10.2	3.34
9	0:00:10.8	3.52
10	0:00:11.4	3.60
11	0:00:12.0	3.64
12	0:00:12.6	3.71
13	0:00:13.2	3.72
14	0:00:13.8	3.78
15	0:00:14.4	3.83
16	0:00:15.0	3.86
17	0:00:15.6	3.89
18	0:00:16.2	3.91
19	0:00:16.8	3.94
20	0:00:17.4	3.96
21	0:00:18.0	3.99
22	0:00:18.6	4.01
23	0:00:19.2	4.01
24	0:00:19.8	4.02
25	0:00:21.0	4.05

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

WELL ID: MW-12D

Local ID: 5 Ft. Rising Head
Date: 4/27/2006
Time: 15:20

INPUT

Construction:	
Casing dia. (d_c)	2 Inch
Annulus dia. (d_w)	8.25 Inch
Screen Length (L)	10 Feet
Depths to:	
water level (DTW)	4.21 Feet
top of screen (TOS)	8 Feet
Base of Aquifer (DTB)	18 Feet
Annular Fill:	
across screen --	Medium Sand
above screen --	Bentonite
Aquifer Material --	Fine Sand

COMPUTED

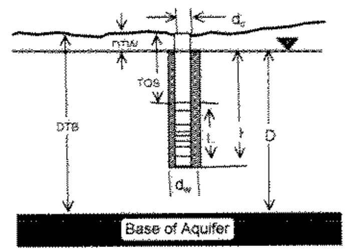
L_{wetted}	10 Feet
D =	13.78 Feet
H =	13.78 Feet
L/r_w =	29.09
$y_{0\text{-DISPLACEMENT}}$ =	2.58 Feet
$y_{0\text{-SLUG}}$ =	2.38 Feet

From look-up table using L/r_w

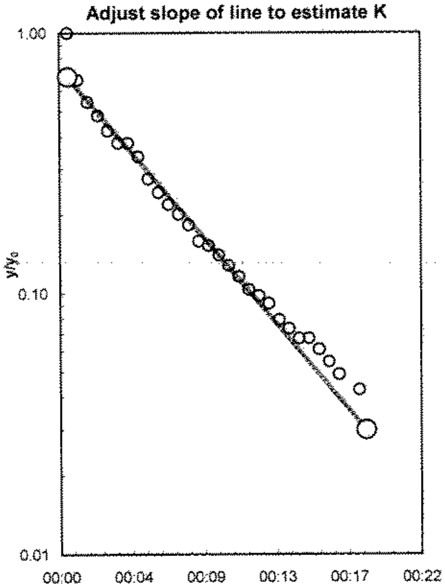
Fully penetrate C =	2.041
ln(Re/rw) =	2.716
Re =	5.20 Feet
Slope =	0.076187 $\log_{10}$/sec
$t_{90\%}$ recovery =	13 sec

Input is consistent.

K = 14 Feet/Day



Adjust slope of line to estimate K



Reduced Data

Entry	Time, Hr:Min:Sec	Water Level
1	0:00:03.6	6.80
2	0:00:04.2	5.92
3	0:00:04.8	5.62
4	0:00:05.4	5.46
5	0:00:06.0	5.31
6	0:00:06.6	5.20
7	0:00:07.2	5.20
8	0:00:07.8	5.09
9	0:00:08.4	4.93
10	0:00:09.0	4.85
11	0:00:09.6	4.79
12	0:00:10.2	4.74
13	0:00:10.8	4.69
14	0:00:11.4	4.63
15	0:00:12.0	4.61
16	0:00:12.6	4.58
17	0:00:13.2	4.55
18	0:00:13.8	4.52
19	0:00:14.4	4.49
20	0:00:15.0	4.47
21	0:00:15.6	4.46
22	0:00:16.2	4.42
23	0:00:16.8	4.41
24	0:00:17.4	4.39
25	0:00:18.0	4.39
26	0:00:18.6	4.38
27	0:00:19.2	4.36
28	0:00:19.8	4.35
29	0:00:21.0	4.33

REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

U.S. Environmental Protection Agency

EPA On-line Tools for Site Assessment Calculation

Retardation Factor

Retardation Factor Calculator

Retardation Factor $R = 1 + \rho_b k_d / \theta$

R = retardation factor

ρ_b = bulk density = $\rho_s(1-\theta)$

ρ_s = solids density

θ = porosity

k_d = (soil) distribution coefficient = $f_{oc} K_{oc}$

f_{oc} = fraction organic carbon

K_{oc} = organic carbon/water partition coefficient

Example Data | Calculate | Clear

Save Data | Recall Data | Go Back

Input Parameters

Site Name	Midler Avenue Brownfield	
Date	May 2006	Current Date
Porosity (θ)	0.40	(Try 0.25)
Fraction Organic Carbon (f_{oc})	0.08	(Try 0.0001)
Chemical Data Source	BIOSCREEN or BIOCHLOR user guides	
Note:	BIOSCREEN and BIOCHLOR user guides: BIOSCREEN Natural Attenuation Decisions Support System Version 1.3, EPA/600/R-96/087, August 1996.	

Data

revision date	August, 1996 and January, 2000
Chemical	(PCE) tetrachloroethene (perchloroethene)

Default Parameters

Solids Density (ρ_s)	2.65	Default
K_{oc} value	426	L/kg

Results

Bulk Density (ρ_b)	1.59	g/cm^3
k_d	34.08	L/kg
Retardation Factor (R)	140.	

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U.S. Environmental Protection Agency

EPA On-line Tools for Site Assessment Calculation

Retardation Factor

Retardation Factor Calculator

Retardation Factor $R = 1 + \rho_b k_d / \theta$

R = retardation factor

ρ_b = bulk density = $\rho_s(1-\theta)$

ρ_s = solids density

θ = porosity

k_d = (soil) distribution coefficient = $f_{oc} K_{oc}$

f_{oc} = fraction organic carbon

K_{oc} = organic carbon/water partition coefficient

Example Data | Calculate | Clear
Save Data | Recall Data | Go Back

Input Parameters

Site Name	Midler Avenue Brownfield	
Date	May 2006	Current Date
Porosity (θ)	0.40	(Try 0.25)
Fraction Organic Carbon (f_{oc})	0.08	(Try 0.0001)
Chemical Data Source	BIOSCREEN or BIOCHLOR user guides	
Note:	BIOSCREEN and BIOCHLOR user guides: BIOSCREEN Natural Attenuation Decisions Support System Version 1.3, EPA/600/R-96/087, August 1996.	

Data

revision date	August, 1996 and January, 2000
Chemical	(TCE) trichloroethene

Default Parameters

Solids Density (ρ_s)	2.65	Default
K_{oc} value	130	L/kg

Results

Bulk Density (ρ_b)	1.59	g/cm^3
k_d	10.40	L/kg
Retardation Factor (R)	42.	

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Retardation Factor

Retardation Factor Calculator

Retardation Factor $R = 1 + \rho_b k_d / \theta$

R = retardation factor
ρ_b = bulk density = $\rho_s(1-\theta)$
ρ_s = solids density
θ = porosity
k_d = (soil) distribution coefficient = $f_{oc}\, K_{oc}$
f_{oc} = fraction organic carbon
K_{oc} = organic carbon/water partition coefficient

Example Data | Calculate | Clear
Save Data | Recall Data | Go Back

Input Parameters

Site Name	Midler Avenue Brownfield	
Date	May 2006	Current Date
Porosity (θ)	0.40	(Try 0.25)
Fraction Organic Carbon (f_{oc})	0.08	(Try 0.0001)
Chemical Data Source	BIOSCREEN or BIOCHLOR user guides	
Note:	BIOSCREEN and BIOCHLOR user guides: BIOSCREEN Natural Attenuation Decisions Support System Version 1.3, EPA/600/R-96/087, August 1996.	

Data

revision date	August, 1996 and January, 2000
Chemical	dichloroethene (undifferentiated isomers)

Default Parameters

Solids Density (ρ_s)	2.65	Default
K_{oc} value	125	L/kg

Results

Bulk Density (ρ_b)	1.59	g/cm^3
k_d	10.00	L/kg
Retardation Factor (R)	41.	

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View the graphical version of this page at: http://www.epa.gov/Athens/learn2model/part-two/onsite/retard.htm

Retardation Factor

Retardation Factor Calculator

Retardation Factor $R = 1 + \rho_b k_d / \theta$

R = retardation factor
ρ_b = bulk density = $\rho_s(1-\theta)$
ρ_s = solids density
θ = porosity
k_d = (soil) distribution coefficient = $f_{oc} K_{oc}$
f_{oc} = fraction organic carbon
K_{oc} = organic carbon/water partition coefficient

Example Data | Calculate | Clear
Save Data | Recall Data | Go Back

Input Parameters

Site Name	Midler Avenue Brownfield	
Date	May 2006	Current Date
Porosity (θ)	0.40	(Try 0.25)
Fraction Organic Carbon (f_{oc})	0.08	(Try 0.0001)
Chemical Data Source	BIOSCREEN or BIOCHLOR user guides	
Note:	BIOSCREEN and BIOCHLOR user guides: BIOSCREEN Natural Attenuation Decisions Support System Version 1.3, EPA/600/R-96/087, August 1996.	

Data

revision date	August, 1996 and January, 2000
Chemical	(VC) vinyl chloride or chloroethene

Default Parameters

Solids Density (ρ_s)	2.65	Default
K_{oc} value	29.6	L/kg

Results

Bulk Density (ρ_b)	1.59	g/cm^3
k_d	2.368	L/kg
Retardation Factor (R)	10.	

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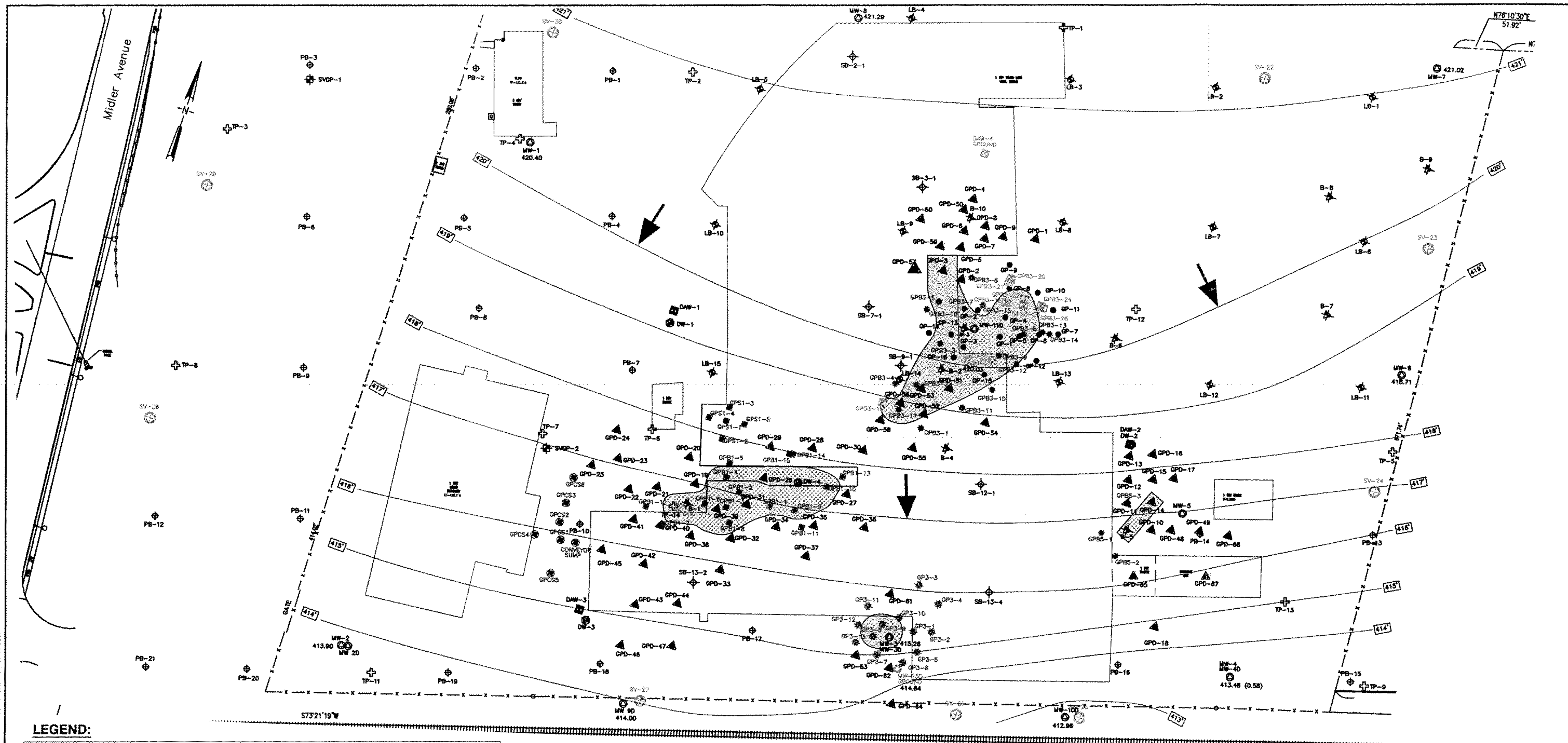

LEGEND:

MW-10 MW-10D		PERMANENT MONITORING WELL
TP-14		TEST PITS
B-5		B SERIES COMPLETED NOV. 2004
GPD-44		GPD SERIES COMPLETED SEPT. 2005
GP-12		GP SERIES COMPLETED MARCH 2005
SB-13-4		INTERIOR SOIL BORING COMPLETED AS TEMPERARY MONITORING WELLS MARCH 2005
DW-1		DW SERIES COMPLETED JULY 2005
DAW-1		DAW SERIES COMPLETED AUG. 2005
PB-18		PB SERIES COMPLETED NOV. 2004
LB-1		LB SERIES COMPLETED NOV. 2004
SVGP-1		SVOC SAMPLES COMPLETED SEPT. 2005
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA
		CONVEYOR SUMP INVESTIGATION COMPLETED MARCH 2006
		MW3/3D INVESTIGATION COMPLETED MARCH 2006
		IRM DESIGN B-5 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-3 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-1 SOURCE AREA COMPLETED MARCH 2006
MW-10 MW-10D		MW SERIES COMPLETED APRIL 2006
DAW-1		DAW SERIES COMPLETED APRIL 2006
GPB3-18		GPB SERIES COMPLETED APRIL 2006
GPD-44		GPD SERIES COMPLETED APRIL 2006
SV		SOIL VAPOR SAMPLING LOCATIONS COMPLETED APRIL 2006

GeoLogic

GeoLogic NY, Inc.

GROUNDWATER ELEVATIONS
PEAT/MARL UNIT
MAY 16, 2006

DR. BY: FCE/SR	SCALE: AS SHOWN	PROJ. NO: 205006B
REVD BY: FCE	DATE: MAY 2006	DRWG. NO: 1

C&S ENGINEERS, INC.
499 Col. Eileen Collins Blvd. Syracuse, New York 13212 Phone: 315-455-2000 Fax: 315-455-9667 Toll Free: 1-877 CS SOLVE WWW.CSCOS.COM

DATE:	APRIL 2006
SCALE:	AS SHOWN
FILE NO.	C81.002.001

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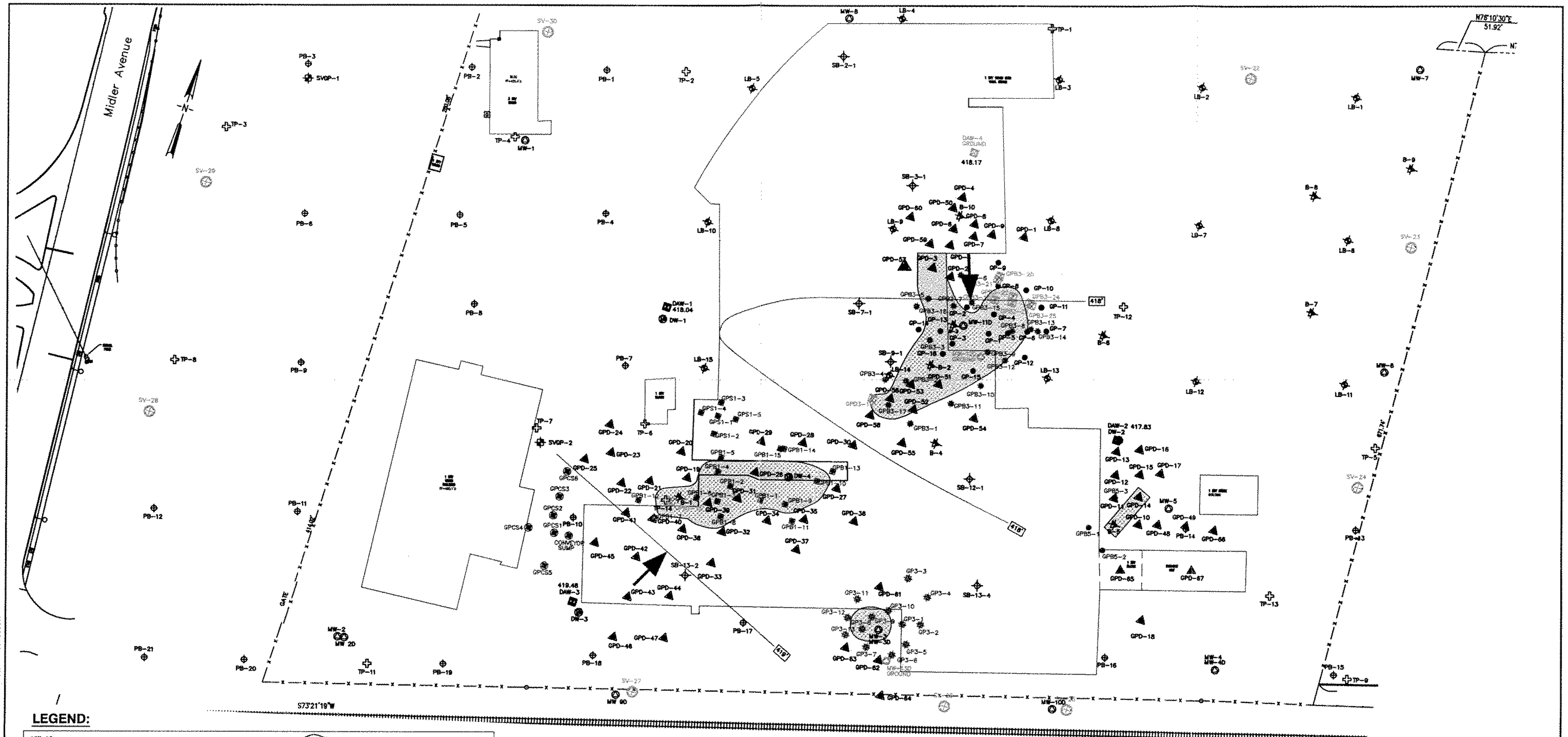
Pioneer Midler Avenue LLC
Interim Remedial Measure
Proposed Thermal Treatment Areas

Figure IRM-2



LEGEND:

MW-10 MW-100		PERMANENT MONITORING WELL
TP-14		TEST PITS
B-5		B SERIES COMPLETED NOV. 2004
GPD-44		GPD SERIES COMPLETED SEPT. 2005
GP-12		GP SERIES COMPLETED MARCH 2005
SB-13-4		INTERIOR SOIL BORING COMPLETED AS TEMPERARY MONITORING WELLS MARCH 2005
DW-1		DW SERIES COMPLETED JULY 2005
DAW-1		DAW SERIES COMPLETED AUG. 2005
PB-18		PB SERIES COMPLETED NOV. 2004
LB-1		LB SERIES COMPLETED NOV. 2004
SVGP-1		SVOC SAMPLES COMPLETED SEPT. 2005
		APPROXIMATE LIMIT OF PROPOSED THERMAL TREATMENT AREA
		CONVEYOR SUMP INVESTIGATION COMPLETED MARCH 2006
		MW3/3D INVESTIGATION COMPLETED MARCH 2006
		IRM DESIGN B-5 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-3 SOURCE AREA COMPLETED MARCH 2006
		IRM DESIGN B-1 SOURCE AREA COMPLETED MARCH 2006
MW-10 MW-100		MW SERIES COMPLETED APRIL 2006
DAW-1		DAW SERIES COMPLETED APRIL 2006
GPB3-18		GPB SERIES COMPLETED APRIL 2006
GPD-44		GPD SERIES COMPLETED APRIL 2006
SV		SOIL VAPOR SAMPLING LOCATIONS COMPLETED APRIL 2006

GeoLogic

GeoLogic NY, Inc.

GROUNDWATER ELEVATIONS
SAND UNIT
MAY 16, 2006

DR. BY: FCE/SR	SCALE: AS SHOWN	PROJ. NO: 205006B
REVD BY: FCE	DATE: MAY 2006	DRWG. NO: 2

C&S ENGINEERS, INC.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
Toll Free: 1-877 CS SOLVE
WWW.CSCOS.COM

DATE:	APRIL 2006
SCALE:	AS SHOWN
FILE NO.	C81.002.001

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Pioneer Midler Avenue LLC
Interim Remedial Measure
Proposed Thermal Treatment Areas

Figure IRM-2

APPENDIX B

IRM TREATMENT AREA COMPARATIVE ANALYSIS DATA

Appendix B
Pioneer Midler Avenue, LLC
IRM Work Plan

Boring ID	TOTAL CVOCs								
B-3 AREA (CVOCs > 10,000 ppb)		**>10,000**	**>20,000**	**>30,000**	**>40,000**	**>50,000**	**>100,000**	**>500,000**	**>1,000,000**
B-3	408,000	120	120	120	120	120	120		
MW-11D	13,650	4							
GPB3-2	686,000	202	202	202	202	202	202	202	
GPB3-3	388,000	114	114	114	114	114	114		
GPB3-5	98,400	29	29	29	29	29			
GPB3-7	278,900	73	73	73	73	73	73		
GPB3-9	7,410,000	1,932	1,932	1,932	1,932	1,932	1,932	1,932	1,932
GPB3-10	16,200	4							
GPB3-11	10,400	3							
GPB3-12	29,100	8	8						
GPB3-13	25,000	7	7						
GPB3-14	12,000	3							
GPB3-16	12,820	3							
GPB3-17	1,376,000	359	359	359	359	359	359	359	359
GPB3-18	2,126,000	554	554	554	554	554	554	554	554
GPB3-22	1,460,000	381	381	381	381	381	381	381	381
GPD-3	345,226,700	90,032	90,032	90,032	90,032	90,032	90,032	90,032	90,032
GPD-51	43,000,000	11,214	11,214	11,214	11,214	11,214	11,214	11,214	11,214
GPD-52	46,800	12	12	12	12				
GPD-57	14,000	4							
GP-3	13,250,000	3,455	3,455	3,455	3,455	3,455	3,455	3,455	3,455
GP-15	513,200	134	134	134	134	134	134	134	
Avg. Concentration	**18,927,326**								
Treatment Area (sq. ft.)	**16,224**								
Treatment Volume (cy)	**12,018**								
CVOC Mass Removal (kg)		**108,648**	**108,627**	**108,613**	**108,613**	**108,601**	**108,572**	**108,264**	**107,928**

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Appendix B
Pioneer Midler Avenue, LLC
IRM Work Plan

Boring ID	TOTAL CVOCs								
B-1 AREA (CVOCs > 10,000 ppb)		**>10,000**	**>20,000**	**>30,000**	**>40,000**	**>50,000**	**>100,000**	**>500,000**	**>1,000,000**
B-1	38,900	12	12	12					
TP-14	98,200	31	31	31	31	31			
GPD-19	20,300	6	6						
GPD-26	2,500,000	790	790	790	790	790	790	790	790
GPD-32	27,700	9	9						
GPD-33	20,530	6	6						
GPD-37	10,860	2							
GPD-38	22,000	4	4						
GPD-41	17,400	3							
GPD-42	11,800	2							
GPD-44	11,600	2							
GPB1-1	324,900	64	64	64	64	64	64		
GPB1-2	6,300,000	1,240	1,240	1240	1240	1240	1240	1,240	1,240
GPB1-3	6,900,000	1,359	1,359	1359	1359	1359	1359	1,359	1,359
GPB1-4	4,479,000	882	882	882	882	882	882	882	882
GPB1-6	4,810,000	947	947	947	947	947	947	947	947
GPB1-7	19,300	4							
GPB1-8	2,858,000	563	563	563	563	563	563	563	563
GPB1-9	9,940,000	1,957	1,957	1957	1957	1957	1957	1,957	1,957
GPB1-10	68,440,000	13,475	13,475	13475	13475	13475	13475	13,475	13,475
GPB1-11	28,030	6	6						
GPB1-12	10,100	2							
DW-4	646,000	127	127	127	127	127	127	127	
SB-13-2	23,200	5	5						
Avg. Concentration	**4,481,576**								
Treatment Area (sq. ft.)	**13,362**								
Treatment Volume (cy)	**9,898**								
CVOC Mass Removal (kg)		**21,499**	**21,484**	**21,447**	**21,435**	**21,435**	**21,404**	**21,340**	**21,213**

Appendix B
Pioneer Midler Avenue, LLC
IRM Work Plan

Boring ID	TOTAL CVOCs								
MW-3D AREA (CVOCs > 10,000 ppb)		**>10,000**	**>20,000**	**>30,000**	**>40,000**	**>50,000**	**>100,000**	**>500,000**	**>1,000,000**
MW-3D	2,000								
GP3-1	1,943								
GP3-2	2,640								
GP3-3	4,140								
GP3-4	2,035								
GP3-5	2,460								
GP3-6	705								
GP3-7	15								
GP3-8	193,200	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77
GP3-9	4,200,000	147.08	147.08	147.08	147.08	147.08	147.08	147.08	147.08
GP3-10	2,610								
GP3-11	2,080								
GP3-12	1,656								
GP3-13	725								
GPD-61	491								
GPD-62	51								
GPD-63	20								
Avg. Concentration	**259,810**								
Treatment Area (sq. ft.)	**1,683**								
Treatment Volume (cy)	**1,247**								
CVOC Mass Removal (kg)		154	154	154	154	154	154	154	154

Appendix C

Community Air Monitoring Plan

Community Air Monitoring Plan

Midler Avenue Brownfield Cleanup Program
NYSDEC Site # C734103
Syracuse, Onondaga County, New York

Prepared for
Pioneer Midler Avenue, LLC

Prepared by

C&S Engineers, Inc.
499 Colonel Eileen Collins Blvd.
Syracuse, New York 13212

June 2006

Community Air Monitoring Plan

Pioneer Midler Interim Remedial Measure

Introduction

This Community Air Monitoring Plan (CAMP) has been prepared for Pioneer Midler Avenue, LLC, volunteer for the Midler Avenue Redevelopment Brownfield Cleanup Program (BCP) Project. This CAMP was developed consistent with the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan.*

A CAMP requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. This CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Air Monitoring During Construction

Continuous monitoring will be performed for all ground intrusive activities. Ground intrusive activities for the Pioneer Midler IRM include soil excavation and handling, trenching, and the installation of soil borings and monitoring wells.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area. Upwind concentrations will be measured at the start of each workday and hourly thereafter to establish/confirm background conditions. The ambient air at the downwind perimeter of the work area (within 50 feet of the ground-intrusive activities) will be monitored hourly for a minimum of five consecutive minutes. The monitoring work will be performed using a hand-held photoionization diction (PID) instrument appropriate to measure the types of contaminants known to be present at the Midler site. The PID equipment will be calibrated daily prior to commencing the day’s activities.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds five parts per million (ppm) above background, work activities will be temporarily halted and monitoring continued. If the total organic vapor level at the downwind perimeter of the work area readily decreases below five ppm over background, work activities can resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of five ppm over background but less than 25 ppm, work activities will be halted, corrective actions will be taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work area perimeter (or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet) is below five ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, all work activities will be shutdown.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

Air Monitoring During Operation and Site Monitoring

Pioneer Midler Avenue LLC will remediate the source areas utilizing in-situ thermal desorption (ISTD). In-situ thermal desorption has been selected as the preferred technology for addressing the most significantly impacted CVOC source areas based on the shallow depth to groundwater and the generally deeper occurrences of CVOC impacts in those areas. Those conditions result in the majority of CVOC impacts being well below the water table. The proposed IRM approach also includes potential excavation in some small areas. This will be implemented within shallow zones to remove either CVOC-impacted source materials or petroleum-impacted materials. Excavated materials could be disposed off-site or moved into a thermal heating zone for on-site treatment. The maximum depth for excavation will generally be no greater than eight to ten feet, but excavation may be conducted within isolated deeper areas where zones of low hydraulic conductivity might allow deeper excavation without requiring excessive dewatering effort. Community air monitoring during excavation activities will be conducted consistent with the methods set forth in "Air Monitoring During Construction", pages 2 and 3 of this Plan.

Operation of the treatment system will be performed by TerraTherm, Inc. of Fitchburg, Massachusetts. The overall objective of the ISTD remediation is to reduce the concentrations of volatile COCs within the Target Treatment Zone (TTZ). To achieve the remedial objectives, the ISTD system has been designed to operate for a total of 164 days; including 10 days of startup, 134 days of heating, and 20 days of polishing/cool down. At the end of the operating period, the average subsurface temperature within the TTZ is expected to be approximately 100°C. Many locations, especially unsaturated regions close to the heater wells, will be well above 100°C. Saturated portions of the subsurface are expected to attain 100°C. Small regions may be at lower temperatures, but still sufficiently remediated to meet the treatment standard.

The ISTD process utilizes conductive heating and vacuum to remediate soils contaminated with a wide range of organic compounds. Heat and vacuum are applied simultaneously to subsurface soils, either with an array of vertical heater/vacuum wells, or horizontally positioned heaters under imposed vacuum. The electrically powered heating elements are operated at temperatures of up to 1,500°F.

Heat flows through the soil from the heating elements primarily by thermal conduction. As the soil is heated, volatile, semi-volatile and non-volatile organic contaminants in the soil are vaporized and/or destroyed by a number of mechanisms, including evaporation into the air stream; steam distillation; boiling; oxidation; and pyrolysis (chemical decomposition in the absence of oxygen). The vaporized water and contaminants, as well as some volatilized inorganic compounds, are drawn counter-current to the heat flow into the vacuum extraction wells ("heater-vacuum" wells). A portion of the contaminants are destroyed within the soil, before they reach the extraction wells and are conveyed to the surface. Contaminants that have not been destroyed within the soil are removed from the produced vapor stream with an Air Quality Control (AQC) system. The AQC system for this site will consist of a regenerative thermal oxidizer, a wet scrubber with a quench for acid gas cooling and neutralization, and extraction blowers. Vapor phase carbon adsorbers will be available to serve as backup in the event the oxidizer needs to be shut down for maintenance. The system will be operated with approval of the NYSDEC for air emissions. During operation, VOCs will be monitored a minimum of twice daily for a minimum period of five consecutive minutes at the downwind property line. Upwind concentrations will be measured prior to the downwind monitoring to establish/confirm background conditions. Should a notable change in wind direction occur, the placement of the upwind and downwind monitoring locations will be appropriately adjusted and the adjustments recorded. The monitoring will be performed using a hand-held photoionization diction (PID) instrument appropriate to measure the types of contaminants known to be present at the Midler site. The PID equipment will be calibrated daily prior to commencing the day's activities.

Since no soil disturbance will take place during the treatment system operation, particulate monitoring will not be conducted.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, opening a well, and during well baling/purging.

Addendum 1

Community Air Monitoring Plan

Pioneer Midler Interim Remedial Measure

This page replaces Page 6 of the July 2006 Community Air Monitoring Plan. The added text is shown in *italics*.

TerraTherm will also remotely monitor the system and an automatic teledialer will call out to both the system operator and the home office in the event of any system upset such as a power failure, oxidizer/scrubber fault, low vacuum/blower fault, etc. A project team member will be available to respond to the site within a few hours of any system upset to resolve any issues

All air monitoring records, including positions of monitoring equipment, periods when active VOC monitoring is taking place, and the levels measured will be recorded and will be available for State personnel to review.

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APPENDIX D

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

June 2006

ISTD Remediation Project
Midler Avenue Brownfield Cleanup Program
621 South Midler Avenue
Syracuse, Onondaga County, New York
NYSDEC Site # C734103

Prepared for:

Pioneer Midler Avenue, LLC
250 South Clinton Street
Syracuse, NY 13202

Prepared by:

TerraTherm, Inc.
356 Broad Street
Fitchburg, MA 01420
978-343-0300

Table of Contents

1. Introduction

1.1 HASP Applicability

TerraTherm, Inc. (TerraTherm) has developed this site-specific Health and Safety Plan (HASP). It establishes the health and safety procedures to minimize any potential risk to TerraTherm and TerraTherm's subcontractor personnel involved with the in-situ thermal desorption (ISTD) remediation program at the Midler Avenue Redevelopment Brownfield Cleanup Program (BCP) Project at 621 South Midler Avenue in Syracuse, NY (Midler Avenue Brownfield Site). TerraTherm is performing this work on behalf of the current site owner Pioneer Midler Avenue, LLC (Pioneer).

The provisions of this plan apply to all TerraTherm personnel and TerraTherm subcontractors who may potentially be exposed to safety and/or health hazards related to activities described in Section 3.0 of this document.

This HASP has been written to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). All activities covered by this HASP must be conducted in complete compliance with this HASP and with all applicable federal, state, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply will be excluded from site activities.

This plan will be distributed to each employee involved with the ISTD program at the Midler Avenue Brownfield Site. Each employee must sign a copy of the attached health and safety plan receipt and acknowledgment form (see Attachment A).

1.2 Modifications to HASP

The procedures in this HASP have been developed based on information provided by Pioneer and the proposed scope of work. Every effort has been made to address the chemical hazards that may be encountered during the implementation of the proposed remediation plan. Similarly, this document also discusses the physical hazards associated with the proposed remediation activities. However, unanticipated site-specific conditions or situations may occur during the implementation of this project. Also, TerraTherm and/or contractors may elect to perform certain tasks in a manner that is different from what was originally intended due to a change in field conditions. As such, this HASP must be considered a *working document* that is subject to change to meet the needs of this dynamic project.

Therefore, TerraTherm and/or contractors will complete a Job Hazard Analysis (JHA) prior to the beginning of each major phase of work to ensure that all chemical and physical hazards have been properly addressed. The use of new installation techniques or operating procedures will be reviewed and if new hazards are associated with the proposed changes, they will be documented on the JHA. An effective control measure must also be identified for each new hazard. The Site Safety Officer (SSO) will review JHAs prior to their implementation. Once approved, the JHAs will be reviewed with all field staff during the daily safety meeting. A blank JHA is presented as Attachment B.

1.2.1 HASP Modifications

Should significant information become available regarding potential on-site hazards, it may be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the Project Manager (PM) before such modifications are implemented. Any significant modifications must be incorporated into the written document, as addenda and the HASP must be reissued. The PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the Site Safety Officer (SSO). The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

1.3 Organization/Responsibilities

The implementation of health and safety at this project location will be the shared responsibility of the TerraTherm Project Manager (PM), the TerraTherm Construction Manager, the TerraTherm Project Site SSO, and all other on-site TerraTherm and contractor personnel.

1.3.1 TerraTherm Project Manager

The TerraTherm PM is the individual who has the primary responsibility for ensuring the overall health and safety of this project. As such, the PM is responsible for ensuring that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Assigning a SSO to the project whose training and field experience is commensurate with the safety requirements of the proposed ISTD plan for the Midler Avenue Brownfield Site;

- Assuring that all personnel to whom this HASP applies have received a copy of it;

- Providing the TerraTherm Construction Manager, Safety Advisor, and SSO with updated information regarding environmental conditions at the site and the scope of site work;

- Providing adequate authority and resources to the Construction Manager and SSO to allow for the successful implementation of all necessary safety procedures;

- Supporting the decisions made by the Construction Manager and/or the SSO;

- Maintaining regular communications with the Construction Manager and SSO; and,

- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.

1.3.2 TerraTherm Site Safety Officer

All TerraTherm employees working at the Midler Avenue Brownfield Site are responsible for implementing the safety requirements specified in this HASP. However, during each major phase of the project (e.g., construction, operation, demobilization), a designated employee, appointed by the PM, will serve as the SSO. The SSO will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have submitted a completed copy of the HASP receipt and acceptance form;

- Assuring that all personnel to whom this HASP applies attend the pre-entry briefing prior to entering an exclusion zone and also attend all subsequently scheduled safety meetings;

- Maintaining a high level of health and safety consciousness among employees at the work site;
- Preparing a JHA, in conjunction with the contractors, for each new task or hazard that is not addressed by this HASP and reviewing the information with the field team;
- Procuring and distributing the personal protective equipment (PPE), respiratory protection and safety equipment needed for this project for TerraTherm employees;
- Procuring the air monitoring instrumentation required by this HASP and performing health and safety-related air monitoring for TerraTherm activities;
- Verifying that all PPE and health and safety equipment used by TerraTherm are in good working order;
- Verifying that all contractors are prepared with the required PPE, respirators and safety equipment;
- Setting up and maintaining the decontamination zone and assuring proper cleanup of all site personnel involved with the ISTD program;
- Notifying the PM of all noncompliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within the established restricted areas to ensure that required safety and health procedures are being followed;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing and subsequent safety meetings, as required by Section 10.0 of the HASP; and,
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.

1.3.3 TerraTherm Field Personnel and Contractor Personnel

All TerraTherm field personnel and contractor personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training, if applicable, to the Construction Manager or SSO prior to the start of work;
- Attending the required pre-entry briefing prior to beginning on-site work and any subsequent safety meetings that are scheduled by the SSO;
- Bringing forth any questions or concerns regarding the content of the HASP to the Construction Manager or the SSO prior to the start of work;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SSO; and,
- Complying with the requirements of this HASP and the requests of the SSO.

1.3.4 Subcontractors

In addition to other requirements referenced in this HASP, all subcontractors are required to:

- Ensure, via daily inspections, that their equipment is in good working order;
- Operate their equipment in a safe manner;
- Appoint one employee as the SSO who will interact with the TerraTherm SSO when necessary;
- Prepare JHAs for new hazards that are introduced during the program and are not addressed in this HASP;

- Provide copies of material safety data sheets (MSDS) for all hazardous materials brought on-site; and,
- Provide all the required PPE, respiratory protection and safety equipment for their employees.

2. Site Description and History

2.1 Site Description

The following is a summary of the site history and conditions, as it relates to the ISTD target treatment area, based on information presented in the Remedial Investigation Data Report (C&S Engineers, Inc., 2005).[1]

The Midler City Industrial Park Site is approximately 22 acres and is located in the eastern portion of the City of Syracuse. The site was originally developed as an industrial facility in the late nineteenth century and was utilized as such through the mid-twentieth century.

2.1.1 Site History

The early history of the site was characterized by its use as an industrial site and its proximity to transportation infrastructure (railroads and previously, the Erie Canal). Former tenants of note include *Pierce, Butler, & Pierce Manufacturing Company*, a producer of heavy iron wares (boilers, radiators, piping, etc.) and *Prosperity Company,* a producer of laundry and dry cleaning equipment. Since being acquired in 1961 by Sutton Investing Company, the buildings have been utilized as general storage/operations (warehouse) rental space. The nature of these tenants is varied and includes, but is not limited to:

- Auto dealer storage of new and used vehicles
- Electrical contractor
- Landscape contractor
- Rack/storage/pallet system vendor
- Hardwood/plywood storage
- General contractors

2.2 Environmental Issues

2.2.1 ISTD Treatment Area

The ISTD treatment area comprises three separate irregularly shaped areas. Soil from excavation of a fourth area, the B-5 area, will be included in the treatment volume. Table 2.1 lists the areas with approximate dimensions.

Table 2.1. Treatment Areas, Depths, and Volumes

Location	Surface Area (ft^2)	Average Depth (ft)	Volume (cy)	Comment
B-3	12,675	20	9,389	In-Situ treatment
B-1	8,400	18	5,600	In-Situ treatment
B-5	840	13	404	Excavated and placed in B-1 and B3 area
MW-3D	1,220	18	813	In-Situ treatment
Total	**22,295**		**16,207**	

2.2.2 General

The source areas to be addressed in the IRM are areas where soil sampling data showed the total CVOC concentration was above 31,200 µg/kg. Drawing C101 shows the areas to be addressed during the IRM. The following provides a description of those areas.

- B-3 Area: Located generally along the eastern edge of former Building 7.. In this source area, maximum CVOC concentrations in soil are two to three orders of magnitude greater than the concentrations detected at other sampling locations in the surrounding area. CVOC impacts of that magnitude are present to a maximum depth of 26 feet (GPD-3) in these source areas.

- B-1 Area: Located along the northern edge of former Building 13, this area includes a source areas defined by the PCE/TCE analytical data for boring B-1 and test pit TP-14 at the western side, and borings DW-4 and GPD-26 at eastern side. The CVOC impacts in this area is relatively shallow (<15 ft. below the ground surface).

- B-5 Area: Located east of Building 12, the IRM work in this area addresses one area (characterized by soil samples B-5 and GPD-14), where the data indicate CVOC concentrations exceed 31,200 µg/kg to a depth of approximately ten feet. This area will be excavated and the material will be placed in areas B-1 and B-3, prior to placement of the ISTD surface cover, for subsequent treatment by ISTD.

- MW-3D area: The soil sample from this boring did not exhibit significant CVOC impacts during initial investigations, but the groundwater sample concentration of PCE from this

[1] C & S Engineers, Inc. (C & Engineers, 2005), Remedial Investigation Data Report, Midler City Industrial Park Site NYSDEC BROWNFIELD SITE # C734103, Syracuse, NY, November 2005.

location exceeded Class GA standards. During October 2005, a dense non-aqueous phase liquid (DNAPL) exhibiting the olfactory characteristics of PCE was observed in this MW-3D. Subsequent laboratory analysis confirmed that the DNAPL was PCE. Additional borings in this area have confirmed the presence of elevated levels of CVOCs in a small area around MW-3D.

3. Scope of Work

3.1 Remedial Objectives

The overall objective of the ISTD remediation is to reduce the concentrations of volatile COCs within the Target Treatment Zone (TTZ).

The Contaminants of Concern (COCs) and remediation criteria are listed in Table 3.1.

Table 3.1. Numeric Cleanup Standards

Contaminant	Cleanup standard (µg/kg)
PCE	5,600
TCE	2,800
Vinyl Chloride	800
trans-1,2-DCE	1,200
cis-1,2-DCE	NA
Total CVOC	**10,400**

To achieve the remedial objectives, the ISTD system has been designed to operate for a total of 164 days; including 10 days of startup, 134 days of heating, and 20 days of polishing/cool down. At the end of the operating period, the average subsurface temperature within the TTZ is expected to be approximately 100°C. Many locations, especially unsaturated regions close to the heater wells, will be well above 100°C. Saturated portions of the subsurface are expected to attain 100°C. Small regions may be at lower temperatures, but still sufficiently remediated to meet the treatment standard.

3.2 General ISTD Process

The ISTD process utilizes conductive heating and vacuum to remediate soils contaminated with a wide range of organic compounds. Heat and vacuum are applied simultaneously to subsurface soils, either with an array of vertical heater/vacuum wells, or horizontally positioned heaters under imposed vacuum. The electrically powered heating elements are operated at temperatures of up to 1500°F.

Heat flows through the soil from the heating elements primarily by thermal conduction. As the soil is heated, volatile, semi-volatile and non-volatile organic contaminants in the soil are vaporized and/or destroyed by a number of mechanisms, including: (1) evaporation into the air stream; (2) steam distillation; (3) boiling; (4) oxidation; and (5) pyrolysis (chemical decomposition in the absence of oxygen). The vaporized water and contaminants, as well as some volatilized inorganic compounds, are drawn counter-current to the heat flow into the vacuum extraction wells ("heater-vacuum" wells). A portion of the contaminants are destroyed within the soil, before they reach the extraction wells and are conveyed to the surface. Contaminants that have not been destroyed within the soil are removed from the produced vapor stream with an Air Quality Control (AQC) system. The AQC system for this site will consist of a regenerative thermal oxidizer, a wet scrubber with a quench for acid gas cooling and neutralization, and extraction blowers. Vapor phase carbon adsorbers will be available to serve as backup in the event the oxidizer needs to be shut down for maintenance.

3.3 Specific Installation and Operational Tasks

The major installation and operation field tasks associated with the ISTD remediation to be performed by TerraTherm and contractors hired directly by TerraTherm include:

- Site Preparation Activities
- Installation of the ISTD System (wells, electrical, mechanical, AQC)
- ISTD System Operation/Monitoring
- Decommissioning and Demobilization Activities

3.3.1 Site Preparation Activities

Prior to the ISTD construction, some ancillary tasks must be completed. These tasks include the following:

- The surface grade around the wellfield will be adjusted to promote positive drainage away from the treatment area.
- Installing 30 horizontal vapor collection screens bedded in pea stone material, and covered with road base material to shape the subgrade surface.
- Mobilizing and installing temporary facilities, including a job site trailer.
- Installing temporary phone and power to the job trailer.
- Installing utility services for the project including, electric, water, sewer and gas (by Owner)

3.3.2 ISTD Installation

The wellfield will be laid out laid out on a hexagonal grid pattern, with approximately 15-foot spacing between wells. The heater wells will be installed to depths varying from approximately 20 ft to 31 ft below the top of the fill material. Wellfield installation activities include the following:

- Installing 211 heater-only wells using rotosonic drilling or an alternative direct driving method using a pile driver;

- Installing heaters into wells and attaching electric enclosures to the wells;

- Constructing an infiltration barrier/insulating cap over the surface of the treatment zone to contain steam and volatilized contaminant vapors for collection by the vapor extraction system and to prevent precipitation and surface runoff from infiltrating into the treatment zone;

- Installing temperature monitoring points to monitor progress of the heating and pressure monitoring points to ensure that a negative pressure is maintained;

- Installing aboveground fiberglass wellfield piping, including cutting, beveling, and heat fusing joints as required.

- Placing, wiring and piping the ISTD AQC process skids; and

- Placing and wiring electric distribution equipment, including the feed from the utility company transformer, feeding the various treatment equipment components and wiring the wellfield heaters.

3.3.3 ISTD System Operation

Once TerraTherm has completed and tested the electrical and mechanical connections, the system will be commissioned and startup testing will begin. This includes calibrating and testing instrumentation, testing process safety interlocks, and starting and checking process vent fans, oxidizer and scrubber systems, and other major components of the off-gas treatment system. Once the system commissioning and testing is successfully completed, the heaters will be energized and the ISTD remediation will begin.

3.3.4 ISTD System Monitoring

The ISTD system operator will collect the following measurements manually once per site visit:

- Amperage on each ISTD heater circuit;
- Temperature distribution within the wellfield via thermocouples placed in temperature monitoring points;

- Pressure distribution within the wellfield;
- Pressure distribution in the fume header legs (adjust to balance flow);
- Flow, pressure and temperature in the main header lines from the ISTD wellfield;
- Total organic vapor concentrations in the influent from the well field, using a direct-reading instrument such as a photo ionization detector (PID);
- Temperature and pressure at selected locations in the AQC system;
- Caustic usage, scrubber sump pH;
- Ambient outside temperature; and,
- Electric power usage to date.

In addition, at least once per site visit, the ISTD operator will perform a general inspection of the accessible ISTD system components to identify components that may require maintenance or adjustment and to correct potential problems before they occur. In addition to these manual measurements, certain process performance monitoring data will be collected by the PLC and data acquisition system.

3.4 Other Sampling/Monitoring Requirements

3.4.1 Air Emissions Monitoring

AQC Emissions data will be collected during system startup and approximately biweekly throughout the operating phase to document compliance with the New York Department of Environmental Conservation's (NYSDEC) air emission requirements. Field screening of the AQC inlet and outlet vapor streams will be performed using a portable PID instrument.

The purpose of the screening with a PID is to allow the ISTD system operator to track the performance of the thermal oxidizer unit. Summa can grab samples will be collected bi-weekly and submitted for TO-14 analysis to provide a quantitative measure of system progress and treatment system emissions. If the Destruction and Removal Efficiency (DRE) of the unit declines, this will be detected by the vapor screening, at which point corrective measures defined in the O&M Plan will be implemented.

3.4.2 Confirmation Sampling

Interim and confirmatory soil sampling will be conducted by the Owner's consultant C&S Engineers; although TerraTherm staff may be present during the sampling to assist and observe. Soil sampling will follow the plan described in the IRM Workplan to determine the degree of treatment achieved at specific locations and depths and specific temperature regimes.

3.5 Disposition of Contaminated Materials

A limited volume of contaminated materials may be generated throughout the various stages of the ISTD project including:

- Soil cuttings during well installations;
- Spent media associated with the vapor treatment system;
- Excess condensation and water associated with personnel and equipment decontamination;
- Particulate matter that may be collected by the AQC system; and
- Construction debris and waste materials generated during demobilization from the site.

Soil waste material, spent media and decontamination fluids will be sampled for waste characterization to determine final disposition.

3.6 System Demobilization

Upon completion of the thermal treatment, temporary facilities will be disconnected and/or removed as appropriate. Once post-treatment sampling is completed, heaters, wiring and piping will be removed from the wellfield, decontaminated as required and demobilized. The aboveground ISTD equipment will be decontaminated and demobilized. Thermal wells and monitoring points and the surface cover will be removed and decommissioned by the Owner or their designee after TerraTherm demobilizes from the site.

4. Chemical Hazards and Exposure Control

4.1 Chemical Hazards

4.1.1 Contaminants of Concern

The contaminants of concern (COCs) in the soil in the treatment area are halogenated VOCs. Maximum concentrations of the COCs presented in the IRM Work Plan (C & S Engineers 2006) can be summarized as follows for the treatment area:

- Tetrachloroethylene (PCE) – up to 1,000,000,000 µg/kg (1,000,000 ppm; NAPL)
- Trichloroethylene (TCE) – up to 1,000,000 µg/kg (1,000 ppm)
- *Cis*-1,2-dichloroethylene (DCE) – up to 170,000 µg/kg (170 ppm)
- *Trans*- 1,2-dichloroethylene (DCE) – up to 150,000 µg/kg (150 ppm)
- Vinyl chloride – up to 80,000 µg/kg (80 ppm)

Overexposure to the chlorinated organic solvents likely to be present in the site soils may result in depression of the central nervous system, symptoms of which include, dizziness, headache, giddiness and drunken-like behaviors. Chronic overexposures can result in liver and kidney damage. Vinyl chloride is a known human carcinogen. The threshold limit values (TLVs) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) for the COCs are presented in the table below.

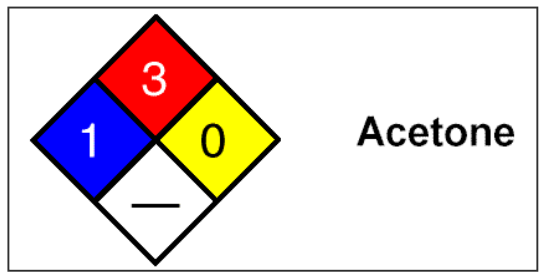
COC	ACGIH TLV (ppm)	Immediately Dangerous to Life and Health (IDLH) Concentration (ppm)
PCE	25	150
TCE	50	1,000
DCE	200	1,000
Vinyl chloride	1	None determined (Carcinogen)

Note that these IDLH concentrations are vapor phase concentrations, as compared to the soil concentrations presented above. However, the very high soil concentrations encountered at some locations have the potential to produce elevated concentrations in the vapor phase that could impact the breathing zone. As such, ambient air monitoring will be conducted to monitor breathing zone VOC concentrations.

In addition to these COCs, the decomposition of chlorinated VOCs has the potential to produce hydrochloric acid (HCl). The wet scrubber will neutralize acid gasses and acidic condensate that results from the oxidation of the CVOCs. However, there is the potential for HCl to be present in steam and condensate in and around the ISTD wells, manifold piping and AQC equipment. pH paper and Drager air sampling tubes can be used to monitor for the presence of HCl in liquid and vapor, respectively.

COC	ACGIH TLV (ppm)	Immediately Dangerous to Life and Health (IDLH) Concentration (ppm)
HCl	5 (STEL/Ceiling)	50

4.1.2 Hazardous Substances Brought On-Site by TerraTherm or Contractors



A material safety data sheet (MSDS) must be available for each hazardous substance that TerraTherm or their subcontractors bring on the site. This includes solutions/chemicals that will be used to decontaminate sampling equipment, calibration gases or fuels, as well as caustic (25% NaOH) that will be used to neutralize acid vapors in the scrubber.

In addition, all containers of hazardous materials, including tanks, vessels and other containers, must be labeled in accordance with OSHA's Hazard Communication Standard. Either the original manufacturer's label or an NFPA 704M label specific for the material (as shown

The 25% NaOH caustic solution that will be used in the wet scrubber is a strong corrosive liquid. The caustic will be stored in drums or a small bulk tank on site. Specific hazards related to the caustic solution include dermal contact, ingestion and inhalation.

- Inhalation of fumes or mist of the caustic are not expected to be an issue as the solution will be pumped to the scrubber, where it will be mixed into the recirculating liquid to neutralize acid gasses. If necessary, engineering control (ventilation fan) or a respirator with an approved cartridge can be used to control inhalation hazards.

- Ingestion hazards can be controlled by following good personal hygiene procedures. Wear gloves when contact with caustic is likely or possible, and wash hands before eating or drinking.
- Dermal contact with the caustic solution is the most likely exposure scenario that may be encountered when repairing or maintaining the scrubber, caustic pump or tank, and when changing/refilling the caustic tank. Use of proper PPE is required, including goggles, safety glasses, face shield, gloves (rubber, neoprene, or vinyl), and impervious clothing (splash apron, poly-coated tyvek, etc.), as appropriate to the task, to prevent contact with the eyes or exposed skin.

4.2 Chemical Exposure and Control

4.2.1 Chemical Exposure Potential

Site soils are known to be impacted with chlorinated solvents. Impacted soils may be disturbed during well installation activities. Therefore, the field team should be prepared for the potential for exposure to the contaminants of concern, via inhalation of dusts and vapors and direct dermal contact.

4.2.2 Chemical Exposure Control

TerraTherm will use several methods to control the potential for chemical exposure during the proposed ISTD program:

- The breathing zone of employees will be screened for the presence of chlorinated solvent vapors, using a PID, during subsurface activities that disturb contaminated soils as well as during the sampling of the off-gas system. Engineering controls will be used to minimize vapor or airborne hazards to the extent possible. If sustained vapor concentrations exceed the established action level, as defined in Section 6.1, respiratory protection, as indicated in Section 7.2, will be donned.

- Using a portable dust monitor during well installation/excavation activities to determine if sustained dust levels exceed the established action level. Implementing engineering controls (i.e. applying light mist of water) if the action limit is exceeded.

- To avoid direct dermal contact with contaminated soils, protective clothing, as described in Section 7.1, will be required, as specified for each task.

- Although highly unlikely, exposure to any of the contaminants of concern may occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 9.0 address personal hygiene issues that will limit the potential for contaminant ingestion.

5. Physical Hazards and Controls

5.1 Utility Hazards

5.1.1 Underground Utilities

Pioneer is responsible for removing or closing active underground utilities in the vicinity of the work area. As part of the demolition of the prior site facilities, the majority of on-site utility lines have already been removed.

New York law requires that a utility clearance be performed at least two (2) business days prior to initiation of any subsurface work. TerraTherm will contact Dig Safely New York (1-800-962-7962) to request a mark-out of underground utilities in the proposed subsurface work locations. Work will not begin until the required utility clearances have been performed. Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. If the utility locator does not mark utilities in the work area or declare the work area clear of utilities, TerraTherm will consult with Pioneer and C&S to verify the absence of underground utilities in the work area prior to beginning work. It is expected that there will be no subsurface utilities within the immediate vicinity of the TTZ. Regardless, the driller and excavating contractors must exercise due diligence and try to identify the location of any private utilities on the property being investigated. The contractors can fulfill this requirement in several ways, including:

- Obtaining as-built drawings for the areas being investigated from the property owner;
- Visually reviewing each proposed drilling/excavation location with the property owner or knowledgeable site representative;
- Performing a geophysical survey to locate utilities or hiring a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill zone; or,
- Hand digging in the proposed drilling locations if insufficient data is available to accurately determine the location of the utility lines.

5.1.2 Overhead Utilities

Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane, etc.) near energized overhead lines shall be operated so that a clearance of at least 10 feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage.

5.2 Drilling Hazards

Rotosonic drilling or a direct driving method (utilizing a pile driver, or similar) will be required to install the wells and monitoring points. Use of a drill rig or pile driver to install thermal wells will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and technicians must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller/operator and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.

- The driller/operator must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment.

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.

- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools that could rotate, the driller/operator must shut down the rig prior to initiating such work.

- Drillers, helpers, and technicians must secure all loose clothing, or other items that could become entangled in the machinery when in the vicinity of drilling/driving operations.

- Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed.

- No person shall climb the drill mast while tools are rotating.
- No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards, and a fall protection slide rail) or portable ladder that meets the requirements of OSHA standards.

5.3 Noise

Use of heavy equipment during thermal well installation may expose the field team to noise levels that exceed the OSHA PEL of 90 dBA for an 8-hour day. Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and the perception of auditory signals;
- Interference with the performance of complicated tasks; and,
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ.

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: If the noise levels are such that you must shout at someone 5 feet away from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 db.

5.4 Back Safety

Using the proper techniques to lift and move heavy and awkward pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Use mechanical devices to move objects that are too heavy to be moved manually.
- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not the waist. Let your legs do the lifting.

- Do not twist while lifting.

- Bring the load as close to you as possible before lifting.

- Bring a card table into the field so that work can be performed at waist level versus bending over from the ground surface.

- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip, and fall hazards.

5.5 Hand and Power Tool Use

A variety of hand and power tools may be used during the pre-construction, system installation and demobilization activities, as well as during routine system operations and maintenance tasks. The use of each can pose serious safety hazards to the user.

5.5.1 Hand Tools

The greatest hazards posed by hand tools result from misuse and improper maintenance.

- When using hand tools be sure you have selected the right tool for the job. If a chisel is used as a screwdriver, the tip of the chisel may break or fly off, hitting the user or others.
- Inspect tools for damage such as mushroomed chisel heads or broken hammer handles. If jaws of a wrench are sprung, the wrench may slip. If a wooden handle is loose, splintered or cracked, the head of the tool may fly off.
- Do not use damaged tools.
- Be sure you know how to use the tool you are working with.

5.5.2 Knives and Cutting Tools

There is the potential for employees to cut themselves on the sharp edges of piping, unfinished or jagged edges of metal, or during the use of hand tools, as well as knives, handsaws, and blades that may be used to cut materials that are needed to install the proposed system. To prevent the potential for cuts and lacerations, employees will wear either leather work gloves or Kevlar™ gloves. When using knives or blades for these activities, as well as others that involve the cutting of tubing and/or small diameter piping, follow the safety precautions listed below:

- Keep your free hand out of the way.
- Secure your work if cutting through thick material.
- Use only sharp blades; dull blades require more force that results in less knife control.
- Pull the knife toward you; pulling motions are easier to manage.
- Don't put your knife in your pocket.
- Use a self-retracting blade.
- Wear leather or Kevlar™ gloves when using knives or blades.

5.5.3 Power Tools

To prevent hazards associated with the use of power tools, workers should observe the following general precautions:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords away from heat, oil, and sharp edges.
- Disconnect tools when not using them, before servicing or cleaning them, and when changing accessories such as blades, bits, and cutters.
- Secure work with clamps or vise, freeing up both hands to operate the tool.
- Avoid accidental starting. Do not hold fingers on the switch button when carrying a plugged-in tool.
- Keep tools sharp and clean for best performance.
- Wear appropriate clothing. Loose clothing or jewelry can become caught in moving parts.
- Keep all guards in place.

5.5.4 Electric Tools

When using portable tools that are electrically powered, follow the safety precautions listed below:

- Check to see that electrical outlets used to supply power during field operations is of the three wire grounding type.

- All portable or temporary wiring, which is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD THAT CAUSES A GFCI TO TRIP.

- Extension cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO, or SJTO.

- NEVER remove the ground plug blade to accommodate ungrounded outlets.

- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings, or floors.

- Protect the cord from becoming damaged if the cord is run through doorways, windows, or across pinch points.

- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades MUST BE REMOVED from service immediately.

- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.

5.6 Welding Hazards

Field welding may be required in areas where standard manifold piping lengths cannot be installed and during installation of the AQC system. The specific welding process being used is shielded metal arc welding or "stick welding".

The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when the power is on. To avoid electrical shocks and burns, do not touch live electrical parts. Employees will wear dry, hole-free insulating gloves. Insulate yourself from work and ground using dry insulating mats. Always verify the supply ground. When making input connections, attach proper grounding conductor first. Inspect power cord for damage or bare wiring. Replace immediately if damaged. Connect work cable to the work as close as possible to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.

In addition, field welding may be required to fabricate or repair stainless steel heater sleeves and/or heater elements. The “TIG” (Tungsten Inert Gas) welding method will be used for this work. An inert gas, commonly nitrogen, is expelled from the tip of the Tungsten electrode to “shield” the weld pool.

Electric arc welding is a source of intense radiation of visible light and invisible (infrared and ultraviolet) rays that can burn eyes and skin. UV light is the most harmful fraction of the radiant energy produced. If unprotected, intense irritation of the cornea and eyelids occurs. The action of UV light on the exposed skin of the welder produces a burn similar to sunburn. It is therefore mandatory for the welder to wear a welding helmet fitted with the proper shade of filter. Based on the type of welding and the various electrode sizes being used, filters with shade # 10, #12 and #14 will be required. Warn others not to watch the arc and if necessary, use a protective screen or barrier to protect others from flash and glare.

Welding produces gases (i.e. ozone, nitric oxide and nitrogen dioxide) and metal fumes. However, welding is being conducted outdoors so natural dilution ventilation should be sufficient to remove gases and fumes from welder’s breathing zone.

Sparks can fly off from the welding arc. The flying sparks, as well as the hot work piece and hot equipment, can cause fires. Accidental contact of the electrode to metal objects can cause sparks, explosion, overheating or fire. Do not weld where sparks can strike flammable materials. Remove all flammables and combustibles within 35 ft of the welding arc. Keep a fire extinguisher in the welding area. Wear oil-free protective garments. Welders should also wear leather gloves and boots and flame-resistant coveralls that are cuff-less. When re-fueling, stop the engine and let it cool off.

Welding can cause sparks and flying metal. As welds cool, they can throw off slag. Wear safety glasses with side shields under welding helmet.

5.7 Electrical Hazards

5.7.1 Electrical Installation

Electrical work on this project will be performed in accordance with the National Electrical Code (NEC, NFPA 70). A licensed electrician, subcontracted to TerraTherm, will perform electrical wiring. Connections to the high voltage (primary) power supply, wiring from the high voltage supply, and wiring to the primary side of the transformer will be performed by the local utility company. TerraTherm’s subcontracted electrician will wire from the secondary side of the transformer to the electrical distribution panels, connect power wiring to the off-gas treatment equipment, and wire the ISTD heaters. TerraTherm staff will support the wellfield wiring efforts and will install low voltage instrumentation wiring (e.g., thermocouple extension cable).

There will be no exposed, live electrical parts in the wellfield. Electrical connections to the primary and secondary sides of the transformers and the various power distribution panels will be made within approved electrical enclosures, using standard UL approved electrical connection devices. ISTD heater electrical connections will be made inside NEMA 3R or NEMA 4 electrical enclosures. To protect against worker injury in the event of an electrical fault with the heater elements, the heater cans, well screens, and metallic process piping will be bonded together with an appropriately sized copper conductor, which will be connected to an earth ground (i.e., ground rod). In addition, metallic instrumentation ports (e.g., temperature & pressure monitoring ports) will also be bonded to an earth ground. Transformers and electrical distribution gear will be connected to an earth ground as required by the NEC.

The silicon controlled rectifiers (SCRs) used to supply power to the heater circuits are encased in a fiberglass enclosure on the front and sides, however the top and bottom are typically open frame structures to allow flow through and/or forced ventilation to dissipate the heat generated by these devices. As such, the SCRs will be enclosed in a locked shed, accessible to authorized personnel only. Authorized and trained personnel shall only enter the SCR shed when necessary to perform maintenance on the devices, and shall use appropriate PPE for the task being performed. At a minimum, leather boots, safety glasses and voltage rated gloves must be worn when working in this enclosure. Additional PPE including arc-flash protective hood and shield, and fire resistant coveralls are also required when testing or working on live equipment in this enclosure. Lock-out/tag-out procedures shall also be followed when removing, replacing or repairing SCRs.

To minimize the potential for worker exposure to energized electrical sources, access to the electrical distribution panels and the heater element electrical junction boxes will be restricted to authorized personnel only. Electrical components will be equipped with appropriate warning labels (e.g., high voltage, arc flash, etc.) as required by the NEC.

5.7.2 Working Near Energized Circuits

Per OSHA electrical regulations (29 CFR 1910.333), only "qualified" persons may work on energized electrical circuit parts or equipment or perform testing work on energized electrical circuits or equipment. The standard further states that even qualified persons working near exposed energized electrical parts can't approach closer than 1 foot of a system that is over 300 volts but not over 750V. The standard does allow for closer approaches by qualified personnel if personnel are wearing insulated gloves with the proper voltage rating. For this program, qualified personnel will wear insulated gloves with a voltage rating of up to 1,000 volts (Class O glove). Leather protector gloves will be worn over the insulated gloves.

5.7.3 Lock-Out/Tag-Out

It is the responsibility of TerraTherm employees to verify that all equipment is locked out in accordance with TerraTherm's standard operating procedures before performing any maintenance or repair work on energized equipment. The source must be locked out; it is not enough to push the power switch to "off" and disconnect the breaker. Anyone can re-engage power under these circumstances. Locking out the power source is the only way to guarantee that the power will not be inadvertently reactivated**.**

The ISTD Operation and Maintenance Manual will include a lock-out/tag-out procedure for use during troubleshooting and maintenance activities. TerraTherm and electrical subcontractor personnel will be instructed in the application of these lock-out/tag-out procedures during the site-specific training and will be required to follow the procedures during electrical repair and/or maintenance activities.

5.8 Machine Guarding

Certain components of the off-gas treatment system may be guarded. Machine guards are designed to protect hands and arms from being cut, amputated or crushed. Machine areas that are typically guarded include:

- Points of operation;
- Mechanical power transmission apparatus; and,
- Moving points or pinch points (any point other than a point of operation at which it is possible for a part of the body to be caught).

Most machine guards are built into the equipment. The machine guards that are most common for this project include the metal mesh covers that are placed around the drive belts of the pumps, blowers, or compressors. These guards can be removed to perform repairs or maintenance to the equipment. However, in compliance with 29 CFR 1910.211-222, **equipment shall not be operated without having the required machine guards in place.** As such, all employees are reminded to replace all machine guards if they have to be removed to facilitate maintenance activities.

5.9 System Operation Safety

The ISTD treatment system components have inherent fail-safes to protect from overheating, fire, and catastrophic failure, as well as accidental discharge of hazardous materials during system malfunction. Examples of such safety features include:

- Heater elements are self-regulating with respect to power consumption to prevent elements from overheating and burning out or failing;
- A pressure sensor installed in the well field manifold piping will monitor the vacuum level in the manifold. This sensor will provide input to the motor controller for the main process blower, modifying the blower speed to maintain the system vacuum at the desired setpoint.
- If the AQC system is being operated in its back-up configuration with treatment provided by vapor-phase GAC, the GAC vessels will be monitored for excessive temperature and pressure. If carbon bed temperatures rise above the high temperature set point, the bed will be bypassed and isolated to prevent a possible carbon bed fire.
- The oxidizer and scrubber are equipped with flow, pressure, and temperature sensors, and in the case of the scrubber, level sensors with appropriate interlocks to ensure that these components operate within the desired ranges. The scrubber is also equipped with a pH controller to maintain the desired pH range.
- In the event that a high incoming vapor concentrations causes an excessive rise in temperature across the thermal oxidizer, a temperature sensor will trigger an alarm, initiate a shutdown of the thermal oxidizer and close the main valve in the well field manifold to cut off the flow of vapor from the ISTD well field.

5.10 Contact with Exposed Hot Surfaces and Hot Soils

5.10.1 Exposed Hot Surfaces

Appropriate measures will be taken to protect on-site workers from incidental contact with exposed hot surfaces. Exposed hot surfaces may include the heater cans, process piping and certain components of the off-gas treatment equipment. Surfaces that are expected to exceed 140°F will be covered with insulation or otherwise protected with a guard where insulation is not practical. In addition, personnel working in areas where incidental contact with hot surfaces (140°F) may be possible will wear leather gloves.

In some instances, exposure to hot material and/or components is unavoidable. Such circumstances may include, but are not limited to, replacing ISTD heater elements (if required) during heating and dismantling the ISTD system. In these instances, only trained personnel will be allowed in the work area. Worker protective measures will be selected in accordance with the potential heat exposure. For example, if removal and replacement of a heater element is required during the ISTD heating, the heater element may be in excess of 500°F. In this case, TerraTherm personnel will wear special high-temperature heat resistant gloves. Direct contact with the hot heater element will be minimized to the extent possible (e.g., using a hook or chain to remove and/or move the hot heater element). TerraTherm will also include specific procedures for handling these potential exposures to high temperatures as part of the Operation and Maintenance Plan.

5.10.2 Hot Soils/Equipment

A minimum soil temperature of approximately 212°F (100°C) is expected to be achieved over the vertical soil profile at the centroids in approximately 3 to 4 months from the start of full power heating. Soil temperatures closer to the heater wells are expected to be in excess of 800°F (~400°C) by that time. If necessary, hot core barrels may be handled with tongs and/or high temperature gloves until air-cooled sufficiently to handle with gloves. Hot well screens/cans may be directly handled during demobilization and may require the wearing of high-temperature gloves.

5.10.3 Thermal Oxidizer

The combustion chamber will be enclosed within the thermal oxidizer system enclosures and is labeled to warn system operators about the high temperature hazard associated with the unit. These precautions should be sufficient to prevent employees from receiving a thermal burn. In the unlikely event that repair work has to be performed on the unit, heat-resistant gloves should be worn.

5.11 Thermal Stress

The total heating/ISTD treatment duration is estimated to be 164 days. So the hazards of both cold and heat stress are addressed in this HASP.

5.11.1 Cold Stress

Types of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip, or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness, and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30°F. The fluids around the cells of the body tissue freeze, causing the skin to turn white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There may be a tingling, stinging, or aching feeling in the effected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers, and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95°F. This must be taken as a sign of danger and exposure to cold must be immediately terminated. Productive physical and mental work is limited when severe shivering occurs.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40°F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loose fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene, or a similar type of synthetic material that wicks away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it may become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. The office trailer is heated and should be available for periodic warming if work is performed continuously in the cold at temperatures, or equivalent to wind chill temperatures, of 20°F.

Dehydration occurs in the cold environment and may increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

5.11.2 Heat Stress

Types of Heat Stress

Heat related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash can occur when sweat isn't allowed to evaporate, leaving the skin wet most of the time and making it subject to irritation. Fainting may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. Heat exhaustion results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea, and headache. Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red, and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. ***EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.*** A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

- Decline in task performance
- Excessive fatigue

- Lack of coordination
- Decline in alertness
- Unsteady walk
- Reduced vigilance
- Muscle cramps
- Dizziness

Susceptibility to Heat Stress Increases due to:

- Lack of physical fitness
- Lack of acclimation
- Increased age
- Dehydration
- Obesity
- Drug or alcohol use
- Sunburn
- Infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluid than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the project manager and the SSO. Potable water should be made available each day for the field team.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method: Check radial pulse rates by using fore-and middle fingers and applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beats/minute, shorten the next work cycle by one-third and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle again by one-third.

5.12 Slips, Trips, and Falls

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip, and fall hazards at construction sites. Essential elements of good housekeeping include:

- Orderly placement of materials, tools and equipment, including the hoses to the supplied-air respiratory system;
- Placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish;
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand;
- Awareness on the part of all employees to walk around, not over or on, equipment that may have be stored in the work area

During the winter months, snow shovels and salt crystals should be kept on site to keep paths and work areas free of accumulated snow and ice.

6. Air Monitoring

6.1 Direct-Reading Instrumentation

Instrument I: Photoionization Detector (PID)

A PID, such as an MiniRAE PID, equipped with a 10.6 eV lamp, will be used to screen the breathing zone of employees during ISTD wellfield installation and system influent and effluent monitoring. If breathing zone concentrations are sustained (15 minutes) at 1 unit above background and administrative or engineering controls are not sufficient to eliminate the vapor concentrations, Level C respiratory protection, as described in Section 7.2, will be donned. This action limit is based on the OSHA PEL of 1 ppm for vinyl chloride, its reported response to the selected instrument and an applied safety factor of 2.

All sampling will be conducted by the SSO. Readings will be taken at regular intervals (i.e., at least once every hour) from the breathing zone of employees during subsurface activities, or more frequently when noticeable odors are present. Additional monitoring may be required if action levels are repeatedly exceeded during a certain activity.

6.2 Personal Exposure Monitoring

TerraTherm will not conduct personal exposure monitoring during the ISTD program.

6.3 Calibration and Recordkeeping

The PID will be calibrated to a 100 ppm isobutylene-in-air standard on a daily basis in accordance with manufacturer's instructions. All PID readings will be recorded in the field notebook or on dedicated air monitoring result sheets (see Attachment C). In addition, all calibrations must be recorded.

7. Personal Protective Equipment

Personal protective equipment (PPE) will be worn to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with impacted soils during certain intrusive activities. The following table describes the PPE and chemical protective clothing to be worn, where required, for general site activities and for certain specific tasks.

7.1 Chemical Protective Clothing

PPE Item	Task #							
	1	2	3	4	5	6	7	8
Hard Hat	Overhead hazard	✓	✓		✓	✓		Overhead hazard
Rubber steel-toed boots or booties		If standing in impacted soils	If standing in impacted soils					
Steel Toed Safety boots	✓	✓	✓	✓	✓	✓	✓	✓
Safety Glasses with Sideshields	✓	✓	✓	✓	✓	✓	✓	✓
Tyvek coveralls		If generating impacted cuttings	If contacting impacted soil				If contacting impacted soil	✓ (for Decon)
Inner latex gloves				✓	✓	✓	✓	✓
Nitrile rubber gloves		When contact with impacted soils	When contact with impacted soils	When contact with COCs	✓	✓	✓	✓
Leather or Kevlar gloves	When cut hazard exists	✓	✓	✓	For general mechanical work	When cutting open liners		✓
Heat Resistant gloves				When replacing heater element	For work on/around hot surfaces	✓		
Hearing Protection	When using noisy machine	✓	✓		For work on/around noisy machinery	✓		When using noisy machine

Task 1 –Site Preparation
Task 2 – Installation of Wells/Wellfield

Task 3 – Excavation Activities
Task 4 – Operating/Monitoring System
Task 5 – Caustic Tank/Pump Service
Task 6 – Post-Treatment Soil Sampling
Task 7 - Waste Disposition Sampling
Task 8 – Demobilization

7.2 Respiratory Protection

Respiratory protection may be needed during activities that involve disturbance to impacted soils and influent and effluent monitoring. If total VOC concentrations exceed 1 unit in the breathing zone (sustained for 15-minutes) Level C respiratory protection will be donned. Respirators may also be donned if odors are a nuisance. Combination acid gas and organic cartridges are the preferred cartridge for this application.

Level C Specification- Half-mask, air-purifying respirator organic vapor cartridge

Level C respiratory protection will be upgraded to a full-face mask air-purifying respirator if breathing zone concentrations are sustained at concentrations exceeding 10 units. If breathing zone concentrations exceed 50 units, work will be temporarily suspended until the PM and Safety Advisor can determine the best control measures to implement to control VOC concentrations.

All employees who are expected to wear respiratory protection must have successfully passed a quantitative or qualitative fit-test within the past year.

7.3 Other Protective Equipment

The following additional safety items should be available in the immediate work area and the construction trailer:

- Portable, hand-held eyewash
- First aid kit
- Type A-B-C fire extinguisher (on drill rig, in trailer, and near welding operations)
- Lock-out/Tag-out Kit

8. Site Control

8.1 Site Identification

A site contact poster will be displayed in a permanent and conspicuous location at the site. The poster will identify a TerraTherm contact name and contact phone number.

8.2 Site Control

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with personal protective equipment requirements will be clearly identified. TerraTherm designates work areas or zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November, 1985. They recommend the areas surrounding each of the work areas to be divided into three zones:

- Exclusion or "Hot" Zone
- Contamination Reduction Zone (CRZ)
- Support Zone

8.2.1 Exclusion Zone

It is assumed that the existing site fence will provide a sufficient degree of security and that additional security fencing or guards will not be required. TerraTherm may erect an interior snow fence or temporary fencing to segregate our work area, depending on project activities and safety needs. This secondary fence will also demarcate the exclusion zone. This zone will serve to protect site visitors and delivery personnel from chemical or physical hazards that are associated with the implementation of the ISTD remediation program. All personnel entering the exclusion zone must wear the prescribed level of protective equipment for the specific task and meet the training requirements of Section 10.

8.2.2 Contamination Reduction Zone

Mini-decontamination zones will be established adjacent to the exclusion zone. Personnel will remove contaminated gloves and other disposable items in these areas and place them in a 55-gallon drum or other container until they can be properly disposed of. To assist with the decontamination of rubber boots that have been in direct contact with contaminated materials, a boot wash and boot storage area will be established in each mini-CRZ. A bench will be placed in this area to assist employees when removing their boots.

8.2.3 Support Zone

A construction trailer is being mobilized to the site and will serve as the support zone for the ISTD program. The trailer will be located adjacent to the ISTD treatment area.

8.3 Safety Practices

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- TerraTherm employees will implement the "buddy system" for heavy lifting activities and when entering the energized wellfield. The buddy system does not need to be implemented when TerraTherm employees are performing routine recording of system parameters. However, the employees must have the ability to contact additional TerraTherm staff or the client's representative if assistance is needed for certain tasks.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the exclusion zone and the decontamination zone.

- Smoking is prohibited in all contaminated work areas. Matches and lighters are not allowed in these areas. Smoking will be permitted outside the construction trailer located in the support zone.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.

- Beards or other facial hair that interfere with respirator fit are prohibited.

- The use of alcohol or illicit drugs or being under the influence of such is prohibited during the conduct of field operations.

- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the Work Plan.

9. Decontamination

9.1 Personal Decontamination

Proper decontamination is required of all personnel before leaving the site. Decontamination will occur within the contamination reduction zone (CRZ). Disposable PPE will be removed in the decontamination zone and placed in 55-gallon drums. To assist with the decontamination of rubber boots that have been in direct contact with tarry materials, a three-basin boot wash and boot storage area will be established in the CRZ.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. At the end of the day, respirators will be washed with warm, soapy water, and then rinsed in clear cool water. If possible, respirators should be allowed to air-dry in a clean area. If such an area does not exist, respirators will be wiped dry and placed in plastic bags for proper storage.

Regardless of the type of decontamination system required, a container of potable water and liquid soap should be made available in the immediate work area, so employees can wash their hands and face before leaving the site. Toilet facilities will be available next to the trailer.

9.2 Equipment Decontamination

Large pieces of machinery will be decontaminated via steam cleaning. The equipment cannot leave the site until the SSO has released it.

10. Medical Monitoring and Training Requirements

10.1 Medical Monitoring

All personnel, performing activities covered by this HASP that may result in exposure to the site contaminants, must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on the site covered by this HASP.

10.2 Health and Safety Training

10.2.1 HAZWOPER

All personnel, performing activities covered by this HASP that may result in exposure to the site contaminants, must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an annual 8-hour refresher-training course and/or an initial 40-hour training course within the last year prior to performing any work on the sites covered by this HASP.

10.2.2 Pre-Entry Briefing

The SSO will conduct a pre-entry briefing before site activities begin. HASP receipt and acceptance sheets will be collected at this meeting. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project. Attendance of the pre-entry meeting and subsequent safety meetings is mandatory and will be documented by the TerraTherm SSO. An attendance form is presented in Attachment D.

10.2.3 Daily Safety Meetings

Daily safety meetings will also be conducted by the SSO to ensure that all workers are prepared for and knowledgeable of the safety hazards associated with the scheduled work. All field employees must be present during the daily safety meetings and must sign the attendance sheet for each such meeting.

10.3 Site Visitors

Only authorized personnel or authorized representatives from federal and/or state regulatory agencies will be permitted to access an exclusion zone. Visitors will not be permitted to enter the exclusion zone unless escorted by a TerraTherm employee. Visitors will not be permitted in an exclusion zone unless they have documentation that indicates they have been properly trained as described above. Additionally, visitors cannot enter the site unless they have the proper PPE, have read the HASP, signed the HASP acknowledgment form, and have attended a pre-entry briefing conducted by the TerraTherm SSO.

11. Emergency Response

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." TerraTherm response actions will be limited to evacuation and medical/first aid as described within this section below as well as small spill response and responding to fires that can be extinguished via the use of portable fire extinguishers.

The basic elements of an emergency evacuation plan include:

- Employee training;
- Alarm systems;
- Escape routes;
- Escape procedures;
- Critical operations or equipment;
- Rescue and medical duty assignments;
- Designation of responsible parties;
- Emergency reporting procedures; and,
- Methods to account for all employees after evacuation.

11.1 Employee Training

Employees must be instructed in the site-specific aspects of emergency evacuation. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. Specific escape routes from the work area will be reviewed upon arrival to the site.

11.2 Alarm Systems/Emergency Signals

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight can not be easily maintained amongst all TerraTherm and subcontracted personnel because of distance, terrain, or other obstructions.

Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. Phone service will be available in the contractor trailer if local emergency responders need to be called to the site.

11.3 Escape Routes and Procedures

The escape route from the site will be via the entrance/exit gate of the site to S. Midler Avenue.

11.4 Rescue and Medical Duty Assignments

The phone numbers of the police and fire departments, ambulance service, local hospital, and TerraTherm representatives are provided in the emergency reference sheet. This sheet will be posted in the site vehicles and the on-site contractor trailer.

In the event an injury or illness requires more than first aid treatment, the SSO, or his designated representative, will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the project manager.

If the injured employee can be moved from the accident area, he or she will be brought to the CRZ where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on-site. If this is not feasible, decontamination will be performed after the injured person has been stabilized.

11.5 Designation of Responsible Parties

The SSO is responsible for initiating emergency response. In the event the SSO cannot fulfill this duty, the alternate SSO will take charge.

11.6 Employee Accounting Method

All TerraTherm subcontractors and visitors must sign in and out daily on the sign-in sheet that will be located in the trailer. This sheet will be used to count personnel in the event of an evacuation/emergency. All personnel on site are responsible for knowing the escape route from the site and where to assemble after evacuation for a headcount.

11.7 Accident Reporting and Investigation

Any incident (other than minor first aid treatment) resulting in injury and illness requires an accident investigation and report in accordance with TerraTherm's Workplace Injury and Illness Prevention Policy. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An accident investigation form is presented in Attachment E of this HASP. The injured TerraTherm employee's supervisor should be notified immediately of the injury.

If a subcontractor employee is injured, they are required to notify the TerraTherm SSO. Once the incident is under control, the subcontractor shall submit a copy of their company's accident investigation report to the SSO for review.

11.8 Spill Response

A limited volume of contaminated materials will be generated including:

- Soil during well installations;
- Soil/gravel during drainage sump excavation;
- Spent media associated with the vapor treatment system;
- Excess condensation and water associated with personnel and equipment decontamination;
- Particulate matter that may be collected by the AQC system; and
- Construction debris and waste materials generated during demobilization from the site.

All waste materials will be managed and handled in accordance with the project workplan requirements and applicable regulations. Solid materials will be contained in roll-off containers or drums. Roll-off containers and drums will be segregated from work areas to minimize damage to the container so as to prevent a spill. Given this, TerraTherm does not anticipate the need for significant spill response during this ISTD program. However, TerraTherm will be prepared for primary spill response actions in the unlikely event of a spill. The field team will be equipped with spill response kits and will be prepared to create earthen berms, when necessary, to control the spread of any spilled materials.

EMERGENCY REFERENCES

Ambulance:	911
Fire:	911
Police:	911
Medical Services:	315-464-5611
	Upstate Medical University Hospital 750 East Adams Street Syracuse, NY 13210-1834
On Site Telephone:	Phone service will be available in the project trailer

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TerraTherm Project Representatives: **Office: 978-343-0300**

- Gregg Crisp, Site Superintendent, Cell: 209-564-0734

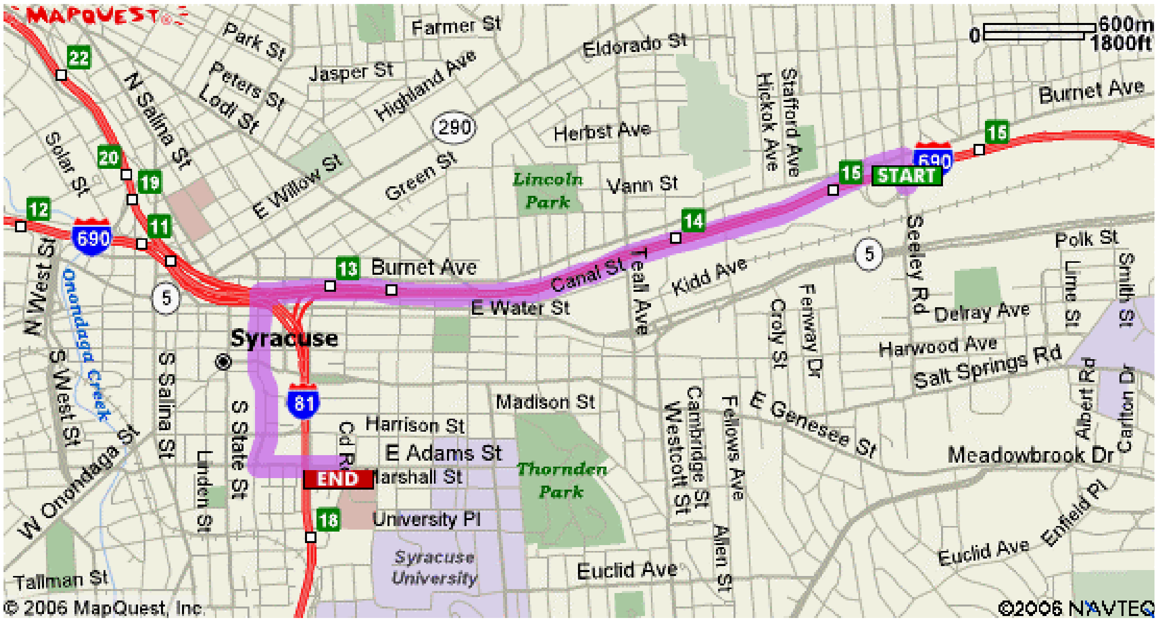
-Ken Parker, Project Manager, Cell: 978-790-9361

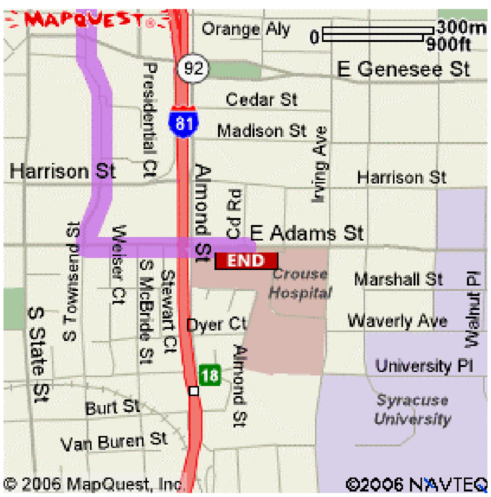
-Jim Galligan, Project Engineer, Cell: 978-833-7714

-Ralph Baker, CEO & Technology Manager, Cell: 978-766-5253

-John Bierschenk, President and Operations Manager, Cell: 978-502-4839

Maps and Directions from Site to Hospital





Directions to Upstate Medical University Hospital

START	1:	Start out going NORTH on S MIDLER AVE / NY-598 toward BURNET AVE.	0.1 miles
	2:	Turn LEFT onto BURNET AVE.	0.1 miles
WEST 690	3:	Merge onto I-690 W via the ramp on the LEFT.	1.8 miles
13 EXIT	4:	Take the TOWNSEND ST exit- EXIT 13.	0.2 miles
	5:	Turn LEFT onto N TOWNSEND ST.	0.6 miles
	6:	Turn LEFT onto E ADAMS ST.	0.2 miles
END	7:	End at **Upstate Medical University Hospital** 750 E Adams St, Syracuse, NY 13210, US	

Total Est. Time: 7 minutes **Total Est. Distance:** 3.22 miles

Attachment A

Health and Safety Plan Receipt and Acceptance Form

Health and Safety Plan Receipt and Acknowledgement Form

In-Situ Thermal Desorption
Midler Avenue Brownfield Site
Syracuse, New York

I have received a copy of the Health and Safety Plan prepared for the above-referenced site and activities. I have read and understood its contents and I agree that I will abide by its requirements.

Name (Print): ____

Signature: ____

Date: ____________________

Representing (Print): ____
Company Name

Attachment B

Example Job Hazard Analysis Form

JOB HAZARD ANALYSIS

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**

Attachment C

Air Monitoring Form

In-Situ Thermal Desorption
Midler Avenue Brownfield Site
Syracuse, New York

Air Monitoring Report Form

Date:

Activities:

Equipment:

Time	Background	Results

Attachment D

Health and Safety Plan Pre-Entry Briefing Attendance Form

Health and Safety Plan Pre-Entry Briefing Attendance Form

In-Situ Thermal Desorption
Midler Avenue Brownfield Site
Syracuse, New York

Briefing Conducted By: ____

Date Performed: ______________________________

Printed Name	Signature	Representing

Attachment E

Supervisor's Accident Investigation Report Form

TerraTherm, Inc.

SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

Injured Employee ________________________________ Job Title ______________________________

Home Office _______________________________ Division/Department _________________________

Date/Time of Accident ____

Location of Accident ____

Witnesses to the Accident ____

Injury Incurred? ________ Nature of Injury

-

____

Engaged in What Task When Injured? ____

____

Will Lost Time Occur? _______ How Long? __________ Date Lost Time Began

-

Were Other Persons Involved/Injured? ____

____

How Did the Accident Occur? ____

____

____

What Could Be Done to Prevent Recurrence of the Accident? __________________________________

____

____

What Actions Have You Taken Thus Far to Prevent Recurrence? _______________________________

____

____

Supervisor's Signature ___________________________ Title ____________________ Date

Reviewer's Signature ____________________________ Title ____________________ Date __________

Note: If the space provided on this form is insufficient, provide additional information on a separate page and attach. The completed accident investigation report must be submitted to the Corporate Health and Safety Manager within two days of the occurrence of the accident.