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PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER CAMP MANISTIQUE PRISON
401 N. MAPLE STREET
MANISTIQUE, MICHIGAN

for

SCHOOLCRAFT COUNTY
300 WALNUT STREET
MANISTIQUE, MICHIGAN 49854

AKT Peerless Project No. 5187L-4-20
September 24, 2008

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 BACKGROUND 1

2.1 SITE DESCRIPTION AND PHYSICAL SETTING 1

2.2 SUBJECT PROPERTY HISTORY AND LAND USE 2

2.3 ADJACENT PROPERTY LAND USE 2

2.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS 3

2.4.1 July 21, 2008 Phase I ESA, U.P. Engineers and Architects 3

2.4.2 October 2, 2006 Phase I Environmental Site Assessment, Pine Street Expansion Project, AKT Peerless Environmental Services 3

2.5 SUMMARY OF RECOGNIZED ENVIRONMENTAL CONDITIONS 4

3.0 PHASE II ENVIRONMENTAL SITE ASSESSMENT ACTIVITIES 5

3.1 SCOPE OF ASSESSMENT 5

3.1.1 Soil Evaluation 6

3.1.2 Groundwater Evaluation 7

3.1.3 Deviations from Sampling and Analysis Plan 7

3.2 QUALITY ASSURANCE/QUALITY CONTROL 7

3.2.1 Decontamination of Equipment 8

3.2.2 Calibration of Field Equipment 8

3.2.3 Documentation of Activities 8

3.2.4 Sample Preservation Techniques 8

3.2.5 QA/QC Sample Collection 9

3.3 LABORATORY ANALYSES AND METHODS 9

4.0 EVALUATION AND PRESENTATION OF RESULTS 11

4.1 SUBSURFACE CONDITIONS 11

4.1.1 Geologic Setting 11

4.1.1.1 Soil and Groundwater Conditions based on Published Material ... 11

4.1.1.2 Soil and Groundwater Conditions based on Field Observations ... 11

4.2 MDEQ RELEVANT EXPOSURE PATHWAYS AND APPLICABLE CRITERIA 12

4.2.1 Relevant Exposure Pathways 12

4.2.1.1 Ingestion of Groundwater Pathway 12

4.2.1.2 Groundwater Venting to Surface Water Pathway 12

4.2.1.3 Groundwater Contact Pathway 12

4.2.1.4 Volatilization to Indoor Air Inhalation Pathway 12

4.2.1.5 Volatilization to Ambient Air Pathway 13

4.2.1.6 Particulate Inhalation Pathway 13

4.2.1.7 Direct Contact Pathway 13

4.2.2 Applicable Criteria 13

4.3 LABORATORY ANALYTICAL RESULTS 13

4.3.1 Soil Analytical Results 14

4.3.2 Groundwater Analytical Results 15
4.3.3 Quality Assurance/Quality Control Analytical Results 15
4.3.3.1 Soil 15
4.3.3.2 Groundwater 15

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 15
5.1 SUMMARY OF ENVIRONMENTAL CONCERNS 15
5.2 SUMMARY OF SUBSURFACE INVESTIGATION 16
5.3 CONCLUSIONS 16
5.4 RECOMMENDATIONS 16
5.4.1 Future Owner(s)/Operator(s) 16

6.0 LIMITATIONS 17

7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS 17

FIGURES

Figure 1 ..... Topographic Location Map
Figure 2 ..... Site Map with Test Pit Locations
Figure 3 ..... Site Map with Soil Results Exceeding MDEQ GCC

TABLES

Table 1 ..... Summary of Soil Analytical Results
Table 2 ..... Summary of Groundwater Analytical Results

APPENDICES

Appendix A ..... Test Pit Logs
Appendix B ..... Low-Flow Sampling Logs
Appendix C ..... Laboratory Analytical Reports

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PHASE II ENVIRONMENTAL SITE ASSESSMENT

FORMER CAMP MANISTIQUE PRISON
401 N. MAPLE STREET
MANISTIQUE, MICHIGAN

AKT PEERLESS PROJECT NO. 5187L-4-20

1.0 INTRODUCTION

Schoolcraft County retained AKT Peerless Environmental Services (AKT Peerless) to conduct a Phase II Environmental Site Assessment (Phase II ESA) of a property located at 401 North Maple Street in Manistique, Michigan (subject property). This Phase II ESA was conducted in accordance with AKT Peerless' Proposal for a Phase II ESA (Proposal Number PL-9195), dated August 13, 2008, and American Society for Testing and Materials (ASTM) Designation E 1903-97 *"Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process."*

This Phase II ESA scope of work is intended to evaluate the recognized environmental conditions (RECs) presented in Section 2.5 of this report. AKT Peerless' Phase II ESA report documents the field activities, sampling protocols, and laboratory results pertaining to this site assessment. AKT Peerless' Phase II ESA was performed for the benefit of Schoolcraft County, who may rely on the contents and conclusions of this report.

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND PHYSICAL SETTING

The subject property is located at 401 North Maple Street in Manistique, Michigan, and comprises one parcel (Parcel Identification Number 051-700-412-20) consisting of approximately 30 acres. The property was most recently used as the Camp Manistique Prison, and was vacated in 2007. The subject property contains several buildings, including the main prison building, prisoner visitation building, and storage buildings (gasoline storage, firewood storage, and a maintenance building). There are two paved parking areas on the south and east sides of the main prison building, as well as a large gravel area north of the main building. The northern portion of the property is vacant, and covered with tall grass and scrub vegetation.

The subject property is situated in the northeast ¼ of the northeast ¼ of Section 12, Township 41 North, Range 16 West, and part of the northwest ¼ of the northwest ¼ of Section 7, Township 41 North, Range 15 West in the City of Manistique, Schoolcraft County, Michigan.

Refer to Figure 1 for a topographic site location map. See Figure 2 for a site map.

2.2 SUBJECT PROPERTY HISTORY AND LAND USE

U.P. Engineers and Architects completed a Phase I ESA in July 2008, which describes the subject property history. A summary follows:

The property was originally developed in the late 1800s, as part of a larger industrial property. Industrial operations ceased in about 1923, leaving multiple buildings and machinery until 1950 when the property was cleared. Occupants of the industrial property from the late 1800s to 1923 included:

- Chicago Lumbering Company of Michigan;
- Weston Lumbering Company;
- Burrell Chemical Company;
- Lake Superior Iron and Chemical Company; and
- Charcoal Iron Company of America.

These companies produced a variety of materials, including lumber products, wood alcohol, acetate of lime, acetone, charcoal, tars, pig iron, and slag. Based on review of historical Sanborn Maps, the subject property itself housed 6 rows of kilns, an alcohol refinery, cooling towers with asbestos and iron linings, underground smoke ducts, underground water pipes, cinder pits, and several railroad spurs and trestles.

The industrial property was razed prior to 1950, when it remained vacant and unused. The City of Manistique used the subject property for snow dumping and miscellaneous storage. The western portion of the property eventually became the City Industrial Park, and the subject property was developed as the Camp Manistique Prison in 1991.

The State of Michigan Department of Corrections owns the property and operated the Camp Manistique Prison from about 1992 until 2007. Since that time, the property has remained vacant.

2.3 ADJACENT PROPERTY LAND USE

The adjacent property to the west is known as the City Industrial Park (CIP). It shares a common history with the subject property, being utilized for the same industrial purposes until the 1920s, sitting vacant until the City used it for storage from the 1950s until about 1980. In 2004, On-Line Engineering developed a portion of the CIP, including an office building and parking areas. The Manistique River adjoins the CIP property to the west.

To the north, the property contains a railroad easement and vacant land beyond. The Manistique River is located about 600 feet north of the subject property boundary.

The property adjoining the Camp Manistique Prison property to the east is currently used as a County Garage. Prior use is unknown, but may include a tannery.

The southern adjoining properties currently house the Veterans of Foreign Wars (VFW), the County Industrial Park, and the Edison Electric Company substation. Historial use of the County

Industrial Park dates back to the 1860s. Occupants of the County Industrial Park property have included the Chicago Lumbering Company of Michigan and several marble and stone producers. The property contains a limestone quarry and is known to be contaminated above Michigan Department of Environmental Quality (MDEQ) Part 201 Generic Cleanup Criteria (GCC).

2.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

2.4.1 July 21, 2008 Phase I ESA, U.P. Engineers and Architects

U.P. Engineers and Architects (UPEA) completed a Phase I ESA of the subject property on July 21, 2008. As part of the site reconnaissance, UPEA entered all the buildings and documented the contents and condition of each building. UPEA reported the following recognized environmental conditions (RECs) for the Camp Manistique Property:

1. The historical use of the property included charcoal kilns, underground wood smoke flues, wood alcohol processing, slag stockpiles, railroad spurs, and other hazardous material use and storage. Potential contamination could result from creosote (wood processing), unknown ballast and fill materials (railroad construction), and metals (iron processing).
2. During a prior investigation at the subject property, as part of a larger investigation, 40 test pits were dug at various locations. No sampling was conducted, however, slag material was noted to at least 3-feet below ground surface.
3. A wetland area on the eastern portion of the subject property has been filled in. The source of the fill material used is unknown. It is likely that the filling occurred in the 1960s.
4. The western adjoining property, Manistique City Industrial Park (CIP) has known contamination including VOCs, SVOCs, and metals. In addition, there are known USTs, underground vats, and flues which contain creosote. Contaminated soil and groundwater are also present. Berms constructed along the property boundary with the subject property are constructed of known contaminated soil.
5. The northern adjoining property contains an operating railroad. Potential concerns include the use of unknown fill material for ballast, as well as spills or leaks of hazardous materials and/or petroleum products.
6. The southern portion of the subject property (also known as Pine Street Road Expansion) was part of the subject property's historical industrial operations. Specifically, portions of a railroad spur and an industrial building were located on this portion of the subject property. In addition, a small creek was previously located on the eastern portion of this area, and was filled in between 1953 and 1964, with unknown fill materials. Local personnel indicated that the fill was likely obtained from slag and waste stockpiles remaining from the industrial operations.

2.4.2 October 2, 2006 Phase I Environmental Site Assessment, Pine Street Expansion Project, AKT Peerless Environmental Services

AKT Peerless completed a Phase I ESA of the southern part of the subject property, identified as the Pine Street Expansion, on October 2, 2006. AKT Peerless reported the following recognized environmental conditions (RECs) for the Pine Street Expansion:

1. The eastern portion of the [Pine Street Expansion] property appears to have been developed with a railroad line and potentially a portion of an industrial building from at least 1953 until before 1964. Potential concerns typically associated with railroad right-of-ways include the use of fill materials as ballast to support ties and rails of the railroad track, and leaks or spills of hazardous materials or petroleum products.

2. A portion of a small creek was located on the eastern portion of the [Pine Street Expansion] property from at least 1953 until before 1964 when it was filled in with material from an unknown source.

3. The northern adjoining property (i.e. the Camp Manistique Property) was developed as industrial from at least 1890 until 1923. Operations on-site were associated with what is now the northwestern adjoining property and structures on-site included charcoal kilns and several railroad lines.

4. The northwestern adjoining property, the City Industrial Park, was identified on the State Hazardous Waste Site database. According to MDEQ file information, laboratory analytical results indicated the presence of VOCs in two bedrock-monitoring wells above DWP and GSI Criteria. Xylenes and naphthalene were detected above GSI in samples adjacent to the Manistique River; while toluene and ethylbenzene were detected above GSI; and benzene, ethylbenzene, and 1,2,4 trimethylbenzene were detected above DWP. Laboratory analytical results indicated the presence of SVOCs in two bedrock wells and two shallow wells above GSI Criteria. Naphthalene, phenanthrene, fluoranthene, 2 methylphenol, 3,4 methylphenol, and 2,4 dimethylphenol were detected above GSI. Laboratory analytical results also indicated the presence of cadmium, chromium, barium, copper, lead, silver, and zinc above GSI in all but one of the monitoring wells.

   In AKT Peerless' opinion this property represents an environmental concern to the [Pine Street Expansion] property, based on the following: (1) industrial operations on the northwestern adjoining property, expanded onto the northern adjoining property and continued from at least 1890 through 1923, and (2) contamination exists in groundwater on-site in excess of GSI and DWP Criteria.

5. The eastern adjoining property was developed with potential industrial buildings and a railroad line from at least 1953 until before 1964. Due to data failure, AKT Peerless was unable to determine what operations existed on this property during that time.

2.5 SUMMARY OF RECOGNIZED ENVIRONMENTAL CONDITIONS

Based on the RECs identified in the Phase I ESA reports summarized above, AKT Peerless and UPEA developed a Scope of Work for the Phase II ESA. The scope is based on: (1) the location of former industrial facilities (i.e. railroads, buildings, kilns, etc.) at the subject property, (2) the location of fill materials in wetlands, berms, and the former creek bed, and (3) adjoining property potential impacts. Specifically, the following concerns were addressed by the proposed scope of work:

1. Former kilns, flues, railroads, wood alcohol building, charcoal retort building, a iron cooler building with asbestos, former slag piles, and the existing railroad located north and adjacent to the subject property. Potential concerns typically associated with the above items include: the use of fill materials used as ballast to support the railroad track structures and leaks or spills of hazardous materials or petroleum products; metals and creosote associated with kilns and flues, metals and wood alcohol associated with the wood alcohol building; metals and asbestos associated with the charcoal retort building and iron cooler building; and metals associated with the former slag piles. These concerns are concentrated along the north side of the property and the northwest corner of the property.
2. The current City Industrial Park with known contamination located adjacent and west of the subject property. Contamination documented on the CIP occurred in association with the industrial activities which occurred on both the CIP and the subject property from the early 1870's through 1923. The site was used for the production of pig iron, wood alcohol, acetate of lime, acetone, charcoal, tars, and slag. In addition, two berms with existing contamination from the CIP are located along the east property line of the CIP. These concerns are associated with the groundwater migration from the CIP located to the west of the subject property to the west side and southwest corner of the subject property.
3. Former industrial activities, railroad lines, and a creek were located on the south side of the subject property along with a berm which was constructed during the prison site development. The source material for the berm is unknown. In addition, contamination has been documented on the County Industrial Park located south of the subject property. These RECs represent potential petroleum or hazardous materials releases from the rail lines, unknown fill materials for a former creek and the berm, and petroleum or hazardous materials potentially impacting the site from the County Industrial Park.
4. A small fuel shed was utilized by the former Camp Manistique. The shed had a concrete floor with fuel or oil staining on the floor surface. This REC represent a potential release of gasoline or oil to the ground surface.
5. A wetland fill area is located east of the perimeter prison fence and appeared to be filled with material from an unknown source. This REC represents potential contamination including metals, fuels, and oils.

3.0 PHASE II ENVIRONMENTAL SITE ASSESSMENT ACTIVITIES

3.1 SCOPE OF ASSESSMENT

To further evaluate the RECs, UPEA, under the direction of AKT Peerless, conducted a subsurface investigation of the subject property that included: (1) the excavation of 16 test pits, (2) the collection of seventeen soil samples and four groundwater samples, and (3) fifteen QA/QC samples. The following samples were submitted for laboratory analyses:

- 13 soil samples for volatile organic compounds (VOCs);
- 15 soil samples for base neutral acids (BNAs) or polynuclear aromatic hydrocarbons (PNAs);
- 15 soil samples for Michigan 10 Metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc);

- 3 soil samples for polychlorinated biphenyls (PCBs);
- 1 soil sample for target analyte list (TAL 23) Metals;
- 3 groundwater samples for VOCs;
- 4 groundwater samples for PNAs; and
- 4 groundwater samples for Michigan 10 Metals.

The following table summarizes each REC, the site investigation activities performed to address each REC, and the laboratory parameters used to address each REC.

Summary of AKT Peerless' Scope of Investigation

Recognized Environmental Conditions	Proposed Test Pit or Boring	Number of Samples and Matrix	Analytical Parameters
Kilns, Flues, RR	TP-101	1 Soil 1 Groundwater	VOCs, PNAs MI 10 Metals
Kilns, Flues, RR, Wood Alcohol Bld	TP-102	1 Soil	VOCs, PNAs, MI 10 Metals
		1 Groundwater	PNAs, MI 10 Metals
Wood Alcohol Bld, Kilns	TP-102A	1 Soil	VOCs, PNAs, MI 10 Metals
Charcoal Retort, Kilns, Iron Cooler w/ asbestos	TP-102B	1 Groundwater	VOCs, PNAs, MI 10 Metals
Slag, Old RR	TP-103	1 Soil	MI 10 Metals, PNAs
		1 Soil 1 Groundwater	VOCs, PNAs, MI 10 Metals
Slag, Old RR	TP-104	1 Soil	MI 10 Metals, PNAs
Old RR, Kilns, City Industrial Park (CIP)	TP-105	1 Soil	VOCs, PNAs, MI 10 Metals
Old RR, CIP	TP-106	1 Soil	
CIP, Berms	TP-107	1 Soil	
Berms, County Ind. Park	TP-108	1 Soil	
Old RR, Berm, Former Creek, County Ind. Park	TP-109	1 Soil	TAL 23 Metals BNAs, VOCs, PCBs
	TP-109A	1 Soil	VOCs, PNAs, MI 10 Metals
Old RR, Berm, Former Bld on County Ind. Park	TP-110	1 Soil	VOCs, PNAs, MI 10 Metals
Wetland Fill Area	TP-111A TP-111 B	1 Soil	VOCs, PNAs, MI 10 Metals, PCBs
Fuel Shed	TP-112	1 Soil	VOCs, MI 10 Metals
		1 Soil	MI 10 Metals, PNAs

3.1.1 Soil Evaluation

On September 3 and 4, 2008, UPEA advanced 16 test pit excavations at the subject property. UPEA directed excavation operators from Manistique Rentals, Inc. (MRI) in locating and completing the test pit excavations. UPEA collected 17 grab soil samples from the excavations based on visual observations (i.e. debris present, stained soils), olfactory evidence, and field-

screening readings. Test pits were advanced to bedrock, at a maximum depth of 9-feet below ground surface (bgs). UPEA personnel inspected, field-screened, and logged the findings at each test pit, including samples collected at each soil boring location. Refer to Figure 2 for a site map with test pit locations. Boring logs are provided in Appendix A.

3.1.2 Groundwater Evaluation

UPEA encountered groundwater in some of the test pit locations at the subject property. UPEA collected 4 "grab" samples of groundwater from trench bottoms in four locations. Groundwater sampling was conducted using low-flow sampling methodologies described in the April 1996 United States Environmental Protection Agency (U.S. EPA) document Groundwater Issue titled *"Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures."* Stabilization data recorded for each well were documented in Low-Flow Sampling Logs included in Appendix B.

3.1.3 Deviations from Sampling and Analysis Plan

On August 13, 2008 AKT Peerless submitted a Sampling and Analysis Plan (SAP) to the U.S. Environmental Protection Agency (U.S. EPA) for approval. The plan was approved on August 18, 2008. In completing field activities, the following deviations from the approved SAP were made:

- HA-101 and HA-102 were substituted by TP-112;
- Groundwater was not sampled at several locations due to poor recovery. Locations were: TP-104, -105, -106, -109, -110, -111 (A & B) and -112;
- TP-102 and 102a: substitute VOCs for Methanol analysis;
- TP-102: VOC analysis was omitted from TP-102 groundwater sample;
- TP-102b: Was originally intended to be a soil sample with asbestos analysis. Groundwater was collected instead and analysis for VOCs and PNAs was added;
- TP-103: A second soil sample and one groundwater sample were added and analyzed for VOCs, PNAs, and Michigan 10 Metals;
- TP-109a: Added one test pit and one soil sample with analysis for VOCs, PNAs, and Michigan 10 Metals;
- TP-112: Was originally two separate hand auger locations with analysis for VOCs and PNAs. One test pit was substituted and analysis was divided between VOCs and Michigan 10 Metals for one sample and PNAs and Michigan 10 Metals for the second sample;
- QA/QC: insufficient sample volume was submitted to complete both MS/MSD and FD, which were collected from the same locations. Lab analysis was run for FD samples only.

3.2 QUALITY ASSURANCE/QUALITY CONTROL

To ensure the accuracy of data collected during on site activities, AKT Peerless and UPEA implemented proper quality assurance/quality control (QA/QC) measures. The QA/QC procedures included, but were not limited to, (1) decontamination of sampling equipment before and between sampling events, (2) calibration of field equipment, (3) documentation of field activities, and (4) sample preservation techniques.

3.2.1 Decontamination of Equipment

During sample collection, UPEA adhered to proper decontamination procedures. Sampling equipment was decontaminated using the following methods to minimize potential cross-contamination of soil samples:

- Steam-cleaning or washing and scrubbing the equipment with non-phosphate detergent
- Rinsing the equipment
- Air-drying the equipment

3.2.2 Calibration of Field Equipment

All field instruments were calibrated prior to first use on-site to ensure accuracy. Field instruments utilized during investigation activities at this subject property were a photoionization detector (PID), a water quality indicator meter (the meter measures pH, temperature, dissolved oxygen, conductivity and oxidation reduction potential), and a turbidity meter.

During the Phase II ESA, a photoionization detector (PID) was used to screen all soil samples. The PID was maintained in a calibrated condition using 100 ppm isobutylene span gas prior to subsurface investigations.

The water quality indicator meter was used to measure indicator parameters during low-flow sampling conducted at the subject property. The meter was calibrated using known standards and in accordance with manufacturer specifications prior to first use on the subject property. The meter was designed to measure turbidity, pH, temperature, dissolved oxygen, conductivity and oxidation reduction potential.

The turbidity meter was used during low-flow sampling conducted at the subject property. The meter was calibrated using known standards and in accordance with manufacturer specifications prior to first use on the subject property.

3.2.3 Documentation of Activities

During AKT Peerless' Phase II ESA activities, subject property conditions (i.e. soil boring locations, weather conditions) were documented. AKT Peerless visually inspected the soil and groundwater samples and prepared a geologic log for each soil boring. The logs include soil characteristics such as (1) color, (2) composition (e.g., sand, clay, or gravel), (3) soil moisture and water table depth, and (4) signs of possible contamination (i.e., stained or discolored soil, odors). Soil types were classified in accordance with ASTM publication D-2488 "*Unified Soil Classification System.*" All soil and groundwater samples were delivered to a laboratory under chain-of-custody documentation. See Appendix A for UPEA's soil boring logs. See Figure 3 for site map with soil results.

3.2.4 Sample Preservation Techniques

UPEA collected soil samples according to USEPA Publication SW-846, "*Testing Methods for Evaluating Solid Waste.*" Soil and groundwater samples were collected in laboratory-supplied

containers, stored on ice or at approximately 4 degrees Celsius, and submitted under chain-of-custody documentation.

Soil samples collected for volatile analyses were field preserved with methanol in accordance with U.S. EPA Method 5035. Soil samples collected for polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCBs) and metals analyses were stored in unpreserved, 4-ounce wide-mouth jars.

Groundwater samples collected from excavations were collected with a peristaltic pump and dedicated tubing. Groundwater samples for volatile organic compound analyses were collected with zero headspace into 40 ml glass vials and preserved with hydrochloric acid. Groundwater samples for metal analyses were collected into plastic bottles and preserved with nitric acid. Groundwater samples collected for analysis of PNAs and PCBs were collected into 1-liter amber glass jars.

3.2.5 QA/QC Sample Collection

UPEA collected QA/QC samples for soil and water matrices in accordance with QA/QC sample procedures outlined in the "Quality Assurance Project Plan (QAPP), Brownfield Assessment Program, Hazardous Substances and Petroleum Site Assessment Grant, Schoolcraft County, Michigan," dated May, 2006, revision 1. The following table describes the QA/QC samples collected for each matrix.

Summary of AKT Peerless QA/QC Sampling

Number Samples/ Matrix	QA/QC Sample (Frequency)				
	Field Duplicate	MS/MSD	Field Blank	Field Equip. Blank	Trip Blank
17/ Soil	2	1	2	2	4
4/ Water	2	2			

Test pit excavation was completed with an excavator. Field equipment blanks were taken with respect to groundwater sampling rather than attempting to sample off the excavator. Measures were taken during soil sampling to ensure that soil samples were taken from excavated material or pit walls which did not come into contact with the excavation equipment.

3.3 LABORATORY ANALYSES AND METHODS

UPEA submitted 17 soil and 4 groundwater samples for laboratory analyses. The following table summarizes the location, depth, matrix, and laboratory analysis for each sample.

Summary of Laboratory Analyses

Sample Name (depth in feet)	Matrix	VOCs	PNAs	Michigan 10 Metals	TAL 23 Metals	BNAs	PCBs
TP-101 (1-3')	S	✓	✓	✓			
TP-101 (1-3') DUP	S	✓	✓	✓			
TP-101	W	✓	✓	✓			
TP-102 (1-3')	S	✓	✓	✓			
TP-102 (2-4')	S	✓	✓	✓			
TP-102	W		✓	✓			
TP-102A (4-4.5')	S	✓	✓	✓			
TP-102B	W	✓	✓	✓			
TP-103 (3-4')	S		✓	✓			
TP-103 (3-5')	S	✓	✓	✓			
TP-103	W	✓	✓	✓			
TP-104 (4-6')	S		✓	✓			
TP-105 (1-2.5')	S	✓	✓	✓			
TP-106 (0-2')	S	✓	✓	✓			
TP-107 (2-4')	S	✓	✓	✓			
TP-108 (2-4')	S	✓	✓	✓			
TP-109 (0-1.5')	S	✓			✓	✓	✓
TP-109 (0-1.5') DUP	S	✓			✓	✓	✓
TP-109A (1-3')	S	✓	✓	✓			
TP-110 (0-1')	S	✓	✓	✓			
TP-111A (0-2')	S	✓	✓	✓			✓
TP-112 (0-1.5')	S	✓		✓			
TP-112 (2-2.5')	S		✓	✓			

Note: S = Soil sample, W = Water sample

The laboratory analyzed the samples for: (1) VOCs in accordance with USEPA Method 8260B/5030B; (2) PNAs in accordance with USEPA Method 8270C/3535; (3) metals in accordance with USEPA Method 6020/3050B, (4) BNAs in accordance with USEPA Method 8270C/3550B, (5) PCBs in accordance with USEPA Method 8082/3550B, and (6) TAL Elements by USEPA Methods 6010B and 6020/3050B.

4.0 EVALUATION AND PRESENTATION OF RESULTS

4.1 SUBSURFACE CONDITIONS

4.1.1 Geologic Setting

4.1.1.1 Soil and Groundwater Conditions based on Published Material

According to the MDNR Geological Survey Division's "*Bedrock Geology of Northern Michigan* (1987)," bedrock beneath the subject property is classified as the Manistique Group Unit of the Manistique Group, which is included in the Niagaran Series within the Silurian System of the Paleozoic Era. The depth to bedrock beneath the subject property was encountered during the site investigation at depths between 3.5 to 9-feet below ground surface.

According to the Michigan Geological Survey Division's publication, "*Quaternary Geology of Northern Michigan* (1982)," soil in the subject property area is defined as lacustrine sand and gravel. This soil is described as pale brown to pale reddish brown, fine to medium sand, commonly including beds or lenses of small gravel. This soil occurs chiefly as former beach and near-offshore littoral deposits of glacial Great Lakes and may include intercalated lacustrine clay. Soil thickness ranges from 3 to 100 feet. Typically, lacustrine sand and gravel is associated with moderate hydraulic permeability and may allow the movement of contaminants through groundwater.

According to the NRCS's "*Interim Soil Survey of Schoolcraft County, Michigan* (2006)," soil at the subject property is classified as belonging to the Deford-Tawas-Deer Park Association, for which a description is not available. As indicated on Photo Sheet #33A of the soil survey, subject property soils are described as belonging to the Schuberts, Manistique complex which is described as occurring on swales and beach ridges with a surface layer consisted of muck and fine sand that is somewhat poorly to poorly drained.

4.1.1.2 Soil and Groundwater Conditions based on Field Observations

During investigation activities, UPEA encountered the following soil types:

- FILL from ground surface to depths between 2.5 to 8-feet bgs. The fill consisted mainly of sand with slag, brick, charcoal, and building materials (pipe, timbers, etc.). At one location (TP-106) the fill was primarily slag and iron ore. At locations TP-109 and TP-110, no fill was observed. TP-109a was located in the privacy berm, and about 3-feet of fill was observed above the natural grade.
- SAND in most test locations, from below the fill extending to depths between 6 to 8 feet, or to bedrock. The sand was primarily described as medium grain size, with some silt and/or clay layering. Some test locations also had organic material including peat and roots.
- CLAY in a few test locations, silty clay with sand was encountered. In TP-111 and 111a, the clay was located directly below the fill material, at about 2.5-feet bgs. In TP-101, -103 and -106, the clay was encountered at between 6 to 8 feet bgs and extended to bedrock. The maximum depth explored was 9 feet bgs.
- BEDROCK was encountered at all test pit locations, at depths between 3.5 and 9-feet bgs.

Due to the history of the site, these soil conditions were not unexpected. The quantity of buildings, railroads, and kilns used in the industrial operations would indicate that large amounts of fill were placed during construction. In addition, it is known that slag, iron ore, and other raw materials were stored at the site. The demolition of the buildings and equipment pre-1950s would also have left significant quantities of fill materials, including the slag, iron ore, and brick noted in most test pit locations. Other debris, including railroad ties and underground smoke flues, were also noted and are included on individual test pit logs included in Appendix A.

4.2 MDEQ RELEVANT EXPOSURE PATHWAYS AND APPLICABLE CRITERIA

4.2.1 Relevant Exposure Pathways

As defined in Michigan Public Act 451 Part 201, "relevant pathway" means an exposure pathway that is reasonable and relevant because there is a reasonable potential for exposure to a hazardous substance. The analysis of potential exposure pathways is based on existing conditions at the subject property. The following subsections identify the relevant exposure pathways based on the subject property conditions observed.

4.2.1.1 Ingestion of Groundwater Pathway

Groundwater was encountered in some of the test pit locations at the subject property. The groundwater appears to be perched upon shallow bedrock located at between 3.5 and 9 feet below ground surface across the subject property. Water is available to the site by the City of Manistique from deep wells located north of the subject property. It is unlikely that groundwater at the property would be utilized for consumption. However, ingestion of groundwater at the subject property is a relevant exposure pathway due to its shallow depth.

4.2.1.2 Groundwater Venting to Surface Water Pathway

Groundwater Venting to Surface Water is not a human exposure pathway, but rather an exposure pathway based on aquatic toxicity. The subject property is located about 500-feet east of the Manistique River and 1.32 miles north of Lake Michigan. Therefore, groundwater venting to surface water is a relevant exposure pathway.

4.2.1.3 Groundwater Contact Pathway

Groundwater was encountered at several test pit locations at depths between 5 to 8 feet below ground surface. The groundwater appears to be perched on top of the bedrock encountered across the entire subject property. Future construction or development of the property could result in exposure to groundwater. Therefore, groundwater contact is a relevant exposure pathway due to the shallow occurrence of groundwater.

4.2.1.4 Volatilization to Indoor Air Inhalation Pathway

Contaminant volatilization from soil and/or groundwater to indoor air is a concern where buildings are located atop contamination. There is currently no development plan for the subject property. Future construction or development could occur on any portion of the property. Therefore, Volatilization to Indoor Air Inhalation is a relevant exposure pathway.

4.2.1.5 Volatilization to Ambient Air Pathway

Contaminant volatilization to ambient air is a risk to public health. Users or occupants of the subject property could become exposed to volatized contaminants from soil or groundwater at the subject property. Therefore, Volatilization to Ambient Air is a relevant exposure pathway.

4.2.1.6 Particulate Inhalation Pathway

Contaminated soil particles may become airborne as part of construction activities or as soils become desiccated during drought. Users or occupants of the subject property could become exposed to contaminants from soil if these conditions occur. Therefore, Particulate Inhalation is a relevant exposure pathway.

4.2.1.7 Direct Contact Pathway

Contaminated soil and shallow groundwater may be exposed during property use, development, and occupancy of the subject property. Therefore, Direct Contact is a relevant exposure pathway.

4.2.2 Applicable Criteria

Applicable criterion means a cleanup criterion for a relevant pathway. A criterion is not applicable if the exposure pathway is not relevant. Based on the exposure pathway evaluation, the applicable pathways at the subject property include:

- Drinking Water Protection Criteria (DWP)/Drinking Water Criteria (DW);
- Groundwater to Surface Water Protection Criteria (GSIP)/Groundwater to Surface Water Criteria (GSI);
- Groundwater Contact Protection Criteria (GCP)/Groundwater Contact Criteria (GC)
- Soil Volatilization to Indoor Air Inhalation (SVIAI)/Groundwater Volatilization to Indoor Air Inhalation (GVIAI);
- Infinite Source Volatile Soil Inhalation (VSIC);
- Particulate Soil Inhalation (PSI), and;
- Soil Direct Contact (DC)/Groundwater Contact (GC).

AKT Peerless compared the laboratory analytical data to the applicable Part 201 Residential Generic Cleanup Criteria (GCC) as published by the MDEQ-RRD.

4.3 LABORATORY ANALYTICAL RESULTS

AKT Peerless collected soil and groundwater samples for the purpose of determining if the subject property meets the definition of a *facility*. Analytical results were compared with MDEQ Residential and Commercial I Generic Cleanup Criteria provided in MDEQ Remediation and Redevelopment Division's Operational Memorandum No. 1, Tables 1 and 2.

4.3.1 Soil Analytical Results

AKT Peerless submitted seventeen soil samples for laboratory analysis of VOCs, PNAs/BNAs, metals, and PCBs. The results of the laboratory analyses of the soil samples are summarized in the table below:

Summary of Soil Analytical Results

Soil Boring Location & Depth *	Parameter	MDEQ Criteria Exceeded						
		DWP	GSIP	GCP	SVIAI	VSI	PSI	DC
TP-101 DUP (1-3')	Benzene	✓						
TP-102 (1-3')	Arsenic	✓						✓
	Selenium		✓					
	Mercury		✓					
TP-102 (2-4')	Mercury		✓					
TP-102 A (4-4.5')	Trichloroethylene	✓						
	1,2,4-Trimethylbenzene		✓					
	Xylenes		✓					
	Selenium		✓					
	Mercury		✓					
TP-103 (3-4')	Selenium		✓					
TP-104 (4-6')	Naphthalene		✓					
	Arsenic	✓						
	Selenium		✓					
	Silver		✓					
	Mercury		✓					
TP-106 (0-2')	Mercury		✓					
TP-107 (2-4')	Mercury		✓					
TP-108 (2-4')	Mercury		✓					
TP-109 (0-1.5') TP-109 DUP (0-1.5')	Selenium		✓					
	Mercury		✓					
	Iron	✓						
	Magnesium	✓						
	Aluminum	✓						
	Cobalt	✓						
	Manganese	✓						
TP-109 A (1-3')	Mercury		✓					
TP-110 (0-1')	Mercury		✓					
	Xylenes		✓					
TP-111 A (0-2')	Mercury		✓					
TP-112 (1-1.5')	Mercury		✓					

*- Sample identification: TP-# indicates test pit and (#-#) indicates sample depth in feet.
DWP – Drinking Water Protection Criteria
GSIP – Groundwater Surface Water Interface Protection Criteria
GCP – Groundwater Contact Protection Criteria
SVIAI – Soil Volatilization to Indoor Air Inhalation Criteria
VSI – Volatile Soil Inhalation Criteria
PSI – Particulate Soil Inhalation Criteria
DC – Direct Contact Criteria

Refer to Figure 3 for a site map with soil analytical results exceeding MDEQ criteria. Refer to Table 1 for a summary of soil analytical results. Refer to Appendix C for a complete analytical laboratory report.

4.3.2 Groundwater Analytical Results

AKT Peerless submitted four groundwater samples for laboratory analysis of VOCs, PNAs, and metals. None of the groundwater samples exceeded MDEQ Criteria. Refer to Table 2 for a summary of groundwater analytical results. Refer to Appendix C for a complete analytical laboratory report.

4.3.3 Quality Assurance/Quality Control Analytical Results

4.3.3.1 Soil

QA/QC samples were collected in accordance with the QAPP, except for the following:

- Matrix Spike and Matrix Spike Duplicate samples could not be analyzed in the laboratory due to insufficient sample volume.
- Levels of copper in duplicate sample TP-101 (DUP) were higher than the original sample. Levels of arsenic and chromium were less than half the level of the original sample. The duplicate also had detections of benzene and toluene which were not detected in the original sample.
- Sample TP-109 (DUP) had levels of manganese one-and-a-half times higher than levels in the original sample. The duplicate also had detections of fluoranthene, pyrene, and beryllium which were not detected in the original sample.

4.3.3.2 Groundwater

QA/QC samples were collected in accordance the QAPP, except for the following:

- Matrix Spike and Matrix Spike Duplicate samples could not be analyzed in the laboratory due to insufficient sample volume.

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 SUMMARY OF ENVIRONMENTAL CONCERNS

UPEA completed a Phase I ESA for the subject property on July 21, 2008. The RECs identified in their investigation are summarized below:

1. Industrial use of the subject property, including former kilns, flues, railroads, wood alcohol building, charcoal retort building, a iron cooler building with asbestos, former slag piles, and the existing railroad located north and adjacent to the subject property.
2. The current City Industrial Park with known contamination located adjacent and west of the subject property.
3. Former industrial activities, railroad lines, and a creek were located on the south side of the subject property along with a berm which was constructed during the prison site development. The source material for the berm is unknown. In addition,

contamination has been documented on the County Industrial Park located south of the subject property.

4. A small fuel shed was utilized by the former Camp Manistique.
5. A wetland fill area is located east of the perimeter prison fence and appeared to be filled with material from an unknown source.

5.2 SUMMARY OF SUBSURFACE INVESTIGATION

On September 3 and 4, 2008, UPEA (with AKT Peerless) conducted a subsurface investigation at the subject property to address the environmental concerns identified during previous environmental investigations. UPEA (1) excavated 16 test pit locations, (2) collected 17 soil samples, and (3) collected four groundwater samples for laboratory analyses. Soil and groundwater samples were submitted for laboratory analyses of select parameters, including: VOCs, PNAs, BNAs, metals, and PCBs.

5.3 CONCLUSIONS

UPEA and AKT Peerless conducted soil and groundwater sampling in areas most likely to be impacted by contaminants based on the past use of the subject property. The results of the investigation indicate the following:

- Benzene, trichloroethylene, 1,2,4-trimethylbenzene, xylenes, naphthalene, selenium, silver, mercury, arsenic, iron, aluminum, cobalt, and manganese were detected in subsurface soils at concentrations exceeding the MDEQ Part 201 Generic Residential/Commercial I Cleanup Criteria. Various concentrations in soil were detected above the drinking water protection criteria and groundwater surface water interface protection criteria.

Based on laboratory analytical results, the subject property meets the definition of a *facility*, as defined in Part 201 of the NREPA, Michigan Public Act (PA) 451, 1994, as amended.

5.4 RECOMMENDATIONS

5.4.1 Future Owner(s)/Operator(s)

In addition to those recommendations provided in Section 5.4.1, AKT Peerless recommends any future owner(s)/operator(s) prepare a Baseline Environmental Assessment (BEA) report. Section 26(1)(c) of Part 201 provides certain liability protections to a person who becomes an owner or operator of a *facility* on, or after June 5, 1995 if they comply with both of the following, or unless other defenses apply: a BEA is conducted prior to or within 45 days after the earlier of the date of purchase, occupancy, or foreclosure, and the owner or operator discloses the results of the BEA to the MDEQ and subsequent purchaser or transferee.

In addition, because the subject property meets the definition of a facility, AKT Peerless recommends conducting a Section 20107(a) Compliance Analysis to assure compliance with Due Care obligations. Due Care obligations include:

- Undertaking measures to prevent exacerbation of existing contamination.
- Exercising due care by undertaking response activities to mitigate unacceptable exposure to

hazardous substances, mitigate fire and explosion hazards due to hazardous substances, and allow for the intended use of the subject property in a manner that the protects health and safety.

- Taking reasonable precautions against the reasonably foreseeable acts or omissions of a third party and the consequences that could result from those acts or omissions.

Some examples of these due care activities may include the continuation of municipal water service for consumptive purposes; and measures such as limits on soil transportation within the property boundary; prohibition of soil removal from the property; and limiting earth disturbances which would expose contaminants to air and water, which would increase the potential for transport off-site and exposure to occupants of the subject property.

6.0 LIMITATIONS

The information and opinions obtained in this report are for the exclusive use of Schoolcraft County. No distribution to or reliance by other parties may occur without the express written permission of AKT Peerless. AKT Peerless will not distribute this report without your written consent or as required by law or by a Court order. The information and opinions contained in the report are given in light of that assignment. The report must be reviewed and relied upon only in conjunction with the terms and conditions expressly agreed upon by the parties and as limited therein. Any third parties who have been extended the right to rely on the contents of this report by AKT Peerless (which is expressly required prior to any third-party release), expressly agrees to be bound by the original terms and conditions entered into by AKT Peerless and Schoolcraft County.

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7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

The following individuals contributed to the completion of this investigation.

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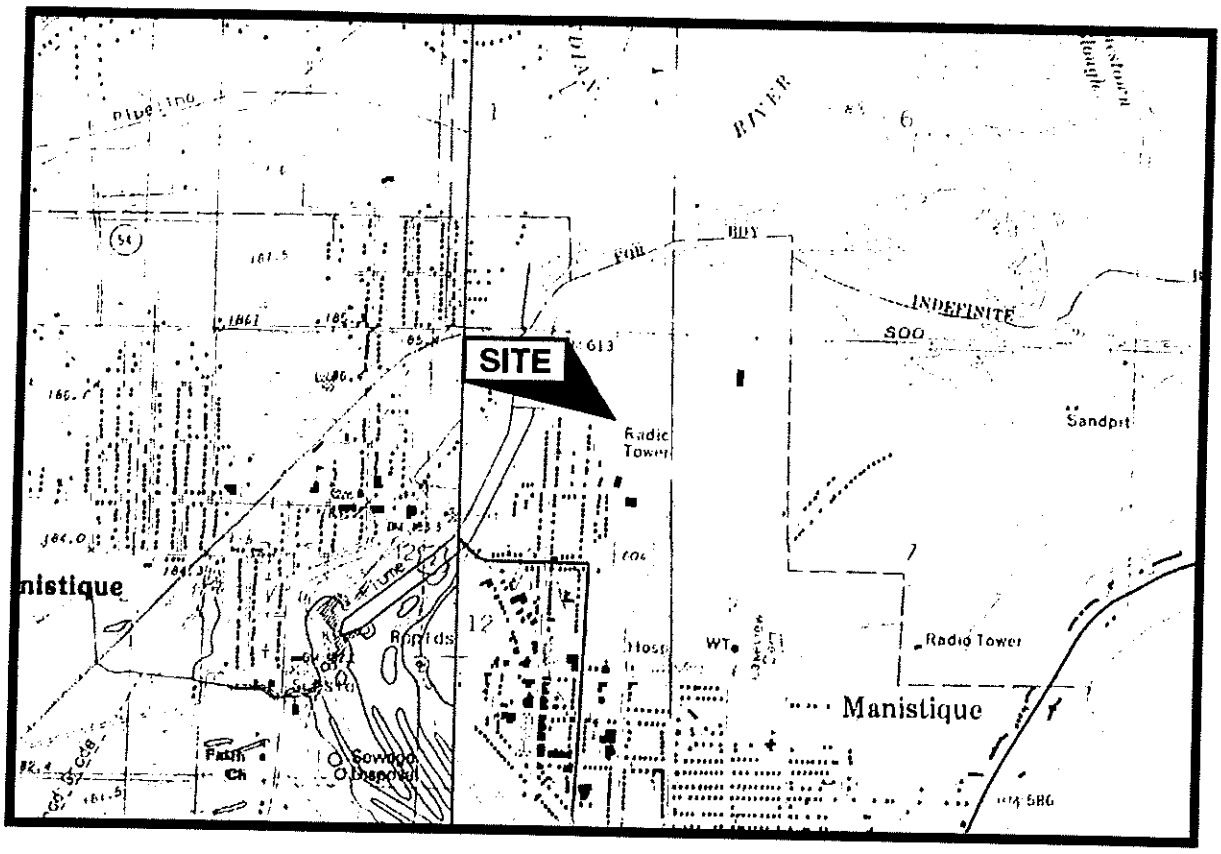
environmental services

FIGURES

MANISTIQUE EAST QUADRANGLE

MICHIGAN - SCHOOLCRAFT COUNTY

7.5 MINUTE SERIES (TOPOGRAPHIC)



T.41 N. - R.16 W.

1 MILE

7000 FEET

1 KILOMETER

COUNTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

MICHIGAN QUADRANGLE LOCATION

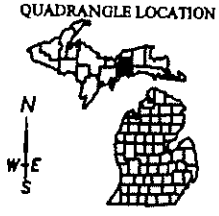


IMAGE TAKEN FROM 1972 U.S.G.S. TOPOGRAPHIC MAP

AKTPEERLESS environmental services

TOPOGRAPHIC LOCATION MAP

FORMER CAMP MANISTIQUE

401 NORTH MAPLE STREET

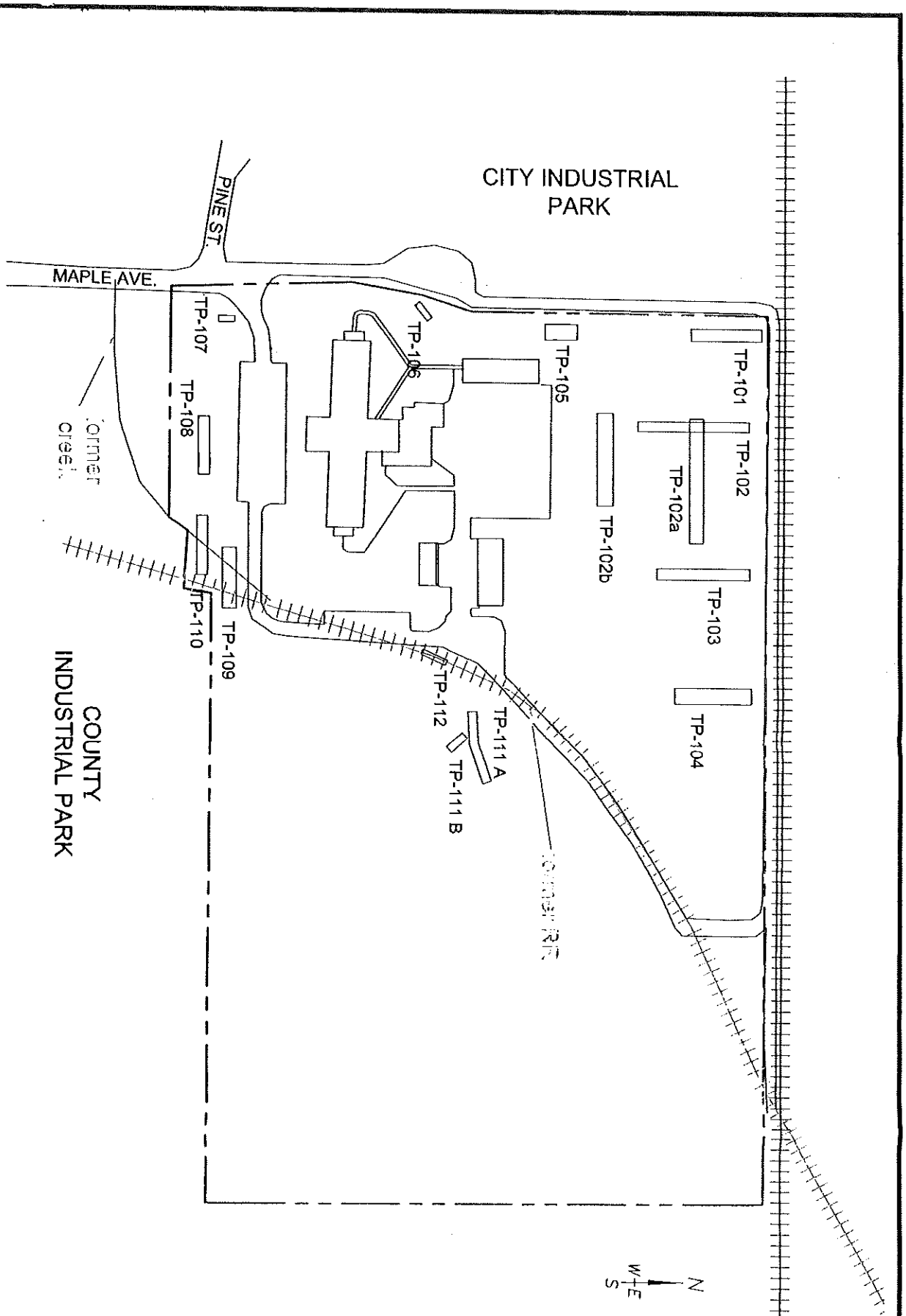
MANISTIQUE, MICHIGAN

PROJECT NUMBER : 5187L

DRAWN BY: SRS

DATE: 08-12-08

FIGURE 1



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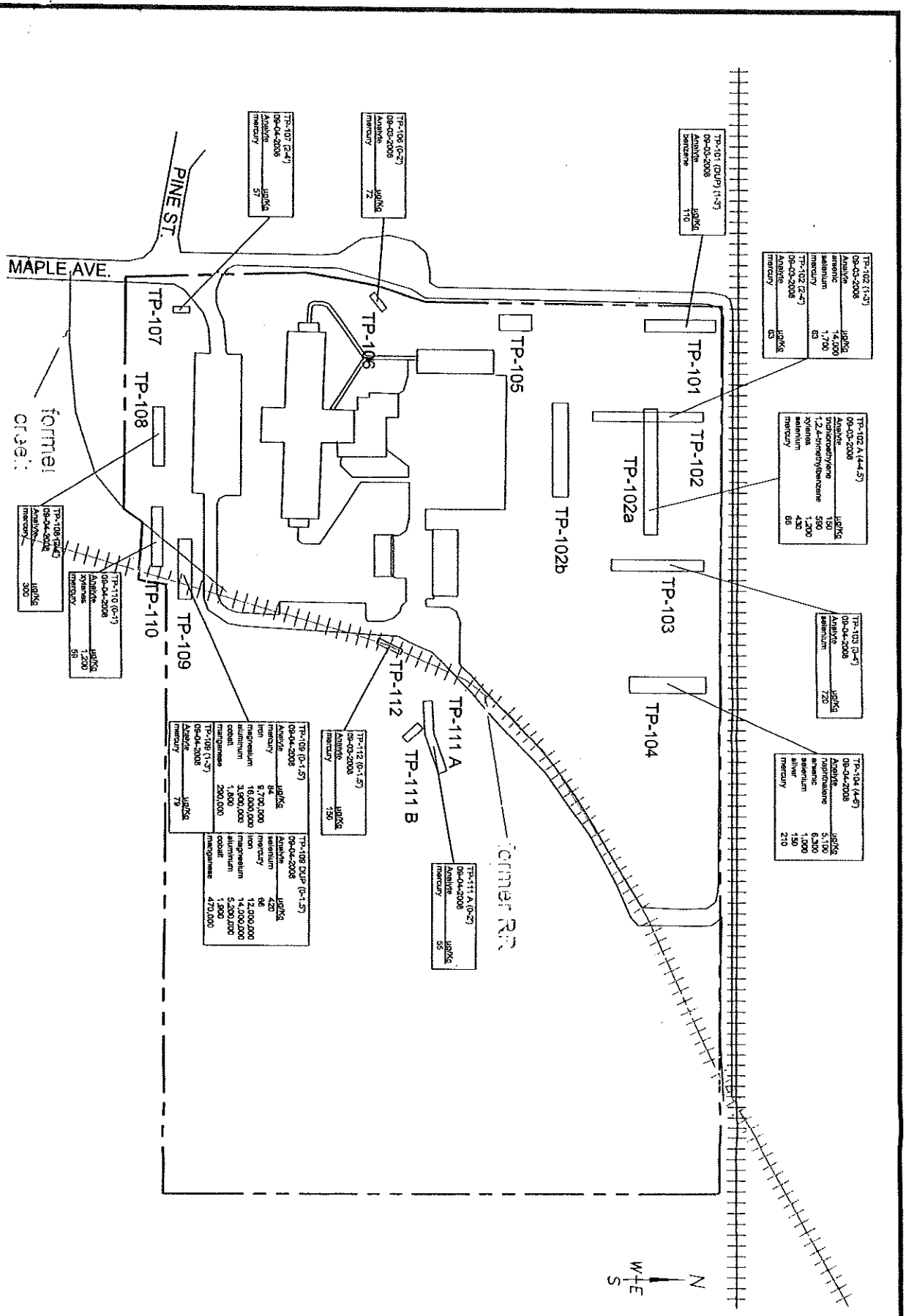
SITE MAP WITH TEST PIT LOCATIONS

FORMER CAMP MAINSTIQUE
401 N. MAPLE STREET
MANISTIQUE, MICHIGAN
PROJECT NUMBER : 5187L-4-20

LEGEND
= PROPERTY LINE
= TEST PIT LOCATION

DRAWN BY: jeb
DATE: 08 12 08
0 ~75 ~150
SCALE: 1" = approx. 150'

FIGURE 2



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SITE MAP with SOIL RESULTS EXCEEDING MDEQ GCC

FORMER CAMP MAINSTIQUE
401 N. MAPLE STREET
MANISTIQUE, MICHIGAN
PROJECT NUMBER : 51871-4-20

LEGEND
= PROPERTY LINE
= TEST PIT LOCATION

DRAWN BY: jcb
DATE: 08.12.08
0 75 150
SCALE: 1" = approx. 150'

FIGURE 3

AKTPEERLESS
environmental services

TABLES

Table 2
Summary of Groundwater Analytical Results
Former Camp Manistique Prison
401 N. Maple
Manistique, Michigan
AKT Peerless Project Number 5187L-4-20

Sample Identification and Date		Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level	TP-101 09/03/2008	TP-101 DUP 09/03/2008	TP-102 B 09/03/2008	TP-102 perched 09/03/2008	TP-103 09/04/2008	TP-103 DUP 09/04/2008
Analytes	CAS#															
Volatile Organic Compounds (VOCs) (µg/L)																
n-Butylbenzene	104518	80	230	ID	ID	ID	5,900	NA	ID	ID	ND	ND	4.0	NT	ND	ND
n-Propylbenzene (I)	103651	80	230	ID	ID	ID	15,000	NA	ID	ID	ND	ND	1.2	NT	ND	ND
1,2,3-Trimethylbenzene	526738	63	63	17	56,000	56,000	56,000	55,890	56,000 (S)	ID	ND	ND	1.3	NT	ND	ND
1,2,4-Trimethylbenzene (I)	95636	63 (E)	63 (E)	17	56,000 (S)	56,000 (S)	56,000 (S)	55,890	56,000 (S)	ID	ND	ND	3.8	NT	ND	ND
1,3,5-Trimethylbenzene (I)	108678	72 (E)	72 (E)	45	61,000 (S)	61,000 (S)	61,000 (S)	61,150	ID	ID	ND	ND	1.3	NT	ND	ND
Remaining VOCs	various	-	-	-	-	-	-	-	-	-	ND	ND	ND	NT	ND	ND
Polynuclear Aromatic Hydrocarbons (PNAs) (µg/L)																
2-Methylnaphthalene	91576	260	750	ID	ID	ID	25,000 (S)	24,600	ID	ID	ND	ND	6.0	ND	ND	ND
Naphthalene	91203	520	1,500	13	31,000 (S)	31,000 (S)	31,000 (S)	31,000	NA	31,000 (S)	ND	ND	NT	5.6	ND	ND
Remaining PNAs	various	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Total Metals Analysis (µg/L)																
Barium (B)	7440393	2,000 (A)	2,000 (A)	(G,X)	NLV	NLV	1.4E+7	NA	ID	ID	130	130	ND	ND	ND	ND
Remaining Michigan 10 Metals	various	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND

A - Criterion is the state of Michigan drinking water standard established pursuant to section 5 of 1976 PA 399, MCL 325.1005.
B - Background, as defined in R 299.5701(b), may be substituted if higher than the calculated cleanup criterion.
E - Criterion is the aesthetic drinking water value, as required by section 20120a(5) of the act.
G - Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water.
I - Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. Section 261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and which is available for inspection at the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan.
L - Criteria for lead are derived using a biologically based model, as allowed for under section 20120a(10) of the act, and are not calculated using the algorithms and assumptions specified in pathway-specific rules.
S - Criterion defaults to the hazardous substance-specific water solubility limit.
X - The groundwater surface water interface (GSI) criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source.
ID - Insufficient data to develop criterion.
NA - Criterion or value is not available or, in the case of background and chemical abstract service numbers, not applicable.
NC - No Criteria available
ND - Analyte not present above laboratory detection limits for this sample
NT - Sample not tested for this parameter
µg/L - micrograms per liter

Table 1
Summary of Soil Analytical Results
Former Camp Manistique Prison
480 N. Maple
Manistique, Michigan
AKT Peerless Project Number:
3187L-4-20

Sample Identification and Date		Statewide Default Background Levels	Groundwater Protection				Indoor Air	Ambient Air (V)				Direct Contact		Indoor Air	Direct Contact		TP-111 A (0-2') 09/03/2008	TP-112 (0-1.5') 09/03/2008	TP-113 (0-2.5') 09/03/2008
Analytes	CAS#		Residential Drinking Water Protection Criteria & RRSLs	Industrial and Commercial Drinking Water Protection Criteria & RRSLs	Groundwater Surface Water Interface Protection Criteria & RRSLs	Groundwater Contact Protection Criteria & RRSLs	Residential and Commercial I Soil Volatilization to Indoor Air Inhalation Criteria & RRSLs	Residential and Commercial I Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RRSLs	Residential and Commercial I Finite VSIC for 5 Meter Source Thickness	Residential and Commercial I Finite VSIC for 2 Meter Source Thickness	Residential and Commercial I Particulate Soil Inhalation Criteria & RRSLs	Residential and Commercial I Direct Contact Criteria & RRSLs	Soil Saturation Concentration Screening Levels	Soil Volatilization to Indoor Air Inhalation Criteria & RRSLs	Industrial and Commercial II	Soil Saturation Concentration Screening Levels			
Volatile Organic Compounds (VOCs) (µg/Kg)																			
Benzene (I)	71432	NA	30	100	4,000 (X)	2.2E+5	1,600	13,000	94,000	79,000	3.8E+8	1.8E+5	4.0E+5	8,400	4.0E+5 (C)	4.0E+5	ND	ND	NT
n-Butylbenzene	104518	NA	1,600	4,600	ID	1.2E+5	ID	ID	ID	ID	ID	7.3E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	NT
sec-Butylbenzene	135988	NA	1,600	4,600	ID	88,000	ID	ID	ID	ID	ID	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	NT
Ethylbenzene (I)	100414	NA	1,500	1,500	360	1.4E+5 (C)	87,000	7.2E+5	1.0E+6	2.2E+6	1.0E+10	1.4E+5 (C)	1.4E+5	1.4E+5 (C)	1.4E+5 (C)	1.4E+5	ND	ND	NT
Naphthalene	91203	NA	33,000	1.0E+5	870	2.1E+6	2.5E+5	3.0E+5	3.0E+5	3.0E+5	7.0E+8	1.6E+7	NA	4.7E+5	5.2E+7	NA	ND	ND	NT
n-Propylbenzene (I)	103651	NA	1,600	4,600	NA	3.0E+5	ID	ID	ID	ID	1.3E+9	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	NT
Toluene (I)	108883	NA	16,000	16,000	2,800	2.5E+5 (C)	2.5E+5 (C)	2.8E+6	5.1E+6	1.2E+7	2.7E+10	2.5E+5 (C)	2.5E+5	2.5E+5 (C)	2.5E+5 (C)	2.5E+5	120	190	NT
Trichloroethylene	79016	NA	200	100	4,000 (X)	4.4E+5	7,100	78,000	1.7E+5	3.9E+5	1.8E+9	5.0E+5 (C,DD)	5.0E+5	37,000	5.0E+5 (C,DD)	5.0E+5	ND	ND	NT
1,2,3-Trimethylbenzene (I)	526738	NA	1,800	1,800	570	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	NT
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	2,100	570	1.1E+5 (C)	1.1E+5 (C)	2.1E+7	5.0E+8	5.0E+8	8.2E+10	1.1E+5 (C)	1.1E+5	1.1E+5 (C)	1.1E+5 (C)	1.1E+5	ND	ND	NT
1,3,5-Trimethylbenzene (I)	108678	NA	1,800	1,800	1,100	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	NT
Xylenes (I)	1330207	NA	3,600	3,600	700	1.5E+5 (C)	1.5E+5 (C)	4.6E+7	6.1E+7	1.5E+8	2.9E+11	1.5E+5 (C)	1.5E+5	1.5E+5 (C)	1.5E+5 (C)	1.5E+5	ND	200	NT
Remaining VOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	NT
Semi-Volatile Organic Compounds (SVOCs) (µg/Kg)																			
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	NT	NT	NT
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	NT	NT	NT
Remaining SVOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NT	NT	NT
Polynuclear Aromatic Hydrocarbons (PNAs) (µg/Kg)																			
Acenaphthene	83329	NA	3.0E+5	8.8E+5	4,400	9.7E+5	1.9E+8	8.1E+7	8.1E+7	8.1E+7	1.4E+10	4.1E+7	NA	3.5E+8	1.3E+8	NA	ND	NT	ND
Acenaphthylene	208968	NA	5,900	17,000	ID	4.4E+5	1.6E+6	2.2E+6	2.2E+6	2.2E+6	2.5E+9	1.6E+6	NA	3.0E+6	5.2E+6	NA	ND	NT	ND
Anthracene	120127	NA	41,000	41,000	ID	41,000	1.0E+9 (D)	1.4E+9	1.4E+9	1.4E+9	6.7E+10	2.3E+8	NA	1.0E+9 (D)	7.3E+8	NA	ND	NT	ND
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	NT	ND
Benzo(a)pyrene (Q)	50328	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	2,000	NA	NLV	8,000	NA	ND	NT	ND
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA	ID	80,000	NA	ND	NT	ND
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	8.0E+8	2.5E+6	NA	NLV	7.0E+6	NA	ND	NT	ND
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2.0E+5	NA	NLV	8.0E+5	NA	ND	NT	ND
Chrysene (Q)	218019	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	2.0E+6	NA	ID	8.0E+6	NA	ND	NT	ND
Dibenz(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA	NLV	8,000	NA	ND	NT	ND
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	ND	NT	ND
Fluorene	86737	NA	2.9E+5	8.9E+5	5,500	8.9E+5	5.8E+8	1.3E+8	1.3E+8	1.3E+8	9.3E+9	2.7E+7	NA	1.0E+9 (D)	8.7E+7	NA	ND	NT	ND
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	NT	ND
2-Methylnaphthalene	91576	NA	57,000	1.7E+5	ID	3.5E+6	ID	ID	ID	ID	ID	8.1E+6	NA	ID	2.6E+7	NA	ND	NT	ND
Naphthalene	91203	NA	33,000	1.0E+5	870	2.1E+6	2.5E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.6E+7	NA	4.7E+5	5.2E+7	NA	NT	NT	ND
Phenanthrene	85018	NA	36,000	1.6E+5	5,300	1.1E+6	2.8E+6	1.6E+5	1.6E+5	1.6E+5	6.7E+6	1.8E+6	NA	5.1E+6	5.2E+6	NA	ND	NT	ND
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	ND	NT	ND
Polychlorinated biphenyls (PCBs) (J,T)																			
Various PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	NT	NT
Michigan Metals (µg/Kg)																			
Arsenic	7440382	5,800	4,600	4,600	70,000 (X)	2.0E+6	NLV	NLV	NLV	NLV	7.2E+5	7,600	NA	NLV	37,000	NA	1,600	2,700	520
Barium (B)	7440393	75,000	1.5E+6	1.3E+6	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	3.7E+7	NA	NLV	1.3E+8	NA	88,000	180,000	240,000
Cadmium (B)	7440439	1,200	6,000	6,000	(G,X)	2.3E+8	NLV	NLV	NLV	NLV	1.7E+6	3.3E+5	NA	NLV	2.1E+6	NA	590	310	1,800
Chromium (III) (B,N)	16065831	18,000 (total)	1.0E+9 (D)	1.0E+9 (D)	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	7.3E+8	7.9E+8	NA	NLV	1.0E+9 (D)	NA	5,000	8,800	1,600
Copper (B)	7440508	32,000	5.8E+6	5.8E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+8	2.0E+7	NA	NLV	7.3E+7	NA	12,000	22,000	14,000
Lead (B)	7439921	21,000	7.0E+5	7.0E+5	(G,X)	ID	NLV	NLV	NLV	NLV	1.0E+8	4.0E+5	NA	NLV	9.0E+5 (DD)	NA	15,000	23,000	3,800
Selenium (B)	7782492	410	4,000	4,000	400	7.8E+7	NLV	NLV	NLV	NLV	1.3E+8	2.6E+6	NA	NLV	9.6E+6	NA	370	340	700
Silver (B)	7440224	1,000	4,500	13,000	200 (M); 27	2.0E+8	NLV	NLV	NLV	NLV	6.7E+6	2.5E+6	NA	NLV	9.0E+6	NA	ND	ND	ND
Zinc (B)	7440666	47,000	2.4E+6	5.8E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.7E+8	NA	NLV	6.2E+8	NA	41,000	45,000	140,000
Mercury (Total) (B,Z)	Varies	130	1,700	1,700	20 (M); 1.2	47,000	48,000	52,000	52,000	52,000	2.0E+7	1.6E+5	NA	89,000	5.8E+5	NA	85	230	ND
TAL Elements and Other Metals (µg/Kg)																			
Calcium																	NT	NT	NT
Iron (B)	7439896	1.2E+7	6,800	6,800	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.8E+8	NA	NLV	3.8E+8	NA	NT	NT	NT
Magnesium (B)	7439954	NA	8.8E+6	2.2E+7	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.7E+9	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT
Potassium																	NT	NT	NT
Sodium	17341252	NA	2.5E+6	7.0E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT
Antimony	7440360	NA	4,300	4,300	94,000	4.9E+7	NLV	NLV	NLV	NLV	1.5E+7	1.8E+5	NA	NLV	6.7E+5	NA	NT	NT	NT
Aluminum (B)	7429905	6.9E+6	1,000	2,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	5.0E+7 (DD)	NA	NLV	3.7E+8 (DD)	NA	NT	NT	NT
Beryllium	7440417	NA	31,000	31,000	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.5E+6	4.1E+5	NA	NLV	1.6E+6	NA	NT	NT	NT
Cobalt	7440484	6,800	200	2,000	2,000	4.8E+7	NLV	NLV	NLV	NLV	1.3E+7	2.6E+6	NA	NLV	9.0E+6	NA	NT	NT	NT
Manganese (B)	7439965	4.4E+5	1,000	1,000	(G,X)	1.8E+8	NLV	NLV	NLV	NLV	5.3E+6	2.5E+7	NA	NLV	9.0E+7	NA	NT	NT	NT
Nickel (B)	7440020	20,000	1.0E+5	1.0E+5	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+7	4.0E+7	NA	NLV	1.5E+8	NA	NT	NT	NT
Thallium (B)	7440280	NA	2,300	2,300	4,200 (X)	1.5E+7	NLV	NLV	NLV	NLV	ID	35,000	NA	NLV	1.3E+5	NA	NT	NT	NT
Vanadium	7440622	NA	72,000	9.9E+5	1.9E+5	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	7.5E+5 (DD)	NA	NLV	5.3E+6 (DD)	NA	NT	NT	NT

Table 3
Summary of Soil Analytical Results
Former Camp Manistique Prison
401 N. Maple
Manistique, Michigan
AKT Peerless Project Number
5187L-4-20

Sample Identification and Date		Statewide Default Background Levels	Groundwater Protection: Residential Drinking Water Protection Criteria & RBSLs	Groundwater Protection: Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Protection: Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Protection: Groundwater Contact Protection Criteria & RBSLs	Indoor Air: Residential and Commercial I Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Ambient Air (Y): Residential and Commercial I Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Ambient Air (Y): Residential and Commercial I Finite VSIC for 5 Meter Source Thickness	Ambient Air (Y): Residential and Commercial I Finite VSIC for 2 Meter Source Thickness	Ambient Air (Y): Residential and Commercial I Particulate Soil Inhalation Criteria & RBSLs	Direct Contact: Residential and Commercial I Direct Contact Criteria & RBSLs	Direct Contact: Soil Saturation Concentration Screening Levels	Indoor Air: Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Direct Contact: Industrial and Commercial II	Direct Contact: Soil Saturation Concentration Screening Levels	TP-105 (1-2.5') 09/03/2008	TP-106 (0-3') 09/03/2008	TP-107 (2-4') 09/04/2008	TP-108 (2-4') 09/04/2008	TP-109 (0-1.5') 09/04/2008	TP-109 DUP (0-1.5') 09/04/2008	TP-109 A (1-3') 09/04/2008	TP-110 (0-3') 09/04/2008
Analytes	CAS#																							
Volatile Organic Compounds (VOCs) (µg/Kg)																								
Benzene (I)	71432	NA	100	100	4,000 (X)	2.2E+5	1,600	13,000	34,000	79,000	3.8E+8	1.8E+5	4.0E+5	8,400	4.0E+5 (C)	4.0E+5	ND	ND	ND	ND	ND	ND	ND	55
n-Butylbenzene	104518	NA	1,600	4,600	ID	1.2E+5	ID	ID	ID	ID	ID	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	ND	ND	ND	65
sec-Butylbenzene	135988	NA	1,600	4,600	ID	88,000	ID	ID	ID	ID	ID	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	ND	ND	ND	55
Ethylbenzene (I)	100414	NA	1,500	1,500	360	1.4E+5 (C)	87,000	7.2E+5	1.0E+6	2.2E+6	1.0E+10	1.4E+5 (C)	1.4E+5	1.4E+5 (C)	1.4E+5 (C)	1.4E+5	ND	63	ND	ND	ND	ND	ND	150
Naphthalene	91203	NA	35,000	1.0E+5	870	2.1E+6	2.5E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.6E+7	NA	4.7E+5	5.2E+7	NA	ND	ND	ND	ND	ND	ND	ND	440
n-Propylbenzene (I)	103651	NA	1,600	4,600	NA	3.0E+5	ID	ID	ID	ID	1.3E+9	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	ND	ND	ND	180
Toluene (I)	108883	NA	16,000	16,000	2,800	2.5E+5 (C)	2.5E+5 (C)	2.8E+6	5.1E+6	1.2E+7	2.7E+10	2.5E+5 (C)	2.5E+5	2.5E+5 (C)	2.5E+5 (C)	2.5E+5	ND	250	ND	62	110	63	65	350
Trichloroethylene	79016	NA	100	100	4,000 (X)	4.4E+5	7,100	78,000	1.7E+5	3.9E+5	1.8E+4	5.0E+5 (C,DD)	5.0E+5	37,000	5.0E+5 (C,DD)	5.0E+5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethylbenzene (I)	526738	NA	1,800	1,800	570	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	ND	ND	ND	ND	ND	150
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	2,100	870	1.1E+5 (C)	1.1E+5 (C)	2.1E+7	5.0E+8	5.0E+8	8.2E+10	1.1E+5 (C)	1.1E+5	1.1E+5 (C)	1.1E+5 (C)	1.1E+5	ND	140	ND	ND	ND	ND	ND	390
1,3,5-Trimethylbenzene (I)	108678	NA	1,800	1,800	1,100	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (I)	1330207	NA	5,600	5,600	700	1.5E+5 (C)	1.5E+5 (C)	4.6E+7	6.1E+7	1.3E+8	2.9E+11	1.5E+5 (C)	1.5E+5	1.5E+5 (C)	1.5E+5 (C)	1.5E+5	ND	450	ND	ND	ND	ND	ND	1,200
Remaining VOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs) (µg/Kg)																								
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	NT	NT	NT	NT	ND	420	NT	NT
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	NT	NT	NT	NT	ND	380	NT	NT
Remaining SVOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NT	NT	NT	NT	ND	ND	NT	NT
Polynuclear Aromatic Hydrocarbons (PNAs) (µg/Kg)																								
Acenaphthene	83329	NA	3.0E+5	8.8E+5	4,400	9.7E+5	1.9E+8	8.1E+7	8.1E+7	8.1E+7	1.4E+10	4.1E+7	NA	3.5E+8	1.3E+8	NA	ND	ND	ND	ND	NT	NT	ND	NT
Acenaphthylene	208968	NA	5,900	17,000	ID	4.4E+5	1.6E+6	2.2E+6	2.2E+6	2.2E+6	2.3E+9	1.6E+6	NA	3.0E+6	5.2E+6	NA	ND	ND	ND	ND	NT	NT	ND	NT
Anthracene	120127	NA	41,000	41,000	ID	41,000	1.0E+9 (D)	1.4E+9	1.4E+9	1.4E+9	6.7E+10	7.3E+8	NA	1.0E+9 (D)	7.3E+8	NA	ND	ND	ND	ND	NT	NT	ND	NT
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	ND	ND	1,500	NT	NT	700	NT
Benzo(a)pyrene (Q)	50328	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	2,000	NA	NLV	8,000	NA	ND	ND	ND	1,500	NT	NT	610	NT
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA	ID	80,000	NA	ND	ND	ND	1,700	NT	NT	820	NT
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	8.0E+8	2.5E+6	NA	NLV	7.0E+6	NA	ND	ND	ND	980	NT	NT	400	NT
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2.0E+5	NA	NLV	8.0E+5	NA	ND	ND	ND	670	NT	NT	370	NT
Chrysene (Q)	218019	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	2.0E+6	NA	ID	8.0E+6	NA	ND	ND	ND	1,500	NT	NT	640	NT
Dibenzo(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA	NLV	8,000	NA	ND	ND	ND	ND	NT	NT	ND	NT
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	ND	ND	ND	3,100	NT	NT	1,700	NT
Fluorene	86737	NA	3.9E+5	8.9E+5	5,300	8.9E+5	5.8E+8	1.3E+8	1.3E+8	1.3E+8	9.3E+9	2.7E+7	NA	1.0E+9 (D)	8.7E+7	NA	ND	ND	ND	ND	NT	NT	ND	NT
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	ND	ND	920	NT	NT	490	NT
2-Methylnaphthalene	91576	NA	57,000	1.7E+5	ID	5.5E+6	ID	ID	ID	ID	ID	8.1E+6	NA	ID	2.6E+7	NA	ND	ND	ND	ND	NT	NT	ND	NT
Naphthalene	91203	NA	35,000	1.0E+5	870	2.1E+6	2.5E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.6E+7	NA	4.7E+5	5.2E+7	NA	NT	NT	NT	ND	NT	NT	ND	NT
Phenanthrene	85018	NA	56,000	1.6E+5	5,300	1.1E+6	2.8E+6	1.6E+5	1.6E+5	1.6E+5	6.7E+6	1.6E+6	NA	5.1E+6	5.2E+6	NA	ND	ND	ND	980	NT	NT	790	NT
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	ND	ND	ND	3,400	NT	NT	1,100	NT
Polychlorinated biphenyls (PCBs) (J,T)																								
Various PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NT	NT	NT	NT	ND	ND	NT	ND
Michigan Metals (µg/Kg)																								
Arsenic	7440382	5,800	4,600	4,600	70,000 (X)	2.0E+6	NLV	NLV	NLV	NLV	7.2E+5	7,600	NA	NLV	37,000	NA	550	2,500	3,200	2,200	2,000	2,300	2,300	2,700
Barium (B)	7440393	75,000	1.3E+6	1.3E+6	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	3.7E+7	NA	NLV	1.3E+8	NA	55,000	68,000	130,000	120,000	51,000	71,000	100,000	21,000
Cadmium (B)	7440439	1,200	6,000	6,000	(G,X)	2.3E+8	NLV	NLV	NLV	NLV	1.7E+6	5.5E+5	NA	NLV	2.1E+6	NA	300	270	2,400	610	460	540	470	180
Chromium (III) (B,H)	16065831	18,000 (total)	1.0E+9 (D)	1.0E+9 (D)	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	7.9E+8	NA	NLV	1.0E+9 (D)	NA	3,400	5,100	9,600	6,300	6,200	7,100	5,300	4,800
Copper (B)	7440508	32,000	5.8E+6	5.8E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+8	2.0E+7	NA	NLV	7.3E+7	NA	3,500	25,000	25,000	56,000	27,000	39,000	28,000	17,000
Lead (B)	7439921	21,000	7.0E+5	7.0E+5	(G,X)	ID	NLV	NLV	NLV	NLV	1.0E+8	4.0E+5	NA	NLV	9.0E+5 (DD)	NA	8,300	28,000	67,000	70,000	37,000	47,000	37,000	44,000
Selenium (B)	7782492	410	4,000	4,000	400	7.8E+7	NLV	NLV	NLV	NLV	1.3E+8	2.6E+6	NA	NLV	9.6E+6	NA	ND	310	ND	300	330	420	250	390
Silver (B)	7440224	1,000	4,500	13,000	100 (M); 27	2.0E+8	NLV	NLV	NLV	NLV	6.7E+6	2.5E+6	NA	NLV	9.0E+6	NA	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (B)	7440666	47,000	2.4E+6	5.0E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.7E+8	NA	NLV	6.3E+8	NA	10,000	43,000	310,000	130,000	120,000	170,000	150,000	26,000
Mercury (Total) (B,Z)	Varies	130	1,700	1,700	50 (M); 1.2	47,000	48,000	52,000	52,000	52,000	2.0E+7	1.6E+5	NA	89,000	5.8E+5	NA	ND	72	87	300	84	66	79	59
TAL Elements and Other Metals (µg/Kg)																								
Calcium																	NT	NT	NT	NT	34,000,000	33,000,000	NT	NT
Iron (B)	7439896	1.2E+7	6,000	6,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.6E+8	NA	NLV	5.8E+8	NA	NT	NT	NT	NT	9,700,000	12,000,000	NT	NT
Magnesium (B)	7439954	NA	8.0E+6	2.2E+7	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.7E+9	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT	NT	16,000,000	14,000,000	NT	NT
Potassium																	NT	NT	NT	NT	740,000	910,000	NT	NT
Sodium	17341252	NA	2.5E+6	7.0E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT	NT	210,000	250,000	NT	NT
Antimony	7440360	NA	4,300	4,300	94,000	4.9E+7	NLV	NLV	NLV	NLV	1.3E+7	1.8E+5	NA	NLV	6.7E+5	NA	NT	NT	NT	NT	640	850	NT	NT
Aluminum (B)	7429905	6.9E+6	1,000	1,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	5.0E+7 (DD)	NA	NLV	3.7E+8 (DD)	NA	NT	NT	NT	NT	3,900,000	8,200,000	NT	NT
Beryllium	7440417	NA	51,000	51,000	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+6	4.1E+5	NA	NLV	1.6E+6	NA	NT	NT	NT	NT	ND	510	NT	NT
Cobalt	7440484	6,800	800	2,000	2,000	4.8E+7	NLV	NLV	NLV	NLV	1.3E+7	2.6E+6	NA	NLV	9.0E+6	NA	NT	NT	NT	NT	1,800	2,900	NT	NT
Manganese (B)	7439965	4.4E+5	1,000	1,000	(G,X)	1.1E+8	NLV	NLV	NLV	NLV	3.3E+6	2.5E+7	NA	NLV	9.0E+7	NA	NT	NT	NT	NT	290,000	470,000	NT	NT
Nickel (B)	7440020	20,000	1.0E+5	1.0E+5	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+7	4.0E+7	NA	NLV	1.5E+8	NA	NT	NT	NT	NT	5,300	6,400	NT	NT
Thallium (B)	7440280	NA	2,300	2,300	4,200 (X)	1.5E+7	NLV	NLV	NLV	NLV	ID	35,000	NA	NLV	1.3E+5	NA	NT	NT	NT	NT	ND	ND	NT	NT
Vanadium	7440622	NA	72,000	9.9E+5	1.9E+5	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	7.5E+5 (DD)	NA	NLV	5.5E+6 (DD)	NA	NT	NT	NT	NT	9,300	10,000	NT	NT

Table 1
Summary of Soil Analytical Results
Former Camp Manistique Prison
401 N. Maple
Manistique, Michigan
AECI Project Project Number
5187L-4-20

Sample Identification and Date		Statewide Default Background Levels	Groundwater Protection				Indoor Air	Ambient Air (V)				Direct Contact		Indoor Air	Direct Contact		TP-101 (1-3') 09/05/2008	TP-101 DUP (1-3') 09/05/2008	TP-102 (1-3') 09/05/2008	TP-102 (2-4') 09/04/2008	TP-102 A (4-4.8') 09/05/2008	TP_103 (2-4') 09/04/2008	TP_103 (3-5') 09/04/2008	TP-104 (4-6') 09/04/2008
			Residential Drinking Water Protection Criteria & RRSLs	Industrial and Commercial Drinking Water Protection Criteria & RRSLs	Groundwater Surface Water Interface Protection Criteria & RRSLs	Groundwater Contact Protection Criteria & RRSLs	Residential and Commercial I Soil Volatilization to Indoor Air Inhalation Criteria & RRSLs	Residential and Commercial I Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RRSLs	Residential and Commerical I Finite VSIC for 5 Meter Source Thickness	Residential and Commerical I Finite VSIC for 2 Meter Source Thickness	Residential and Commerical I Particulate Soil Inhalation Criteria & RRSLs	Residential and Commercial I Direct Contact Criteria & RRSLs	Soil Saturation Concentration Screening Levels	Soil Volatilization to Indoor Air Inhalation Criteria & RRSLs	Industrial and Commercial II	Soil Saturation Concentration Screening Levels								
Analytes	CAS#																							
Volatile Organic Compounds (VOCs) (µg/Kg)																								
Benzene (I)	71432	NA	700	700	4,000 (X)	2.2E+5	1,600	13,000	34,000	79,000	3.3E+8	1.8E+5	4.0E+5	8,400	4.0E+5 (C)	4.0E+5	ND	110	ND	ND	62	NT	ND	NT
n-Butylbenzene	104518	NA	1,600	4,600	ID	1.2E+5	ID	ID	ID	ID	ID	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	54	NT	ND	NT
sec-Butylbenzene	135988	NA	1,600	4,600	ID	88,000	ID	ID	ID	ID	ID	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	ND	NT	ND	NT
Ethylbenzene (I)	100414	NA	1,500	1,500	360	1.4E+5 (C)	87,000	7.2E+5	1.0E+6	2.2E+6	1.0E+10	1.4E+5 (C)	1.4E+5	1.4E+5 (C)	1.4E+5 (C)	1.4E+5	ND	ND	63	ND	300	NT	ND	NT
Naphthalene	91203	NA	35,000	1.0E+5	870	2.1E+6	2.2E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.8E+7	NA	4.7E+5	5.2E+7	NA	ND	ND	ND	ND	ND	NT	ND	NT
n-Propylbenzene (I)	103651	NA	1,600	4,600	NA	3.0E+5	ID	ID	ID	ID	1.3E+9	2.5E+6	1.0E+7	ID	8.0E+6	1.0E+7	ND	ND	ND	ND	130	NT	ND	NT
Toluene (I)	108883	NA	16,000	16,000	2,800	2.5E+5 (C)	2.5E+5 (C)	2.8E+6	3.1E+6	1.2E+7	2.7E+10	2.5E+5 (C)	2.5E+5	2.5E+5 (C)	2.5E+5 (C)	2.5E+5	ND	770	190	ND	220	NT	ND	NT
Trichloroethylene	79016	NA	300	300	4,000 (X)	4.4E+5	7,100	78,000	1.7E+5	3.9E+5	1.8E+9	5.0E+5 (C,DD)	3.0E+5	37,000	5.0E+5 (C,DD)	5.0E+5	ND	ND	ND	ND	180	NT	ND	NT
1,2,3-Trimethylbenzene (I)	526738	NA	1,800	1,800	570	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	ND	ND	360	NT	ND	NT
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	2,100	870	1.1E+5 (C)	1.1E+5 (C)	2.1E+7	5.0E+8	5.0E+8	8.2E+10	1.1E+5 (C)	1.1E+5	1.1E+5 (C)	1.1E+5 (C)	1.1E+5	ND	ND	ND	ND	590	NT	ND	NT
1,3,5-Trimethylbenzene (I)	108678	NA	1,800	1,800	1,100	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000	94,000 (C)	94,000 (C)	94,000	ND	ND	ND	ND	100	NT	ND	NT
Xylenes (I)	1330207	NA	5,600	5,600	700	1.5E+5 (C)	1.5E+5 (C)	4.6E+7	6.1E+7	1.3E+8	2.9E+11	1.5E+5 (C)	1.5E+5	1.5E+5 (C)	1.5E+5 (C)	1.5E+5	ND	ND	230	ND	1,200	NT	ND	NT
Remaining VOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	NT	ND	NT
Semi-Volatile Organic Compounds (SVOCs) (µg/Kg)																								
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.7E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	NT	NT	NT	NT	NT	NT	NT	NT
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	NT	NT	NT	NT	NT	NT	NT	NT
Remaining SVOCs	various	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NT	NT	NT	NT	NT	NT	NT	NT
Polynuclear Aromatic Hydrocarbons (PNAs) (µg/Kg)																								
Acenaphthene	83329	NA	3.0E+5	8.8E+5	4,400	9.7E+5	1.9E+8	8.1E+7	8.1E+7	8.1E+7	1.4E+10	4.1E+7	NA	3.3E+8	1.3E+8	NA	ND	ND	ND	ND	NT	ND	ND	ND
Acenaphthylene	208968	NA	5,900	17,000	ID	4.4E+5	1.6E+6	2.2E+6	2.2E+6	2.2E+6	2.3E+9	1.6E+6	NA	3.0E+6	5.2E+6	NA	ND	ND	ND	ND	NT	ND	ND	ND
Anthracene	120127	NA	41,000	41,000	ID	41,000	1.0E+9 (D)	1.4E+9	1.4E+9	1.4E+9	6.7E+10	2.3E+8	NA	1.0E+9 (D)	7.3E+8	NA	ND	ND	ND	ND	NT	ND	ND	1,000
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	ND	ND	ND	NT	ND	ND	1,200
Benzo(a)pyrene (Q)	50328	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.3E+6	2,000	NA	NLV	8,000	NA	ND	ND	ND	ND	NT	ND	ND	1,100
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA	ID	80,000	NA	ND	ND	ND	ND	NT	ND	ND	ND
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	8.0E+8	2.5E+6	NA	NLV	7.0E+6	NA	ND	ND	ND	ND	NT	ND	ND	ND
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2.0E+5	NA	NLV	8.0E+5	NA	ND	ND	ND	ND	NT	ND	ND	ND
Chrysene (Q)	218019	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	2.0E+6	NA	ID	8.0E+6	NA	ND	ND	ND	ND	NT	ND	ND	1,600
Dibenz(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA	NLV	8,000	NA	ND	ND	ND	ND	NT	ND	ND	ND
Fluoranthene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.7E+9	4.6E+7	NA	1.0E+9 (D)	1.3E+8	NA	ND	ND	ND	ND	NT	ND	ND	3,600
Fluorene	86737	NA	3.9E+5	8.9E+5	5,500	8.9E+5	5.8E+8	1.3E+8	1.3E+8	1.3E+8	9.3E+9	2.7E+7	NA	1.0E+9 (D)	8.7E+7	NA	ND	ND	ND	ND	NT	ND	ND	ND
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	NLV	80,000	NA	ND	ND	ND	ND	NT	ND	ND	ND
2-Methylnaphthalene	91576	NA	57,000	1.7E+5	ID	5.5E+6	ID	ID	ID	ID	ID	8.1E+6	NA	ID	2.0E+7	NA	ND	ND	ND	ND	NT	ND	ND	5,400
Naphthalene	91203	NA	35,000	1.0E+5	870	2.1E+6	2.2E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.8E+7	NA	4.7E+5	5.2E+7	NA	NT	NT	NT	NT	NT	NT	ND	NT
Phenanthrene	85018	NA	56,000	1.6E+5	5,300	1.1E+6	2.8E+6	1.6E+5	1.6E+5	1.6E+5	6.7E+6	1.6E+6	NA	3.1E+6	5.2E+6	NA	ND	ND	ND	ND	NT	ND	ND	5,100
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	4.8E+5	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA	1.0E+9 (D)	8.4E+7	NA	ND	ND	ND	ND	NT	ND	ND	3,700
Polychlorinated biphenyls (PCBs) (J,T)																								
Various PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NT	NT	NT	NT	NT	NT	NT	NT
Michigan Metals (µg/Kg)																								
Arsenic	7440382	5,800	4,600	4,600	70,000 (X)	2.0E+6	NLV	NLV	NLV	NLV	7.2E+5	7,600	NA	NLV	37,000	NA	1,900	690	14,000	3,200	610	2,200	1,400	6,300
Barium (I)	7440393	75,000	1.3E+6	1.3E+6	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	3.7E+7	NA	NLV	1.3E+8	NA	260,000	230,000	140,000	130,000	20,000	380,000	130,000	260,000
Cadmium (I)	7440439	1,200	6,000	6,000	(G,X)	2.3E+6	NLV	NLV	NLV	NLV	1.7E+6	5.5E+5	NA	NLV	2.1E+6	NA	1,400	820	970	2,300	130	1,100	170	1,400
Chromium (III) (I,J,H)	16065831	18,000 (total)	1.0E+9 (D)	1.0E+9 (D)	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	7.9E+8	NA	NLV	1.0E+9 (D)	NA	6,500	3,100	5,200	9,600	2,300	2,500	10,000	5,300
Copper (I)	7440508	32,000	5.8E+6	5.8E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+8	2.0E+7	NA	NLV	7.3E+7	NA	16,000	30,000	61,000	25,000	3,000	25,000	5,900	600,000
Lead (I)	7439921	21,000	7.0E+5	7.0E+5	(G,X)	ID	NLV	NLV	NLV	NLV	1.0E+8	4.0E+5	NA	NLV	9.0E+5 (DD)	NA	7,400	6,900	59,000	47,000	2,900	9,200	5,900	110,000
Selenium (I)	7782492	410	4,000	4,000	400	7.8E+7	NLV	NLV	NLV	NLV	1.0E+8	2.6E+6	NA	NLV	9.0E+6	NA	330	210	1,700	ND	430	720	330	1,000
Silver (I)	7440224	1,000	4,500	13,000	380 (M); 27	2.0E+8	NLV	NLV	NLV	NLV	6.7E+6	2.5E+6	NA	NLV	9.0E+6	NA	ND	ND	ND	ND	ND	ND	ND	130
Zinc (I)	7440666	47,000	2.4E+6	5.0E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.7E+8	NA	NLV	6.3E+8	NA	99,000	140,000	75,000	310,000	10,000	130,000	26,000	120,000
Mercury (Total) (I,Z)	Varies	130	1,700	1,700	50 (M); 1.2	47,000	48,000	52,000	52,000	52,000	2.0E+7	1.0E+5	NA	89,000	5.8E+5	NA	ND	ND	63	87	46	ND	ND	230
TAL Elements and Other Metals (µg/Kg)																								
Calcium																	NT	NT	NT	NT	NT	NT	NT	NT
Iron (I)	7439896	1.2E+7	6,000	6,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.6E+8	NA	NLV	5.8E+8	NA	NT	NT	NT	NT	NT	NT	NT	NT
Magnesium (I)	7439954	NA	8.8E+6	2.2E+7	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.7E+9	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT	NT	NT	NT	NT	NT
Potassium																	NT	NT	NT	NT	NT	NT	NT	NT
Sodium	17341252	NA	2.5E+6	7.0E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA	NLV	1.0E+9 (D)	NA	NT	NT	NT	NT	NT	NT	NT	NT
Antimony	7440360	NA	4,300	4,300	94,000	4.9E+7	NLV	NLV	NLV	NLV	1.3E+7	1.8E+5	NA	NLV	6.7E+5	NA	NT	NT	NT	NT	NT	NT	NT	NT
Aluminum (I)	7429905	6.9E+6	1,000	1,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	3.0E+7 (DD)	NA	NLV	3.7E+8 (DD)	NA	NT	NT	NT	NT	NT	NT	NT	NT
Beryllium	7440417	NA	51,000	51,000	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+6	4.1E+5	NA	NLV	1.6E+6	NA	NT	NT	NT	NT	NT	NT	NT	NT
Cobalt	7440484	6,800	800	2,000	2,000	4.8E+7	NLV	NLV	NLV	NLV	1.3E+7	2.6E+6	NA	NLV	9.0E+6	NA	NT	NT	NT	NT	NT	NT	NT	NT
Manganese (I)	7439965	4.4E+5	1,000	1,000	(G,X)	1.8E+8	NLV	NLV	NLV	NLV	3.3E+6	2.6E+7	NA	NLV	9.0E+7	NA	NT	NT	NT	NT	NT	NT	NT	NT
Nickel (I)	7440020	20,000	1.0E+5	1.0E+5	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+7	4.6E+7	NA	NLV	1.5E+8	NA	NT	NT	NT	NT	NT	NT	NT	NT
Thallium (I)	7440280	NA	2,300	2,300	4,200 (X)	1.5E+7	NLV	NLV	NLV	NLV	ID	35,000	NA	NLV	1.3E+5	NA	NT	NT	NT	NT	NT	NT	NT	NT
Vanadium	7440622	NA	72,000	9.9E+5	1.9E+5	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	7.5E+5 (DD)	NA	NLV	5.3E+6 (DD)	NA	NT	NT	NT	NT	NT	NT	NT	NT

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Appendix A

Test Pit Logs

AKT PEERLESS
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TEST PIT LOG

Schoolcraft County
Camp Manistique
400 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-101

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	7.5 feet bgs
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
0		0	FILL	Gray	**TOPSOIL** with sand		Groundwater was sampled from test pit bottom.
		0	FILL		**SAND:** with kiln brick, slag, brick, charcoal - fill - moist		
2		0					
		0	FILL	black tan & gray	**SAND:** with slag, rock and brick - fill - moist charcoal and creosote odor noted at former kiln locations		
4		0					
		0	SP	brown	**SAND:** varved, moist		
6		0					
		0					
8		0	CL	tan-gray	**CLAY:** some fine sand and silt - saturated		
10					Test pit bottom at 9-feet bgs at bedrock. Groundwater flowing south from bedrock at north trench bottom.		
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
400 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-102

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	4.5 feet (perched), 8 feet bgs
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
2		0	FILL	gray-brown	**TOPSOIL:** with sand	M	Groundwater was sampled from test pit bottom.
		0		black	**SAND:** with brick, slag, charcoal, kiln brick, rock, timbers		
		0			charcoal and creosote odor noted at former kiln locations		
4		0					
		0	SP	gray	**SAND:** medium grained - moist	M	
		0			perched water at 4.5-feet bgs		
6		0			sewage odor noted in perched groundwater		
		0			**SAND:** with clay and silt - moist to saturated	W	
8		0			▽		
						W	
10					Test pit bottom at 9-feet bgs at bedrock.		
					Groundwater flowing in from test pit sides.		
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-101

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	7.5 feet bgs
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
2		0	FILL	Gray	**TOPSOIL** with sand		Groundwater was sampled from test pit bottom.
		0	FILL		**SAND:** with kiln brick, slag, brick, charcoal - fill - moist		
		0					
4		0	FILL	black tan & gray	**SAND:** with slag, rock and brick - fill - moist charcoal and creosote odor noted at former kiln locations		
		0					
6		0	SP	brown	**SAND:** varved, moist		
		0					
8		0					
		0	CL	tan-gray	**CLAY:** some fine sand and silt - saturated		
10					Test pit bottom at 9-feet bgs at bedrock.		
					Groundwater flowing south from bedrock at north trench bottom.		
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-102

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	4.5 feet (perched), 8 feet bgs
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
2		0 0 0 0	FILL	gray-brown black	**TOPSOIL:** with sand **SAND:** with brick, slag, charcoal, kiln brick, rock, timbers charcoal and creosote odor noted at former kiln locations	M	Groundwater was sampled from test pit bottom.
4 6 8		0 0 0 0 0	SP	gray	**SAND:** medium grained - moist perched water at 4.5-feet bgs sewage odor noted in perched groundwater **SAND:** with clay and silt - moist to saturated ▽	M W W	
10 12 14 16 18 20					Test pit bottom at 9-feet bgs at bedrock. Groundwater flowing in from test pit sides.		

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-102a

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	6 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
0		0	FILL	gray-brown	**TOPSOIL:** with sand	M	
		0		tan	**SAND:** with bricks at former kiln row - dry		
2		0	FILL	gray	**SAND:** with kiln brick, slag, rock, charcoal, timbers - fill - moist		
		0					
4		0.5	SP	black	**SAND:** with roots, wet	M	
		0	SP	brown	**SAND:** medium grained, saturated	W	
6					Test pit bottom at 6-feet bgs.		
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-102b

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	6.5 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	5 feet bgs (from duct)
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
0		0	FILL	gray-brown tan	**TOPSOIL:** with sand **SAND:** with kiln brick, slag, timbers - fill - moist	M	Found duct running E/W at north end, built on bedrock. Groundwater sample only.
2		0.1 0.2					
4		0.2 0.5			creosote odor noted ▽	M	
6		0 0			aqueduct extending to bedrock	W	
8					Test pit bottom at 6.5-feet bgs.		
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-103

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	5.2 feet bgs
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	TEMPORARY WELL DIAGRAM
0		0	FILL	gray	**SAND:** with slag - fill - dry	M	2 soil samples: 3-4 feet bgs and 3-5 feet bgs.
2		0					
		0					
		0	FILL	black	**SAND:** with charcoal, bricks and slag - moist creosote odor		
4		0			perched water with sheen ▽		
		0			same as above, with peat		
6		0	CL	brown	**CLAY:** some silt, interbedded medium sand - wet	W	
		0					
8		0					
		0			Test pit bottom at 9-feet bgs.		
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
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401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-104

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	6 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
0		0.2	FILL	dk brown	**SAND:** with slag, bricks - fill - moist	M	
		0.2					
2		0.2					
		0.2					
4		4.2	SP	dk brown	**SAND:** fine to medium grained - moist strong creosote odor	M	
		4.2			same as above, with peat		
6					Test pit bottom at 6-feet bgs at bedrock.		
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-105

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	6 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	5 feet bgs (perched)
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
0		0	FILL	black	**Crushed Limestone** **SAND:** with kiln brick, charcoal, stained soil - fill	M	
2		0					Foundation wall running E/W at Test Pit middle
		105	SP	brown	**SAND:** medium grained - moist thin layer of peat and roots	M	Brick floor (kiln bottom?) was noted in test pit from 0.3 to 1 foot.
4		17					
		11.9					No groundwater recovery
6		0		gray	**SAND:** medium grained, with gray clay and silt - wet ▽	W	
8					Test pit bottom at 6-feet bgs at bedrock.		
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
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401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-106

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
0		0.1	FILL	gray	**TOPSOIL**		
		0.1		dk brown	**SAND:** with slag, bricks - fill		
2		0					
		0					
4		0	FILL		**FILL:** slag and iron ore, banded iron formation, unprocessed - very little soil present		
		0					
6		0					
		0					
8		0	CL	gray	**CLAY:** silty, some sand - moist		
					Test pit bottom at 9-feet bgs at bedrock		
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-107

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	overcast, 60 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	5 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
		0.1	FILL	dk brown	**SAND:** with limestone, slag - fill - moist		
		0.1					
2		0.3			same as above, with lenses of charcoal ash, trace of brick		
		0.3					
4		0.3			▽		
					Test pit bottom at 5-feet bgs at bedrock.		
6							
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-108

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	overcast, 60 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	9 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
2		0	FILL	dk brown	**SAND:** medium grained, with limestone and brick - dry to moist - fill		
		0					
		0.1					
		0.1					
4		0					
		0.2	FILL	dk brown	same as above, with wood, brick, wire, some clay - fill	▽	
6		0.2					
		0.1					
8		0.1	SP	tan	**SAND:** fine to medium grained, with clay and silt, some gravel		
					Test pit bottom at 9-feet bgs at bedrock.		
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-109

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	overcast, 60 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	3.5 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
0		0.1	SM	dk brown	**SAND:** medium grained, with organics and roots - moist - wetland soils		Railroad ties noted on upland at wetland boundary. (Fmr. RR spur running to south)
		0.1					
2		0.1	SP	tan	**SAND:** fine, mottled - moist	M	
4					Test pit bottom at 3.5-feet bgs at bedrock.		No evidence of former stream as identified in Phase I ESA
6							West end of Test Pit identified as TP-109a due to higher ground surface from prison berm.
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-109a

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	overcast, 60 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	6.5 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
2		0.1	FILL	dk brown	**SAND:** with slag, limestone, brick - moist - fill (prison berm fill)		
		0.2					
		0.2					
4		0.1	SM	dk brown	**SAND:** medium grained, wetland soils with roots and organics - moist	M	
		0.1	SP	tan	**SAND:** fine grained, mottled - moist		
6		0.1					
					Test pit bottom at 6.5-feet bgs at bedrock.		
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-110

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	overcast, 60 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	4.5 feet bgs
Date of Excavation:	09/04/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
2		0	SM	dk brown	**SAND:** medium grained, with organics and roots (wetland soils) - moist	M	Railroad ties noted at 0.5-1 foot bgs. Minimal ballast noted below ties.
		0.1	SP	tan	**SAND:** fine grained, some silt, clay and gravel - dry	D	
		0.1					No evidence of former stream identified in Phase I ESA report.
4		0.1					
					Test pit bottom at 4.5-feet bgs at bedrock.		
6							
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-111a

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	5 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
2		0.3	FILL	brown	**SAND:** medium grained, with slag, vegetative debris, bricks, and pipe - moist	M	
		0.3					
		0.2	CL	tan	**CLAY:** some sand with silt - moist	M	
4		0.2					
		0.2					
6					Test pit bottom at 5-feet bgs at bedrock.		
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-111b

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	5 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
2		0.3	FILL	brown	**SAND:** medium grained, with slag, vegetative debris, bricks, and pipe - moist	M	No sample taken.
		0.3					
		0.2					
4		0.2	CL	tan	**CLAY:** some sand with silt - moist	M	
		0.2					
6					Test pit bottom at 5-feet bgs at bedrock.		
8							
10							
12							
14							
16							
18							
20							

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TEST PIT LOG

Schoolcraft County
Camp Manistique
401 N. Maple, Manistique
PROJECT NUMBER: 5187L

TP-112

Drawn By: JEB
Date: 09/15/08

Excavation Company:	Manistique Rentals, Inc.	Weather:	sunny, 65 degrees
Field Engineer:	Robb Cookman, UPEA	Exploration Depth:	3.5 feet bgs
Date of Excavation:	09/03/08	Depth to GW:	n/a
Exploration Method:	Test Pit	Screen Interval:	n/a
		Screen Material:	n/a

DEPTH FEET	SAMPLE INTERVAL	PID VALUE	USCS SOIL CLASS.	COLOR	GEOLOGIC DESCRIPTION	MOISTURE	NOTES
		1.3	FILL	dk brown	**SAND:** medium grained, trace peat and organics - moist	M	Two soil samples taken: 0-1.5 feet bgs and 2-2.5 feet bgs
		1.4	FILL	black	**Crushed Limestone**, some black soil and charcoal	M	
2		1.3	FILL	dk brown	**SAND:** with charcoal - moist	M	
		0	SP	lt brown	**SAND:** medium grained, moist	M	
4					Test pit bottom at 3.5-feet bgs at bedrock.		
6							
8							
10							
12							
14							
16							
18							
20							

AKTPEERLESS
environmental services

Appendix B

Low-Flow Sampling Logs

Project Number 419-26562

EXAMPLE (Minimum Requirements)

WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) Camp Manistique

Well Number TP-101 Date 9/3/08

Field Personnel: R. Cookman

Sampling Organization: **U.P.E.A, Inc.**

Depth to _____ / _____ of screen
(below TOC) top bottom

Pump Intake at (ft. below TOC)

Purging Device; (pump type): **GEOPUMP 2 Peristaltic**

Monitoring Devices: **YSI 556 and Hach**

Clock Time 24 HR	Water Depth below TOC Ft	Pump Dial [1]	Purge Rate ml/min	Cum. Volume Purged Gal.	Temp. °C	Spec. Cond. [2] mS/cm	DO %	DO Mg/L	pH	ORP/ Eh [3] mv	Turbidity NTU	Comments
9:15	~~9.33~~			3gal	11.82	1.082	8.7	0.94	6.31	-60.9		
9:19					11.71	1.082	8.5	0.92	6.31	-56.9		Grey turbid.
9:25					11.80	1.081	8.3	0.90	6.82	-65.4		
9:30	Sampled & Dup			HNO_3, HCl, Amber								Grey turbid

1. Pump dial setting (for example: hertz, cycles/min, etc.).
2. mSiemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (Minimum Requirements)

WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) Camp Mauristine

Well Number TP-102 Perched Date 9/3/08

Field Personnel: R. Cook

Sampling Organization: **U.P.E.A, Inc.**

Depth to ____ / ____ of screen
(below TOC) top bottom

Pump Intake at (ft. below TOC)

Purging Device; (pump type): **GEOPUMP 2 Peristaltic**

Monitoring Devices: **YSI 556 and Hach**

Clock Time 24 HR	Water Depth below TOC Ft	Pump Dial [1]	Purge Rate ml/min	Cum. Volume Purged Gal.	Temp. °C	Spec. Cond. [2] mS/cm	DO %	DO Mg/L	pH	ORP/ Eh [3] mv	Turbidity NTU	Comments
12:12	Started											Perched water table
12:20	—	—		1.5	13.58	1.045	6.5	0.68	6.69	-167.6		Some small rocks
12:25				1.8	13.65	1.045	6.7	0.70	6.71	-170.6		clear
12:30	—	Sampled		2.0	13.66	1.045	6.3	0.64	6.73	-170.6		clear
		3 VOAs, HNO3, Amber										
			Note: Water ran from E-W trending Buried Wood Path 5' BGS									

1. Pump dial setting (for example: hertz, cycles/min, etc.).
2. mSiemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

Page 1 of 1
Project Number A19-26562

EXAMPLE (Minimum Requirements)
WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) Camp Marstrand
Well Number TP 102b Date 9/3/08
Field Personnel: Robb Cockman
Sampling Organization: **U.P.E.A, Inc.**

Depth to _____ / _____ of screen
(below TOC) top bottom
Pump Intake at (ft. below TOC)
Purging Device; (pump type): **GEOPUMP 2 Peristaltic**
Monitoring Devices: **YSI 556 and Hach**

Clock Time 24 HR	Water Depth below TOC Ft	Pump Dial [1]	Purge Rate ml/min	Cum. Volume Purged Gal.	Temp. °C	Spec. Cond. [2] mS/cm	DO %	DO Mg/L	pH	ORP/ Eh [3] mv	Turbidity NTU	Comments
14 48				0.5	12.33	1.100	[illegible]	3.5	[illegible]	-[illegible]		
14 [illegible]				0.[illegible]	12.51	1.[illegible]	26.6	2.60	[illegible]	-[illegible]		
14 [illegible]				1.3	12	1.095	17.3	1.71	0.91	-[illegible]		
15 [illegible]				1.5	13.[illegible]	1.093	16.1	1.6[illegible]	0.[illegible]	192.6		
	Sampled HACs VOAs DRAIN											
					Strong creosote odor & dark color							

1. Pump dial setting (for example: hertz, cycles/min, etc.).
2. mSiemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

Page 1 of
Project Number A19-26562

EXAMPLE (Minimum Requirements)

WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) Camp Mennentine

Well Number TP-103 Date 9/4/08

Field Personnel: Robb Cedarwall

Sampling Organization: U.P.E.A, Inc.

Depth to _____ / _____ of screen
(below TOC) top bottom

Pump Intake at (ft. below TOC)

Purging Device; (pump type): GEOPUMP 2 Peristaltic

Monitoring Devices: YSI 556 and Hach

Sample Location in line w/ middle Kiln Road

Clock Time 24 HR	Water Depth below TOC Ft	Pump Dial [1]	Purge Rate ml/min	Cum. Volume Purged Gal.	Temp. °C	Spec. Cond. [2] mS/cm	DO %	DO Mg/L	pH	ORP/ Eh [3] mv	Turbidity NTU	Comments
1330				0.5	13.15	0.876	40.5	4.24	6.91	-4.6		Steam on water
1335				0.8	13.19	0.892	41.0	4.27	6.87	8.4		Not Purging
1340				1.1	13.13	0.853	40.8	4.27	6.87	11.6		
1345				1.5	13.14	0.883	41.0	4.31	6.55	18.2		
	Sampled 1345				VOAs Ambers			HNO3				
				TP-103 Dup				‡	TP-103			Matrix Spike
				Field Blank		1530						
				Field Blank		1545						

1. Pump dial setting (for example: hertz, cycles/min, etc.).
2. mSiemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).