

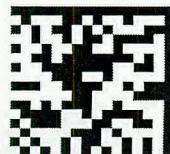
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Work Plan For:

**TIME CRITICAL REMOVAL ACTION
AT SITE 15 AT HANCOCK FIELD
SYRACUSE, NEW YORK**

Project No.:

Contract No.: DAKF11-00-A-0030

Prepared For:



AIR NATIONAL GUARD BUREAU

Environmental Division
Installation Restoration Program
3500 Futchet Avenue
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OCTOBER 2001



PARSONS

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NATIONAL GUARD BUREAU
LIST OF ACRONYMS AND ABBREVIATIONS

A-E	Architect-Engineer
AFB	Air Force Base
AMSL	Above Mean Sea Level (elevation)
ANG	Air National Guard
ANGRC	Air National Guard Readiness Center
AQC-E	Acquisition Contract Division
ARARs	Applicable or Relevant and Appropriate Requirements
BACT	Best Available Control Technology
BAT	Best Available Technology
BD	Business Development
BD/DR	Building Demolition/Debris Removal
bgs	below ground surface
BTEX	Petroleum Related Compounds (Benzene, Toluene, Ethylbenzene, Xylenes)
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituents of Concern
COR	Contracting Officer's Representative
C.I.H.	Certified Industrial Hygienist
C.S.P.	Certified Safety Professional
CWA	Clean Water Act
DFAR	Defense Federal Acquisition Regulations
DFR	Daily Field Report
DOD	Department of Defense
DOT	Department of Transportation
DQOs	Data Quality Objectives
DRMO	Defense Reutilization and Marketing Office
EOD	Explosive Ordnance Disposal
EPA	U. S. Environmental Protection Agency
FAR	Federal Acquisition Regulations
FEMA	Federal Emergency Management Agency
FS	Feasibility Study
FW	Fighter Wing
GW	Groundwater

NATIONAL GUARD BUREAU
LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

HASP	Health and Safety Plan
HSA	Hollow Stem Auger
HWM	Hazardous Waste Management
IDW	Investigation Derived Waste
IRP	Installation Restoration Program
IRPIMS	Installation Restoration Program Information Management System
LNAPLs	Light Non-Aqueous Phase Liquids
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
mg/Kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Contingency Plan
NGB	National Guard Bureau
NYANG	New York Air National Guard
NYSDEC	State of New York Department of Environmental Conservation
NYSDOH	State of New York Department of Health
OSHA	Occupational Safety and Health Administration
Parsons	Parsons Engineering Science, Inc.
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo Ionization Detector
PM	Project Manager
PMP	Program Management Plan <i>or</i> Project Management Plan
POL	petroleum, oil, and lubricant
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
ppb	parts per billion
ppm	parts per million
PPPS	Pollution Prevention Program Study
PR/TS	Product Recovery/Treatability Study
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation

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**NATIONAL GUARD BUREAU
LIST OF ACRONYMS AND ABBREVIATIONS**

(continued)

RS	Responsiveness Summary
SAP	Sampling and Analysis Plans
SOW	Scope of Work
SVE	soil vapor extraction
SVOC	semi-volatile organic compounds
TCL	Toxic Compound List
TPH	total petroleum hydrocarbons
TSCA	Toxic Substance Control Act
UFPO	Underground Facilities Protection Organization
USPFO	U.S. Property and Fiscal Office
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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SECTION 1

INTRODUCTION

1.1 PROJECT OBJECTIVES AND SCOPE

1.1.1 Objectives

The objective of the Hancock Site 15 Time Critical Removal Action is to reduce the risk to potential receptors by excavation and removal of the PCB-contaminated soil from Site 15. Supplemental objectives include additional investigation of groundwater conditions at and downgradient of Site 15 (as requested by NYSDEC) and selected monitoring well rehabilitation and abandonment.

1.1.2 Scope of Work

Field work will consist of excavation and off-site disposal of PCB-contaminated soil, removal and off-site disposal of steel from adjacent tanks, monitoring well rehabilitation and abandonment, and groundwater investigation. Each of these elements is described in detail below.

1.1.2.1 Soil Removal and Disposal

The field work task will be conducted based on the following work scope:

- Remove the existing unused concrete pad, pump house foundation, and six 25,000-gallon underground storage tanks. Concrete from underground storage tanks will be left in place as backfill. Metal from storage tanks will be properly disposed off-site;
- Excavate shallow soil (0-2 feet below ground surface (bgs)) contaminated with PCBs over 1 parts per million (ppm). The area to be excavated is limited to the area immediately southeast of the former pump house, as shown in Figure 1.3, plus surface soils in a small drainage swale northwest of the former pump house. Confirmatory soil sampling will be conducted using 25-foot by 25-foot grids to demonstrate that PCB cleanup levels of 1 ppm for surface soils and 10 ppm for subsurface soils are achieved. Confirmatory composite samples will be collected from the bottom and sides of the excavations to verify attainment of cleanup standards. Samples will be analyzed using USEPA verified PCB Immunoassay Field Test Kits in accordance with the Sampling and Analysis Plan presented as Appendix C. In addition to field testing, 10 percent of confirmatory samples will be sent to the subcontracted laboratory for PCB analysis by USEPA Method SW-846;
- Excavate deep soil with PCBs over 10 ppm. The area to be excavated is limited to the area immediately southeast of the former pump house, as shown

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in Figure 1.4. Excavation side walls will be sloped or shored in accordance with Subpart P of 29 CFR 1926. The excavation will be dewatered as needed, to allow deep soil removal to proceed. Water that needs to be managed above ground will be managed in accordance with SPDES requirements. Confirmatory composite samples will be collected from 25-foot by 25-foot grids at the bottom and sides of the excavation to verify attainment of PCB subsurface soil cleanup objective of 10 ppm. Samples will be analyzed using USEPA verified PCB Immunoassay Field Test Kits in accordance with the Sampling and Analysis Plan presented as Appendix C. In addition to field testing, 10 percent of collected samples will be sent to the subcontracted laboratory for PCB analysis by USEPA Method SW-846. Any obvious separate phase liquid within the excavation would also be removed.

- Dispose soil off site at an appropriate licensed facility;
- Dispose of accumulated water from excavation dewatering at an appropriate permitted treatment facility. Waste groundwater that needs to be removed to allow excavation to continue will be stored, treated on site as needed, and either released adjacent to the site based on approval from the NYSDEC or transported to a suitable offsite disposal facility that can accept this water. Options do not include municipal wastewater treatment at Onondaga County Department of Drainage and Sanitation facilities based on input received recently from the County.
- Perimeter air monitoring at four stations, over an anticipated construction time period of three weeks. Air monitoring will continue for the duration of the PCB soil removal work;
- Backfill excavation to original grade using the concrete from the concrete pad, former pump house foundation, and underground storage tanks. Large chunks of concrete will be placed so that clean excavated material and off-site fill can be compacted around the concrete. Reseed area to establish vegetative cover;
- The concrete will be separated from PCB-impacted soil and tested for PCBs. If PCB soil cleanup objectives are exceeded, the concrete will not be placed back in the excavation;
- The sumps and oil-water separator (as they exist in place) will be removed, crushed, and tested for PCBs like the concrete from the tanks, and disposed based on PCB results; and
- Remove and dispose of existing JP-8 pipeline (Figure 1.2), as required, from the limits of excavation. The remaining section will be capped and left in place. Parsons has assumed that the pipeline has been drained of product and cleaned. IF LNAPL is found within the pipeline, the LNAPL will be drained and disposed properly offsite as the pipeline is removed from within the excavation area.

1.1.2.2 Monitoring Well Rehabilitation and Abandonment

This task will be conducted based on the following work scope:

- Abandon MW-5 in accordance with NYSDEC Groundwater monitoring Well Decommissioning Procedures (NYSDEC, 1996);
- Install new concrete pad and flush mount curb box at MW-13 following completion of grading activities;
- Install new concrete pad and flush mount curb boxes for MW-1,2,3,4 and 9;
- Replace protective casing for MW-16; and
- Remove PVC casing to allow protective casing to lock.

These activities will be completed during the field portion of the project.

1.1.2.3 Additional Groundwater Investigation

During this task, subsurface investigation work adjacent to Site 15 south of Molloy Road will be conducted. The investigation will include collection of groundwater samples at six new locations up to 150 feet south (downgradient) of Molloy Road, as shown in Figure 1.5. The samples will be collected from temporary (direct push) well points, and will be analyzed for both BTEX and PCBs using USEPA Method 8260 and USEPA Method 8082, respectively. Samples at four of the six locations will be collected from shallow groundwater 10 to 15 feet bgs. Samples at the other two locations will be collected from 30 to 40 feet bgs. In addition, samples will be collected from eleven previously installed monitoring well points (MWs 2, 6s, 6d, 9, 11, 15, 19, 20, 21, 22, and 23). Upon completion, a brief report will be prepared summarizing the results of the investigation.

1.2 SITE HISTORY

The 174th Fighter Wing of the New York State Air National Guard is based at Hancock Field, a former Air Force Base located two miles north-northeast of the City of Syracuse in Onondaga County in central New York (Figure 1.1). Site 15 is part of the land used by the 174th Fighter Wing and is comprised of approximately 2.5 acres in area consisting of brush vegetation, wooded vegetation in the southern portion adjacent to Molloy Road, a large concrete pad, a former pump house foundation, a bermed area where a JP-8 aboveground tank was formerly located, and two drainage swales (Figure 1.2). The entire site is fenced and located within the Air National Guard Base at Hancock Field directly adjacent to the Syracuse Hancock Airport.

Three drainage swales and an oil-water separator remain in place below the floor of the raised pump house. In addition, underground storage tanks remain in place outside the northeast end of the pump house, and one dry well remains outside the northwest end of the pump house. The underground storage tanks have been closed in place with concrete. Other than these underground tanks and some monitoring wells, no other

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subsurface structures remain at the site. The only remaining surface structures are the foundation of the pump house and a large concrete pad south of the pump house.

The sources of PCBs and BTEX in soil and groundwater are three historical spills in the vicinity of the pump house (HWRAP, 1997). The first was a spill of PCBs before 1980 presumably associated with transformers in front (south) of the pump house. The second was a 4,000-gallon spill of JP-4 inside the pump house in April 1990. The third was a 150-gallon spill of JP-8 in June 1994. Both JP-4 and JP-8 are forms of jet fuel that are lighter than water. Fuel spilled in 1990 reportedly entered three sumps inside the pump house and mixed with PCB-contaminated sediment. Following the second spill, contaminated surface soils were removed, and the area was backfilled with gravel and crushed stone. Fuel from the third spill was contained before it was able to migrate.

1.3 RESULTS FROM INVESTIGATION WORK

Six investigations/studies of Site 15 have taken place during the period from June 1990 to January 2001. Results of these investigations/studies are summarized briefly below.

1.3.1 Spill Investigation (June 1990)

Site 15 was not evaluated in any of the investigations previously conducted at Hancock Field. In June 1990, investigation of the spill that occurred in April 1990 consisted of the installation and sampling of four monitoring wells (MW-1, MW-2, MW-3, MW-4) and the collection of 15 soil samples. PCBs were detected at a maximum concentration of 23 mg/kg or parts per million in the soil. No PCBs were detected in the groundwater samples, but benzene was found at a maximum concentration of 510 µg/L (Radian, 1994).

1.3.2 First Site Investigation (November and December 1990)

Following a NYSDEC request for further study of Site 15, field work for a Base POL Area Site Investigation Report was conducted in November and December 1990. Six soil borings were drilled and completed as groundwater monitoring wells (MEMW-5 through MEMW-10, later referred to as MW-5 through MW-10), and groundwater samples were collected from these and the four previously-installed monitoring wells. Sixteen shallow soil, several sump seepage water, two surface water, and two sediment samples were also collected. The soil samples were taken from the west, south, and east sides of the pumphouse while the sump seepage water samples came from groundwater allowed to seep into a clean, dry sump in the pumphouse. Sediment and surface water samples were collected from the drainage swale located on the northeast side of the site. All of the samples were analyzed for PCBs and/or petroleum hydrocarbons (Radian, 1994, and M&E, 1995).

Soil and sump seepage water samples were analyzed for PCBs. PCB concentrations in soil samples from the area in front of (on the southeast side of) the pumphouse ranged

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from "not detectable" to 240 mg/kg. PCB concentrations in the sump seepage water were as high as 120 ppm for Aroclor-1260 and 15 ppm for Arclor-1254 (M&E, 1995).

Groundwater, sump seepage water, surface water, and sediment samples were analyzed for petroleum hydrocarbons. Groundwater samples at the site contained up to 700 mg/L of benzene, 520 mg/L of ethylbenzene, 1,800 mg/L of xylenes, and 2.3 mg/L of TPH. Hydrocarbons did not appear to be present beneath the pumphouse, based on results of the sump seepage water analysis. No BTEX or TPH compounds were detected in surface water or in sediment samples collected near the site (Radian, 1994).

1.3.3 Second Site Investigation (June and July 1994)

In June and July of 1994, another site investigation was performed. Groundwater samples were collected from nine of the ten monitoring wells (MW-5 was damaged) and analyzed for VOCs, TPH, and PCBs. Concentrations in groundwater samples from the monitoring wells had not changed by more than a factor of 2 or 3 since 1990. Petroleum hydrocarbons were detected at increased levels at MW-7 and MW-2, but were not detected at the outermost monitoring wells (MW-8, MW-9, and MW-10). The detection of PCB, Aroclor-1260, in groundwater from MEMW-6 was consistent with the detection of PCBs in shallow soil samples that were collected from the area in front of the pumphouse during the previous investigation (M&E, 1995).

1.3.4 Remedial Investigation (1995 and 1996)

A RI was performed in 1995 and 1996 with the purpose of defining the nature and extent of PCB and jet fuel-related impacts on the soil and groundwater. During the course of the investigation, phenol was unexpectedly encountered, so the investigation was expanded to evaluate the potential sources of phenol (HWRAP, 1997).

Several new monitoring wells were installed during the RI:

- MW-5R was installed to replace MW-5, which had been found to be damaged ES new shallow wells were installed: MW-11, MW-12S, and MW-13.
- Two deep monitoring wells were installed: one paired with MW-6S and one paired with MW-12S.

Groundwater samples were collected from all of the previously-installed, intact wells and all of the newly-installed wells. A total of 98 soil samples were collected from across the entire site and in areas around the site. Four sediment samples were also collected: three from the southwestern drainage swale and one from the northeastern drainage swale. Borings for the soil and sediment samples were advanced using a hand auger or a Geoprobe.

VOCs were observed in the soil at three areas: northeast, southwest, and in front of the pumphouse. VOCs extended from 2 feet bgs to the water table (at 10.5 to 16 feet). SVOCs were restricted mainly to an area on the northeast side of the pumphouse (HWRAP, 1997).

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VOCs and SVOCs were also present in groundwater. The horizontal extent of the plume is in a downgradient direction extended to the wooded area approximately 100 feet southeast of the site, but not beyond property owned by the ANG. A localized area of free product, about six inches thick, was found at the leading edge of the plume. Based on samples from two deep wells, product in the groundwater did not appear to have migrated vertically (HWRAP, 1997).

PCBs were found in the soil in front of and on either side of the pumphouse. For the most part, the vertical extent of the PCBs was limited to the top four feet of soil. Groundwater, however, did not appear to have been impacted by PCBs (HWRAP, 1997).

During the RI, phenol was detected in many of the soil samples. The phenol impacts appeared to be random and unrelated to jet fuel; the highest concentrations were found in background samples. According to the RI report, the most likely source of the phenols is an herbicide application that took place in May 1995, three months before the RI sampling began (HWRAP, 1997).

1.3.5 Treatability Study (May 1998 and September-October 1999)

The initial investigation for the treatability study was conducted primarily because of the presence of free product in MW-12S, which had been installed during the RI. Free product had been found during the RI and in August 1997, when MW-12S was checked again. The purpose of the investigation for the treatability study was to delineate the free product plume and to initiate a product recovery program. Four monitoring wells (MW-14 through MW-17) and one recovery well (RW-1) were installed, but no free product was found in any of these wells, in MW-12S, or in any of the pre-existing wells in the area of MW-12S. The recovery well and MW-12S were gauged five more times within a year, and no product was found. Based on these results, no product recovery pump was installed (Aneptek, 1999).

At the request of the NYSDEC, an investigation of BTEX in groundwater was conducted. In May 1998, groundwater samples were collected from the four new monitoring wells and analyzed for VOCs. Benzene and/or ethylbenzene were found in MW-14 and MW-15. In the fall of 1999, 24 temporary groundwater sampling points were installed to delineate the dissolved phase BTEX in the groundwater. Three permanent groundwater monitoring wells (MW-18, MW-19, MW-20) were also installed. Groundwater samples from 21 temporary points, 16 monitoring wells, and RW-1 were screened onsite for VOCs. BTEX compounds were found in 24 of the sample locations.

During the September-October 1999 sampling event, free product was recovered in bailers at three of the temporary sampling points and one of the wells. Product samples from these four locations were analyzed for PCBs, and PCBs were detected in two of the samples (Aneptek, 1999).

Also in September and October of 1999, two rounds of samples were collected from MW-18, MW-19, and MW-20 and were analyzed for VOCs, SVOCs, TPH, PCBs, and

metals. The extent of the free product plume and the PCB plume were found to be nearly the same, covering an area from the pumphouse under the concrete pad to the area southeast of the former AST. BTEX compounds, however, were found in groundwater as far south as MW-19 (Aneptek, 1999).

1.3.6 Remedial Investigation (2000 and 2001)

On December 18, 2000, six surface soil samples were collected southeast of the former pumphouse and concrete pad at Site 15. Each surface soil sample was obtained using a stainless steel hand-driven auger. The hand-driven auger was decontaminated between each soil boring location utilizing an Alconox and distilled water wash and rinse. Each surface soil sample was collected from 0 to 1 feet bgs and submitted to Galson Laboratory of East Syracuse, New York for total PCB analysis using USEPA SW-846 Method 8082.

In addition, fourteen surface soil samples were collected from the two swales that originate north and northeast of the former pumphouse and concrete pad. These surface soil samples were collected on December 18, 2000 and January 30, 2001. These surface soil samples were collected from 0 to 1 feet below ground surface using the same collection procedure as presented above for the other six soil samples. One soil sample at each location was collected from the bottom of the swale, and two grab samples were collected from the sidewalls of the swale and composited into one sample. Surface soil samples were submitted to Galson Laboratories of East Syracuse, NY for total PCB analysis using USEPA SW-846 Method 8082.

Also, as part of the surface soil sampling program, the quality assurance/quality control samples collected and analyzed in accordance with the approved work plan were a duplicate, matrix spike, matrix spike duplicate, and equipment blank.

Twenty surface soil and seventeen groundwater samples were submitted for laboratory analysis as part of this investigation. Detailed analytical results generated during this investigation were stored and managed by Parsons using Paradox™ database software. Analytical results were provided by the laboratory on diskettes and imported directly into the database. The results were subsequently adjusted to reflect any changes resulting from data validation results.

PCBs were detected in 19 of the 20 soil samples collected during the Data Gap Investigation. Concentrations of PCBs within the soil ranged from 28 µg/kg (or ppb) at SS-01 (0 to 1 foot) and SS-15 (0 to 1 foot) to 1,600 µg/kg, or 1.6 ppm, at SS-19 (0 to 1 foot). The downstream extent of surface soil exceeding one part per million PCBs in the drainage swale west of the concrete pad has not yet been determined.

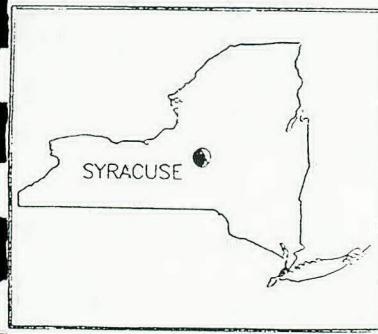
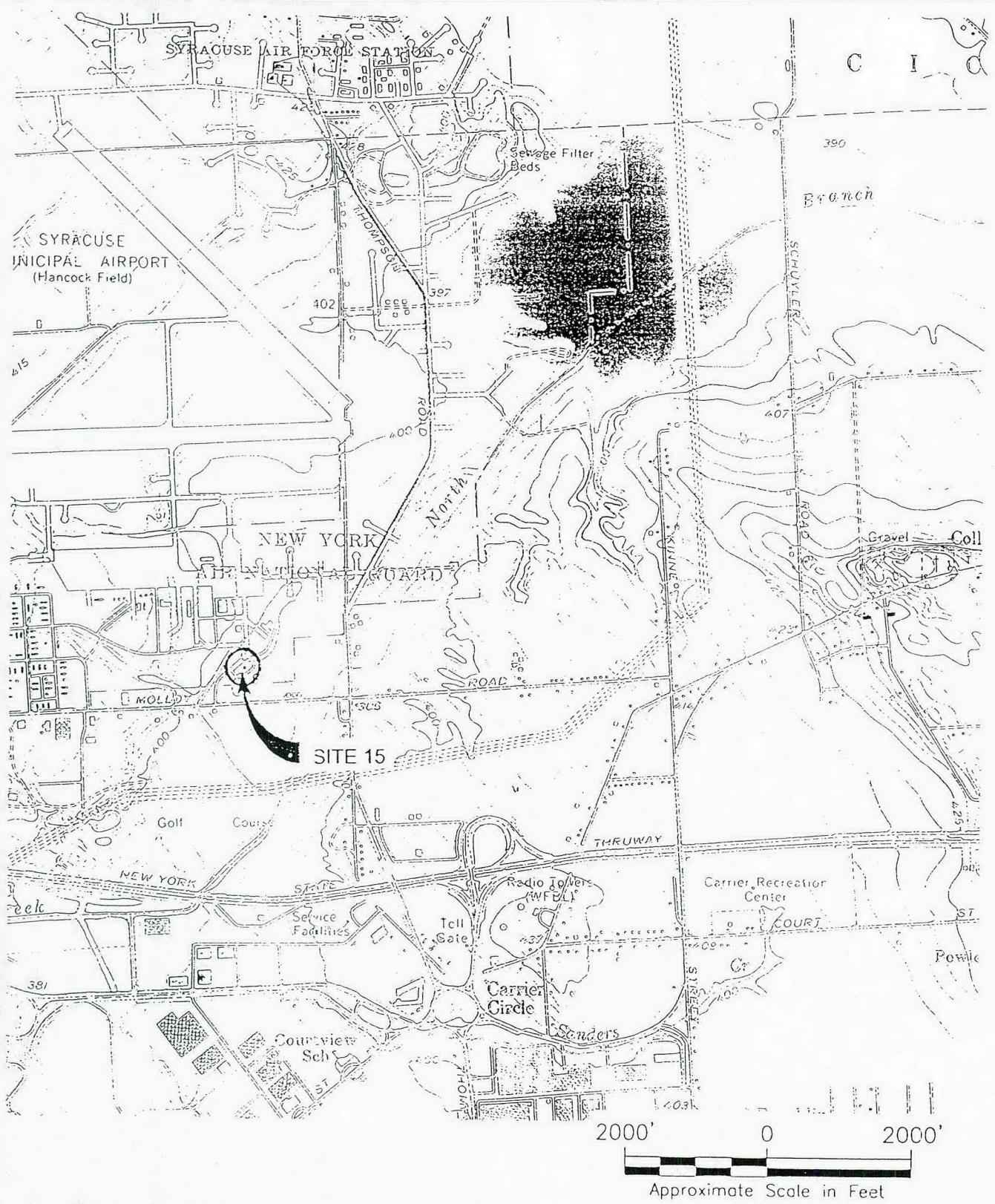
1.4 WORK PLAN ORGANIZATION

This work plan is organized into eleven sections and four appendices. The project objectives, scope of work, site history, and other available information are presented in

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Section 1. Project management information is provided in Section 2 and the Action Memorandum is presented in Section 3. Section 4 describes required approvals and permits for the project. Remedial design activities are described in Section 5. Remedial Action Procedures are presented in Section 6; Monitoring Well Rehab procedures are described in Section 7, and a summary of the Golf Course Investigation Procedures are presented in Section 8. The optional Public Meeting is discussed in Section 9. Section 10 describes the completion report, and references are included in Section 11. Appendix A contains the site specific Health and Safety Plan. Appendix B contains the Quality Assurance Project Plan. Appendix C contains the Field Sampling and Analysis Plan. A supplement to the Action Memorandum is provided as Appendix D.

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LATITUDE: N45° 06' 01"
LONGITUDE: W76° 06' 06"

SOURCE: USGS 7.5 MINUTE
SERIES (TOPOGRAPHIC)
SYRACUSE EAST QUADRANGLE
1957

FIGURE 1.1

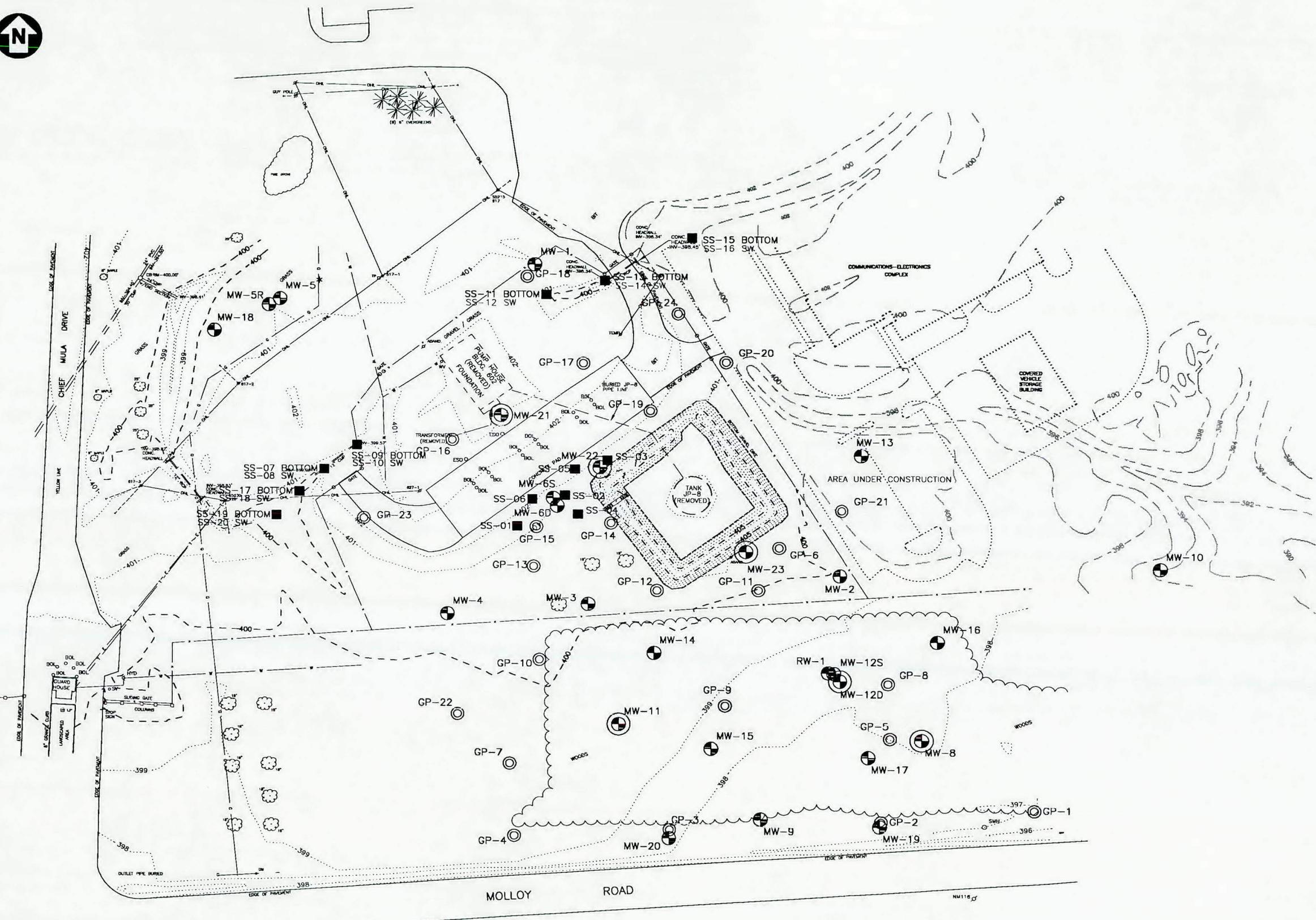
NATIONAL GUARD BUREAU
SITE 15 AT HANCOCK FIELD
SYRACUSE, NEW YORK

SITE LOCATION MAP

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290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13086, PHONE: 315-451-9560



LEGEND:

- MW-1 EXISTING MONITORING WELL LOCATION
- MW-21 NEWLY INSTALLED AND/OR RE-INSTALLED MONITORING WELL LOCATION (JANUARY 2001)
- RW-1 EXISTING RECOVERY WELL LOCATION
- SS-01 SHALLOW SOIL OR SEDIMENT SAMPLE LOCATION (DEC 2000)
- GP-11 PREVIOUS DIRECT PUSH LOCATIONS
- SW SIDE WALLS OF SWALE
- BOTTOM BOTTOM OF SWALE
- MW-6S SHALLOW MONITORING WELL
- MW-6D DEEP MONITORING WELL
- * NON-FUNCTIONAL MONITORING WELL (MW-5)

100 50 0 100 200

FIGURE 1.2

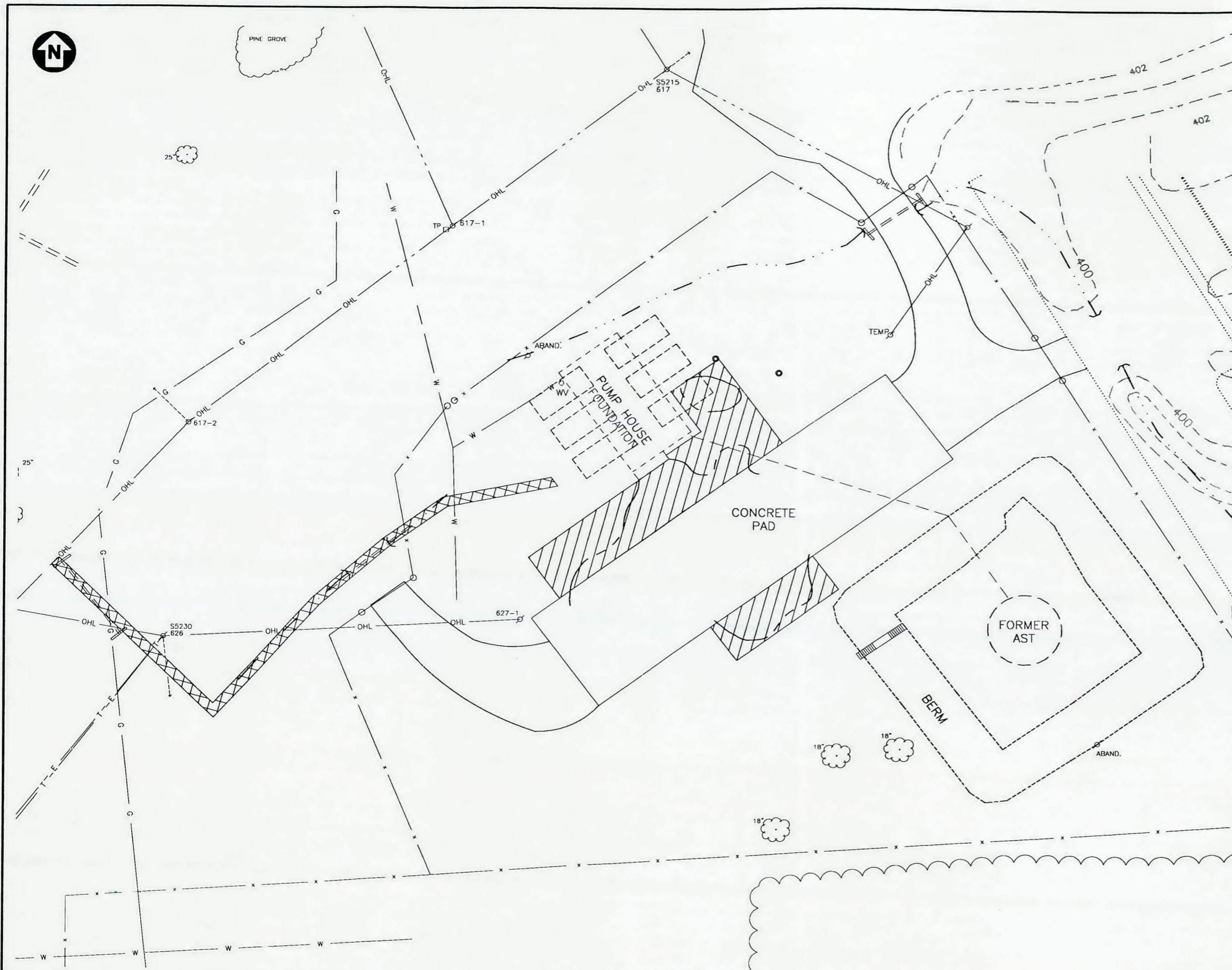
SITE 15, HANCOCK FIELD
SYRACUSE, NEW YORK

SITE MAP

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LEGEND:

- SW SIDE WALLS OF SWALE
- DOTTOM BOTTOM OF SWALE
- FENCE LINE
- INTERMITTENT DRAINAGE SWALES
- APPROXIMATE OUTLINE OF AREA OF SURFICIAL (0-2') PCB CONTAMINATION EXCEEDING NYSDEC ACTION LEVEL OF 1000 ug/Kg
- SHALLOW EXCAVATION (0-2 FEET BGS) - PCB IMPACTED SOIL
- SEDIMENT EXCAVATION - PCB IMPACTED SOIL

50 25 0 50 100

SCALE: 1"=50'

FIGURE 1.3

SITE 15, HANCOCK FIELD
SYRACUSE, NEW YORK

SHALLOW SOIL
EXCAVATION AREAS

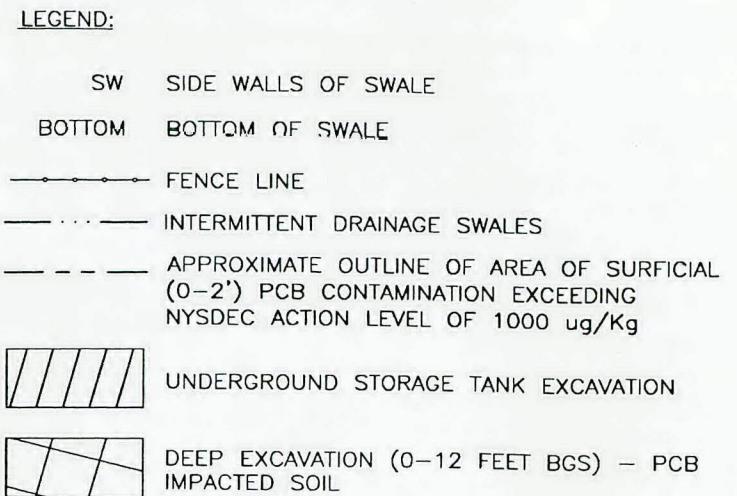
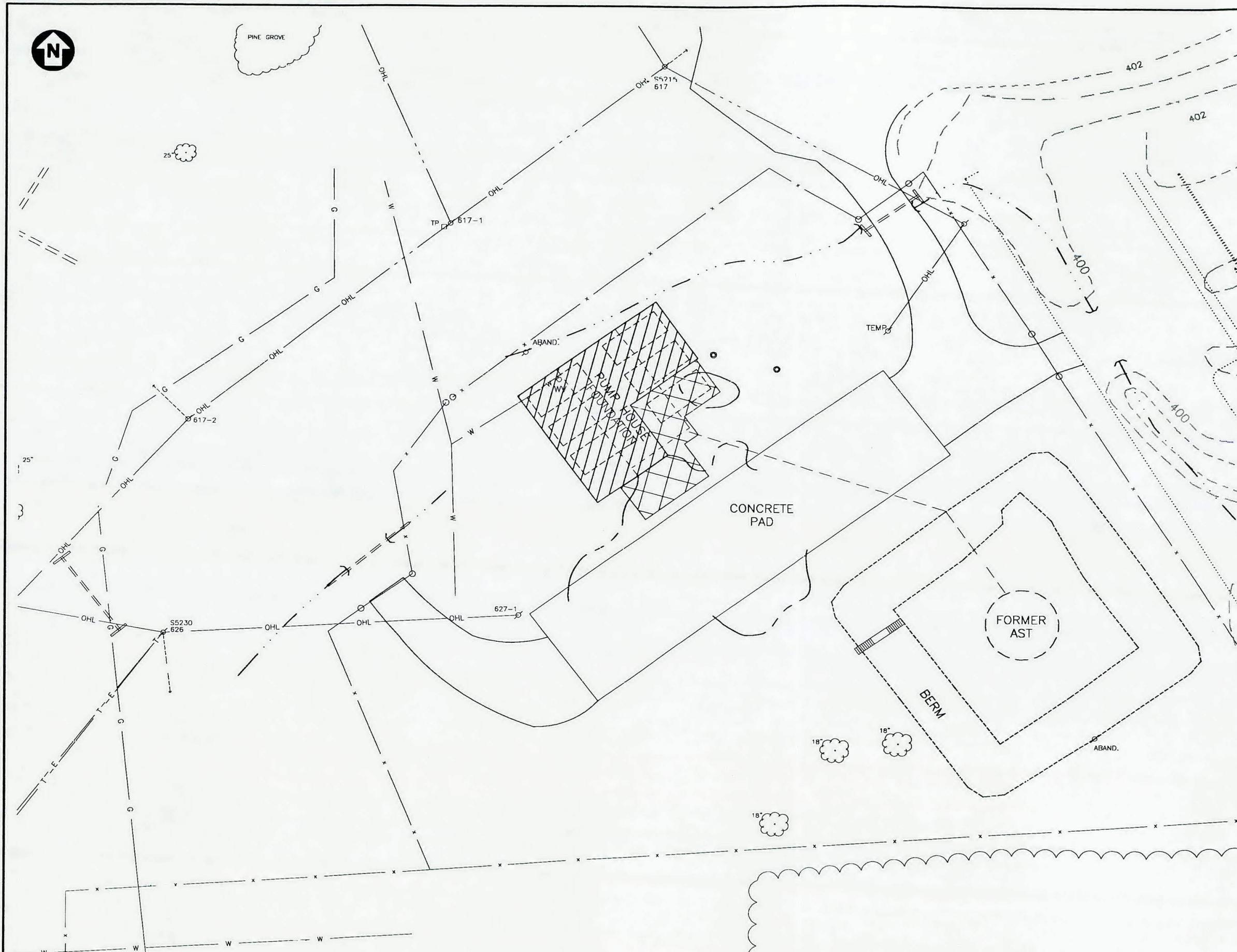


FIGURE 1.4

SITE 15, HANCOCK FIELD
SYRACUSE, NEW YORK

UNDERGROUND STORAGE TANK
AND DEEP SOIL
EXCAVATION AREAS

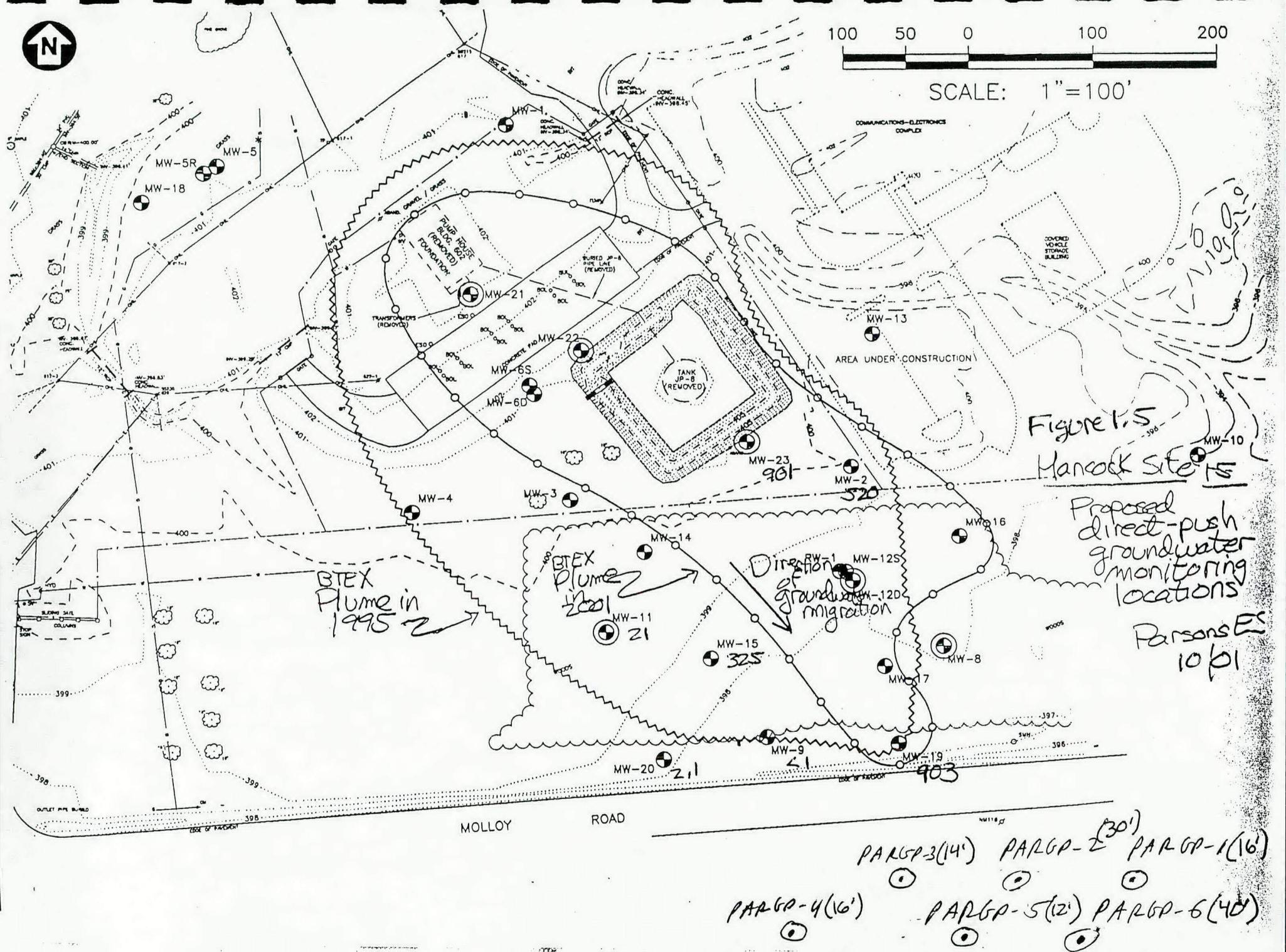
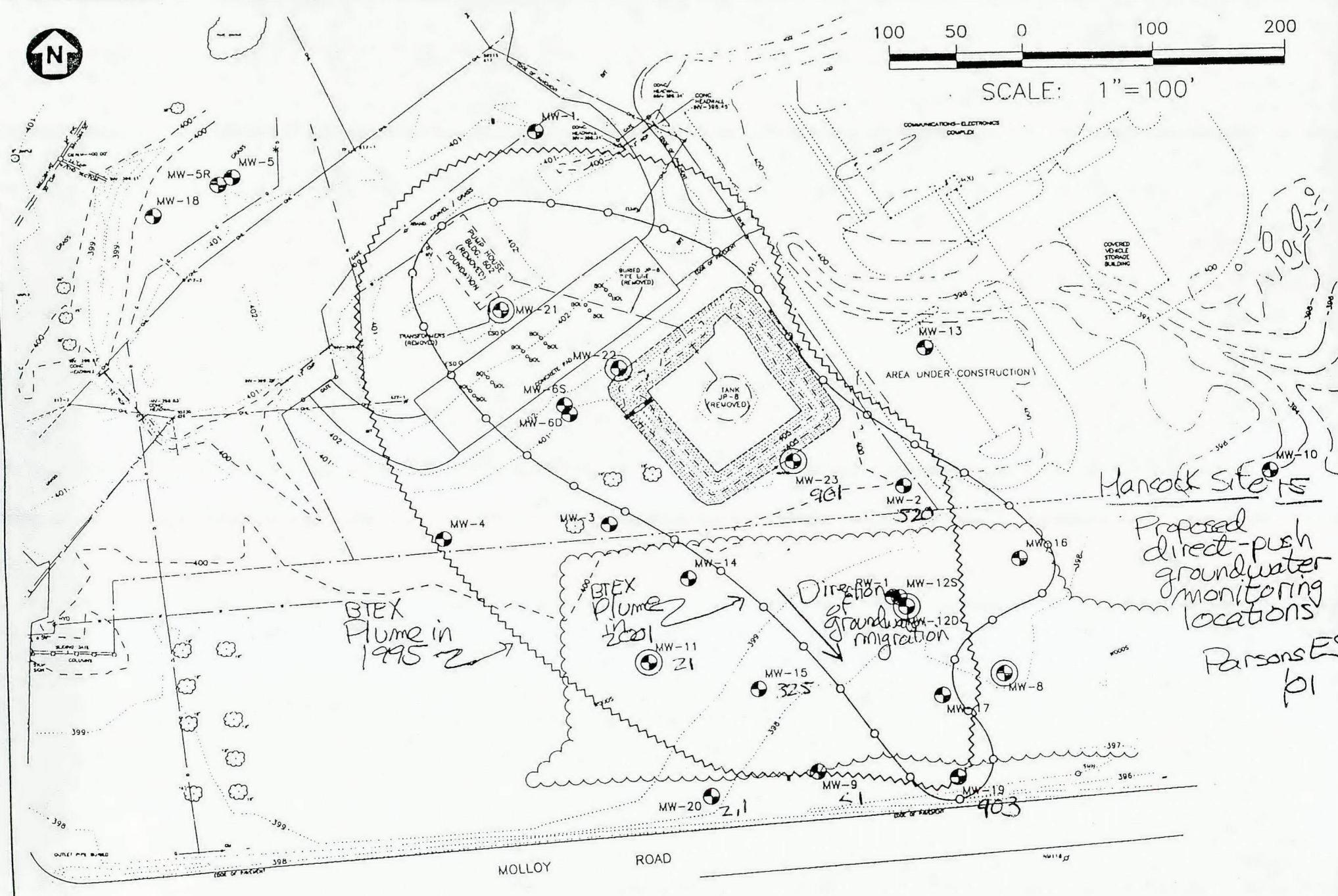


Figure 1.5
Mancock Site ³⁹⁸ MW-10

Proposed direct-push groundwater monitoring locations

Parsons Es
10/1

1-13



SECTION 2

PROJECT MANAGEMENT APPROACH

2.1 PROJECT ORGANIZATION

The Parsons management and technical staff required to execute this project and their areas of responsibility are identified in Figure 2.1. The responsibilities of key personnel are further described as follows:

2.1.1 ANG Project Manager

Mr. Badrul (Bud) Hoda from Andrews AFB in Maryland is the Air National Guard's project manager for the Hancock time-critical removal action. Mr. Hoda will interact with the 174th Fighter Wing, the State of New York, and Parsons Engineering Science to complete this work in accordance with the scope and schedule describe herein and also within budget limits. Any change in work scope will need to be approved through Mr. Hoda before being implemented.

2.1.2 174th Fighter Wing

Major Earl Evans is the base civil engineer, and Mr. Tim Sager is the Environmental Manager for the 174th Fighter Wing located at Hancock Field. Parsons work at Hancock Site 15 will be done with direct oversight and assistance as needed from Mr. Sager. Major Evans will be involved with and significant work scope or support requirements needed from the 174th Fighter Wing.

2.1.3 Parsons Project Manager

Mr. David Babcock, P.E. will be the Project Manager for this project. Mr. Babcock will be directly responsible to NYANG and Parsons management to ensure that the project objectives are met. Mr. Babcock will be responsible for maintaining the project schedule, keeping the project within budget, and ensuring the technical adequacy of the work performed. He will also be the primary point of contact for NYANG on all technical, schedule, and contractual issues.

2.1.4 Parsons Technical Director

Mr. Steve Warren will be the Technical Director for this project. The Technical Director's responsibilities are to: 1) provide innovative and sophisticated input to various technical questions as they arise; 2) ensure compliance with all regulatory guidelines; 3) ensure overall quality assurance of the work; and 4) provide senior review of the work at key points. Mr. Warren will be the Technical Director for the overall design and constructability of the project.

2.1.5 Parsons Construction Manager

Mr. Dan Hoffner will be the Construction Manager for this project. Mr. Hoffner will be responsible for the management of all construction activities, including management of field supervisors, documentation of project performance, and manpower and equipment.

2.1.6 Parsons Health and Safety Officer

The Health and Safety Officer for this project will be Mr. Brian Powell. Mr. Powell is a C.S.P. and a C.I.H. Mr. Powell will ensure that the health and safety plan is properly prepared and implemented and that all Parsons and subcontractor site personnel are trained in the site-specific project health and safety requirements. Mr. Powell will have authority to stop work if unsafe conditions are observed.

2.2 POINTS OF CONTACT

Several organizations will be involved directly in the performance and review of this project. These organizations have specific project functions and relate to each other in various ways according to their project responsibilities. The purpose of this section is to provide an understanding of the overall project organization and the function and responsibility of various groups to aid in the exchange of information and to ensure efficient project operation.

Table 2.1 presents a listing of the key contacts.

2.3 PROJECT DELIVERABLES AND SCHEDULE

Table 2.2 gives a deliverables and distribution schedule for the project. Quantities indicated by a slash indicate numbers of hard copy/diskette. Parsons will provide two copies of the final documents on compact disk. All drawings will be in a portable format that does not use reference or call files. Each electronic copy of each drawing will be a stand-alone drawing.

The project schedule is presented in Figure 2.2. Parsons will make every effort to meet the schedule as shown, given the need to complete this project as a time-critical removal effort. However, since most of the tasks have review and comment periods that are not under control of Parsons, no guarantee can be made for meeting the schedule shown.

2.4 QUALITY MANAGEMENT

The following summarizes project administrative procedures to be used in executing the Removal Action at Site 15.

2.4.1 Review

Technical and/or peer review of deliverables will be performed prior to submittal. Deliverables that will be reviewed include all technical reports, studies, assessments, work plans, sampling and analysis plans, health and safety plans, drawings, specifications, calculations, and procurement/subcontract technical documents.

The Technical Director and other technical management reviewers will verify the correct technical approach and responsiveness to the project statement of work and regulatory requirements. Technical design reviewers shall verify the adequacy of reference material used, technical procedures and approaches applied, drawing accuracy, constructability, operability, technical documents prepared, and calculations made by authors.

For letter reports, at least one technically qualified person will review the document for technical and nontechnical aspects. For large bound reports, several technically qualified people will review the technical aspects of the document. In addition, a separate, nontechnical reviewer will check the document. The Parsons Project Manager will ensure that the appropriate level of document review is conducted.

2.4.2 Document Control and Records

Upon completion of technical and nontechnical reviews, review comments shall be placed into the project files to document that the review was conducted. If reviewers provide comments directly on draft versions of the document, the draft versions shall be maintained in the project file until the final version has been approved. Once the document has been finalized, all draft versions of the document shall be removed from the project file and discarded. Since draft comments will be discarded, each reviewer shall also sign a Document Review Form. This form should be completed and placed into the project file to permanently document each review.

2.4.3 Audits

Audits will be performed, as authorized by the Parsons Quality Assurance Officer to ensure that project activities and client deliverables are being performed and reviewed in accordance with project procedures. Audit reports will also document any deviation(s) from the plan and corrective actions performed.

2.5 SUBCONTRACTOR MANAGEMENT

A statement of work will be developed for each subcontractor including the task work to be accomplished, identification of the methods to be used, equipment required, precision to be met, etc. The subcontract will define deliverables and establish progress reporting and performance requirements.

Subcontracts for geotechnical work, laboratory analysis, excavation and survey (as required) will be required for this project. Parsons will continuously monitor performance of work by all subcontractors during the execution of these subcontracts.

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Figure 2.1
PROJECT ORGANIZATION
SITE 15 - HANCOCK FIELD

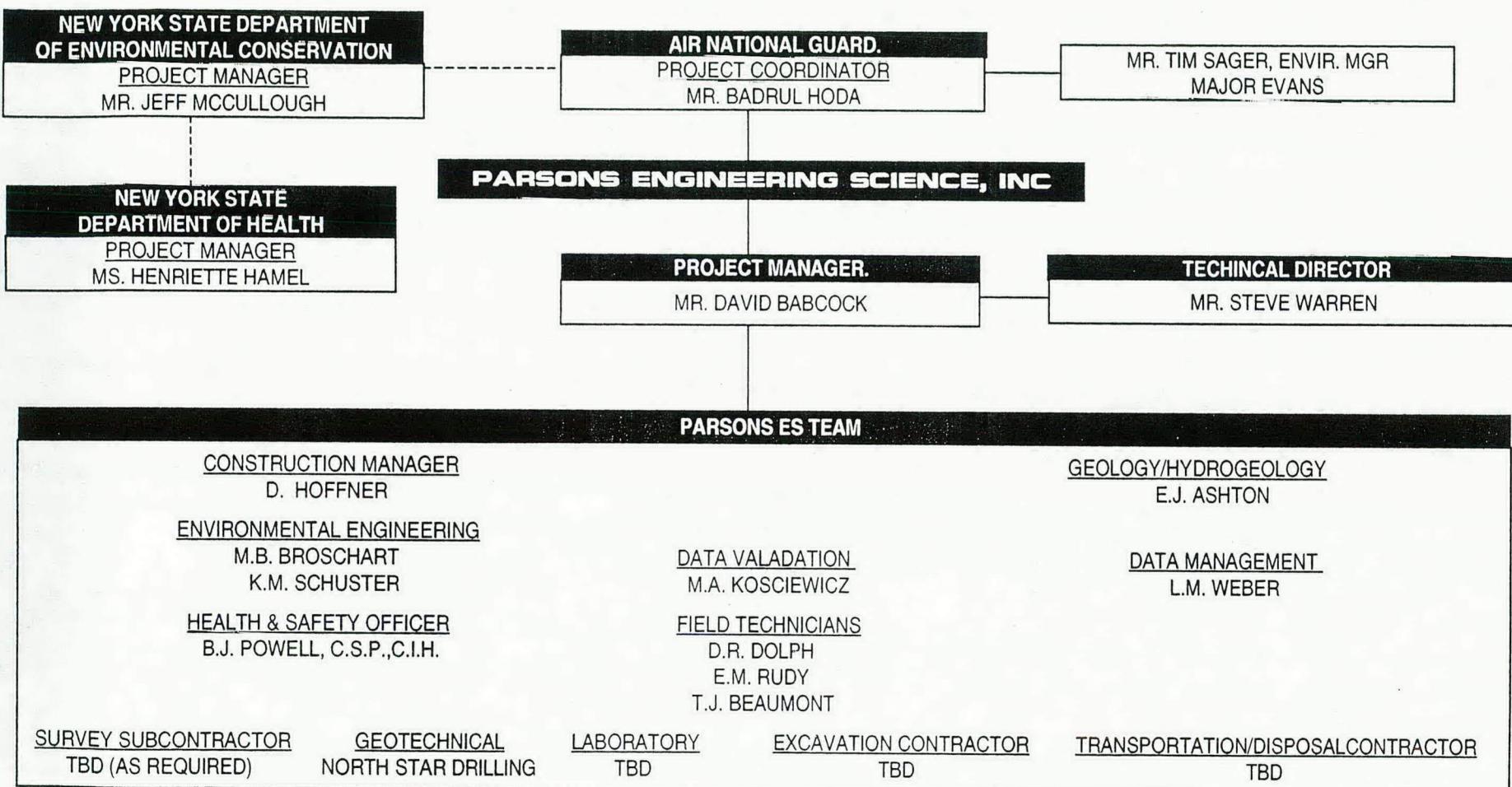
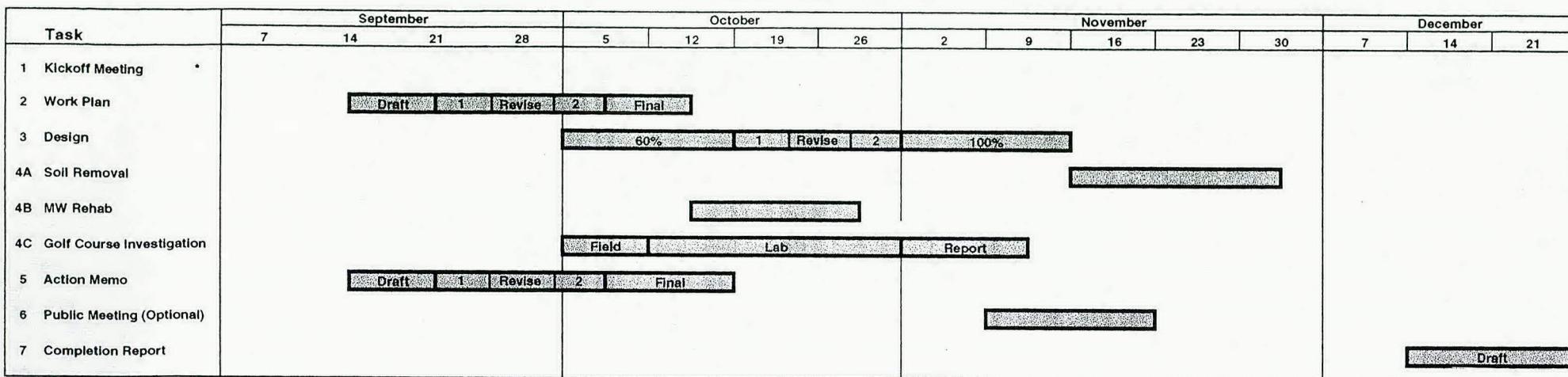


Figure 2.2
 Remedial Action
 Hancock Site 15 Timetable
 Off-Site Disposal



 - ANG / 174th FW Review

 - State Review

TABLE 2.1
KEY PROJECT CONTACTS

ANG CONTACTS

Badrul (Bud) Hoda
ANGRC/CEV
3500 Fetchet Avenue
Andrews AFB, MD 20762-5157
Phone: (301) 836-8144
Fax: (301) 836-8121
Email: badrul.hoda@ang.af.mil

Tim Sager
174th FW/EMO
6001 East Molloy Road
Syracuse, NY 13211
Phone: (315) 454-6111
Fax: (315) 454-6489
Email: Tim.Sager@nysyra.ang.af.mil

Major Earl Evans
174th FW
6001 East Molloy Road
Syracuse, NY 13211
Phone: (315) 454-6446

AACC CONTACT

Dianne Biddy
Army Atlanta Contracting Center
HQ USA FORSCOM DCSLOG CD
1301 Anderson Way SW
Fort McPherson, GA 30330-1096
Phone: (404) 464-0584
Fax: (404) 464-4194
Email: biddyd@forcom.army.mil

NEW YORK STATE DEC

Mr. Jeff McCullough
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233-7015
Phone: (518) 402-9623
Fax: (518) 402-9627
Email: jbmccull@gw.dec.state.ny.us

NEW YORK STATE DEPARTMENT OF HEALTH

Ms. Henriette Hamel
New York State Department of Health
217 South Salina Street
Syracuse, NY 13202
Phone: (315) 426-7627
Fax: (315) 426-7625

PARSONS CONTACTS

Project Manager

David B. Babcock
Parsons Engineering Science, Inc.
290 Elwood Davis Road
Liverpool, NY 13088
Phone: (315) 451-9560
Fax: (315) 451-9570
Email: David.Babcock@parsons.com

Technical Director (Design)

Steve A. Warren
Parsons Engineering Science, Inc.
290 Elwood Davis Road
Liverpool, NY 13088
Phone: (315) 451-9560
Fax: (315) 451-9570
Email: Stephen.Warren@parsons.com

Health & Safety Officer

Brian J. Powell, CIH, CSP
Parsons Engineering Science, Inc.
290 Elwood Davis Road
Liverpool, NY 13088
Phone: (315) 451-9560
Fax: (315) 451-9570
Email: Brian.Powell@parsons.com

Table 2.2
Deliverables and Distribution Schedule

Task Number And Description	ANG Copies	NYANG Copies	NYSDEC Copies	Public Copies
Task 2A Draft Work Plan	1	3	1	0
Task 2B Final Work Plan	1/1	3/1	1	0
Task 3A 60% Design	2	1	1	0
Task 3B Final Design	1/1	1	1	0
Task 4A Soil Removal and Disposal	1	1	0	0
Task 4B Monitoring Well Rehab and Abandonment Additional Site Investigation Draft Report	1	1	1	0
Task 4C Additional Groundwater Investigation	1	1	1	0
Task 5A Draft Action Memo	1	3	1	0
Task 5B Final Action Memo	1/1	3/1	1	0
Task 6 (optional) Agenda and Presentation Slides for Public Meeting	2/1	3/1	0	20
Task 6 Public Meeting Transcript	2/1	3/1	1	0
Task 6 Draft Responsiveness Summary	2	3	1	0
Task 6 Final Responsiveness Summary	2/1	3/1	1	0
Task 7A Draft TCRACR	1	3	1	0
Task 7B Final TCRACR	1/1	3/1	1	0
Task 8 Monthly Reports	1	1	0	0

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SECTION 3

ACTION MEMORANDUM

MEMORANDUM

DATE: October 25, 2001

SUBJECT: Notification of Proposed Removal Action at Hancock Field ANG Site 15, Syracuse, Onondaga County, New York

FROM: David Babcock, Parsons ES

THRU: Badrul Hoda, ANGRC/CEV

TO: Jeff McCullough, NYSDEC

NYSDEC Site ID #: 734054

I. PURPOSE

The purpose of this Action Memo is to request and document approval of the proposed removal action described herein for the Hancock Field ANG Site 15, Syracuse, Onondaga County, New York.

II. SITE CONDITIONS AND BACKGROUND

The action at Hancock ANG Site Number 734054 (Site 15) is considered a time-critical removal action.

A. Site Description

1. Removal site evaluation

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The petroleum, oil, and lubricant (POL) storage area at Site 15 was constructed in 1951 and used until 1999 when it was decommissioned and a new POL area was constructed. When the area was actively used, it was the site of the Jet Fuel Transfer Pumphouse, a transformer pad, an AST, six USTs, and equipment for transferring jet fuel (JP-4 until the 1980s, JP-8 thereafter) to the tanks. In 1999, the pumphouse was demolished, the AST was cleaned and removed, and the USTs were cleaned and filled in place.

Three releases have been documented at ANG Site 15. In the 1980s, PCBs were released, possibly from the transformers located in front of the pumphouse (Radian, 1994). In April 1990, 3,850 gallons of JP-4 were released inside the pumphouse. Some of the fuel reportedly flowed out of the building before it could be recovered (Radian, 1994, and M&E, 1995). In June 1994, 150 gallons of JP-8 overflowed onto the ground from USTs under the northeast side of the building. The spill was reportedly contained with absorbent pads before it was able to exit through the drainage ditch on the east side of the site (M&E, 1995, and Aneptek, 1999).

2. Physical location

Figure 1.1 in Section 1 of the work plan shows the ANG Site 15 location.

3. Site characteristics

Sites 1 and 15 are located at the 174th Fighter Wing (FW) of the New York Air National Guard (NYANG) at Hancock Field near Syracuse, New York. Site 15 is a 2.5-acre plot of land and the site of a former POL storage area. The site was used to transfer and store JP-4 until the 1980s when the ANG began using JP-8. Site 1 is located about one-half mile northeast of Site 15.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

Records indicate that six closed underground storage tanks exist at the site. Approximately 3,000 tons of soils are contaminated with PCBs on site. Potential routes of human exposure include soil ingestion and inhalation.

5. NPL Status

Hancock ANG Site 15 is a New York State Superfund site.

B. Other Actions to Date

Site History is given in Section 1.3 of this Work Plan.

C. State and Local Authorities' Roles

State Points of Contact are given in Section 2.2 of this Work Plan. An optional public meeting is discussed in Section 9 of this Work Plan.

III. THREATS TO THE ENVIRONMENT

PCB concentrations in the soil at Site 15 exceed 1,000 ppm, based on a handful of sampling results. A neighboring golf course is adjacent to the site, as well as Hancock Airport.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

A description of the actions may be found in Section 1.1.2 of this Work Plan.

2. Contribution to remedial performance

The action described in the Action Memorandum and Work Plan is one portion of the overall remedial actions needed at Hancock ANG Site 15. This Work Plan is aimed at removing PCBs from the Site. Some VOCs will be removed as a result of the activities, but VOC removal is not the main objective of the action. To address residual VOC contamination, soil vapor extraction (SVE) and groundwater pump-and-treat are being considered for future remedial actions.

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3. Description of alternative technologies

In-situ thermal desorption was considered as an alternative remedial action for PCB removal from the soil. An advantage to this alternative was that it avoided offsite disposal. The main disadvantage to this alternative was that it required an extended remediation schedule due to testing and additional State and potentially public input. Other disadvantages to thermal desorption included increased costs and the attainment of a TSCA permit for PCB management.

4. EE/CA

An EE/CA is not needed based on this being a time-critical remedial action. The Feasibility Study conducted by Parsons provides an initial cost estimate for this action (see Table 3.1).

5. Applicable or relevant and appropriate requirements (ARARs)

Soil cleanup objectives must meet TAGM #HWR-90-4046. TSCA standards for Management of materials containing PCBs is regulated under TSCA and associated regulations under 40 CFR Part 761. Additionally, RCRA and corresponding New York state waste management laws and regulations under NYCRR Parts 370 through 375 provide several potentially applicable standards pertaining to governing of solid and hazardous waste management in New York State.

6. Project schedule

The project schedule is found in Section 2.3 of this Work Plan.

B. Estimated Costs

Table 3.1 shows the Project Cost Summary for the soil removal action. The costs in this table are based on the excavation and disposal of 2,082 tons of soil. In this table, the Subcontractor represents the contractor(s) used for all earthwork activities, such as soil excavation and monitoring well rehabilitation. The Subcontractor (Lab) in the table represents the subcontractor utilized for soil sampling.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action will increase potential for exposure to impacted soils.

VII. OUTSTANDING POLICY ISSUES

None have been identified.

VIII. ENFORCEMENT

The 174th Air National Guard is the Responsible Party at Site 15. The ANG requested that the removal action be performed, and will perform the removal action promptly and properly.

IX. RECOMMENDATION

This decision document provides notification for a removal action for the Hancock Field ANG Site Number 734054 (Site 15), in Onondaga County, New York, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. The NYSDEC and NYSDOH previously provided their preliminary approval to proceed with this action.

Conditions at the site meet the NCP section 300.415(b)(2) criteria for a time-critical removal.

Table 3.1
Hancock Site 15
COST SUMMARY
Soil Removal Based on PCB Concentrations and Offsite Disposal

CAPITAL COSTS

Item	Unit	Quantity	Unit Cost	Total Cost
1. Remove entire transformer pad and portion of concrete pad.	CY	204	\$46	\$9,384
2. Remove soil above water table (assumed = 9 feet) or "in the dry."				
a. Surface soil exceeding 1 ppm PCBs	CY	367	\$20	\$7,340
b. Surface soil at swale exceeding 1 ppm PCBs	CY	44	\$20	\$880
c. Subsurface soil exceeding 10 ppm PCBs	CY	400	\$20	\$8,000
d. Soil from pile at Site 1	CY	100	\$15	\$1,500
3. Install pump to remove water from within deep excavation areas.	EA	2	\$300	\$600
4. Treat water.	LS	1	\$5,000	\$5,000
5. Remove soil below the water table.				
a. Subsurface soil exceeding 10 ppm PCBs	CY	57	\$20	\$1,140
6. Remove soil to create side slopes (1:1) at deep excavation areas.				
a. Subsurface soil exceeding 10 ppm PCBs	CY	420	\$20	\$8,400
7. Transport treated soil to a hazardous waste landfill.	TON	2,082	\$250	\$520,500
8. Backfill excavation with clean fill.	CY	1,388	\$15	\$20,820
9. Seed excavated areas.	SY	2,000	\$5	\$10,000
12. Miscellaneous (health and safety, etc.)	LS	1	\$10,000	\$10,000
13. Subtotal Capital Costs				\$603,564
14. Engineering, Design, and Construction Oversight				\$60,000
TOTAL CAPITAL COSTS				\$664,000



New York State Department of Environmental Conservation

Division of Environmental Remediation
Bureau of Eastern Remedial Action, Room 242
50 Wolf Road, Albany, New York 12233-7010
Phone: (518) 457-3976 · FAX: (518) 457-4198
Website: www.dec.state.ny.us

June 28, 2001

Mr. Badrul Hoda
Installation Restoration Program Branch
Environmental Division
ANG/CEVR
3500 Fetchet Avenue
Andrews AFB, MD 20762-5157

Dear Mr. Hoda:

RE: Hancock Field ANG Site # 734054 (Site 15 - POL Area)

This letter is in response to issues discussed during the June 20, 2001 conference call concerning POL Site 15 at the Hancock Air National Guard facility. The subject of the conference was to discuss the possibility of the ANG performing an Interim Remedial Measure (IRM) of removal and off site disposal of PCB contaminated soils associated with past releases at Site 15.

The NYSDOH and the NYSDEC have discussed this issue and preliminarily concur with implementation of an IRM. Before final approval is given, the ANG will be required to submit for review a site specific Work Plan and a Health and Safety Plan (HASP). The NYSDEC and NYSDOH also require provision for Community Air Monitoring for excavation activities be included in the HASP. This proposed work will also include the removal of contaminated soil currently stockpiled at the Fire Training Area.

If you have any questions, I may be contacted at our new office (625 Broadway, Albany 12233-7015), phone (518) 402-9396 after July 9, 2001, my email address remains the same (jbmccull@gw.dec.state.ny.us).

Sincerely,

Jeffery McCullough
Federal Project Section
Division of Environmental Remediation

SECTION 4

APPROVALS AND REQUIREMENTS

Prior to the start of work, the following approvals and requirements will be conducted:

- Underground and overhead utilities will be located approximately one week in advance by contacting 1-888-DIG-SAFE (344-7233). To locate base utilities, a Civil Engineering form is required.
- If hotwork is conducted, approval from the base Fire Department will be obtained. The Chief of Fire Department (315-454-6663) will be contacted to obtain the permit.
- If confined space entry work is conducted, approval from the Hancock ANG will be obtained as needed. Parsons will coordinate to obtain the permit at least two days in advance.
- Approval will be obtained from the NYSDEC before any significant work scope change is undertaken. Parsons will coordinate to obtain approval.
- Before soil is moved to an offsite disposal facility, acceptance from the disposal site will be obtained. Parsons will coordinate to obtain the acceptance.
- The NYSDEC tank manager for Region 7 will be notified and copied on tank and piping removal closure efforts in accordance with 40 CFR Part 280 and corresponding state requirements.

SECTION 5

DESIGN SUMMARY

5.1 60% DESIGN

The preliminary design report is the first design submittal and represents a 60% level of effort. The preliminary design report will concentrate on the remediation portion of the project. The anticipated table of contents for the preliminary design report is provided in Table 5.1. The anticipated lists of specifications and design drawings are provided in Tables 5.2 and 5.3, respectively. The draft specifications will be submitted at this stage although all material selections may not have been made yet. The excavation plan will be developed. Excavated material volumes will be estimated. The volume estimates and minimum allowable grade will then be used to prepare a rough layout and grading plan of the site.

5.2 FINAL DESIGN

The final design report is the second design submittal and represents a 100% level of effort. Regulatory agency review comments from the preliminary design report will be incorporated in the final design report. The anticipated table of contents for the final design report is provided in Table 5.4.

TABLE 5.1

**PRELIMINARY (60%) DESIGN REPORT
ANTICIPATED TABLE OF CONTENTS
SITE 15 – HANCOCK FIELD**

SECTION 1 – INTRODUCTION

- 1.1 Report Objectives and Background
- 1.2 Report Organization
- 1.3 Site Location and Historical Site Information
- 1.4 Remedial Action Objectives and Selected Remedy
- 1.5 Remedial Design Elements

SECTION 2 – REMEDIATION REQUIREMENTS AND CRITERIA

- 2.1 Applicable or Relevant and Appropriate Regulatory Requirements
- 2.2 Remediation Performance Criteria
- 2.3 Notification Requirements and Status
- 2.4 Access Needs During Remediation

SECTION 3 – DESIGN ELEMENTS AND STATUS

- 3.1 Introduction
- 3.2 Incorporation of Predesign Investigation
- 3.3 Stormwater/Erosion and Sediment Control
- 3.4 Site Preparation
- 3.5 Excavation Plan

SECTION 4 – SCHEDULE

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TABLE 5.1 (CONTINUED)

**PRELIMINARY (60%) DESIGN REPORT
ANTICIPATED TABLE OF CONTENTS
SITE 15 – HANCOCK FIELD**

**APPENDIX A DESIGN CALCULATIONS
- EARTHWORK VOLUME ESTIMATES**

APPENDIX B 60% SPECIFICATIONS

APPENDIX C 60% DESIGN DRAWINGS

APPENDIX D PROJECT PLANS (e.g. Construction Quality Assurance Plan)

TABLE 5.2

ANTICIPATED LIST OF SPECIFICATIONS
SITE 15 – HANCOCK FIELD

DIVISION TITLE
AND
SECTION NO.
SPECIFICATIONS

SECTION TITLE

DIVISION 1 - GENERAL REQUIREMENTS

01010	Summary of the Work
01025	Measurement and Payment (100% design only)
01051	Grades, Lines, and Levels
01105	Health and Safety
01300	Submittals
01310	Progress Schedule
01400	Quality Assurance and Quality Control
01500	Temporary Facilities and Field Office
01564	Erosion Control
01600	Material and Equipment
01630	Substitutions
01650	Facility Startup
01700	Project Closeout
01720	Project Record Drawings

DIVISION 2 – SITE WORK

02085	Groundwater Monitoring Well Abandonment
02055	Concrete Demolition
02131	Decontamination Pads and Equipment
02140	Dewatering and Construction Water Management
02222	Excavation
02223	Backfilling
02228	Compaction
02990	Finish Grading, Topsoil, and Seeding

TABLE 5.3

ANTICIPATED LIST OF DESIGN DRAWINGS
SITE 15 – HANCOCK FIELD

Civil Drawings

- C-1 Existing Site Plan
- C-2 Excavation Plan
- C-3 Final Grading Plan
- C-4 Details & Sections
- C-5 Details & Sections

TABLE 5.4

**FINAL (100%) DESIGN REPORT
ANTICIPATED TABLE OF CONTENTS
SITE 15 – HANCOCK FIELD**

SECTION 1 – INTRODUCTION

- 1.1 Report Objectives and Background
- 1.2 Report Organization
- 1.3 Site Location and Historical Site Information
- 1.6 Remedial Action Objectives and Selected Remedy
- 1.7 Remedial Design Elements

SECTION 2 – REMEDIATION REQUIREMENTS AND CRITERIA

- 2.1 Applicable or Relevant and Appropriate Regulatory Requirements
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- 2.3 Notification Requirements and Status
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- 3.1 Introduction
- 3.2 Incorporation of Predesign Investigation
- 3.3 Stormwater/Erosion and Sediment Control
- 3.4 Site Preparation
- 3.5 Excavation Plan
- 3.6 Construction Cost Estimate
- 3.7 Citizen Participation

PARSONS ENGINEERING SCIENCE, INC.

TABLE 5.4 (CONTINUED)

**FINAL (100%) DESIGN REPORT
ANTICIPATED TABLE OF CONTENTS
SITE 15 – HANCOCK FIELD**

SECTION 4 - SCHEDULE

LIST OF APPENDICES

**APPENDIX A DESIGN CALCULATIONS
- EARTHWORK VOLUME ESTIMATES**

APPENDIX B 100% SPECIFICATIONS

APPENDIX C 100% DESIGN DRAWINGS

APPENDIX D CONSTRUCTION COST ESTIMATE

APPENDIX E FINAL PROJECT PLANS

SECTION 6

REMOVAL ACTION PROCEDURES SUMMARY

6.1 INTRODUCTION

The purpose of this section is to identify general field procedures to be observed during the Site 15 removal action.

6.2 GENERAL GUIDELINES FOR FIELD WORK

6.2.1 Surface Hazards

Potential on-site surface hazards, such as sharp objects, overhead power lines, and building hazards, will be identified prior to initiation of field work. Generally, such hazards will be identified during a site reconnaissance visit that precedes the first day of field work.

6.2.2 Underground Utilities

All underground utilities, including electric lines, gas lines, and communication lines, will be identified prior to initiation of drilling and other subsurface work. This will be accomplished by contacting the UFPO: (800) 962-7962. A UFPO representative will mark all buried utility lines in the work area. New York State law requires that UFPO be notified at least 2 working days, and not more than 10 working days, before subsurface work is conducted. In addition, site representatives will be contacted to identify any other facility utilities, sewer lines, or other obstructions that may pose a risk to health and safety.

6.2.3 Field Log Books

All field activities will be carefully documented in field logbooks. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field books will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of field work.

- Erroneous entries made while field work is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. The correction will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.
- The Parsons Project Manager will control field books when field work is not in progress.
- At a minimum, daily field book entries will include the following information:
 - Date and page number each page or set of pages;
 - Location of field activity;
 - Date and time of entry;
 - Names and titles of field team members;
 - Names and titles of any site visitors and site contacts;
 - Weather information: temperature, cloud coverage, wind speed and direction;
 - Purpose of field activity; and
 - A detailed description of the field work conducted, observations and any measurements or readings. Where appropriate, a hand-drawn sketch map will also be included that identifies significant landmarks, features, sample locations, and utilities.
- When appropriate boring numbers, well numbers, sample point ID or key activities should be identified on the top of each page to facilitate retrieval of data at a later date.

6.3 FIELD EQUIPMENT CHECKLIST

A general list of equipment necessary for field measurement and sample collection includes:

- Appropriate sample containers (see QAPP);
- Chain-of-Custody seals and record forms;
- Field sample record forms;
- Log book and indelible ink markers;
- Phosphate-free decontamination soaps (such as Alconox), reagent-grade solvents, and deionized water to be used for decontaminating equipment between sampling stations;

- Buckets, plastic wash basins, plastic drop cloths, and scrub brushes to be used for decontaminating equipment;
- Camera and film for use in documenting sampling procedures and sample locations;
- Stakes to identify sampling locations;
- Shipping labels and forms;
- Knife;
- Bubble wrap or other packing/shipping material for sample bottles;
- Strapping tape;
- Clear plastic tape;
- Coolers;
- Duct tape;
- Rope;
- Resealable plastic bags;
- Portable field instruments (photoionization detector, metal detector, combustible gas indicator, conductivity meter, pH/temperature/conductivity meter, dissolved oxygen meter, redox probe, electronic water level indicator, etc.); and
- Health and safety equipment.

6.4 FIELD INSTRUMENT CALIBRATION

All field screening and sampling instruments (e.g., temperature-conductivity-pH probes) that require calibration prior to operation will be calibrated daily in accordance with the manufacturer's instructions. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Instrument operating manuals will be maintained on-site by the field team.

SECTION 7

MONITORING WELL REHABILITATION PROCEDURES SUMMARY

7.1 DRILLING AND LOGGING METHODS

Additional subsurface investigation south of Molloy Road will be conducted using direct push sampling techniques for the collection of groundwater samples. All soil borings will be logged in the field by an experienced Parsons geologist. All soil samples retrieved from the borings will be visually inspected for signs of staining and screened for the presence of hydrocarbon odors and the evolution of organic vapors with a PID equipped with a standard 10.6 eV lamp. No soil samples will be collected for chemical analysis during drilling activities.

7.2 BOREHOLE ABANDONMENT PROCEDURES

MW-5 will be abandoned by knocking out the bottom PVC well cap with a stainless steel split spoon and associated rods using a truck-mounted drill rig. Subsequently, the well will be backfilled by pressure grouting with a cement/bentonite slurry composed of 92% Portland cement and 8% bentonite and water. The PVC casing and screen will be removed from the subsurface, allowing the slurry to fill the void space created as the well material is removed in accordance with NYSDEC Groundwater Monitoring Well Decommissioning Procedures (NYSDEC, 1996).

SECTION 8

GOLF COURSE INVESTIGATION PROCEDURES SUMMARY

Parsons will drill six new temporary well points directly south (downgradient) of Site 15 and south of Molloy Road at the adjacent golf course, as shown in Figure 1.5. These six locations will be aligned in two rows of three well points each approximately 50 and 150 feet south of Molloy Road. After checking for underground utilities and securing site access from the landowner, groundwater samples will be collected from the temporary (direct push) well points to the shallow groundwater (12 to 18 feet bgs) at four of the six boreholes and to two deeper zones as best as reasonably possible) at the remaining two boreholes, in accordance with USEPA Low-Flow Sampling Method for VOCs (USEPA, 1998B), and will be analyzed at an offsite ELAP-approved laboratory for both BTEX and PCBs by USEPA method 8260 and USEPA Method 8082, respectively. In addition, groundwater samples will be collected from eleven previously installed monitoring well points (MWs 2, 6s, 6d, 9, 11, 15, 19, 20, 21, 22, and 23). All of these monitoring wells except MW-21 are downgradient of the area where soil is to be removed. Groundwater samples from these existing monitoring wells will also be analyzed at the same offsite laboratory as the direct-push samples for BTEX and PCBs.

A brief report will be prepared summarizing the results of the monitoring well rehabilitation and golf course investigation work. This report will be submitted approximately eight weeks following the field work. Laboratory results will be validated prior to using the data and submitting the report.

SECTION 9

PUBLIC MEETING (OPTIONAL)

If required, Parsons will prepare a meeting announcement/agenda, and visual aids. The Parsons Project Manager and a Project Engineer will be present at the public meeting. The Project Manager will give the presentation and provide a question answer session following the presentation. Parsons will procure a stenographer to record the presentation of project findings and to record the discussion following the presentation. Parsons will provide a public address system; projection screen; and slides, overhead transparencies, or computer projection (as appropriate) of visual aids. Signing services will be provided as needed.

Following the Public Meeting a draft RS will be provided to the HQ ANG PM, Base EM, and NYSDEC for review. The RS will include responses to questions received during the public meeting as well as any comments received during the comment period. Upon receipt of comments on the draft RS, a final RS will be prepared and submitted as an attachment to the final AM.

SECTION 10

COMPLETION REPORT

10.1 DRAFT COMPLETION REPORT

Following completion of the removal action, a completion report will be prepared documenting the work conducted. The completion report will contain analytical, engineering, statistical, and hydrogeologic data supporting completion. The report will also include figures depicting all data relevant to the removal action.

Following review/comment by HQ ANG PM and the Base EM, the revised draft will be submitted for NYSDEC review and comment.

10.2 FINAL COMPLETION REPORT

Following review/comment by NYSDEC, revisions as needed, and concurrence from HQ ANG PM and the Base EM, the final completion report will be issued.

SECTION 11

REFERENCES

HWRAP, 1997. *Final Remedial Investigation Report Petroleum, Oil, and Lubricant Facility, Site 15*. Hazardous Waste Remedial Actions Program Environmental Management and Enrichment Facilities, July 1997.

NYSDEC, 1996. *Groundwater Monitoring Well Decommissioning Procedures*. New York State Department of Environmental Conservation, October 1996.

Parsons, 2001. *Focused Feasibility Study for Hancock Air National Guard Site 15*. Parsons Engineering Science, Inc., May 2001. (Draft being reviewed by NYSDEC)

Parsons, 2001. *2001 Data Gap Investigation Results for Site 15*. Parsons Engineering Science, Inc., April 2001.

USEPA, 1990. *Superfund Removal Procedures Action Memorandum Guidance*. United States Environmental Protection Agency, December 1990.

APPENDIX A
HEALTH & SAFETY PLAN

PARSONS ENGINEERING SCIENCE, INC.

\SYRFS01\PROJECTS\740741\WP\40741R01A.DOC
OCTOBER 9, 2001

APPENDIX A

HEALTH AND SAFETY PLAN FOR TIME-CRITICAL REMOVAL ACTION AT SITE 15 AT HANCOCK FIELD SYRACUSE, NY

Prepared For:

Air National Guard

Environmental Restoration Branch
3500 Futchet Avenue
Andrews AFB, MD 20762-5157

Prepared By:

PARSONS ENGINEERING SCIENCE, INC.

290 Elwood Davis Road, Suite 312
Liverpool, New York 13088

SEPTEMBER 2001

Reviewed and Approved By:

Name

Date

Project Manager _____

Parsons H&S Officer _____

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- Appendix B - Forms For Health and Safety-Related Activities
- Appendix C - Material Safety Data Sheets
- Appendix D - Standard Safe Work Practices
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EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, contact should first be made with the site coordinator who will notify emergency personnel who will then contact the appropriate response teams. This emergency contacts list must be in an easily accessible location at the site.

<u>Contingency Contacts</u>	<u>Phone Number</u>
Nearest phone located on-site	(315) 454-6111 Tim Sager
Fire Department	911
State Police (Cicero, NY)	911 or (315) 699-2681
UFPO (NYS One call system)	(800) 962-7962
Hospital (SUNY HSC) State University of New York Health Science Center 750 East Adams Street Syracuse, NY 13201	(315) 464-5611
Poison Control Center	(800) 252-5655
Parsons Contract Physician (Qualisys)	(800) 874-4676
<u>Medical Emergency</u>	
Ambulance: (Onondaga County 911 Dispatch)	911

The hospital location is shown on the next page. (Figure 1)

Travel time from the site is approximately 10 minutes.

ROUTE TO HOSPITAL:

1. Turn right out of ANG base onto Molloy Road, heading west
2. Turn left onto Route 11 (becomes Wolf Street)
3. Turn right at Cooper Industries onto 7th North Street
4. Proceed approximately ¾ mile to the west and access Route 81 South
5. Exit Route 81 South at the Harrison & Adams Street Exit and bear left on the off-ramp, following signs for Adams Street.
6. Move to the middle lane while traversing beneath the 81 overpass.
7. Turn Left onto Adams Street. The hospital emergency entrance is one block on the right.

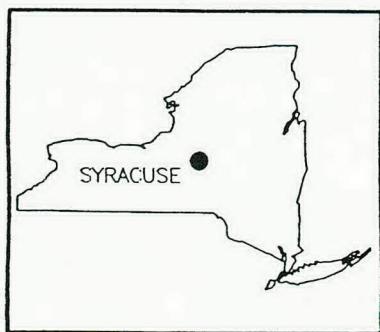
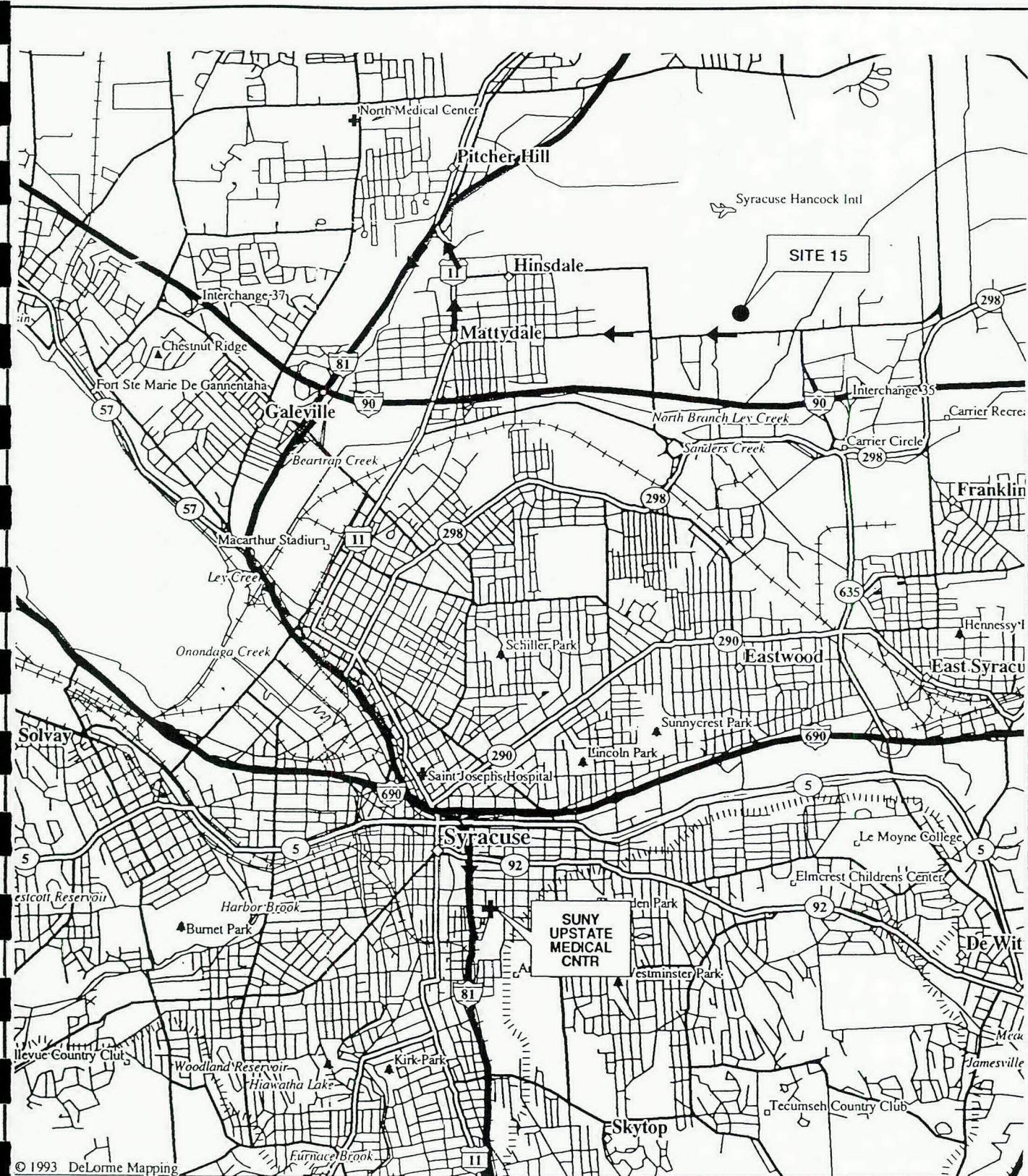
Parsons Contacts

Parsons Project Manager:

David B. Babcock (315) 451-9560
(Parsons Syracuse) (Office)

Parsons Office Health and Safety Representative:

Brian J. Powell (315) 451-9560
(Office)



QUADRANGLE LOCATION
NEW YORK

LATITUDE: N43° 06' 01"
LONGITUDE: W76° 06' 06"
Scale 1:62,500 (at center)
1 Miles
2 KM



FIGURE 1

NATIONAL GUARD BUREAU
SITE 15 AT HANCOCK FIELD
SYRACUSE, NEW YORK

ROUTE TO HOSPITAL MAP

PARSONS

PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.

PARSONS ENGINEERING SCIENCE, INC.
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560



Table 1.0 Health And Safety Summary Table

Based on a review of the potential chemical hazards at Site 15, the following conditions will determine the level of protective equipment that will be used by personnel while onsite:

Conditions for Level D:

Activities to include excavation and dewatering operations, confirmation soil sampling, concrete pad removal, UST removal, monitoring well rehabilitation and abandonment, and Geoprobe® groundwater sampling.

- Total PID readings between 0 and 10 ppm. (Based on potential presence of naphthalene)

and

- Draeger® Benzene 2/a Tube readings < 1 ppm

Benzene colorimetric tube monitoring is required when the PID concentration exceeds 5 ppm sustained for at least 30 seconds in the worker's breathing zone.

Conditions for Level C:

- Total PID readings in the breathing zone are between 10 and 50 ppm for at least 30 seconds

and

- Draeger® Benzene 2/a Tube readings < 5 ppm (daily cartridge change required)

Benzene colorimetric tube monitoring will be used to verify the level of Benzene periodically (minimum 2x per day) during Level C work.

Conditions for Level B (or retreat):

The site health and safety officer may either evacuate workers or upgrade to a Level B protective ensemble when:

- Total PID readings in the breathing zone are greater than 50 ppm for 30 seconds
 - or
- Draeger® Benzene 2/a Tube readings > 5 ppm

Work must be stopped at the site when PID concentrations exceed 350 ppm. (This concentration approaches the IDLH for Toluene)

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ANG	Air National Guard
CFR	Code of Federal Regulations
CRC	Contamination Reduction Corridor
CRZ	Contamination Reduction Zone
EPA	Environmental Protection Agency
HSP	Health and Safety Plan
IDLH	Immediately Dangerous to Life or Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
SCBA	Self-Contained Breathing Apparatus
SVOC	Semivolatile Organic Compound
TLV	Threshold Limit Value
TPH	Total Petroleum Hydrocarbons
UV	Ultraviolet
VOC	Volatile Organic Compound
WBGT	Wet Bulb Globe Temperature

1. INTRODUCTION

1.1 Purpose and Requirements

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for field investigation efforts. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at the Hancock Air National Guard Site 15.

The provisions of the plan are mandatory for all on-site personnel. All Parsons personnel shall abide by this plan. Health and safety plans must be prepared by subcontractors and they must conform to this plan as a minimum. All personnel who engage in project activities must be familiar with this plan and comply with its requirements. These personnel must sign-off on the Plan Acceptance Form (Appendix B) prior to beginning work on the site. The Plan Acceptance Form must be submitted to the Site Health and Safety Officer.

1.2 Site Description

Site 15 is located at the 174th Fighter Wing (FW) of the New York Air National Guard (NYANG) at Hancock Field in Syracuse, New York. Hancock Field is located approximately two miles north-northeast of Syracuse in Onondaga County in central New York. The NYANG base is bordered by the Town of Dewitt to the east and south, the Town of Salina to the west, the Town of Cicero to the north, and Syracuse International Airport to the northeast.

Site 15 is a 2.5-acre plot of land and the site of a former petroleum, oil, and lubricant (POL) storage area located near the southern boundary of the base. Currently located at the site are a bermed area, a concrete pad, a former pump house foundation, and six closed, 25,000-gallon underground storage tanks (USTs). An aboveground storage tank (AST) containing Jet fuel was once located within the bermed area. Most of the site is covered with brush vegetation. Additional wooded vegetation exists adjacent to Molloy Road. One drainage swale borders the site on its north-northeast side, and another drainage swale is located near the west side of the site. The entire site is fenced and located within the Air National Guard Base at Hancock Field directly adjacent to the Syracuse Hancock Airport. Refer to Figure 2 at the end of this section for a site location map.

1.3 Scope of Work

Field tasks to be conducted at the site include:

- Remove the existing unused concrete pad, pump house foundation, and six 25,000-gallon underground storage tanks;
- Excavate soil containing PCBs above state action levels. The area to be excavated is limited to the following:
 1. Soils surrounding the former pump house, up to the concrete pad to the south.
 2. Surface soils located south of the concrete pad.

3. Deep soil south of the former pump house with groundwater removal as needed to excavate soil.
 - Confirmation soil sampling to demonstrate PCB cleanup levels are achieved;
 - Dispose of soil and accumulated water from excavation dewatering offsite in accordance with regulatory requirements.
 - Field supervision of the excavation effort to include perimeter air monitoring at four stations and,
 - Replace excavated soil with the concrete pad and former pump house foundation, concrete from underground storage tanks, and clean fill, to original grade.
 - Seed area to establish vegetative cover.
 - Monitoring well rehabilitation and abandonment.
 - Geoprobe direct-push groundwater sampling (south of Molloy Road) and additional sampling from 11 existing monitoring wells.

1.4 Project Team Organization

Table 2 describes the responsibilities of all on-site personnel associated with this project. The names of principal on-site personnel associated with this project are delineated below:

Project Manager: David B. Babcock, P.E. (Parsons - Syracuse)

Field Team Leader: Mike Broschart ((Parsons - Syracuse))

Site Health and Safety Officer: Dan Hoffner (Parsons - Syracuse)

The field team leader shall act as the alternate site health and safety officer. All Parsons personnel have been appropriately trained in first aid, hazardous waste safety procedures including the operating and fitting of personal protective equipment, and are experienced with the types of field operations to be employed at the site. Training requirements for workers onsite shall comply with 29 CFR 1910.120 and will include 40-hour initial training, supervisor training for the field team leader, annual refresher training for all workers and a minimum of 24 hours of on-the-job training for any unsupervised site workers.

TABLE 1.1
ON-SITE PERSONNEL
AND RESPONSIBILITIES

PROJECT MANAGER - Reports to upper-level management. Has authority to direct response operations. Assumes total control over site activities.

Responsibilities:

- Prepares and organizes the background review of the situation, the Work Plan, the Health and Safety Plan, and the field team.
- Obtains permission for site access and coordinates activities with appropriate officials.
- Ensures that the Work Plan is completed and on schedule.
- Briefs the field teams on their specific assignments.
- Uses the Site Health and Safety Officer to ensure that health and safety requirements are met.
- Prepares the final report and support files on the response activities.
- Serves as the liaison with public officials.

SITE HEALTH AND SAFETY OFFICER - Advises the Project Manager on all aspects of health and safety on site. Stops work if any operation threatens worker or public health or safety.

Responsibilities:

- Periodically inspects protective clothing and equipment.
- Ensures that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the Access Control Points.
- Coordinates health and safety program activities with the Office Health and Safety Representative.
- Confirms each team member's suitability for work based on a physician's recommendation.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Implements the Health and Safety Plan.
- Conducts periodic inspections to determine if the Health and Safety Plan is being followed.
- Enforces the "buddy" system.

TABLE 1.1 - (CONTINUED)
ON-SITE PERSONNEL
AND RESPONSIBILITIES

- Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.
- Sets up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on the site.
- Controls the decontamination of all equipment, personnel, and samples from the contaminated areas.
- Assures proper disposal of contaminated clothing and materials.
- Ensures that all required equipment is available.
- Advises medical personnel of potential exposures and consequences.
- Notifies emergency response personnel by telephone or radio in the event of an emergency.

FIELD TEAM LEADER - Responsible for field team operations and safety.

Responsibilities:

- Manages field operations.
- Executes the Work Plan and schedule.
- Enforces safety procedures.
- Coordinates with the Site Health and Safety Officer in determining the personal protection level.
- Enforces site control.
- Documents field activities and sample collection.
- Serves as a liaison with public officials.

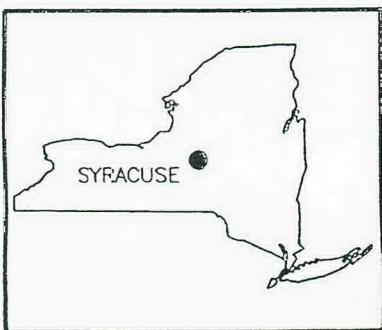
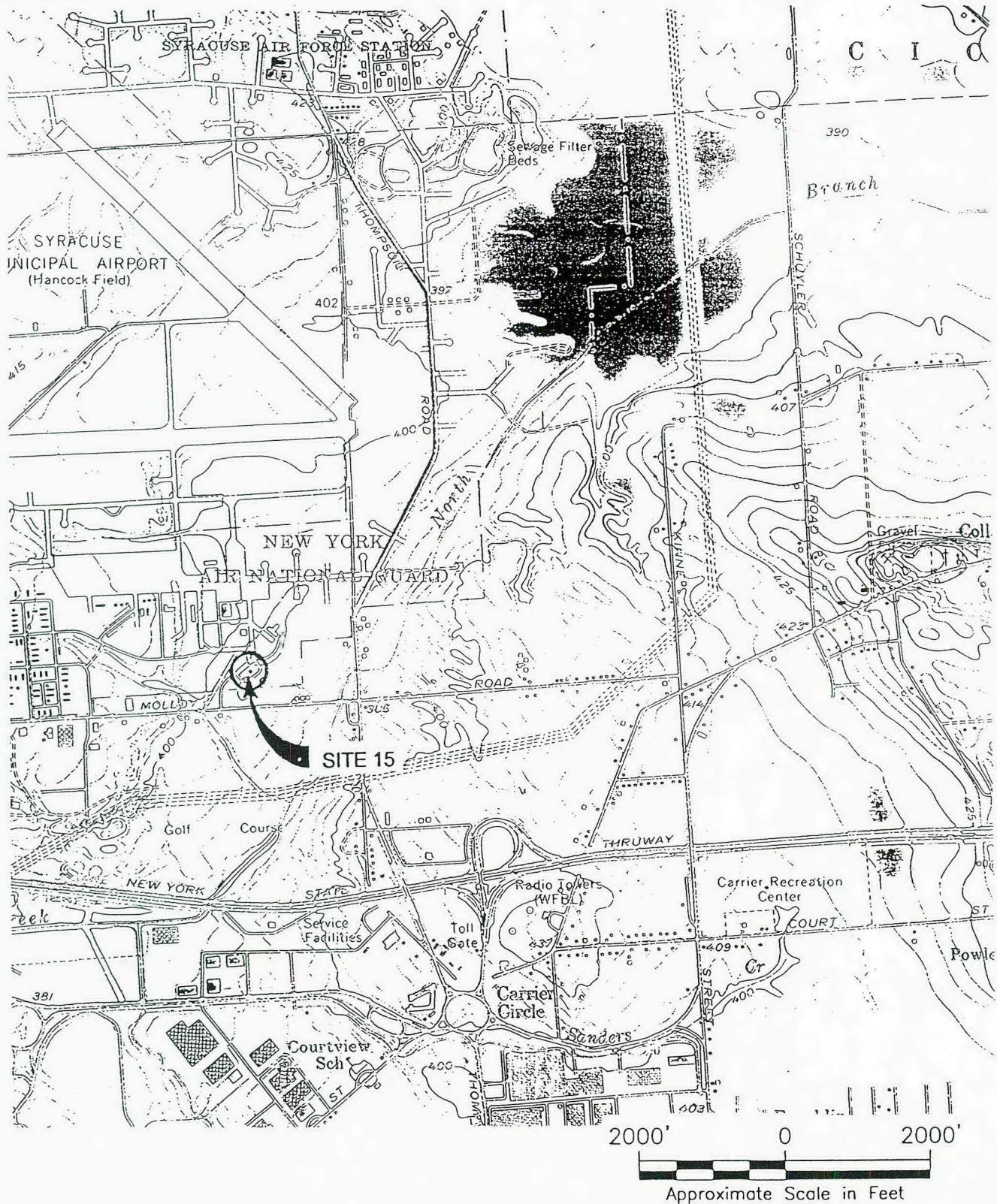
WORK TEAM - Drillers, samplers. The work party must consist of at least two people.

Responsibilities:

- Safely completes the on-site tasks required to fulfill the Work Plan.
- Complies with the Health and Safety Plan.
- Notifies Site Health and Safety Officer or supervisor of suspected unsafe conditions.

1.5 Subcontractors

Subcontractors must be trained in accordance with 29 CFR Section 1910.120 prior to their admittance to the site and must comply with the training requirements specified in Section 6 of this HSP to the extent they will be performing work under the contractor's direction. **As with all subcontractors, the responsibility for protecting the health and safety of subcontractor employees rests with the subcontractor; therefore, the subcontractor must submit an HSP to the Health and Safety Manager that identifies safety procedures for the field activities to be performed. Before beginning any field activity, the subcontractor must provide to the site health and safety coordinator documentation of necessary training and proof of participation in a medical monitoring program.** This documentation will be kept in the project file.



LATITUDE: N43° 06' 01"
LONGITUDE: W76° 06' 06"

SOURCE: USGS 7.5 MINUTE
SERIES (TOPOGRAPHIC)
SYRACUSE EAST QUADRANGLE
1957

QUADRANGLE LOCATION
NEW YORK



FIGURE 2

NATIONAL GUARD BUREAU
SITE 15 AT HANCOCK FIELD
SYRACUSE, NEW YORK

SITE LOCATION MAP

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PARSONS ENGINEERING SCIENCE, INC.
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

2. RISK ANALYSIS

2.1 Chemical Hazards

Potential contaminants which may be encountered while conducting field tasks at the Hancock Air National Guard Site 15 include polychlorinated biphenyls (PCBs) and trace levels of benzene, ethylbenzene, toluene, xylene (BTEX) compounds. Some relevant properties of these compounds are shown in Table 2.1.

For PCBs the following formula is used to justify elimination of the need for real time aerosol monitoring or ambient monitoring of these compounds during work at the site.

$$El_{mix} = \frac{(10^6 \text{ mg/kg}) (EL \text{ mg/m}^3)}{(conc. \text{ mg/kg}) (\text{Safety Factor})}$$

Where;

- EL_{mix} : Air concentration of total dust at which the contaminants of concern would be at their established exposure limit.
- EL: Exposure limit of the contaminant of concern (e.g., its PEL or TLV, whichever is lower, in mg/m^3)
- 10^6 : Conversion Factor
- Conc.: Maximum observed soil concentration of the contaminant of concern in mg/kg .
- Safety Factor: A number between 1 and 10 used to account for the degree of confidence you have in your concentration information. The lower the number used, the more confidence the evaluator has in how well the data represents site conditions.

For PCB's at the site: $EL = 0.50 \text{ mg/m}^3$, $Conc. = 240 \text{ mg/kg}$, Safety Factor = 2.

Therefore

$$El_{mix} = \frac{(10^6 \text{ mg/kg}) (0.5 \text{ mg/m}^3)}{(240 \text{ mg/kg}) (2)}$$

$$El_{mix} = 1041 \text{ mg/m}^3$$

This EL_{mix} value is above 5 mg/m^3 , the nuisance particulate PEL for respirable dust required by OSHA. Therefore, by controlling dust levels to below visible dust clouds ($approximately 5 \text{ mg/m}^3$) through actions such as wetting down of site soils during open excavation and site gracing work, exposure to PCBs will be avoided.

In addition to the compounds detected on site, some of the solvents used in the processing of samples and for the decontamination of equipment are potentially hazardous to human health if they are not used properly. Material Safety Data Sheets for

these compounds are included in Appendix C. Some or all of these compounds may be used in the current tasks to be performed at the site.

2.2 Physical Hazards

2.2.1 Heat Stress

The use of protective equipment, if required, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 70°F or above. Table 2.2 presents the suggested frequency for such monitoring. Table 2.3 presents the apparent temperature for given humidity and ambient temperature readings in shade. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Heat stress monitoring should be performed by a person with a current first-aid certification who is trained to recognize heat stress symptoms. For monitoring the body's recuperative abilities to excess heat, one or more of the following techniques will be used. Other methods for determining heat stress monitoring, such as the wet bulb globe temperature (WBGT) Index from American Conference of Governmental Industrial Hygienist (ACGIH) TLV Booklet can be used.

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third.
- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.
- If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third.
- Do not permit a worker to wear a semipermeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

2.2.2 Prevention of Heat Stress

Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- Adjust work schedules.

- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
 - Maintain water temperature 50° to 60°F (10° to 16.6°C).
 - Provide small disposable cups that hold about four ounces (0.1 liter).
 - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
 - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
 - Train workers to recognize the symptoms of heat related illness.

2.2.3 Cold-Related Illness

If work on this project is conducted in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite.

Hypothermia. Hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.

Frostbite. Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

2.2.4 Prevention of Cold-Related Illness

- Educate workers to recognize the symptoms of frostbite and hypothermia
- Identify and limit known risk factors:
- Assure the availability of enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Develop the capability for temperature recording at the site.
- Assure the availability of warm drinks.

Monitoring

Start (oral) temperature recording at the job site:

- At the Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to work for 48 hours.

2.2.5 Explosion Hazard

During the work activities involving soil borings and trench excavation, a potential for fire or explosion exists due to the LEL properties of many of the compounds known to exist at the site (see Table 2.1). Therefore, precautions should be taken during the performance of these activities to ensure that combustible or explosive vapors have not accumulated. These precautions will include monitoring for explosive materials with an explosimeter and PID, prohibiting smoking or open flames in vicinity of the drums, and using non-sparking tools and equipment.

2.3 Task Hazards Analysis

Soil Excavation and Backfill

The planned Site 15 excavation will be up to 14 feet deep and will be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926. Entry of personnel will be necessary. When an excavation is at least five feet deep, sloping must follow these guidelines:

Type	Angle (degrees)	Max. Depth (feet)
Solid rock, cemented sand or gravel	90	20
Compact angular gravel	63	20
Compact sharp sand	33	20

Rounded loose sand	26	20
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Excavation deeper than 20 feet must be designed by a civil engineer. Prior to any excavation activity, efforts will be made to determine whether underground installations will be encountered and, if so, where these installations are located. Hard hats and safety boots must, as a minimum, be worn within 50 feet of the excavation equipment. Workers not involved in digging will remain at least 8 feet from the edge of the excavation. The excavation equipment cannot be operated within 10 feet of power lines. The perimeter of this excavation must be barricaded along the perimeter with enough distance to keep observers out of potential failure zones. The Site Supervisor or Site Health and Safety Officer will provide constant on-site supervision of the excavation subcontractor to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (i.e.; retrain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken will be forwarded to the Project Manager. The backhoe will not be placed on unstable ground, or ground not capable of supporting heavy equipment. Further guidelines and a daily inspection form are included in Appendix E – Trench and Excavation Safety.

Geoprobe® Boring & Temporary Well Point Installation

Prior to any direct push borings, efforts will be made to determine whether underground installations will be encountered and, if so, where these installations are located. The Geoprobe rig cannot be operated within 10 feet of power lines. The Field Team Leader or Site Health and Safety Officer will provide constant on-site supervision of the drilling subcontractor to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (e.g., retrain, purchase any additional safety equipment). Groundwater samples will be screened with a PID. If contaminant levels reach action limits as specified in Section 3, upgrades in personal protection will be initiated. Geoprobe operators and geologists on site within 30 feet of the drill rig shall start work in Level D PPE and will include use of hearing protection when the rig is operational.

Soil Sampling /Groundwater Sampling

All handling of potentially contaminated soils or groundwater will begin in Level D with careful monitoring of the sampler's breathing zone using the Photoionization Detector (PID). Outer nitrile and inner disposable nitrile (blue) gloves will be included in standard Level D requirements whenever handling samples. Note: Jet fuel degrades latex inner gloves rapidly, and these should not be used for handling of JP contaminated during sampling.

Vehicles and Heavy Equipment

Working with large motor vehicles and heavy equipment could be a major hazard at this site. Injuries can result from equipment hitting or running over personnel, impacts from flying objects, or overturning of vehicles. Vehicle and heavy equipment design and

operation will be in accordance with 29 CFR, Subpart O, 1926.600 through 1926.602. In particular, the following precautions will be utilized to help prevent injuries/accidents.

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each shift.
- Large construction motor vehicles will not be backed up unless:
 - The vehicle has a reverse signal alarm audible above the surrounding noise level; or
 - The vehicle is backed up only when an observer signals that it is safe to do so.
- Heavy equipment or motor vehicle cable will be kept free of all nonessential items, and all loose items will be secured.
- Large construction motor vehicles and heavy equipment will be provided with necessary safety equipment (seat belts, rollover protection, emergency shut-off in case of rollover, backup warning lights and audible alarms.)
- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicles.

TABLE Z-1
HEALTH HAZARD QUALITIES OF HAZARDOUS SUBSTANCES OF CONCERN AT SITE 15

Compound	PEL ^a (ppm)	TLV ^b (ppm)	IDLH ^c (ppm)	Odor Threshold ^d (ppm)	Ionization Potential ^e (eV)	Physical Description/Health Effects/Symptoms
Benzene	1 (29 CFR 1910.1028) ^f	0.1	500	4.7	9.24	Colorless to light-yellow liquid (solid <42°F) with an aromatic odor. Eye, nose, skin, and respiratory system irritant. Causes giddiness, headaches, nausea, staggered gait, fatigue, anorexia, exhaustion, dermatitis, bone marrow depression, and leukemia. Mutagen, experimental teratogen, and carcinogen.
Ethylbenzene	100	100	800	0.25-200	8.76	Colorless liquid with an aromatic odor. Irritates eyes, skin, and mucous membranes. Causes dermatitis, headaches, narcosis, and coma. Mutagen and experimental teratogen.
Toluene	100	50 (skin)	500	0.2-40 ^g	8.82	Colorless liquid with sweet, pungent, benzene-like odor. Irritates eyes and nose. Causes fatigue, weakness, dizziness, headaches, hallucinations or distorted perceptions, confusion, euphoria, dilated pupils, nervousness, tearing, muscle fatigue, insomnia, skin tingling, dermatitis, bone marrow changes, and liver and kidney damage. Mutagen and experimental teratogen.
Xylene (o-, m-, and p-isomers)	100	100	900	0.05-200 ^h	8.56 8.44 (p)	Colorless liquid with aromatic odor. P-isomer is a solid <56°F. Irritates eyes, skin, nose, and throat. Causes dizziness, drowsiness, staggered gait, incoordination, irritability, excitement, corneal irregularities, conjunctivitis, dermatitis, anorexia, nausea, vomiting, abdominal pain, and olfactory and pulmonary changes. Also targets blood, liver, and kidneys. Mutagen and experimental teratogen.
Benzo(a)anthracene	0.2 mg/m ³ ^h	0.2 mg/m ³ ^h	80 mg/m ³ ^h	NA	7.53	Colorless, crystalline solid with greenish-yellow fluorescence. Irritates eyes, respiratory tract, and skin. Causes dermatitis, bronchitis, and lung, kidney, and skin cancer. Carcinogen.
Benzo(b)fluoranthene	0.2 mg/m ³ ^h	0.2 mg/m ³ ^h	80 mg/m ³ ^h	NA	NA	Colorless, needle-like crystals. Irritates eyes, respiratory tract, and skin. Causes dermatitis, bronchitis, and lung, kidney, and skin cancer.

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TABLE 2.1
HEALTH HAZARD QUALITIES OF HAZARDOUS SUBSTANCES OF CONCERN AT SITE 15

Compound	PEL ^{a/} (ppm)	TLV ^{b/} (ppm)	IDLH ^{c/} (ppm)	Odor Threshold ^{d/} (ppm)	Ionization Potential ^{e/} (eV)	Physical Description/Health Effects/Symptoms
Benzo(k)fluoranthene	0.2 mg/m ³ ^{h/}	0.2 mg/m ³ ^{h/}	80 mg/m ³ ^{h/}	NA	NA	Carcinogen. Pale-yellow, needle-like crystals. Irritates eyes, respiratory tract, and skin. Causes dermatitis, bronchitis, and lung, kidney, and skin cancer. Carcinogen.
Benzo(a)pyrene	0.2 mg/m ³ ^{h/}	0.2 mg/m ³ ^{h/}	80 mg/m ³ ^{h/}	NA	NA	Pale-yellow, crystalline solid with a faint aromatic odor. Irritates eyes, respiratory tract, and skin. Causes dermatitis, bronchitis, thickening and discoloration of the skin, and lung, kidney, and skin cancer. Mutagen, experimental teratogen, and carcinogen.
Chrysene	0.2 mg/m ³ ^{h/}	0.2 mg/m ³ ^{h/}	80 mg/m ³ ^{h/}	NA	7.75	Colorless, crystalline solid with blue to red fluorescence. Irritates eyes, skin, and respiratory tract. Causes burns to skin and eyes, dermatitis, bronchitis and lung, skin, and kidney cancer. Mutagen and carcinogen.
2-Methylnaphthalene	NA	NA	NA	0.003-0.04	7.96	Colorless gas or solid with a disagreeable garlic or rotten cabbage odor. Irritates eyes, skin, nose, and throat.
Naphthalene	10	10	250	0.3	8.1	Colorless to brown solid (shipped as a molten liquid) with a mothball-like odor. Irritates eyes, skin, and bladder. Causes headaches, confusion, excitement, convulsions, coma, vague discomfort, nausea, vomiting, abdominal pain, profuse sweating, jaundice, hematoma, hemoglobin in the urine, renal shutdown, dermatitis, optic nerve disorders, and corneal and liver damage. Experimental teratogen and questionable carcinogen.
Phenol	5 (skin)	5 (skin)	250	0.05-5	8.50	Colorless to light-pink, crystalline solid with a burning taste and a sweet acrid odor. Irritates eyes, nose, and throat. Causes anorexia, low-weight, weakness, muscle aches and pain, dark urine, blue skin, skin burns, dermatitis, tremors, twitching, convulsions, and damage to the liver, kidneys, pancreas, spleen, and lungs. Ingestion can cause gangrene and corrosion of the lips, mouth, throat, esophagus, and stomach. Mutagen, experimental teratogen, and questionable carcinogen.

TABLE Z.1
HEALTH HAZARD QUALITIES OF HAZARDOUS SUBSTANCES OF CONCERN AT SITE 15

Compound	PEL ^{a/} (ppm)	TLV ^{b/} (ppm)	IDLH ^{c/} (ppm)	Odor Threshold ^{d/} (ppm)	Ionization Potential ^{e/} (eV)	Physical Description/Health Effects/Symptoms
Aroclor®-1254 (PCB, Chlorodiphenyl with 54% Chlorine)	0.5 mg/m ³ (skin)	0.5 mg/m ³ (skin)	5 mg/m ³	NA	NA	Colorless to pale-yellow, viscous liquid or solid (<50°F) with a mild, hydrocarbon odor. Irritates eyes and skin. Causes chlor-acne, liver damage, gastrointestinal disturbances, and reproductive effects. In animals, causes leukemia and tumors of the pituitary gland and liver. Carcinogen.

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NOTES

- a/ PEL = Permissible Exposure Limit. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm. Expressed as parts per million (ppm) unless noted otherwise. PELs are published in the *NIOSH Pocket Guide to Chemical Hazards*, 1994. Some states (such as California) may have more restrictive PELs. Check state regulations.
- b/ TLV = Threshold Limit Value - Time-Weighted Average. Average air concentration (same definition as PEL, above) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH), *1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*.
- c/ IDLH = Immediately Dangerous to Life or Health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise. IDLH values are published in the *NIOSH Pocket Guide to Chemical Hazards*, 1994.
- d/ When a range is given, use the highest concentration.
- e/ Ionization Potential, measured in electron volts (eV), used to determine if field air monitoring equipment can detect substance. Values are published in the *NIOSH Pocket Guide to Chemical Hazards*, June 1994.
- f/ Refer to expanded rules for this compound.
- g/ Olfactory fatigue has been reported for the compound and odor may not serve as an adequate warning property.
- h/ Based on coal tar pitch volatiles.

Table 2.2
Suggested Frequency of Physiological Monitoring
For Fit and acclimated workers^a

Adjusted Temperature^b	Normal Work Ensemble^c	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation $ta\ adj = ta\ ^\circ F + (13 \times \% \text{ sunshine})$. Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Table 2-3 - HEAT INDEX

ENVIRONMENTAL TEMPERATURE (Fahrenheit)

RELATIVE HUMIDITY	70	75	80	85	90	95	100	105	110	115	120
APPARENT TEMPERATURE*											
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	130
30%	67	73	78	84	90	96	104	113	123	135	148
40%	68	74	79	86	93	101	110	123	137	151	
50%	69	75	81	88	96	107	120	135	150		
60%	70	76	82	90	100	114	132	149			
70%	70	77	85	93	106	124	144				
80%	71	78	86	97	113	136					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body

Source: National Oceanic and Atmospheric Administration

How to use Heat Index:

1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

3. PERSONNEL PROTECTION AND MONITORING

3.1 Medical Surveillance

Parsons will utilize the services of a licensed occupational health physician with knowledge and/or experience in the hazards associated with the project to provide the medical examinations and surveillance specified herein.

Personnel involved in this operation have undergone medical surveillance prior to employment with their employer, and thereafter at 12-month intervals. The 12-month medical examination includes a complete medical and work history and a standard occupational physical. The examination includes: all major organ systems, complete blood count with differential (CBC), and a SMAC/23 blood chemistry screen which includes calcium, phosphorous, glucose, uric acid, BUN, creatinine, albumin, SGPT, SGOT, LDH, globulin, A/G ratio, alkaline phosphatase, total protein, total bilirubin, triglyceride, cholesterol, and a creatinine/BUN ratio. Additionally a pulmonary function test will be performed by trained personnel to record Forced Vital Capacity (FVC) and Forced Expiratory Volume in the first second (FEV₁). An audiogram and visual acuity measurement, including color perception, is administered. The medical exam is performed under the direction of a licensed Occupational Health Physician. The physician provides a medical certification regarding the fitness or unfitness for employment on hazardous waste projects. This evaluation includes any restrictions that may be indicated for each employee. The evaluation will be repeated as indicated by substandard performance or evidence of particular stress that is evident by injury or time loss illness on the part of any worker.

3.2 Site Specific Training

The Site Health and Safety Officer will be responsible for developing a site specific occupational hazard training program and providing training to all Parsons personnel that are to work at the site. This training will consist of the following topics:

- Names of personnel responsible for site safety and health.
- Safety, health, and other hazards at the site.
- Proper use of personal protective equipment.
- Work practices by which the employee can minimize risk from hazards.
- Safe use of engineering controls and equipment on the site.
- Acute effects of compounds at the site.
- Decontamination procedures.

3.3 Personal Protective Equipment and Action Levels

3.3.1 Conditions for Level D

Level D protection will be worn for initial entry on-site and initially for all activities. The following air monitoring conditions must be met:

- Total PID readings between 0 and 10 ppm. (Based on potential presence of naphthalene)
 - and
- Draeger® Benzene 2/a Tube readings < 1 ppm

Benzene colorimetric tube monitoring is required when the PID concentration exceeds 5 ppm sustained for at least 30 seconds in the worker's breathing zone.

Level D protection will consist of:

- Coveralls
- Safety boots
- Nitrile outer and nitrile inner gloves (must be worn during all sampling activities)
- Hard hat (must be worn during drilling activities)
- Safety glasses (Splash goggles must be worn if a splash hazard is present)

3.3.2 Conditions for Level C

The level of personal protection will be upgraded to Level C if any of the following conditions are met:

For Volatile Organic Compounds:

- Total PID readings in the breathing zone are between 10 and 50 ppm for at least 30 seconds
 - and
- Draeger® Benzene 2/a Tube readings < 5 ppm (daily cartridge change required)

Benzene colorimetric tube monitoring will be used to verify the level of Benzene periodically (minimum 2x per day) during Level C work.

For Nonvolatile and Semivolatile Compounds:

It is not possible to directly monitor the concentrations of airborne PCBs which might be generated as a result of wind erosion of soils. However, to avoid any potential exposure, workers will wet down the surrounding area with water if work is being conducted in a non-vegetated area or downwind of a non-vegetated area on a windy day. If the site health and safety officer or any member of the field team does not feel that these measures are sufficient, then workers may don a full-face air-purifying respirator equipped with HEPA cartridges.

Equipment Required For Level C

Level C protection will consist of:

- Full-face air-purifying respirator
- Combination dust/organic vapor cartridges
- Tyvek overall suit
- Nitrile outer and nitrile inner gloves
- Safety boots
- Hard hat (must be worn during drilling activities)

3.3.3 Conditions for Level B or Retreat

The level of personal protection will be upgraded to Level B if any of the following conditions are met:

- Total PID readings in the breathing zone are greater than 50 ppm for 30 seconds
 - or
- Draeger® Benzene 2/a Tube readings > 5 ppm

Work must be stopped at the site when PID concentrations exceed 350 ppm. (This concentration approaches the IDLH for Toluene)

At this point the field team leader must consult with the Office Health and Safety Representative to discuss the options: (1) don Level B protection and continue; (2) wait until the concentration of volatile organics falls below 350 ppm.

If concentrations of Volatile organic compounds approach 2/3 the IDLH concentrations of Toluene (~350 ppm), workers should back off immediately from the site and consult the Office Health and Safety Representative.

Equipment Required For Level B

Level B protection will consist of:

- Airline or SCBA respirator with Grade D breathing air
- Poly-coated Tyvek, overall suit
- 5-minute escape SCBA (if airline is used)
- Nitrile outer and nitrile inner gloves, taped at cuffs
- Safety boots
- Hard hat

OSHA Requirements for Personal Protective Equipment

All personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133 29 CFR 1926.102	ANSI Z87.1-1968
Respiratory	29 CFR 1910.134 29 CFR 1926.103	ANSI Z88.1-1980
Head	29 CFR 1910.135 29 CFR 1926.100	ANSI Z89.1-1969
Foot	29 CFR 1910.136 29 CFR 1926.96	ANSI Z41.1-1967

ANSI = American National Standards Institute

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134).

Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency
- IDLH concentrations
- High relative humidity
- If contaminant levels exceed designated use concentrations.

3.4 Monitoring Requirements

Monitoring for organic vapors in the breathing zone will be conducted with a Photovac MicroTIP photoionization detector (PID). A Draeger® bellows equipped with the appropriate tubes will be used to monitor for Benzene. Readings will be taken under the following circumstances.

- Upon initial entry onto the site.
- When weather conditions change.
- When work begins on another portion of the site.
- Once every hour during excavation work.

4. WORK ZONES AND DECONTAMINATION

4.1 Site Work Zones

To reduce the spread of hazardous materials by workers from the contaminated areas to the clean areas, zones will be delineated at the site. The flow of personnel between the zones should be controlled. The establishment of the work zones will help ensure that: personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

4.1.1 Exclusion Zone

Exclusion zones will be established at the site for all drilling activities; unprotected onlookers should be located 50 feet upwind of drilling or soil sampling activities. In the event that volatile organics are detected in the breathing zone as discussed in Section 3, all personnel within the exclusion zone must don Level C protection. Exclusion zones will also be established around any excavation activity.

All personnel within the exclusion zone will be required to use the specified level of protection. No eating, drinking, or smoking will be allowed in the exclusion or decontamination zones.

4.1.2 Decontamination Zone

A decontamination zone will also be utilized. This zone will be established between the exclusion zone and the support zone, and will include the personnel and equipment necessary for decontamination of equipment and personnel (discussed below). Personnel and equipment in the exclusion zone must pass through this zone before entering the support zone. This zone should always be located upwind of the exclusion zone.

4.1.3 Support Zone

The support zone will include the remaining areas of the job site. Break areas, operational direction and support facilities (to include supplies, equipment storage and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination station. Eating, smoking, and drinking will be allowed only in this area.

4.2 Decontamination

Due to the low level of contaminants expected, any water used in decontamination procedures will be disposed of on-site.

4.2.1 Decontamination of Personnel

Decontamination will be needed for anyone working inside the exclusion zone. Disposable gloves used during sampling activities should be removed and bagged; personnel should be encouraged to remove clothing and shower as soon as is practicable

at the end of the day. All clothing should be machine-washed. All personnel will wash hands and face prior to eating and before and after using the restroom.

Decontamination will also be necessary if Level C protection is used. The following OSHA-specified procedures include steps necessary for complete decontamination prior to entry into the support zone, and steps necessary if a worker only needs to change a respirator or respirator canister.

The site health and safety officer can modify the twelve-station decontamination process, dependent upon the extent of contamination.

Station 1: Segregated Equipment Drop

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Station 2: Suit/Safety Boot and Outer-Glove Wash

Thoroughly wash chemically resistant suit, safety boots and outer gloves. Scrub with long-handle, soft-bristle scrub brush and copious amounts of Alconox/water solution.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Alconox/water solution
3. Long-handle soft-bristle scrub brushes

Station 3: Suit/Safety Boot and Outer-Glove Rinse

Rinse off Alconox/water solution using copious amounts of water. Repeat as many times as necessary.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Spray unit
3. Water
4. Long-handle, soft-bristle scrub brushes

Station 4: Outer Gloves Removal

Remove the outer gloves and deposit in individually marked plastic bags.

Necessary equipment includes:

1. Plastic bag

Station 5: Canister or Mask Change

If a worker leaves the exclusion zone to change a canister (or mask), this is the last step in the decontamination procedures. The worker's canister is exchanged, new outer glove donned, and joints taped. Worker returns to duty. Otherwise the worker proceeds to Station 6.

Necessary equipment includes:

1. Canister (or mask)
2. Tape
3. Gloves

Station 6: Removal of Chemically Resistant Suit

With assistance of helper, remove suit. Deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 7: Inner-Glove Wash

Wash inner gloves with Alconox/water solution that will not harm skin. Repeat as many times as necessary.

Necessary equipment includes:

1. Alconox/water solution
2. Wash tub
3. Long-handle, soft-bristle brushes

Station 8: Inner-Glove Rinse

Rinse inner gloves with water. Repeat as many times as necessary.

Necessary equipment includes:

1. Water
2. Wash tub

Station 9: Respirator Removal

Remove face-piece. Avoid touching face. Wash respirator in clean, sanitized solution, allow to dry and deposit face-piece in plastic bag. Store in clean area.

Necessary equipment includes:

1. Plastic bags
2. Sanitizing solution

3. Cotton

Station 10: Inner-Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 11: Field Wash

Wash hands and face.

Necessary equipment includes:

1. Water
2. Soap
3. Tables
4. Wash basins or buckets
5. Clean towels

Station 12: Redress

If re-entering exclusion zone put on clean field clothes (e.g., Tyvek, gloves, etc.).

Necessary equipment includes:

1. Table
2. Clothing

4.2.2 Decontamination of Equipment

Drill rigs will be steam cleaned and drilled equipment will be decontaminated prior to moving to a site. Drilling equipment used for multiple boreholes will be decontaminated prior to drilling each boring at the site. The equipment will be decontaminated in the following manner:

- The drill rig will be steam cleaned to remove gross contamination.
- Down-hole equipment (auger bits, drill rods, split spoons, etc.) will be steam cleaned and air dried to remove gross contamination.
- Surface equipment, such as field meters and surveying instruments, will be wiped with a clean, damp cloth.

A drilling sequence hierarchy (from less likely to more likely contaminated boring locations) will be imposed to reduce the potential for cross contamination.

5. SAMPLE SHIPMENT

Samples collected in this study, with the exception of any drum samples, tank samples, or other concentrated wastes, will be classified as environmental samples. In general, environmental samples are collected from streams, ponds, or wells and are not expected to be grossly contaminated with high levels of hazardous materials.

The sample label will be legibly written and completed with an indelible pencil or waterproof ink. The information will also be recorded in a log book. As a minimum, it will include:

- Exact location of sample
- Time and date sample was collected
- Name of sampler witnesses (if necessary)
- Project codes, sample station number, and identifying code (if applicable).
- Type of sample (if known)
- Laboratory number (if applicable)
- Any other pertinent information

Chain of custody form

5.1 Environmental Samples

Environmental samples will be packaged and shipped according to the following procedure:

Packaging

1. Place sample container, properly identified and with a sealed lid, in a polyethylene bag, and seal bag;
2. Place sample in a fiberboard container or plastic cooler which has been lined with a large polyethylene bag.
3. Pack with enough noncombustible, absorbent, cushioning material to minimize the possibility of the container breaking.
4. Seal large bag.
5. Seal or close outside container

Marking/Labeling

Sample containers must have a completed sample identification label and the outside container must be marked "Environmental Sample". The appropriate side of the container must be marked "This End Up" and arrows should be drawn accordingly. No DOT marking labeling is required.

Shipping Papers

No DOT shipping papers are required, but laboratory or Parsons chain of custody forms must be signed prior to releasing the package to the carrier.

Transportation

There are no DOT restrictions on mode of transportation.

5.2 Hazardous Samples

Drum samples, tank samples, sludge samples, and grossly contaminated soil samples will be shipped as DOT Hazardous Materials. The designation "Flammable Liquid" or "Flammable Solid" will be used. Refer to International Air Transport Association Guidelines for shipping dangerous goods if the carrier will move the package by air. A completed airway bill must accompany the package and all appropriate labels must be attached to the package.

The samples will be transported as follows:

1. Collect sample in a 16-ounce or smaller glass or polyethylene container with nonmetallic teflon-lined screw cap. Allow sufficient air space (approximately 10% by volume) so container is not liquid full at 54 °C (130 °F). If collecting a solid material, the container plus contents should not exceed 1 pound net weight. If sampling for volatile organic analysis, fill VOA container to septum but place the VOA container inside a 16-ounce or smaller container so the required air space may be provided. Large quantities, up to 3.786 liters (1 gallon), may be collected if the sample's flash point is 23 °C (75 °F) or higher. In this case, the flash point must be marked on the outside container (e.g., carton, cooler), and shipping papers should state that "Flash point is 73 °F or higher."
2. Seal sample and place in a 4-mil-thick polyethylene bag, one sample per bag.
3. Place sealed bag inside a metal jerrican with noncombustible, absorbent cushioning material (e.g., vermiculite or earth) to prevent breakage, one bag per can. Pressure-close the can and use clips, tape or other positive means to hold the lid securely.
4. Mark the can with:

Name and address of originator

"Flammable Liquid N.O.S. UN 1993"

(or "Flammable Solid N.O.S. UN 1325")

NOTE: UN numbers are now required in proper shipping names.

5. Place one or more metal cans in a strong outside container such as an approved plastic cooler or DOT labeled fiberboard box. Preservatives are not used for hazardous waste site samples.
6. Prepare for shipping:

"Flammable Liquid, N.O.S. UN 1993" or "Flammable Solid, N.O.S. UN 1325"; "Cargo Aircraft Only (if more than 1 quart net per outside package); "Limited

Quantity" or "Ltd. Qty.;" "Laboratory Samples"; "Net Weight ~" or "Net Volume ~" (of hazardous contents) should be indicated on shipping papers and on outside of shipping container. "This Side Up" or "This End Up" should also be on container. Sign shipper certification. Parsons emergency number for shipping dangerous good: Chem-Tel (800) 255-3924.

7. Stand by for possible carrier requests to open outside containers for inspection or modify packaging. It is wise to contact carrier before packing to ascertain local packaging requirements and not to leave area before the carrier vehicle (aircraft, truck) is on its way.

5.3 Shipping Papers

A blank Parsons Engineering Science shipping paper should be filled out and maintained within the driver's reach, whenever a Parsons employee carries hazardous materials in a vehicle in quantities above those allowed for Materials of Trade (MOTs). Such materials may include more than 8 gallons of the following:

- Gasoline (for use in a generator) UN1203, Guide #27
- Methanol (for use in decontamination procedures) UN 1230, Guide #28
- Nitric Acid (for use in decontamination procedures) UN 1760, Guide #60
- Hydrochloric Acid (for use in decontamination procedures) UN 1789, Guide #60

Other materials may include the following:

- > 220 pounds of compressed Gas [Air, Compressed] (calibration gas for the PID, or Grade D breathing air for Level B work) UN 1002, Class 2.2.
- Other hazardous materials as defined by the DOT.

Appropriate MSDSs should be maintained with the shipping papers and/or the pocket DOT Emergency Response Guidebook.

6. ACCIDENT PREVENTION AND CONTINGENCY PLAN

6.1 Accident Prevention

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, regular meetings should be held. Discussion should include:

- Tasks to be performed.
- Time constraints (e.g., rest breaks, cartridge changes).
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals.
- Emergency procedures.

6.2 Contingency Plan

6.2.1 Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

General emergency procedures, and specific procedures for personal injury and chemical exposure, are described below.

6.2.2 Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the Field Team Leader (via voice and hand signals) of the chemical exposure. The Field Team Leader should contact the appropriate emergency response agency.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.

- In case of eye contact, an emergency eye wash should be used. Eyes should be washed for at least 15 minutes.
- All chemical exposure incidents must be reported in writing to the Office Health and Safety Representative. The Site Health and Safety Officer or Field Team Leader is responsible for completing the accident report (See Appendix B of this Section).

6.2.3 Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- Another team member (buddy) should signal the Field Team Leader that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- The victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- For less severe cases, the individual can be taken to the site dispensary.
- The Field Team Leader or Site Health and Safety Officer is responsible for making certain that an accident report form is completed. This form is to be submitted to the Office Health and Safety Representative. Follow-up action should be taken to correct the situation that caused the accident.

6.2.4 Evacuation Procedures

- The Field Team Leader will initiate evacuation procedure by signaling to leave the site.
- All personnel in the work area should evacuate the area and meet in the common designated area.
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts of missing persons determined immediately.
- Further instruction will then be given by the Field Team Leader.

6.2.5 Procedures Implemented in the Event of a Major Fire, Explosion, or On-Site Health Emergency Crisis

- Notify the paramedics and/or fire department, as necessary;
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep the area surrounding the problem source clear after the incident occurs;
- Complete accident report form and distribute to appropriate personnel.

6.2.6 Site Perimeter Air Monitoring Plan

Real-time air monitoring for volatile compounds at the perimeter of the exclusion zone is necessary. If particulates become a concern at this site, possibly during test pit activities, this community plan will be modified accordingly. Contaminants on site are not anticipated to pose a problem as particulates because of the moisture content of the soil.

- Volatile organic compounds must be monitored at the downwind perimeter of the exclusion zone daily at 2 hour intervals during excavation activities. If total organic vapor levels exceed 1 ppm above background, excavation activities must be halted and monitoring continued under the provisions of the Vapor Emission Response Plan (see below). All readings must be recorded and be available for State (DEC & DOH) personnel to review.
- Currently, fugitive particulate levels are not of concern, despite the presence of PCBs. Refer to the discussion in section 2.1. If particulate levels become a concern, the following protocol will be followed. Particulates shall be continuously monitored downwind of the exclusion zone with a portable particulate monitor that would have an alarm set at $150 \mu\text{g}/\text{m}^3$. If downwind particulate levels, integrated over a period of 15 minutes, exceed $150 \mu\text{g}/\text{m}^3$, then particulate levels upwind of the survey or work site would be measured. If the downwind particulate level is more than $100 \mu\text{g}/\text{m}^3$ greater than the upwind particulate level, then excavation activities must be stopped and corrective action taken. Ensure that downwind readings are not elevated by diesel emissions from heavy equipment. All readings must be recorded and be available for State (DEC & DOH) personnel to review. These action levels can be modified if particulates are better characterized and identified.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the Exclusion Zone, excavation activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, excavation activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 10 ppm over background at the perimeter of the Exclusion Zone, activities can resume provided:

- the organic vapor level 200 ft. downwind of the Exclusion Zone or half the distance to the nearest receptor, whichever is less, is below 1 ppm over background, and
- more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

If the organic vapor level is above 10 ppm at the perimeter of the Exclusion Zone work activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor

emission does not impact the nearest receptor at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the Survey Site or half the distance to the nearest receptor, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest receptor from the Exclusion Zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria are exceeded in the 20-Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes.
- Organic vapor levels greater than 10 ppm above background for any time period.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
2. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.
3. All Emergency contacts will go into effect as appropriate.

6.2.7 Communication

Communication either via radio or cellular phone will be maintained between the field office and all work parties. In case of emergency or accident the field emergency response person will immediately notify the field office via the communication equipment.

Field team members will use the *buddy* system while performing field activities. Buddies will pre-arrange hand signals for communication. The following hand signals are suggested:

- **Grip partner's wrist or place both arms straight up overhead:** Leave area immediately, no debate.
- **Place both arms overhead in form of an "X":** Need assistance.
- **Thumbs up:** OK, I am all right; or I understand.
- **Thumbs down:** No or negative.

HEALTH AND SAFETY PLAN APPENDIX A

**AIR MONITORING EQUIPMENT CALIBRATION AND
MAINTENANCE**

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

All monitoring instruments must be calibrated and maintained periodically. The operator must understand the limitations and possible sources of errors for each instrument. The operator shall ensure that the instrument responds properly to the substances that it was designed to monitor. Portable air quality monitoring equipment that measures total ionizables present, such as the Photovac MicroTIP HL-2000, must be calibrated at least once each day. Combustible gas/oxygen/%LEL meters (explosimeters) such as the MSA Model 360, must be calibrated at least once each week. Real time aerosol monitors, such as the Personal DataRAM®, must be zeroed at the beginning of each sampling period. The specific instructions for calibration and maintenance provided for each instrument should be followed.

HEALTH AND SAFETY PLAN APPENDIX B

FORMS FOR HEALTH AND SAFETY-RELATED ACTIVITIES

Note: The OSHA Job Safety and Health Protection Poster must be posted prominently during field activities. The following page is an example of the poster to be used in the field. The actual poster must be an 11 inch by 17 inch size version of this page.

(Page 1 of 2)

Project Name: _____

INJURED OR ILL EMPLOYEE

1. Name _____
(First) (Middle) (Last) Social Security # _____
2. Home Address _____
(No. and Street) (City or Town) (State and Zip)
3. Age _____
4. Sex: Male Female
5. Occupation _____
(Specific job title, not the specific activity employee was performing at time of injury)
6. Department _____
(Enter name of department in which injured person is employed, even though they may have been temporarily working in another department at the time of injury)

EMPLOYER

7. Name _____
8. Mailing Address _____
(No. and Street) (City or Town) (State and Zip)
9. Location (if different from mailing address): _____

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure _____
(No. and Street) (City or Town) (State and Zip)
11. Was place of accident or exposure on employer's premises? (Yes/No)
12. What was the employee doing when injured? _____

(Be specific - was employee using tools or equipment or handling material?)

13. How did the accident occur? _____
(Describe fully the events that resulted in the injury or
occupational illness. Tell what happened and how. Name objects and
substances involved. Give details on all factors that led to accident. Use separate sheet if needed)

(Page 2 of 2)

14. Time of accident: _____

15. Date of injury or initial diagnosis of occupational illness _____
(Date)

16. WITNESS

TO ACCIDENT

_____	(Name)	(Affiliation)	(Phone No.)
_____	(Name)	(Affiliation)	(Phone No.)
_____	(Name)	(Affiliation)	(Phone No.)

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

17. Describe the injury or illness in detail; indicate part of body affected.

18. Name the object or substance which directly injured the employee. (For example, object that struck employee; the vapor or poison inhaled or swallowed; the chemical or radiation that irritated the skin; or in cases of strains, hernias, etc., the object the employee was lifting, pulling, etc.)

19. Did the accident result in employee fatality? _____ (Yes or No)

20. Number of lost workdays _____/restricted workdays _____ resulting from injury or illness?

OTHER

21. Did you see a physician for treatment? _____ (Yes or No) _____ (Date)

22. Name and address of physician _____

(No. and Street)

(City or Town)

(State and Zip)

23. If hospitalized, name and address of hospital _____

(No. and Street)

(City or Town)

(State and Zip)

Date of report _____ Prepared by _____

Official position _____

PROJECT HEALTH AND SAFETY PLAN AND WORK PLAN ACCEPTANCE FORM

(For Parsons employees only)

I have read and agree to abide by the contents of the Work Plan and Health and Safety Plan for the following project:

(Project Title)

(Project Number)

Furthermore, I have read and am familiar with the work plan or proposal which describes the field work to be conducted and the procedures to be utilized in the conduct of this work.

Name (print)

Signature

Date

Place in project Health and Safety File as soon as possible

SITE-SPECIFIC HEALTH AND SAFETY TRAINING

(For All Parsons and subcontract employees on site)

I hereby confirm that site-specific health and safety training has been conducted by the site health and safety officer which included:

- Names of personnel responsible for site safety and health
- Safety, health, and other hazards at the site
- Proper use of personal protective equipment
- Work practices by which the employee can minimize risk from hazards
- Safe use of engineering controls and equipment on the site
- Acute effects of compounds at the site
- Decontamination procedures

For the following project:

(Project Title)

(Project Number)

Name (print)

Signature

Date

FINAL

HEALTH AND SAFETY PLAN APPENDIX C

MATERIAL SAFETY DATA SHEETS

FINAL

HEALTH AND SAFETY PLAN APPENDIX D

STANDARD SAFE WORK PRACTICES

STANDARD SAFE WORK PRACTICES

- 1) Eating, drinking, chewing tobacco, smoking and carrying matches or lighters is prohibited in a contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.
- 2) Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surfaces (i.e., ground, etc).
- 3) All field crew members should make use of their senses to alert them to potentially dangerous situations in which they should not become involved; i.e., presence of strong and irritating or nauseating odors.
- 4) Prevent, to the extent possible, spills. In the event that a spill occurs, contain liquid if possible.
- 5) Field crew members shall be familiar with the physical characteristics of investigations, including:
 - Wind direction
 - Accessibility to associates, equipment, vehicles
 - Communication
 - Hot zone (areas of known or suspected contamination)
 - Site access
 - Nearest water sources
- 6) All wastes generated during activities on-site should be disposed of as directed by the project manager or his on-site representative.
- 7) Protective equipment as specified in the section on personnel protection will be utilized by workers during the initial site reconnaissance, and other activities.

HEALTH AND SAFETY PLAN APPENDIX E

TRENCH AND EXCAVATION SAFETY

TRENCH AND EXCAVATION SAFETY

1. OBJECTIVE

All Site personnel will control the hazards posed by open excavation through strict compliance with this procedure and the provisions of the excavation inspection form.

2. REGULATORY REQUIREMENTS

This procedure will follow the guidelines of 29 CFR 1926, Subpart P Excavations. In the case of United States Army Corps of Engineers projects, the requirements of EM 385-1-1, Section 25 will be observed. In the event of a conflict between these referenced standards, the more stringent will prevail.

3. GENERAL REQUIREMENTS

Safety operations while working in and around excavations involve many factors. Factors to be evaluated and corrected before starting work includes:

3.1 Surface Hazards

The excavation area should be inspected and any debris, structures, and surface protrusions that are located so as to create a hazard to employees shall be removed as necessary to safeguard employees. Any buildings on the site should be evaluated for structural integrity and supported if necessary.

3.2 Underground Installations & Utility Locations

Before conducting any excavation work, the location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined.

3.2.1 Utility companies or the state utility protection service shall be contacted at least three working days prior to excavation activities to be advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

- 3.2.2 Site Personnel and subcontractors should be careful to protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations.
- 3.2.3 If the markings of utility locations are destroyed or removed before excavation commences or is completed, the excavation competent person must notify the utility company or utility protection service to inform them that the markings have been destroyed. Normally, it will take two working days of the notice for the utility protection service to remark the locations.
- 3.2.4 Equipment operators shall maintain a reasonable clearance between any underground utility and the cutting edge or point of powered equipment.
- 3.2.5 When excavating with powered equipment within 18 inches of the markings of underground facilities, personnel should conduct the excavation in a careful and prudent manner, excavating by hand to determine the precise location of the facility or utility and to prevent damage.
- 3.2.6 While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

3.3 ACCESS AND EGRESS

3.3.1 Structural Ramps

Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

Structural members used for ramps and runways shall be of uniform thickness.

Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

3.3.2 Means of Egress from Trench Excavations

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

3.4 EXPOSURE TO VEHICULAR TRAFFIC

Employees exposed to public vehicular traffic shall be provided with and shall wear, warning vests or other suitable garments marked with or made of high-visibility material.

3.5 EXPOSURE TO FALLING LOADS

No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with 29 CFR 1926.601(b)(6), to provide adequate protection for the operator from falling objects during loading and unloading operations.

3.6 WARNING SYSTEM FOR MOBILE EQUIPMENT

When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals or stop logs. If possible, the grade should be away from the excavation.

3.7 HAZARDOUS ATMOSPHERES

3.7.1 Testing and Controls

In addition to the requirements set forth, 29 CFR 1926.50 and 1926.107; to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist such as in excavations in landfill areas or excavations in areas where hazardous substances are

suspected, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

Adequate precautions shall be taken, to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation as needed.

Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 10 percent of the lower explosive limit (LEL) of the gas or vapor. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

3.7.2 Emergency Rescue Equipment

Emergency rescue equipment such as self contained breathing apparatus (SCBA), a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

Employees entering bell-bottom pier holes or other similar deep and confined excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

3.8 PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating by the use of water-removal equipment, the water-removal equipment and operations shall be monitored by a competent person to ensure proper operation.

If excavation work interrupts the natural drainage of surface water (such as streams, diversion ditches, dikes, or other suitable means shall be used to prevent surface water

from entering the excavation and to provide , adequate drainage of the area adjacent to the excavation. Excavations subject to run-off from heavy rains will require an inspection by a competent person.

3.9 STABILITY OF ADJACENT STRUCTURES

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

- 3.9.1 A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
- 3.9.2 The excavation is in stable rock; or
- 3.9.3 A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
- 3.9.4 A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.
- 3.9.5 Sidewalks, pavements, and other structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

3.10 PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the excavation face to stop and contain falling material; or other means that provide equivalent protection.

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or

equipment from falling or rolling into excavations, or by a combination of both if necessary.

3.11 INSPECTIONS

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are required when employee exposure can be reasonably anticipated. An Excavation Trenching Inspection Form must be completed by the competent person to document the inspections.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

3.12 FALL PROTECTION

Where employees or equipment are required or permitted to cross over excavations; walkways, or bridges with standard guardrails shall be provided.

Adequate barriers for physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc. shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be covered or back-filled.

4. SOIL CLASSIFICATION

OSHA Soil Classification (Appendix A to Subpart P)

4.1 **Type A** means:

Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

4.1.1 The soil is fissured; or

- 4.1.2 The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
- 4.1.3 The soil has been previously disturbed; or
- 4.1.4 The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:IV) or greater; or
- 4.1.5 The material is subjected to other factors that would require it to be classified as a less stable material.

4.2 **Type B** means:

- 4.2.1 Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
- 4.2.2 Granular cohesion-less soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
- 4.2.3 Previously disturbed soils except those which would otherwise be classed by Type C soil.
- 4.2.4 Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration; or
- 4.2.5 Dry rock that is not stable; or
- 4.2.6 Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:IV), but only if the material would otherwise be classified as Type B.

4.3 **Type C** means:

- 4.3.1 Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
- 4.3.2 Granular soils including gravel sand, and loamy sand; or
- 4.3.3 Submerged soil or soil from which water is freely seeping; or

- 4.3.4 Submerged rock that is not stable; or
- 4.3.5 Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:IV) or steeper.

5. TIMBER SHORING, ALUMINUM HYDRAULIC AND ALTERNATIVES TO SHORING

Refer to 29 CFR 1926 Subpart P (Appendices C, D, and E) for details on shoring, shields, and trench boxes.

6. SELECTION OF PROTECTIVE SYSTEMS

Refer to 29 CFR 1926 Subpart P (Appendix F) for the decision logic in selecting protective systems.

7. INSPECTION FORM

An Excavation / Trenching Inspection Form must be completed by the competent person each day that an excavation is open and personnel may be required to enter the excavation. The excavation inspection form follows this procedure.

TRENCH SAFETY DAILY FIELD REPORT

DATE:

JOB NO:

Project name:

Project owner:

Project Superintendent:

Location:

Weather Condition:

Rainfall amounts 24 hours previous:

I hereby attest that the following conditions existed and that the following items were checked or reviewed during this inspection: (circle appropriate response-circling boldface letter requires additional comment).

1. All open trench was inspected	Y	N
2. All surcharge was located proper distance from toe of slopes	Y	N
3. Were any tension cracks observed along top of any slopes	Y	N
4. Were slopes cut at design angle of repose?	Y	N
5. Was any water seepage noted in trench walls or trench bottom?	Y	N
6. Was bracing system installed in accordance with design?	Y	N
7. Was there evidence at shrinkage cracks in trench walls?	Y	N
8. Was there any evidence of caving or sloughing of soil since the last field inspection?	Y	N
9. Were there any zones of unusually weak soils or materials not anticipated?	Y	N
10. Was there any evidence of significant fracture planes in soil or rock?	Y	N
11. Was there any noted dramatic dips in bedrock?	Y	N
12. All short-term trench(s) covered within 24 hours?	Y	N
13. Non-compliance items photographed?	Y	N
14. Trench box(s) certified?	Y	N

Shield Capacity in pounds per square ft.

15. Were hydraulic shores pumped to design pressure?

16. Type of shoring being used? Secure? Y N

17. Did shoring plan include adequate safety factor to allow for equipment actually being used? Y N

18. Traffic in area adequately away from trenching operations with barricades? Y N

19. Trees, boulders or other hazards in area? Y N

20. Vibrations from equipment or traffic too close to trenching operation? Y N

21. List heavy equipment near operation:

22. Heavy equipment in use on site.

23. Contractor personnel by trade on site:

24. Excavation foreman:

25. Compliance photo activity by station & direction:

26. Changed subsurface condition from those anticipated:

27. Activity by station:

Trench Box

Man Hole Construction

Side Sloping

Bracing

Other

28. Observations:

Contractor Representative:

Project Inspector:

Safety Coordinator:

Copies of this form are to be kept at the job site for review by the safety coordinator, owner, project inspector at all times as well as copies mailed to each at these individuals work place.

Note: THIS FORM MAY BE REPRODUCED

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

PARSONS ENGINEERING SCIENCE, INC.

\SYRFS01\PROJECTS\740741\WP\40741R01A.DOC
CCTOBER 9, 2001

APPENDIX B

**QUALITY ASSURANCE PLAN
FOR TIME CRITICAL REMOVAL ACTION AT
SITE 15 AT HANCOCK FIELD
SYRACUSE, NY**

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SECTION 1

PROJECT DESCRIPTION

1.1 INTRODUCTION

The 174th Fighter Wing (FW) of the New York Air National Guard (NYANG) is based at Hancock Field in Syracuse, New York (Figure 1.1). Hancock Field is located approximately two miles north-northeast of Syracuse in Onondaga County in central New York.

Site 15 is a 2.5-acre plot of land and the site of a former petroleum, oil, and lubricant (POL) storage area near the southern boundary of the base. Soil and groundwater have been impacted by past fueling activities and the storage of polychlorinated biphenyl (PCB)-containing transformers, as evidenced by the presence of jet fuel-related compounds, PCBs, and free product. Benzene, toluene, ethylbenzene, and xylene (BTEX) contamination in groundwater appears to extend from the northern end of the site to East Molloy Road, south of the site. PCBs and free product appear to be concentrated around the northern central area of the site.

Site 1 is located about one-half mile northeast of Site 15. Currently staged on a concrete pad at this site is a volume of PCB-impacted soil, which will be considered along with any PCB-impacted soil to be removed from Site 15.

1.2 PROJECT OBJECTIVES

This QA Plan addresses the remediation to be carried out at the Hancock Field Site 15. All necessary reports and documentation will be prepared in accordance with the provisions specified in the Work Plan for this effort.

The objectives of the Site 15 remediation are as follows:

- Remove all of the existing unused concrete pad, pump house foundation, and six 25,000-underground storage tanks;
- Excavate soil with PCBs. The area to be excavated is limited to the area surrounding the former pump house, up to the concrete pad to the south, plus up to 50 cubic yards of surface soils in a small drainage swale northwest of the former pump house, and a small amount of surface soil south of the concrete pad. The work includes confirmation sampling to demonstrate PCB action levels are achieved. If confirmation sampling indicates more soil needs to be removed than assumed, adjustment of the scope and costs will be required. The HQ ANG PM and Base EM will be contacted immediately upon identification of the need for additional soil excavation beyond what is planned based on previous investigation results;

- Excavation surrounding the former pump house will be conducted to a maximum of 14 feet below ground surface. The excavation will be dewatered as needed, up to a maximum of 10,000 gallons;
- Dispose soil offsite at an appropriate licensed facility. Parsons will provide a listing of two to four facilities to the HQ ANG PM and Base EM for selection of an appropriate disposal facility;
- Dispose of accumulated water from excavation dewatering at an appropriate permitted treatment facility;
- Field supervision of the excavation effort to include perimeter air monitoring at four stations, over a maximum time period of three weeks; and,
- Replace excavated soil with the concrete pad and former pump house foundation, and clean fill, to original grade. Reseed area to establish vegetative cover.
- Selected monitoring well rehabilitation and abandonment, as requested by the 174th Fighter Wing; and
- Additional groundwater investigation work requested by NYSDEC.

SECTION 2

PROJECT ORGANIZATION

The organization of the project team is described in Section 2 of the Work Plan.

SECTION 3

DATA QUALITY OBJECTIVES

3.1 INTRODUCTION

The data produced during the Site 15 investigation will be compared with the defined Quality Assurance (QA) objectives and criteria for precision, accuracy, representativeness, completeness, and comparability (PARCC). The primary goal of these procedures is to ensure that the data reported are representative of actual conditions at the site.

This data assessment activity is an on-going coordinated process with data production and is intended to assure that all data produced during the project are acceptable for use in subsequent evaluations. Both statistical and qualitative evaluations will be used to assess the quality of the data. The primary evaluation of the data will be based upon the control samples described in Section 8. The blank samples will be used to evaluate whether or not the laboratory represents a possible source of sample contamination and duplicate sample results will be used to evaluate data precision.

3.2 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are based on the premise that different data uses require different levels of data quality. Data quality refers to a degree of uncertainty with respect to PARCC. Specific objectives are established to develop sampling protocols and identify applicable documentation, sample handling procedures, and measurement system procedures. These DQOs are established on site conditions, objectives of the project, and knowledge of available measurement systems.

A wide range of data quality is achieved through the use of various analytical methods. The following data quality levels are widely accepted as descriptions of the different kinds of data that can be generated for various purposes:

- Level I: Field screening or analysis using portable instruments (e.g., photoionization detector [PID]). Results are often not compound specific and not quantitative but results are available in real time.
- Level II: Field analysis using more sophisticated portable analytical instruments (e.g., on-site mobile laboratory). There is a wide range in the quality of data that can be generated depending on the use of suitable calibration standards, reference materials, and sample preparation equipment. Results are available in real-time or typically within hours of sample collection.
- Level III: All analyses performed in an off-site analytical laboratory using USEPA approved analytical methods other than the Contract Laboratory Program (CLP) Routine Analytical Service (RAS) Protocols. These data are

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typically used for engineering studies (e.g., treatability testing), risk assessment, and site investigations. Results are both qualitative and quantitative.

- Level IV: These data are generated using the USEPA CLP methods and supported by a rigorous QA program, supporting documentation, and data review procedures. These data are suitable for use in site characterizations, risk assessments, enforcement/litigation activities, and design of remedial alternatives.

The Site 15 project will obtain Level I data quality for field screening with portable instruments such as PIDs which will be used for health and safety and field operational monitoring. Field test kits (Level II data quality) will be used to provide PCB soil concentrations for determining where to collect a sample to assess the presence of contamination; field screening of samples to be designated for laboratory confirmation analyses; and/or monitoring additional field operational parameters. This project will also obtain Level III data quality for laboratory analyses of PCBs in soil, BTEX in soil (as needed), and groundwater quality. Laboratory analyses will be conducted in accordance with USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical and Chemical dated December 1996 (USEPA, 1996), and the project Work Plan.

3.3 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 7), calculating the RPD for duplicate sample results. Field duplicate precision for soil analytical parameters (PCBs) should be $\leq 50\%$ RPD. Field duplicate precision for aqueous analytical parameters should be $\leq 35\%$ RPD.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD = Relative Percent Difference.
 V1, V2 = The two values to be compared.

$|V1 - V2|$ = The absolute value of the difference between the two values.
 $(V1 + V2)/2$ = The average of the two values.

3.4 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity that is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

$\%R$ = Percent recovery.
 SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR	=	Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.
SA	=	Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Table 3.1.

3.5 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Field Sampling Plan. Laboratory sample containers will be thoroughly cleaned in accordance with procedures outlined in Section 4.2. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate, and chain-of-custody procedures are presented in the Field Sampling Plan (Appendix A.1).

3.6 COMPLETENESS

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

3.7 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by the following:

- Using identified standard methods for both sampling and analysis phases of this project
- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST)
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable)
- Using standard reporting units and reporting formats including the reporting of QC data
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

SECTION 4

SAMPLING PROGRAM

4.1 INTRODUCTION

The sampling program will provide data concerning the presence and the nature and extent of contamination of groundwater and soil, if any. This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be collected are specified in the project Work Plan. The sampling procedures are described in detail in the Field Sampling Plan (FSP).

4.2 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION

Sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the USEPA SW-846. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged, the appropriate preservatives will be added. The types of containers are shown in Tables 4.1 and 4.2.

Samples shall be preserved according to the preservation techniques given in Tables 4.1 and 4.2. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4°C with ice, and delivered to the laboratory within 48 hours of collection. Chain-of-custody procedures are described in the Field Sampling Plan (Appendix A.1).

4.3 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.1 and 4.2. Holding times for Toxicity Characteristic Leaching Procedure (TCLP) samples are given in Table 4.3. These holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to the Project Quality Assurance Officer.

4.4 FIELD QC SAMPLES

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

Table 4.1**Water Sample Containerization, Preservation, and Holding Times**

Analysis	Bottle Type	Preservation (a)	Holding Time (b)
Volatile Organic Compounds (VOCs)	two 40-mL glass vials with Teflon septum	Cool to 4°C	7 days
PCBs	1000 mL glass w/ Teflon lined cap	Cool to 4°C	7 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from verified time of sample receipt (VTSR).

* Extraction of water samples for PCB analysis by separatory funnel must be completed within 7 days of sample collection. Continuous liquid-liquid extraction is the required extraction for water samples for SVOCs. Continuous liquid-liquid extraction and concentration of water samples for SVOCs analysis must be completed within 7 days of sample collection. Extracts of water samples must be analyzed within 40 days of sample collection.

Table 4.2**Soil Sample Preservation and Holding Times**

Analysis Parameter	From: Sample Collection To: TCLP(a) Extraction	From: TCLP Extraction To Preparative Extraction	From: Preparative Extraction To Determinative Analysis
Volatiles	14 days	NA	14 days
PCBs	14 days	7 days	40 days

(a) Toxicity Characteristic Leaching Procedure

NA – Not Applicable

- Trip Blanks - A Trip Blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOC vial containing distilled, deionized water that accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples for volatiles analysis. The Trip Blank will be analyzed for BTEX volatile organic compounds to access any contamination from sampling and transport, and internal laboratory procedures.
- Field Blanks - Field Blanks will be taken at a minimum frequency of one per 10 field samples for groundwater. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will consist of:

- Coded Field Duplicate - To determine the representativeness of the sampling methods, one field duplicate per 10 field samples will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Table 3.1 of this Quality Assurance Plan.

SECTION 5

SAMPLE TRACKING AND CUSTODY

5.1 INTRODUCTION

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the Chain-of-Custody (COC) and transfer of samples will be trained as to the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 5.1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession
- Maintained in view after possession is accepted and documented
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody
- In a secured area that is restricted to authorized personnel

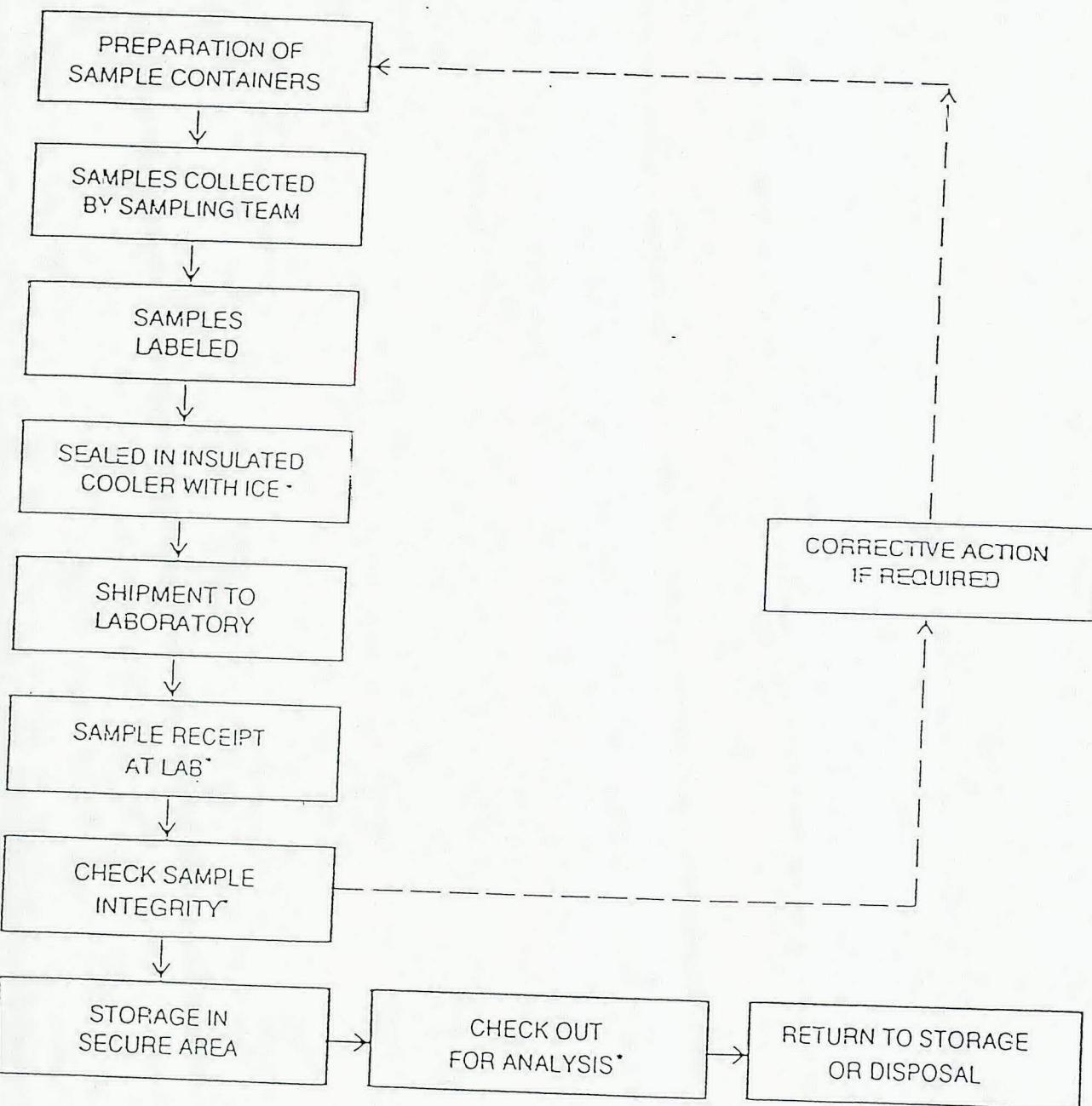
5.2 FIELD SAMPLE CUSTODY

A COC record (Figure 5.2) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper airbill number on the top of the COC. Mistakes will be crossed out with a single line in ink and initialed by the author.

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN OF CUSTODY FORM.

CHAIN OF CUSTODY RECORD

NO: 3131

CLIENT:		PROJECT NO:		PROJECT MGR:		ANALYSES REQUIRED				Send results to:		
PROJECT NAME:		NOTES - (Reference QAPP and/or analytical protocols to be used):								PARSONS ENGINEERING SCIENCE, INC. 290 Elwood Davis Road-Suite 312 Liverpool, NY 13088		
SAMPLERS:												
FIELD SAMPLE ID		LOCATION DESCRIPTION		DATE	TIME	GRAB	COMP	MATRIX	Number of Bottles	Lab Submitted to:		
Relinquished by: (Signature)		Date:	Time:	Shipped via:		Airbill #:		Received by: (Signature)		Date:	Time:	Cooler Temp: °C
												Samples Intact: Yes No
Relinquished by: (Signature)		Date:	Time:	Shipped via:		Airbill #:		Received by: (Signature)		Date:	Time:	Cooler Temp: °C
												Samples Intact: Yes No
Relinquished by: (Signature)		Date:	Time:	Shipped via:		Airbill #:		Received by: (Signature)		Date:	Time:	Cooler Temp: °C
												Samples Intact: Yes No
TYPE CODES: SOLID		SD- Sediment	TP- Test Pit/Tank Pit	WATER		MW- Monitoring Well	FD- Fuel Dispenser	ST- Storm Water	MATRIX	QUALITY CONTROL		
		SS- Surface Soil	DR- Drum Waste			LC- Leachate	MH- Manhole	WW- Waste Water	W- Water			
		SB- Subsurface Soil	WA- Solid Waste			SW- Surface Water	OW- Oil Water Separator	OL- Other Liquid (eg. Drum liquid)	S- Soil			
		MW- Monitoring Well Boring	OS- Other Solid			DW- Drill Water	PR- Piping Run					
NO: 3131		Revised: 9/30/98										FB- Field Blank (with date)
												TB- Trip Blank (with date)
												WB- Wash Blank (with date)

One copy of the COC is retained by sampling personnel and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will not be analyzed.

5.3 LABORATORY SAMPLE CUSTODY

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

SECTION 6

CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the Field Sampling Plan. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader and will be subjected to audit by the project Quality Assurance Officer (QAO). Copies of all the instrument manuals will be maintained on-site by the Field Team Leader. Calibration procedures for the PCB test kits are provided in Appendix C.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector and explosimeter) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in the sections of the USEPA SW-846 that apply to the instruments necessary for the analytical methods given in Section 3.

SECTION 7

DATA REDUCTION, VALIDATION, AND REPORTING

7.1 INTRODUCTION

Data collected during the groundwater investigation will be reduced, reviewed, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods USEPA SW-846. The data packages provided by the laboratory will contain all items specified in USEPA SW-846 for QA Level III reporting with a full data package.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

7.2 DATA REDUCTION

Two copies of the analytical data packages and an electronic disk deliverable will be provided by the laboratory. The Project Manager will immediately arrange for filing one package; a second copy, and the disk deliverable, will be used to generate summary tables. These tables will form the database for assessment of the site contamination condition. The Parsons ES QA reviewer, who will check the package to ensure all deliverables have been provided by performing a contract compliance screening (CCS) and validation. If problems are identified during CCS, the laboratory will be alerted, and corrective actions will be requested.

The electronic deliverable format required is an ASCII comma delimited file with the fields and character lengths summarized in Table 7.1.

Each diskette deliverable must be formatted and copied using an MS-DOS operating system. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this can not be accomplished, then Parsons ES should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All diskette deliverables must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

Table 7.1
Field and Character Lengths for Disk Deliverable

Description	Length	Format
Field Sample ID (as shown on COC)	15	Character
Cas. No. (including '-'s)	10	Character
Parameter Name	31	Character
Concentration	13	Numeric
Qualifier	4	Character
Units	8	Character
SDG	8	Character
Lab Sample ID	15	Character
Date Sampled (from COC)	D	Date
Matrix (soil/water/air)	5	Character
Method Detection Limit	13	Numeric
Method Code	8	Character
Lab Code	6	Character

7.3 DATA VALIDATION

The analytical data generated during the field investigation will be reviewed and validated (if required) by a data evaluation staff. Data validation will be performed in accordance with guidance provided by USEPA documents (USEPA 1992a and 1992b), adapted to the QA/QC criteria in the USEPA SW-846 and this QA/QC plan. Validation will include the following:

- Contract Compliance Screening,
- Verification of 100% of all QC sample results (both qualitative and quantitative),
- Verification of the identification of 100% of all sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and

This work will be performed by trained and experienced data evaluation staff.

A data validation report will be prepared and reviewed by the Parsons ES QAO before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic compound analytical methods, the following will be assessed:

- Holding times
- Instrument tuning
- Instrument calibrations
- Blank results
- System monitoring compounds or surrogate recovery compounds (as applicable) and internal standard recovery results
- MS and MSD results
- Target compound identification
- Pesticide cleanup (if applicable)
- Compound quantitation and reported detection limits
- System performance

For each of the inorganic compounds, the following will be assessed:

- Holding times
- Calibrations

- Blank results
- Interference check sample
- Laboratory check samples
- Duplicates
- Matrix Spike
- Furnace atomic absorption analysis QC
- ICP serial dilutions
- Results verification and reported detection limits

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected at given value
- "UJ" - Estimated not detected at given value
- "J" - Estimated value
- "N" – Presumptive evidence at the value given
- "R" - Result not useable
- No Flag - Result accepted without qualification

SECTION 8

INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

8.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). The MS/MSD samples will be designated by the field personnel. If no MS/MSD samples have been designated, the laboratory will contact the project Quality Assurance Officer (QAO) for corrective action.

8.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

8.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives." The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing KMnO₄. The matrix spike is generated by addition of surrogate standard to each sample.

8.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

SECTION 9

QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

9.1 INTRODUCTION

Quality assurance audits may be performed by the project Quality Assurance Officer (QAO). These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to Parsons ES corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon Parsons ES procedure customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

9.2 SYSTEM AUDITS

System audits, performed by the QAO or designated auditors, will encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

9.3 PERFORMANCE AUDITS

The laboratory will be required to conduct an analysis of Performance Evaluation (PE) samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve (12) months.

9.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead

auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Noncompliances will be logged, and documented through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

SECTION 10

PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

10.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

10.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

10.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

SECTION 11

PROCEDURES FOR ASSESSING DATA

The data collected during this project will undergo a systematic review for compliance with the DQOs and performance objectives as stated in Section 3. In particular, laboratory and field data will be reviewed for compliance with the method QC criteria for performance and accuracy. As noted in Section 8, the chemical data will be qualified according to USEPA Region II SOPs and reported. These data will be evaluated as to usability. In particular, data outside QC criteria, but not rejected, will be reviewed for the magnitude of possible positive and negative bias.

A data usability report that summarizes the implications of the use of any data out of criteria will be written for each round of data. In addition, the data usability report will include the percentage of sample completeness for critical and noncritical samples and a discussion of any issues in representativeness of the data that may develop as a result of validation. The data usability report will address overall data quality and achievement of PARCC and assess issues associated with the overall data.

After data validation, the data will be evaluated as to consistency with site conditions and developed conceptual models.

SECTION 12

CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained
- When procedure or data compiled are determined to be deficient
- When equipment or instrumentation is found to be faulty
- When samples and analytical test results are not clearly traceable
- When quality assurance requirements have been violated
- When designated approvals have been circumvented
- As a result of system and performance audits
- As a result of a management assessment
- As a result of laboratory/field comparison studies
- As required by USEPA SW-846

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the Parsons ES office, sites, laboratories, or subcontractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective

actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

SECTION 13

REPORTS TO MANAGEMENT

Parsons ES management personnel receive QA reports appropriate to their level of responsibility. The PM receives copies of all QA documentation. QC documentation is retained within the department which generated the product or service except where this documentation is a deliverable for a specific contract. QC documentation is also submitted to the QAO for review and approval. Previous sections detailed the QA activities and the reports which they generate. A final audit report for each project may also be prepared. The reports may include:

- periodic assessment of measurement data accuracy, precision, and completeness;
- results of performance audits and/or system audits;
- significant QA problems and recommended solutions for future projects; and
- status of solutions to any problems previously identified.

Additionally, any incidents requiring corrective action will be fully documented.

SECTION 14

REFERENCES

NYSDEC, 1995. *NYSDEC Analytical Services Protocol*, dated December 1995. New York State Department of Environmental Conservation.

USEPA, 1987. *Data Quality Objectives for Remedial Response Actions Activities: Development Process*. EPA/540/G-87/003, OSWER Directive 9355.0-7. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1989. *CERCLA Quality Assurance Manual, Revision 1*, dated October 1989. U.S. Environmental Protection Agency, Region II.

USEPA, 1992a. Standard Operating Procedures (SOP) in "CLP Organics Data Review and Preliminary Review." SOP No. HW-6, Revision #8, dated January 1992. U.S. Environmental Protection Agency, Region II.

USEPA, 1992b. Standard Operating Procedures (SOP) in "Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90." SOP No. HW-2, Revision #11, dated January 1992. U.S. Environmental Protection Agency, Region II.

USEPA, 1996. *USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical and Chemical*, dated December 1996. U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX C

FIELD SAMPLING AND ANALYSIS PLAN

PARSONS ENGINEERING SCIENCE, INC.

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OCTOBER 9, 2001

FINAL

APPENDIX C

**SAMPLING AND ANALYSIS PLAN
FOR SITE 15 AT HANCOCK FIELD
SYRACUSE, NY**

Air National Guard

Environmental Restoration Branch
3500 Futchet Avenue
Andrews AFB, MD 20762-5157

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September 2001



PARSONS

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SECTION 1

INTRODUCTION

1.1 INTRODUCTION

The procedures that will be used to conduct field activities for soil excavation at Site 15 at Hancock Field near Syracuse, New York, are presented in this Field Sampling Plan. The quality assurance and quality control procedures that will be used by subcontractor analytical laboratories are presented in the Quality Assurance Plan (Appendix B).

1.2 GENERAL GUIDELINES FOR FIELD WORK

Surface Hazards

Potential on-site surface hazards, such as sharp objects, overhead power lines, and building hazards, will be identified prior to initiation of field work. Generally, such hazards will be identified during a site reconnaissance or scoping visit that precedes the first day of field work. For a detailed listing of potential chemical and physical hazards at the site, see the site Health and Safety Plan (Appendix A).

Underground Utilities

All underground utilities, including electric lines, gas lines, and communication lines, will be identified prior to initiation of drilling and other subsurface work. This may be accomplished by contacting the Underground Facilities Protective Organization (UFPO) at (800) 962-7962. A UFPO representative will mark all buried utility lines in the work area. UFPO will be notified at least two working days, and not more than 10 working days, before subsurface work is conducted.

Field Log Books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field logbooks will provide a legal record of the activities conducted at the site. Thus, the field logbooks will be maintained according to the following guidelines:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of field work.

- Erroneous entries made while field work is in progress will be corrected by the person who made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. The correction will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.
- The Parsons ES Project Manager will control field books when field work is not in progress.

At a minimum, daily field book entries will include the following information:

- Location of field activity
- Date and time of entry
- Names and titles of field team members
- Names and titles of any site visitors and site contacts
- Weather information: temperature, cloud coverage, wind speed and direction
- Purpose of field activity
- A detailed description of the field work conducted

SECTION 2

FIELD SAMPLING PROCEDURES

2.1 OVERVIEW OF SAMPLING

Procedures for obtaining samples of various environmental media are described in this section.

At a minimum, sampling procedures will be in accordance with the most recent NYSDEC and U.S. Environmental Protection Agency (USEPA) guidelines and/or regulations. The procedures described here are derived primarily from the following guidance documents:

- USEPA - 600-4-83-040, "Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods".
- USEPA - OSWER - 9950.1 "RCRA Ground-water Monitoring Technical Enforcement Guidance Document".
- USEPA - 600-4-79-020, "Methods for Chemical Analysis of Water and Wastes".

2.2 SAMPLING EQUIPMENT DECONTAMINATION

The following equipment, supplies, and methods will be used for decontaminating sampling equipment.

Equipment and Supplies

- Potable water
- Phosphate-free detergent (e.g., Alconox)
- Distilled water (as needed)
- Aluminum foil
- Plastic/polyethylene sheeting
- Plastic buckets and brushes
- Personnel protective equipment in accordance with the HASP (Attachment A)

Decontamination Methods

- Prior to sampling, all non-dedicated bowls, spoons, bailers, and any other tools will be washed with potable water and a phosphate-free detergent (such as Alconox). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.

- Following washing, the sampling equipment will then be rinsed with potable water followed by a reagent-grade methanol rinse and finally a distilled or deionized water rinse or steam cleaning.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

2.3 SOIL SEDIMENT SAMPLING

The following methods will be used to collect sediment samples soil excavation at Hancock ANG Site 15.

Sediment Sampling Methodology

- Sediment samples will be collected from a depth of 0 to 12 inches with a decontaminated stainless-steel trowel or if under water, with a decontaminated hand auger.
- A piece of polyethylene sheeting will be cut to a size sufficient to place the stainless steel bowl, spoon, and soil from one hand-auger bucket.
- Sediment samples will be visually described for: 1) soil type, 2) color, 3) moisture content, 4) texture, 5) grain size and shape, 6) consistency, 7) visible evidence of staining, and 8) any other observations.
- Each sediment sample will be screened with a PID for the evolution of organic vapors.
- Samples will be collected directly from the sampling device. Samples placed into a stainless steel bowl, homogenized, and placed in appropriate containers for PCB test kit analysis on-site and off-site laboratory analysis.
- PCB field screening will be conducted on samples as per specifications in Section 3 of this Sampling and Analysis Plan.
- For the 10 percent samples to be sent to the subcontracted laboratory for PCB analysis, the sample containers will be labeled, placed in a laboratory supplied cooler, packed on ice (stored at a temperature of 4° C) and shipped overnight.
- Chain-of-custody procedures will be followed as outlined in Section 5 of the Analytical Quality Assurance Project Plan (Appendix B).
- The trowel or hand auger will be decontaminated between samples in accordance with procedures described herein.
- Soil or Sediment remaining after sampling will be stockpiled with other sediment materials.

- Sample locations will be staked and labeled with the location number.
- The sample locations, descriptions, and depths will be recorded in the field book.

2.4 GROUNDWATER SAMPLING

Groundwater Sample Extraction

Sample collection will commence with the drilling of six new temporary well points directly south (downgradient) of Site 15 and south of Molloy Road at the adjacent golf course. These six locations will be aligned in two rows of three well points each approximately 50 and 150 feet south of Molloy Road. After checking for underground utilities and securing site access from the landowner, groundwater samples will be collected from the temporary (direct push) well points to the shallow groundwater in accordance with USEPA Low-Flow Sampling Method for VOCs (USEPA, 1998B), and will be analyzed at an offsite ELAP-approved laboratory for both BTEX and PCBs by USEPA method 8260 and USEPA Method 8082, respectively. In addition, groundwater samples will be collected from eleven previously installed monitoring well points (MWs 2, 6s, 6d, 9, 11, 15, 19, 20, 21, 22, and 23). All of these monitoring wells except MW-21 are downgradient of the area where soil is to be removed. Groundwater samples from these existing monitoring wells will also be analyzed at the same offsite laboratory as the direct-push samples for BTEX and PCBs.

SECTION 3

FIELD TESTING METHODS

3.1 PCB FIELD TEST KITS

PCB field screening tests will be performed on the soils and sediments during remedial action. The purpose of field tests will be to define the extent of excavation for contaminated media that exceeds cleanup standards. The following equipment, supplies, and methods will be used to conduct PCB field screening tests.

Equipment and Supplies

- Field book and project plans
- Immunoassay test kit (PCBs) calibrated to Aroclor.
- Immunoassay hardware kit
- Personal protective equipment in accordance with the project Health and Safety Plan (Attachment A).
- Sample bottles
- Sampling equipment
- Marker stakes, flagging, paint

PCB Screening Test Methods

Field screening will be conducted by the Engineer using a PCB-specific immunoassay. PCB testing will be conducted as specified by the manufacturer's instructions. The screening test is a procedure designed to test soils for the presence of polychlorinated biphenyls. The test uses a semi-quantitative, calorimetric method that incorporates immunoassay technology. The test is performed using tubes which are coated with a chemical that specifically binds to PCBs. To perform the test, the standards, samples, and reagents are added in a step-wise manner to the coated tubes. The entire procedure takes approximately 20 minutes and results in a color change within each tube proportional to the concentration of PCBs. The color in the tubes is read by inserting the tubes in a comparative photometer.

The standard concentration will be set at 1 mg/kg (or ppm) PCBs for surface soil or sediment (0-12 inches), and 10 ppm for PCBs in deep soil. If PCB concentrations in the sediment sample are below the appropriate PCB action level, the sample will have passed the immunoassay tests. At this point, additional samples will be collected for laboratory analysis to confirm soil/sediment passes site criteria. If concentrations in the sediment are above the appropriate PCB action level, the sample will have failed the test and additional excavation and soil treatment will be required.

The test consists of the following three steps:

1. Sample Preparation: PCBs will be extracted from soil samples using a solvent. Suspended material will be removed from the extract using a disposable 0.45 micron filter.
2. Testing: The PCB standards and the sample extracts will be added to the coated tubes using dropper bottles. After 10 minutes of incubation, the tubes will be rinsed, and color-developing reagents will be added. Color development in the tubes occurs within several minutes.
3. Results Interpretation: The color of the sample tube will be compared against the color of the standard tube using a photometer to determine the concentration of PCBs in the sample. Several standards may be used to determine whether sample concentrations fall within a particular range or ranges (e.g., less than 1 parts per million (ppm), between 1 and 10 ppm, and greater than 10 ppm).

SECTION 4

CONFIRMATORY SAMPLING

4.1 INTRODUCTION

Confirmatory composite samples will be collected by the Engineer on the bottom and sides of excavations based on a 25 feet by 25 feet grid to delineate the extent of exceedances and verify attainment of cleanup standards. If the analytical results from the confirmatory samples verify attainment of cleanup standards, no further excavation is required. If the analytical results from the confirmatory samples do not verify attainment of cleanup standards, further excavation is required until verification is achieved.

Equipment and Supplies

- Field book and project plans
- Personal protective equipment in accordance with the Health and Safety Plan (Appendix A)
- Marker stakes, flagging, and paint
- Decon supplies
- Stainless steel sampling equipment
- Hand Auger
- Plastic sheeting
- PID
- Camera
- Shipping tape
- Coolers and ice
- Sample bottles
- Shipping supplies

Confirmatory Sampling Method

- Sediment samples from at least 5 locations within the designated 25 ft by 25 ft grid will be collected from a depth of 0 to 6 inches with a decontaminated stainless-steel trcwel or if under water, with a decontaminated hand auger.
- A piece of polyethylene sheeting will be cut to a size sufficient to place the stainless steel bowl, spoon, and sediment from one hand-auger bucket.
- Sediment samples visually described for: 1) soil type, 2) color, 3) moisture content, 4) texture, 5) grain size and shape, 6) consistency, 7) visible evidence of staining, and 8) any other observations.

- Each sediment sample will be screened with a PID for the evolution of organic vapors.
- Samples will be collected directly from the sampling device, placed into a stainless steel bowl, composited, homogenized, and placed in an appropriate container for PCB test kit analysis on site.
- For the 10 percent of samples to be sent to the subcontracted laboratory for PCB analysis, sample containers will be labeled, placed in a laboratory supplied cooler, packed on ice (stored at a temperature of 4° C) and shipped overnight.
- Chain-of-custody procedures will be followed as outlined in Section 5 of the Quality Assurance Project Plan (Appendix B).
- The trowel or hand auger will be decontaminated between samples in accordance with procedures described herein.
- Soil remaining after sampling will be used to backfill the hole.
- Sample locations will be staked and labeled with the location number.
- The sample locations, descriptions, and depths will be recorded in the field book.

Number, Frequency and Location of Confirmatory Sampling

- One composite confirmatory sample will be collected by the Construction Contractor from the excavation sides and bottom at a frequency of one composite sample per every 25 feet by 25 feet grid along an excavation face. This composite sample will be made up of at least five individual samples collected uniformly around the excavation face to a depth of 6 inches using a stainless steel shovel.
- The laboratory samples shall be obtained from the composite sample.

SECTION 5

AIR MONITORING

5.1 AIR MONITORING

The following method will be used by the Engineer to conduct air monitoring.

Equipment and Supplies

- PID
- Personal protective equipment in accordance with the HASP
- Field book and project plans

Air Monitoring Methods

Air monitoring will be conducted with a PID during all field activities. The PID will be used to monitor for VOCs in the breathing zone and in boreholes, and to screen samples for analysis. PID readings will be recorded in the field book and on the boring log during drilling activities.

If VOCs are detected in the breathing zone with the PID, then precautions detailed in the Health and Safety Plan will be followed.

The PID will be a Photovac MicroTip HL-2000 (or equivalent) equipped with a 10.6 eV lamp. The Photovac MicroTip is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for roughly 54 percent to 73 percent of the VOCs on the NYSDEC ASP Target Compound List. The detailed procedure for the PID operation is included in the Health and Safety Plan.

Calibration will be performed at the beginning and end of each day of use with a standard calibration gas of a concentration within the expected range of use in accordance with Manufacturer's Calibration Specifications. The calibration gas which is most often used has an approximate concentration of 100 ppm of isobutylene. If abnormal or erratic readings are observed, additional calibration will be required. All calibration data will be recorded in field notebooks and on calibration log sheets to be maintained on-site. A battery check will be completed at the beginning and end of each working to ensure proper voltage.

SECTION 6

FIELD RECORDS

6.1 SAMPLE LOCATION NUMBERING SYSTEM

The following system will be used to assign sample numbers:

Sediment Samples

- Sediment samples will be numbered consecutively beginning with SED-001.

Surface Soil Samples

- If needed, surface soil samples will be numbered consecutively beginning with SS-001.

6.2 SAMPLE IDENTIFICATION

Each sample will be given a unique alphanumeric identifier in accordance with the following classification system:

LL*	NN*	L	LL
Sample Type	Sample Number	Depth Code	QC Identifier
L = Letter			N = Number
			<u>Solid</u>
Sample Type:			SED - Sediment SS - Surface Soil SP - Stockpiled Soil
Sample Number:			Number referenced to a sample location map.
Depth Code:			Depth in feet of sample interval (i.e. A=0 to 6 inches; B=6 to 12 inches, etc.)
QC Identifier:			FB - Field Blank (wash blank) TB - Trip Blank MS/MSD - Matrix Spike/ Matrix Spike Duplicate

Duplicate Sample Code

Duplicate samples will be assigned identifiers that do not allow the laboratory to distinguish them as duplicates. For example: a duplicate of SB-003A is coded SB-103A. Each sample container will be labeled prior to packing for shipment. The sample identifier, site name, date and time of sampling, and analytical parameters will be written on the label in waterproof ink and recorded in the field book.

6.3 CHAIN OF CUSTODY

- A chain of custody (COC) record will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field, and during return shipment to the laboratory.

- The COC will identify each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, the project name and number, the name of the analytical laboratory that will receive the samples, and the method of sample shipment.
- If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.
- The REMARKS space will be used to indicate if the sample is a matrix spike, matrix spike duplicate, or matrix duplicate.
- Trip and field blanks will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s), and the shipper airbill number will be entered on the COC.
- Finally, a member of the sampling team will write his/her signature, the date, and time on the first RELINQUISHED BY space. Duplicate copies of each COC must be completed.
- One copy of the COC will be retained by sampling personnel. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler.
- Sample shipments will be stored at a maximum temperature of 4°C, typically by packing with ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid, and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape, and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished to the shipper, typically an overnight carrier.
- The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the ES Project Manager, and the samples will not be analyzed.
- The samples must be delivered to the laboratory within 48 hours of collection.

6.4 SAMPLE DOCUMENTATION

The Engineer will retain a copy of the COC and deliver it via fax or hand to the office or data tracker. In addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier;
- Identification of sampled media;
- Sample location with respect to a known reference point;
- Physical description of the sample location;
- Field measurements;
- Date and time of collection;
- Sample collection method;
- Number of sample containers;
- Analytical parameters;
- Preservatives used;
- Shipping information;
- Dates and method of sample shipping;
- Chain-of-Custody Record numbers;
- Air bill numbers; and
- Sample recipient (laboratory name)

SECTION 7

INSTRUCTIONS AND USEPA VERIFICATION ANALYSES FOR PCB TEST KITS

PCB field analyses at Hancock ANG Site 15 will be conducted utilizing either the EnSys or RaPID Assay Immunoassay Test Kits (EnSys kits) or equivalent. The EnSys and RaPID Assay test kits provide a rapid method to screen soil potentially contaminated with PCBs (such as Aroclor 1260). These kits are particularly useful for data requirements at sites such as Hancock where the objective is to determine if soil left in the ground contains less than 10 ppm PCBs. The primary reasons why the EnSys and RaPID test kits were chosen over other test kits were as follows:

1. The analysis time is 30 minutes per run of samples which is less than some of the competing test kits and will expedite the confirmatory sampling process.
2. The sample throughput (1-10 samples per run) is less than some of the competing test kits which will result in less waste of kit materials if errors in procedures are incurred or smaller test batches are required.
3. More experience and familiarity with EnSys compared to some of the competing test kits.
4. The EnSys test kits were used by the Engineer with good success during the 1996 OU-1 Predesign Investigation.

PCB test kit sampling will be conducted in accordance with the attached test protocol provided by Strategic Diagnostics, Inc. (SDI) or equivalent. The method detection limit in soil when using these test kits must be 0.5 ppm or less for Aroclor 1260. The choice between the EnSys and RaPID Assay test kits will depend largely on the number of analyses to be done in a particular day.