INTERNATIONAL TECHNOLOGY CORPORATION

Project No. 519070
August 1994

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Work Plan

Ash Landfill Immediate Response Seneca Army Depot Romulus, New York

Contract No. DACW45-90-D9002
Delivery Order No. 93

Prepared for:
U.S. Army Corps of Engineers
Omaha District
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WORK PLAN
SENECA ARMY DEPOT

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1.0 INTRODUCTION

Seneca Army Depot Activity (SEDA) was listed on the NPL in July of 1989 based on threats posed by contaminated soils and debris that form the source of the groundwater contamination problem at the Ash Landfill site. Contaminated soils cover approximately 78,000 square feet (2 acres). At an average depth of 8 feet, there are approximately 23,000 cubic yards of soil to be treated using Low Temperature Thermal Desorption. Soil will be excavated, treated, tested and then placed back as backfill.

In addition to the treatment of the soil there are three (3) sources of water at this site that must be handled during the removal action; groundwater, precipitation and water generated from decontamination operations. The total quantity of groundwater and precipitation to be disposed of could range from approximately 150,000 to 450,000 gallons.

1.1 Site History

SEDA was constructed in 1941 and has been owned and operated by the Department of the Army since that time. Prior to construction of the depot, the site was used for farming. From 1941 to 1974, uncontaminated trash was burned in a series of burn pits east of the abandoned incinerator building. During approximately the time period of 1941 until the late 1950's or early 1960's the ash from the refuse burning pits was buried in the landfill. The landfill likely received other depot wastes. The incinerator was built in 1974 and took the place of the open burning pits. Between 1974 and 1979, materials intended for disposal were transported to the incinerator. Nearly all of the approximately 18 tons of refuse generated per week on the depot were incinerated. The source for the refuse was domestic waste from depot activities and family housing. Large items which could not be burned were disposed of at the non-combustible fill landfill.

1.2 Location

SEDA is located in Romulus, New York, in Seneca County. The installation is bounded by State Route 96A (to the west) and State Route 96 (to the east). The cities of Geneva and Rochester are located to the northwest; Syracuse is to the northeast and Ithaca is located to the south. The subject of this source removal is the "Bend-in-the-Road" area of the Ash Landfill site. The Ash Landfill is located near the western boundary of SEDA. Within Appendix A, Figure a shows the depot location, Figure 2 shows the Ash Landfill location, Figure 3 shows the Area of Concern - Remediation Plan, and Figure 4 is the Ash Landfill Area Site Plan.

1.3 Site Visit

On July 21, 1994, personnel from the Corps of Engineers (Omaha District and Huntsville Division Offices), IT Corporation, and the Seneca Army Depot conducted a site walk to

assess the area of concern near the "Bend-in-the-Road". Later that same day, a group of potential LTTD subcontractors met to discuss their portion of project.

1.4 Overview

The following Work Plan (WP) has been prepared by IT Corporation (IT) for the U.S. Army Corps of Engineers (USACE) Omaha District, in compliance with the Rapid Response Contract No. DACW45-90-D-9002, Delivery Order No. 93, based upon the USACE's Scope of Work (SOW) dated August 18, 1994.

The WP addresses the remediation of the Ash Landfill located in the "Bend in the Road" area of the Seneca Army Depot near Romulus, New York. The project activities include the following:

- Prepare the site for remedial activity by developing various exclusion zones (EZ), contamination reduction zones (CRZ), a support zone for office trailers and the management staff, Decon facility set-up, and several staging areas for excavated, and treated material, including any debris.
- The installation and subsequent removal (at the end of the project) of 300 linear feet of sheet piling placed around the perimeter of the areas to be excavated. This piling shall be moved in 100 linear feet increments around the immediate excavation areas.
- Set-up and teardown system, proveout and treat up to 34,500 tons of contaminated soils by Low Temperature Thermal Desorption (LTTD).
- Backfill the excavation with properly treated soils and compact to specifications.
- Triple rinse contaminated debris which is too large to be treated by LTTD methods.
- Transport and dispose of contaminated materials and treated wastewater.
- Transport and dispose decontaminated and non-contaminated materials which cannot be used as backfill.
- Restore the site to pre-remedial action condition.

1.5 Plan Preparation

The efforts incorporated into preparing the following plans, are the responses to the predelivery order site visit, the USACE Scope of Work dated August 18, 1994, and

discussions with, Seneca Army Depot, USACE-Huntington, Environmental Sciences, Inc. (ESI) and subcontractor personnel.

The work performed under this activity includes the preparation of plans as required by the Scope of Work. These plans are as follows:

- Site Safety and Health Plan (SSHP) - Appendix A
- Chemical Sampling and Analysis Plan (CSAP) - Appendix B
- Soil Boring Plan - Appendix C
- Excavation, Backfilling, Compaction and Grading Plan - Appendix D
- Erosion/Dust Control Plan - Appendix E
- Air Monitoring Plan - Appendix F
- Start-Up Proveout Plan - Appendix G
- Site Control and Security Plan - Appendix H
- Quality Assurance Plan (QAPP) - Appendix I

These plans are included as appendices to the Work Plan. Revisions and resubmittals will be made as comments are received and changes will be made where necessary.

1.6 Soil Boring Activities

In order to confirm the delineation of the two areas identified by ESI under another contract with USACE-Huntington, IT will perform borings centered on 50 foot intervals around the areas set back five (5) feet from the originally delineated perimeter. Three (3) samples will be collected: one (1) at the surface, one (1) from 4'-6' depth and one (1) immediately above bedrock. The samples will be screened in the field by a portable gas chromatograph (GC), and if the boring is field tested to be clean, the sample will be packaged for off-site analysis of volatile organic compounds and semi-volatile compounds. If the field screening shows contamination, another boring will be completed off-set ten (10) feet from that point, and will continue until three (3) clean samples per borehole are obtained. For further details on the boring activity see the CSAP in Appendix B and the Boring Plan in Appendix C.

Boring locations will be surveyed and staked in the field prior to initiation of the soil boring program. As the boring activity progresses, IT will move the stakes outward based upon the results of the field screening. Upon completion these stakes shall demarcate the area of excavation, and shall outline the area to be shored.

This boring activity will assist in determining whether extensive dewatering will be necessary during excavation activities.

1.7 Baseline Air Monitoring and Permitting

Baseline air monitoring data must be collected three (3) days prior to any remedial activities. This task includes calibration/set-up of a meteorlogical station and allowing it to gather baseline data for three (3) days. Based upon the collected data, site perimeter monitoring stations will be placed, and an additional three (3) days of baseline ambient air data will be gathered prior to mobilization of field crews. For further details see the Air Monitoring Plan in Appendix F.

Simultaneously to baseline monitoring, IT will prepare two (2) air emission permits, and one (1) water discharge authorization for submittal to the New York Department of Environmental Conservation (NYSDEC). IT will draft the permits and upon USACE review and approval, submit to SEDA for signature.

2.0 MOBILIZATION/DEMOBILIZATION AND SET-UP

2.1 Field Support

The project field crew, as well as all H&S materials, vehicles, and small equipment, will be jointly mobilized from the following IT regional offices:

- The Monroeville, Pennsylvania office will provide supervision, cost administration, environmental technicians, equipment operators, truck drivers, a limited amount of H&S material, and small equipment. It is estimated to be 400 miles from Monroeville to the job site.

- The Knoxville, Tennessee office will supply a Thermal Process Engineer to oversee LTTD set-up, proveout and continuing operations. It is estimated to be 850 miles from Knoxville to the job site.

- The Cincinnati, Ohio office will provide project management and air monitoring. It is estimated to be 600 miles from Cincinnati to the job site.

- The Rochester, New York office will provide air monitoring, QA/QC, sampling, health and safety, schedule control and technical management personnel. It is estimated that the Ash Landfill site is 60 miles from Rochester.

The time allotted for mobilization/demobilization of the crew is as follows:

- 10 hours from Pittsburgh, Pennsylvania
- 8 hours from Cincinnati, Ohio
- 8 hours from Knoxville, Tennessee and
- 1 hour from Rochester, New York.

This travel has been estimated as a four-time occurrence, but could change as required. In accordance with IT Corporate Policy all on-site personnel will return to their respective home locations every three (3) weeks. These trips will be coordinated, where possible, to coincide with the major holidays that are anticipated to occur during this project, including Thanksgiving and possibly Christmas and New Years'.

The following equipment shall be mobilized from IT offices or local rental vendors to provide support facilities for all on-site activities:

- two (2) mobile office trailers 10' x 60' or equivalent
- one (1) 10' x 40' break trailer
- six (6) portable bathrooms
- copier, fax, and telephones

- personal computers
- office furniture
- crew vehicles
- clean debris containers
- portable diesel fuel storage container

The scheduling and arrival of these items will be coordinated with both the USACE on-site and the Depot's designated representative. Figure 1 shows the general location of the support zone to the west of the excavation areas.

2.2 Decon Facilities

A 10' x 40' (approximately) decontamination/shower trailer will be mobilized to the site, and two decontamination areas will require construction.

One decontamination area, designated Decon Area I will consist of a 20' x 40' 30 mil HDPE bermed contaminated soil/debris stockpile pad, a 20' x 20' 40 mil HDPE lined debris washing pad, and a Read ScreenAll Model RD90 or equivalent debris screener. This area shall be serviced with a 2000 psi hot pressure washer, a sump pump, contaminated water storage tank(s), rolloff boxes for cleaned debris, fire extinguishers, first-aid kit, eyewash, and an CAT 956 (or equivalent) rubber-tired loader with a four-in-one bucket.

The second decontamination area, deemed Decon Area II will consist of a personnel decontamination/shower trailer, and a 20' x 20' 40 mil HDPE lined equipment decontamination pad. This area shall be serviced by a 2000 psi hot pressure washer, a sump pump, fire extinguishers, first-aid kit, eyewash, and contaminated water storage tanks.

Each decontamination pad shall be constructed as follows: The area shall be sloped with a backhoe to one corner and a sump excavated at the lowest corner. The area shall be outlined with 4" x 4" lumber. Three (3)inches of sand shall be placed in the sloped area and the liner placed on the sand. One (1) inch thick pieces of plywood will be placed on the liner, two additional inches of sand will be placed on top, and 4" x 4" lumber set parallel at 1' intervals set on top of the sand. An additional 4" of sand will be placed between the 4" x 4"s to the level the area.

The decontamination/storage trailer shall include a gross decontamination area where outer personnel protective equipment can be doffed and containerized for disposal, and a shower/scrubbing facility for proper personal hygiene. This trailer shall also be used as storage for unused PPE inventories. Personnel will follow appropriate decontamination procedures as outlined in the Site Safety and Health Plan (SSHP) found in Appendix B.

2.3 Site Preparation

The areas to be excavated will be cleared of brush utilizing a CAT D-3 dozer or equivalent. Care shall be taken to not disturb the boring stakes which delineate the areas, and to minimize the amount of soil disturbed. The brush shall be staged in piles outside the exclusion zone, will be considered clean, and shall not be treated or disposed off-site.

A parking area to the northwest of the office trailers shall be cleared, leveled, geotextile fabric placed and covered with six (6) inches of crushed rock. A 15 foot wide gravel road shall extend eastward to Decon Area II and southward to West Smith Farm Road which runs east/west.

The exclusion zone shall be delineated by installing a four (4) foot orange construction fence 20 feet outside the excavation area, along the outside perimeters of Area A and Area B, and encompassing the process area. The 20 foot buffer zone should be sufficient for shoring installation/removal, and movement of dump trucks. The fence will be installed on six (6) foot T-posts centered approximately every ten (10) feet and tied with metal wire ties. Keep out/warning signs will be posted approximately every 50 feet. The only entrance/exit to the exclusion zone shall be at Decon Area II where all exiting equipment and personnel shall be subject to decontamination measures as specified in the Health and Safety Plan (Appendix B).

Two soil staging areas will be constructed, one 50′ x 80′ at the front end for screened contaminated soil, and one 100′ x 150′ near the LTTD system output, for treated soil.

Each area will be sloped, bermed and have a sump installed in the low corner. A 30 mil HDPE liner will be placed on 6″ of clean sand. Soils that are staged in these areas shall be covered with 6 mil black poly and anchored by sandbags and rope during inclement weather and during inactive periods.

Two office trailers, break, shower/decontamination, and subcontractor trailers will be located in accordance with Figure 1. All trailers will be equipped with adequate heat, air conditioning, power, light and water (where necessary).

A local bottled water service shall be utilized in providing cold and hot water in each trailer. A refrigerator shall be placed in the break trailer.

Construction of the water treatment system shall also take place at this time. A Particulate filter will be piped on the influent end and manifolded to two (2) certified clean 20,000 gallon frac tanks placed in a row. The tank discharges will be manifolded by pipe to another particulate filter which shall run to a low profile air stripper, connected to a certified clean 20,000 gallon frac tank.

2.4 Utilities

All underground buried utilities shall be located prior to any intrusive activities. IT shall coordinate with the Depot's designated contact with regard to on-site Depot utilities identification and IT shall also contact the local municipal utility hotlines.

Site utilities will include, installation of 480-volt (V), 300-amp, 3-phase and 120/240V, 250 amp single-phase services. The work will be done by the Army Depot and a local registered electrician. The electrician will also perform the electrical hook-ups for the trailer(s), on-site water treatment system(s), and miscellaneous utility 110V hook-ups. The site will be illuminated with two (2) 400-watt high-pressure sodium lights attached to the former incinerator, and portable light stands as required for localized use. A total of four telephone lines will be installed to the office trailer, one (1) for the USACE, two (2) for IT, and one (1) for the facsimile. Portable radios shall be utilized for on-site communications, the frequencies of which shall be cleared by the Depot prior to use.

The nearby six (6) inch waterline or watermain will be flushed and recharged by the Depot, and IT subcontractor will tap into the line or connect with existing fire hydrant and a manifold constructed with 2" firehose connections which will be split in order to service both the treatment and support areas.

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2.5 Mobilization of Equipment

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IT intends to utilize the following equipment within the exclusion zone (exclusive of shoring and LTTD subcontractors):

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- one (1) CAT 312 tracked excavator or equivalent with 36 inch bucket
- one (1) CAT 956 or equivalent rubber-tired loader with minimum 2-1/2 cubic yard buckets, and a four-in-one bucket
- one (1) CAT IT28 or equivalent rubber tired loader with forks attachment
- one (1) sheepsfoot compactor
- one (1) Cat D-3 dozer or equivalent
- two (2) 8 cubic yard dump trucks
- one (1) water truck
- six (6) clean debris rolloffs
- one (1) debris screen - Reed Screenall Model No. RD90
- six (6) 630 gallon poly tanks for decon water storage

The following water treatment equipment will be mobilized:

- one (1) tray aerator or stripper
- two (2) 20,000 gallon contaminated water frac tanks
- two (2) 20,000 gallon clean water frac tanks
- one (1) 10 micron particulate filter

- one (1) 5 micron particulate filter
- two (2) 3/4 horsepower electric pumps
- associated PVC, rubber piping, and firehose
- one (1) 2″ trash pump

2.6 Mobilization of Subcontractors

Two (2) subcontractors will be required to support IT in this project.

2.6.1 Mobilization of Sheeting Subcontractor

A sheeting subcontractor will mobilize the following material and equipment:

- Grove 14 ton crane
- Grove 20 ton crane
- ICE 416 vibro hammer
- IR 600 CFM compressor
- IR crawl air drill
- 200 amp welding machine
- misc. piling equipment

All necessary personnel required to perform normal and customary tasks associated with this activity.

2.6.2 Mobilization of LTTD Subcontractor

The mobilization activities of the Low Temperature Thermal Desorption (LTTD) include transporting the equipment to the site, mobilizing the operating personnel and setting up all equipment on-site.

The LTTD subcontractor shall mobilize the following equipment:

- one (1) Low Temperature Thermal Desorber capable of treating soil at or near 800°F including the following associated equipment:
- feed hopper
- conveyor mechanism
- vibrating screen
- impact crusher for oversized material
- on-line belt scale
- rotary dryer
- baghouse for particulate filtration
- thermal oxidizer for VOCs emission control
- treated soil cooler and reconstitution mill
- treated soil stacker and conveyor

- control room

The following support equipment will accompany the unit:

- officer trailer
- tool/supply trailer
- small trucks
- necessary front-end loaders

The following personnel shall support this operation:

- project director
- project manager
- site operations superintendents
- company health and safety officer
- all necessary personnel required to perform normal and customary tasks associated with this activity

2.7 Site Teardown

At the conclusion of the remediation activities, all equipment will be removed and the site will be restored to its original condition, including restoration of all security fencing removed or damaged during field activities. All temporary structures will be dismantled and removed; equipment will be decontaminated and demobilized from the site; all small tools and H&S gear will be inventoried and packed; temporary fencing will be removed; utilities will be terminated; and staging cells will be cut up and dismantled.

3.0 FIELD SAMPLING AND ANALYTICAL

Samples will be required in order to show compliance with the Air Monitoring Plan, the cleanup criteria specified in the USACE Statement of Work, for the disposal of metals contaminated soils, and for discharge/disposal of treated water.

A dedicated sample technician will be present during all active processing times. The technician's responsibility will be to obtain all samples, properly package and ship off-site to a USACE approved laboratory, and track laboratory handling and reporting times in accordance with the CSAP's requirement.

In addition, the sample tech shall gather reported data and recommend to the QA Officer the release of individual treated stockpiles to be used as backfill.

Refer to the CSAP (Appendix B) for specific media sampling, handling, reporting and data requirements.

4.0 TRANSPORTATION AND DISPOSAL

The following wastestreams may require off-site disposal from the Ash Landfill project. These wastestreams are broken into the following groups:

- Wastewater to include decontamination waters, stockpile storage area run-off, and groundwater or run-off encountered in the excavation. This wastewater shall be treated on-site prior to disposal/discharge.

- Metals contaminated soils, PPE, stockpile liner materials.

- Non-contaminated wastes to include cleaned debris, site tear down materials.

Prior to actual disposal of these materials, IT Corporation will propose disposal facilities to USACE. IT understands that the Seneca Army Depot shall be listed as the generator and will have an authorized representative sign all manifests and waste profile sheet(s). A draft manifest will be submitted to the USACE, along with the appropriate analytical results and/or waste profile sheet(s), a minimum of 3 days prior to their submittal to the selected disposal facility for USACE/SEDA review and comment. As outlined in the Scope of Work, the USACE has directed IT to subcontract with the chosen facility and transporter, coordinate, and oversee the entire disposal operation of this project if required.

The cleaned debris, and other non-contaminated material may include liners, tarps, and temporary road surface. Debris that is considered to be non-hazardous shall be direct landfilled at a local non-hazardous landfill.

The treated stockpiled soils and PPE which fail TCLP metals analysis will be considered hazardous. If this is the case, the waste will be transported to a properly permitted facility, treated, and landfilled dependent upon federal regulations and state disposal requirements.

4.1 Disposal of Liquids

It is assumed that the wastewater generated from the decontamination pad, rainwater and groundwater, encountered during excavation, and run-off the soil storage pads will be treated on site. On-site water treatment is discussed in Section 7.3.

4.2 Waste Transporters

IT shall locate transportation companies which are IT preapproved subcontractors or can be preapproved and have the necessary federal, state, and local permits to transport both hazardous and non-hazardous waste.

5.0 EXCAVATION AND BACKFILL

This project involves the excavation, screening, treating, and backfilling of 34,500 tons of contaminated soils. IT has specified the personnel, equipment, and process flow for properly handling this volume of soil, and details these plans in Appendix D. Erosion and dust control measures are addressed in Appendix E.

6.0 HEALTH AND SAFETY

All waste handling activities will be performed under the direct supervision of health and safety professionals at all times, and will also be performed in accordance with specifications set for in the Site Specific Health and Safety Plan (Appendix A). This document describes the health and safety guidelines developed to protect on-site personnel, and the public form physical harm and exposure to hazardous materials at SEDA. These procedures and guidelines were prepared with the best available information available at the time of the plan's preparation. This is regarded, as a dynamic document and as the project progresses and more information becomes available amendments will be generated.

IT's policy is to provide a safe and healthful work environment, and no activity shall compromise this policy.

7.0 ON-SITE TREATMENT

The following on-site treatment activities shall be performed in the remediation of the Ash Landfill:

- Treatment of contaminated soils
- Treatment of contaminated water encountered during excavation, inclement weather, and groundwater infiltration
- Cleaning of landfill debris.

These on-site treatment methods offer the following advantages:

- Reduction of Seneca Army Depot's liability over off-site disposal as hazardous waste (transportation and disposal liabilities)
- Lower overall cost
- Reduction of the amount of borrow required to backfill the excavation.

7.1 Low Temperature Thermal Desorption

This project involved the screening and heating of contaminated soil with particulate and off-gas emissions capture. The soil will be heated to approximately 800°F while being fed through a rotary dryer in a counter current motion.

All fine particulate matter is filtered through a baghouse filter collector with primary and secondary filter fabrics. The filters are cleaned via an air pulse and the fines collected and returned via a series of augers and conveyors to the rotary dryer.

The particulate free off-gas is fed into the thermal oxidizer, where the volatilized contaminants are destroyed by applying heat necessary for oxidation. The thermal oxidizer temperature is registered permanently on a strip chart recorder. All soils exiting the LTTD will be sampled and analyzed in accordance with USACE S.O.W., prior to backfilling. A more comprehensive process description will be made available upon selection of the subcontractor.

7.2 Water Treatment

Wastewaters from various during site operations will be stored in two 20,000 gallon capacity influent frac tanks. The water will be recirculated in the tanks to prevent freezing. The water will be pumped through a particulate bag filter, into a low profile tray aerator at a flow rate not to exceed 50 gallons per minute. Stripper off-gases will be discharged from a 30 foot tall stack to meet dispersion criteria. Treated water will be pumped from the aerator to two 20,000 gallon effluent frac tanks. The water will be sampled in accordance with specifications in the CSAP, and upon receiving analytical results meeting discharge criteria, the water will be either discharged to the onsite drainage swale, or trucked to a local POTW. Figure 2 depicts the process flow.

7.3 Debris Cleaning

Debris will be segregated from the soil using a rubber tired loader with a four-in-one bucket and three (3) technicians. Debris will be thoroughly cleaned using a 2500 psi hot water washer. After cleaning debris will be placed in rolloff bins staged nearby. The segregated soil will be transported with the loader to the LTTD for screening and further processing.

For a more detailed description of this activity, please refer to the Excavation Plan in Appendix D.

8.0 SITE RESTORATION

Any areas not inundated by surface water after backfilling is complete where vegetation was disturbed by the field activities will be reseeded. Soil surfaces will be roughened and grooved by means of machinery and/or hand rakes to provide a foothold for seed to geminate. Grooves will run perpendicular to possible rainwater flow direction. Fertilizer, lime, and seed will be spread by means of a cyclone seeder or hydroseeder to ensure even distribution. After seeding is complete, a layer of straw mulch and/or jute net (if required) will be spread over all newly seeded areas. Surface preparation,

fertilizer, lime, mulch, and vegetation blanket will conform to the specifications provided in the USACE Scope of Work.

9.0 PROJECT MANAGEMENT PLAN SUMMARY OF WORK

Project management is generally defined as planning, control, and direction exercised to ensure that a project conforms to IT's contracted scope and specifications, and that the project plans and scope are amended in a timely manner to reflect changes in circumstances. The goals of project management are to produce quality work, which meets all contract requirements, and to complete projects within budget and schedule to the USACE's satisfaction.

IT's project management system (PMS) is designed to provide their managers with the informational system and control necessary to accomplish all elements of project management in accordance with the project requirements. Project planning, cost control, and execution are the three main components of project management.

9.1 Project Overview

IT will be responsible for ensuring that sufficient supervision, equipment, labor, and materials, including H&S and quality control (QC) provisions, are supplied to execute all the work activities associated with remediation of the Ash Landfill.

9.2 Project Organization

The project organization chart presented as Figure 3 provides the management and technical staff to support the removal effort at Seneca.

IT will provide:

- Personnel trained for hazardous waste site work
- Management of subcontractors, controlling quality, schedule, and cost
- Responsible personnel to provide integration and management of the site sampling and analytical data
- An independent quality assurance (QA)/QC site program which will ensure technical and scientific accuracy in all work activities and sampling
- The development, coordination, and implementation of the site H&S program.

9.3 Project Personnel

The Program Director for this delivery order will be Mr. Albert Meyers who will ensure that contractual obligations are met. Mr. Meyers is located in the Cincinnati, Ohio office.

Mr. Doug Wehner will serve as the Project Manager and will manage all technical and field activities, review all submittals to the USACE, prepare weekly reports, and monitor the budget and schedule. Mr. Wehner is located in the Cincinnati, Ohio office as well.

Mr. Pete Coutts will serve as Technical Manager and be responsible for ensuring that all technical requirements of the project are met. Mr. Coutts is located in the Rochester, New York office.

The Site Manager will be responsible for interfacing with the on-site USACE representative. He will supervise all on-site activities, prepare the daily submittals, and maintain close contact with IT project management.

Mr. Warren Houseman will be the CIH and will review and sign off on the final SSHP on behalf of IT. He will also oversee/advise the on-site SSHO and ensure IT's H&S obligations are being met. Mr. Houseman will be assisted by Mr. Greg McElroy (IH) in managing the Site Health and Safety Program and both gentlemen are located in the Monroeville, Pennsylvania office.

Ms. Lynne Monaco will be the Regulatory Specialist, and will advise project personnel with the preparation of all hazardous waste manifests, waste profile certifications, waste profile sheets, land disposal restriction notifications, etc., along with the various other duties as described in Section 4.0 of the USACE Scope of Work.

Two H&S officers will be responsible for executing the SSHP (one per shift). The H&S officer will conduct site-specific training, tailgate safety meetings, periodic safety audits, and will have the overall responsibility of seeing that all operations are conducted in a safe manner.

Two QA/QC Specialists will be responsible for generating the layout of the sampling grids, usage reporting, and all associated paperwork. The QA/QC Specialist will also conduct QA/QC inspections of all work performed in conjunction with this project.

Resumes of all key personnel along with some supervisory personnel shown in Figure 2 have been provided as Appendix J.

9.4 Scope of Work

The overall Scope of Work for this project is the excavation of contaminated soils, treatment of such, return of treated soils back into the landfill, and treatment/disposal of all effluent waters.

The following activities will be required based upon the Scope of Work as outlined by the USACE. The Scope of Work has been divided into two phases to enable IT to begin

site work and arrange for subcontractors with long lead times. At this time, both phases will be performed consecutively, and no additional costs will be incurred by the USACE.

PHASE I

- Site Visit
- Plan Preparation
- Soil Borings
- Baseline Air Monitoring

PHASE II

- Mobilization
- Field Sampling and Analytical
- Transportation and Disposal
- Excavation and Backfill
- Health and Safety
- On-Site Treatment
- Site Restoration
- Project Management
- Demobilization

9.5 Material and Equipment

Material and equipment will be provided in sufficient quantities as required for all remedial activities. Material and equipment will not be stored or used in such a manner as to create unsafe conditions, and will meet all the requirements of applicable codes and the approval of the USACE-OSR.

9.6 Site Facilities

IT will obtain and maintain temporary site facilities, including field offices, security, communication operations, personnel and equipment decontamination facilities, government facilities, storage facilities, on-site laboratory, temporary site utilities, and project signs during the performance period of the field activities. IT will be responsible for removal of the same at the completion of all field activities.

A separate office trailer will be provided for USACE personnel only. Drinking water facilities, adequate lighting, commercial telephone service (one line), air conditioning/heating equipment, and portable toilets will be furnished and maintained by IT. The office will be furnished as requested. Used furniture, in good condition, will be acceptable. Entrance doors will be equipped with a substantial lock. Photocopy and fax machines will be made available for government use and will be located in IT's office trailer.

9.7 Project Construction Schedule

The schedule for the SEDA Ash Landfill site has been developed primarily as a sequencing tool and is included in Figure 4. Durations on the included schedule have been established based on quantities provided by the USACE, and the estimated throughput by the LTTD subcontractor.

9.8 Daily Work Schedule

In order to closely coordinate work under this contract, IT will prepare a Rapid Response Daily Work Order for approval and signature by the on-site USACE-OSR. This three-page document will outline IT's proposed work schedule for the next workday. A sample copy is included in the USACE Scope of Work.

9.9 Daily Report

In order to document the day's field activities, It will prepare a Rapid Response Quality Control Daily Report for review by the USACE-OSR. This five-page document will discuss weather conditions, work performed by IT and their subcontractors, inspections performed and their results, delays in job progress, verbal instruction/communications, personnel and equipment on site, transportation and disposal information, safety violations and corrective actions, sampling activities and locations, results of on-site field screening, and the estimated cost for each day of activity on site. IT's operations supervisor will submit this report prior at the conclusion of each day's activities. A sample copy is also included in the USACE Scope of Work.

9.10 Cost Tracking Systems

IT has developed a personal computer-based system, designed as a project management tool for tracking estimated field costs (named RapidDay). This system was designed with the flexibility to interact with IT;s Job Tracking System (JTS) or as a stand-alone, estimated cost tracking program.

Cost is tracked by the accounting accumulator categories of Labor (field and office), Equipment (IT owned and rental), Subcontractors, Materials (IT supplied and vendors), Travel and Living Expenses, and Analytical. These costs are also totaled by job-specific phase and task numbers.

The responsibility of tracking, entering, and reporting project costs will be that of the Cost Administrator (CA). The CA is responsible for all paperwork associated with the on-site activities including, but not limited to, timesheets, purchase orders, vendor invoices, petty cash, various status logs, and cost reporting. The CA reports directly to the operations supervisor in an administrative role.

Once daily information has been reviewed and edited, RapidDay prints daily summary reports by resource accumulator category. For job summary purposes, phase-to-date and resource category-to-date summaries are produced comparing accumulated costs to budgeted and estimated costs to completion and are reported on a weekly basis (at a minimum). The daily reports are given to the USACE-OSR for review, approval, and signature as part of the operations supervisor's daily report.

IT's JTS is used to track and maintain actual costs at the Monroeville, Pennsylvania office. JTS is also used to produce periodic cost reports for the Project Manager, Project Director, and IT corporate directors. Project support costs (labor, equipment, and materials) are "picked up" from weekly JTS reports and entered into the RapidDay Tracking Program by the CA.

The project objectives of IT's JTS are management and project reporting, as well as the accounting and billing functions:

- Management/Project Reporting:
  Collect actuals throughout the company
  Provide budgeting/project control tools
  Provide commitments/purchase order tracking
  Match costs and revenue
  Provide data for microanalysis

- Accounting/Billing
  -Perform intercompany accounting
  Generate invoices
  Simplify the revenue accrual process.

9.11 Progress Meeting

9.11.1 Minimum Requirements

IT will schedule and administer weekly progress/schedule meetings and such additional meetings as required by the USACE-OSR and as necessary to meet project needs. These meetings will be held at the project site, usually scheduled for every Friday morning at 10:00 a.m.

9.11.2 General Requirements

IT will administer the following general requirements:

- Prepare agenda for meetings
- Make physical arrangements for meetings
- Preside at meetings
- Record the minutes, including significant proceedings and decisions
- Reproduce and distribute copies of minutes within seven working days after each meeting to meeting participants and to parties affected by decisions made at the meeting. Furnish three copies of the minutes to the USACE.

9.11.3 Suggested Agenda

- Review and approve minutes of previous meeting
- Review of work progress since previous meeting
- Field observations, problems, conflicts
- Problems which impede remediation schedule and proposed corrective actions
- Revisions to remediate schedule
- Projected work progress during succeeding work period
- Discussion of analytical results obtained since the previous meeting
- Coordination of schedule
- Maintenance of quality and safety standards
- Other business as appropriate.

9.12 Weekly Reporting

A project status report will be submitted on a weekly basis beginning with site mobilization through site demobilization. Following demobilization, reporting will be biweekly through final invoice preparation. The report will be the responsibility of IT's PM with input from all on-site supervisory and subcontractor personnel. The report will be submitted to the USACE Technical Manger and Fort Crook Project Engineer via telefax. The report will be submitted no later than Wednesday of the following week being reported. The report will include:

- Summary of work completed on-site and off-site
- Problems encountered with recommended corrective actions
- Deviations from the work plan
- Planned activities for the upcoming week
- Any approved or anticipated changes in scope
- Summary of on-site personnel and changes involving such
- Tabular and/or graphic summaries of status of the project costs and schedule
- Summary of all disposal activity for the week (if any).

Any significant deviations from the budget or schedule shall be thoroughly addressed in this report. A sample of the suggested reporting form is included at the end of this chapter.

9.13 Final Report

9.13.1 Overview

The final report will present an overview of the field activities from mobilization through demobilization, unique or special tasks performed, additional work performed beyond the original scope of work, problems encountered and associated corrective action, and IT's conclusions and comments with regard to this project.

Draft and final copies of the completion report shall be submitted. While all submittals should be error free, an extra effort will be made to provide an error-free final project report. Partial documents will not be submitted unless previously approved or specifically requested. A cover letter will accompany each document and indicate the project, contract number, delivery order number, and to whom comments are to be submitted. The cover letter will not be bound into the document. The completion report will include (if applicable), but not be limited to, the following.

9.13.2 Summary of Work Performed

Summary of work performed including, but not limited to:

- Narrative of the scope of work (including project objectives, mobilization and demobilization, site setup, site operations)
- Safety
- QC
- Recommendation/characterization, lessons learned
- Site maps showing the limits and extent of excavation
- Any other unique or special tasks performed or situations documented
- Photographs of the field work through demobilization and the overall site before and after IT's work
- Summary of quantities of excavated materials and volume of water treated/discharged
- Summary of final disposition of hazardous disposal waste streams
- Results of all analytical testing/screening performed both on site and off site
- Conclusions.

9.13.3 Supporting Data

The tabulation of criteria, data, circulations, etc., which are performed but not included in detail in the report shall be assembled as appendices. Criteria information provided by the Omaha District will not be reiterated, although referenced as appropriate. The appendices shall include, but not be limited to:

- The final scope of work
- Completed permits and applicable licenses

- Hazardous waste manifests, waste profile sheets, and/or hazardous waste weigh tickets and nonhazardous waste weigh tickets, if necessary
- Daily chemical QC reports
- Rapid Response QC daily reports
- Rapid Response Daily Work Orders
- Sampling and analysis documentation and results (to include verification sampling and water discharge sampling)
- Chain-of-custody records
- Photo documentation, to include one set of photographs
- List of visitors
- Project points of contact address and telephone number (including site manager, transportation and disposal (T&D) contractors, subcontractors names, USACE-PM, Fort Crook personnel, etc.)
- Survey reports and backup notes
- Completed verbal conversation records, especially ones that either impact the scope of work, cost proposal, or final report
- Certification of disposal at the treatment/storage/disposal facility (TSDF), if hazardous waste
- As-built records of approved site plan, if required
- List of permanently placed equipment complete with operations and maintenance (O&M) manuals and retail value, if required.

9.14 Site Controls

IT has developed project specific site control and security procedures for this project. These procedures for controlling access to work areas to authorized personnel only are included in Appendix H.

9.15 Meeting with Local Authorities

During the start-up portion of this delivery order, IT's Site Safety and Health Officer (SSHO) will contact local law enforcement officials, emergency medical care units, fire departments, and utility emergency teams to ascertain the type of response required to any emergency situation, and to coordinate the responses of these various units. The purpose of this meeting will be to delineate responsibilities in the event of an emergency situation, to familiarize IT with the local services available, and to provide local authorities and facilities with the necessary information in regard to the type of work to be performed and the potential hazards involved. From this contact, a standard operating procedure describing the appropriate agency's response to foreseeable emergencies will be developed and established. In the event that an emergency cannot be controlled by on-site personnel, telephone numbers and local maps will be posted by site telephones to ensure dependable responses. Also, the site security guard will be actively involved in emergency response actions.

9.16 Subcontractor Selection Control and Management

T

Proper direction and control of subcontractors will be essential elements for the successful completion of this project. Prior to issuing a request for proposal or seeking quotations or bids, a scope of work was defined, delineating the specific services from the subcontractors. The procurement documents specified, as appropriate, the following technical requirements:

- Scope of work
- Pertinent codes and standards
- Material composition and/or physical and chemical requirements.
- Quantity and scheduling requirements
- Work procedures
- Testing and calibration requirements
- Performance and/or accept/reject criteria
- Reporting requirements
- Certificates of insurance
- Applicable Davis/Bacon Wage Rates

- References to procedures in the appropriate project plan documents
- All subcontractors over $25,000 or greater than 5 percent of the delivery order amount (whichever is less) shall be preapproved via written consent from the authorized contracting officer. All lesser value subcontractors can be approved by the USACE-OSR.

The PM and subcontracts administrator retain full responsibility and authority for the proper administration of subcontracts, including QA/QC and H&S consistent with USACE contract requirements. For field operations the QA/QC Specialist and SSHO will perform a check of subcontractors prior to commencing work to determine that they have fulfilled the requirements necessary to begin their activities. This check includes the type, condition, and calibration of equipment, and the qualifications (including supporting documentation) of personnel. Equipment and/or personnel who do not meet project requirements will be rejected by the site manager, and a suitable replacement will be provided.

F

The contractual and administrative aspects of subcontracts are carefully monitored by the subcontractor administrator. The scope of work is written and subcontractors are instructed in, and required to adhere to, specific change notification procedures.

The site manager will verify the quality of the subcontractor's work through periodic, unscheduled QA audits and verify that subcontractor personnel accessing the site conform to the H&S rules and site access procedures in addition to other prime contract requirements.

The site manager will maintain regular communication with the appropriate subcontractor and management personnel to ensure satisfaction with the status of work assignments. A weekly status review meeting with subcontractors with major roles will be conducted during those periods when their performance and adherence to schedule is crucial.

Significant achievements or deviations will be reported promptly to the site manager and the USACE-OSR. Should any problems be identified in these communications, corrective measures will be developed, documented, and implemented immediately.

9.17 Contractor's Quality Control Program

9.17.1 Overview

Except for isolated tests or other items of work specified to be performed by government or another contractor, the quality of all work will be the responsibility of IT. Sufficient inspections and tests of all items of work, including that of subcontractors, to ensure conformance to applicable work plans with respect to the quality of materials, workmanship, construction and remediation finish, functional performance, and identification will be performed on a continuing basis. IT will furnish qualified personnel, appropriate facilities, instruments, and testing devices necessary for the performance of the QA/QC function. The controls will be adequate to cover all remediation operations, will be keyed to the proposed remediation sequence, and will be correlated by IT's PM. The QA/QC program will include four phases of inspection and tests. The USACE-OSR will be notified at least 24 hours in advance of each such test.

9.17.2 Preparatory Inspections

Preparatory inspections will be performed prior to beginning each feature of work on any on-site construction work. Preparatory inspections for the applicable feature or work will include (1) review of all other contract requirements with the foremen or supervisors directly responsible for the performance of the work; (2) check to ensure that provisions have been made to provide required field control testing; (3) examine the work area to ascertain that all preliminary work has been completed; (4) verify all field dimensions and advise the USACE-OSR of any discrepancies; and (5) perform a physical examination of materials and equipment to ensure that all materials and/or equipment is on hand.

9.17.3 Initial Inspection

Initial inspection will be performed as soon as work begins on a representative portion of the particular feature of work and will include examination of the quality of workmanship, as well as a review of control testing for compliance with contract requirements.

9.17.4 Follow-Up Inspections

Follow-up inspections will be performed continuously as any particular feature of work progresses, to ensure compliance with contract requirements, including control testing, until completion of that feature of the work.

9.17.5 Safety Inspections

IT will perform daily weekly and monthly safety inspections of the job site and the work in progress to ensure compliance with USACE Safety and Health Requirement Manual, the Site-Specific Health and Safety Plan, IT corporate policy, and other occupational H&S requirements. Various reporting forms will be used to document these inspections and will include a notation of the safety deficiencies observed and the corrective actions taken. The Contractor will use his designated H&S, QA/QC, and supervisory staff to perform the required inspections and will supplement the staff with additional personnel as needed.

F

9.17.6 Reporting

A

All inspections and test results will be recorded daily. The sample "Quality Control Rapid Daily Report (QCRDR)" form included in the USACE scope of work, or other approved forms will be reproduced and fully executed to show that all inspections and tests shall be submitted to the USACE-OSR on the first workday following the inspection. This report, which is included in the Rapid Response Daily Work Order, details personnel utilized, inspections completed, and other pertinent information.

9.17.7 Records

IT will maintain current records of QA/QC operations, activities, and tests performed including the work of suppliers and subcontractors. These records will be included in the Rapid Response Daily Report Form and will indicate a description of trades working on the project; the number of personnel working; the weather conditions encountered; any delays encountered; and acknowledgement of deficiencies noted, along with the corrective actions taken on current and previous deficiencies. These records will include

factual evidence that required activities or tests have been performed, including, but not limited to, the following:

- Type, number, and results of control activities and tests involved
- Nature of defects and causes of rejection
- Proposed remedial action
- Corrective actions taken.

These records will cover both conforming and defective or deficient features, and will include a statement that supplies and materials incorporated in the work comply with the contract. These records will be furnished to the USACE-OSR daily.

9.17.8 Enforcement

IT will stop work on any task or subcontractor's task, pending satisfactory correction of any deficiency noted by his QA/QC staff or by the USACE-OSR. Remediation will not proceed upon any feature of work containing uncorrected deficiencies.

9.17.9 Contractor QC Summary Report

An independent QC Summary Report (CQCSR) will be prepared by IT at the completion of the work. This report will be submitted as part of the final report. The report will include, at a minimum, the following items:

- A brief summary of sampling procedures, noting any deviations from procedures proposed in the sampling and analysis plan and the quality assurance project plan (QAPP)

- A consolidation and summary of QA/QC reports

- Analytical results, including detection limits, in tabular format

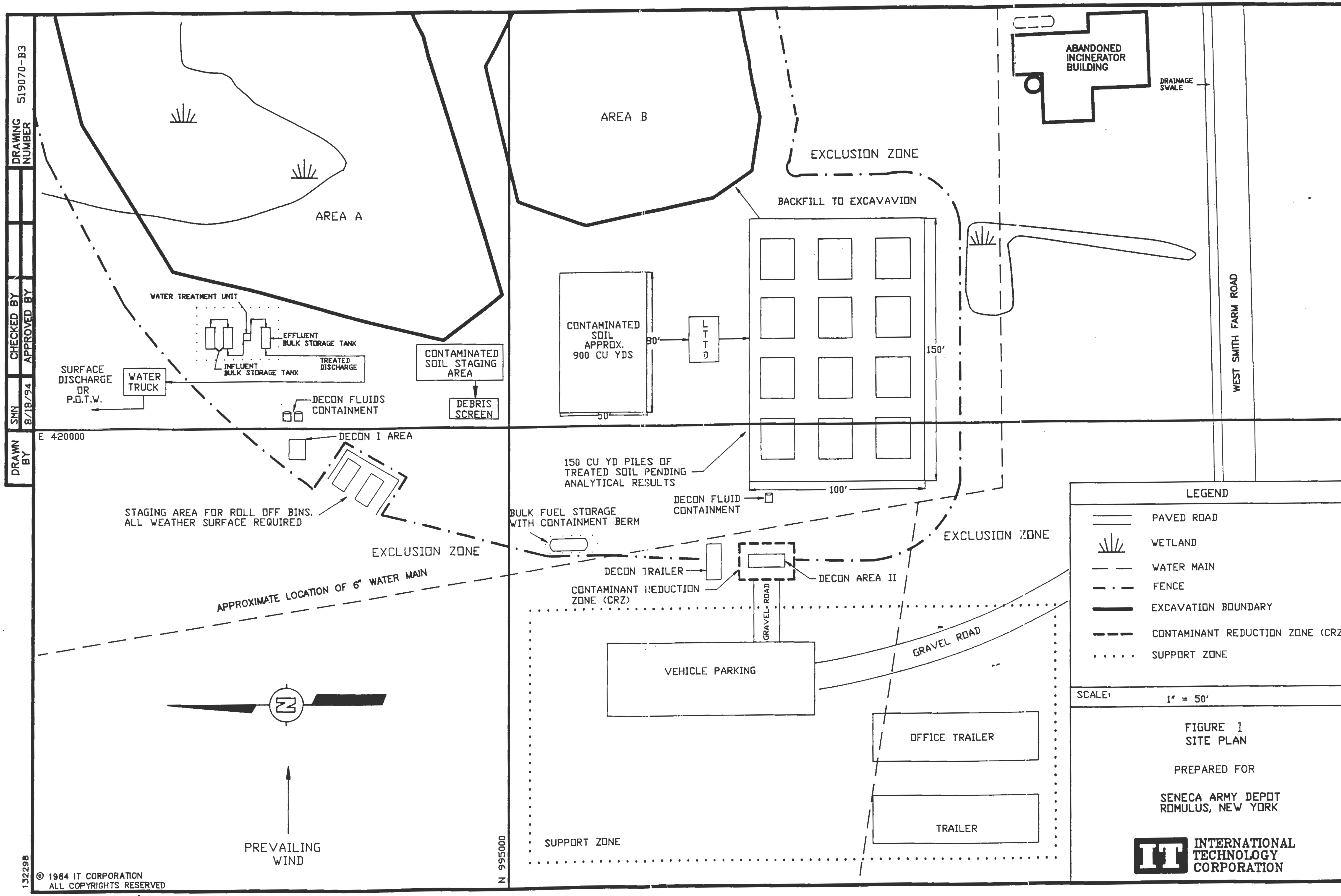
- An outline of QA/QC practices employed, including problems encountered and corrective actions taken

- Conclusions and recommendations describing the impact of analytical results on disposal of material to be removed from the project site.

SENECA ARMY DEPOT ASH LANDFILL
USACE CONTRACT NO. DACW45-90-D-9002
DELIVERY ORDER NO. 93
IT CORPORATION PROJECT NO. 519070

LIST OF CONTACTS

Local		
Fire/EMS	911	
Fire (non-Emergency)		
Police	911	
Police (non-Emergency)		
State Patrol -		
Ambulance	911	
Memorial Hospital -		
Sheriff		
Poison Control		
Weather		
Federal		
USACE Technical Manager	(402) 221-7759	Andy Winslow
USACE Construction PM	(402) 291-4260	Don Thomsen
National Response Center	(800) 424-8802	(24-hour number that rings in
AT&F (Explosives Information)	(800) 424-9555	Washington, DC, staffed by
Chemtrec	(800) 424-9300	the U.S. Coast Guard, can
Center for Disease Control (24 Hour)	(404) 639-2888	relay messages to the EPA, can patch conferences, has HAZMAT information).
USACE Contractors		
IT Rapid Response Program Management Office	(513) 782-4509	Al Meyers
IT Corporation CIH	(412) 372-7701	Warren Houseman
IT Corporation Project Manager	(513) 782-4505	Doug Wehner
IT Project Superintendent		
IT Corporation Subcontractors		
Quanterra	(412) 731-8806	Carrie Smith Gambler
LTTD Subcontractor		
Shoring Subcontractor		



DRAWING NUMBER 519070-B3
CHECKED BY
APPROVED BY
DRAWN BY SMN 8/18/94
AREA A
AREA B
ABANDONED INCINERATOR BUILDING
DRAINAGE SWALE
EXCLUSION ZONE
BACKFILL TO EXCAVAVION
WEST SMITH FARM ROAD
WATER TREATMENT UNIT
EFFLUENT BULK STORAGE TANK
INFLUENT BULK STORAGE TANK
TREATED DISCHARGE
SURFACE DISCHARGE OR P.O.T.W.
WATER TRUCK
CONTAMINATED SOIL STAGING AREA
DEBRIS SCREEN
DECON FLUIDS CONTAINMENT
CONTAMINATED SOIL APPROX. 900 CU YDS
80'
50'
LTTD
150'
100'
E 420000
DECON I AREA
150 CU YD PILES OF TREATED SOIL PENDING ANALYTICAL RESULTS
DECON FLUID CONTAINMENT
STAGING AREA FOR ROLL OFF BINS. ALL WEATHER SURFACE REQUIRED
BULK FUEL STORAGE WITH CONTAINMENT BERM
EXCLUSION ZONE
DECON TRAILER
CONTAMINANT REDUCTION ZONE (CRZ)
DECON AREA II
APPROXIMATE LOCATION OF 6" WATER MAIN
GRAVEL ROAD
VEHICLE PARKING
GRAVEL ROAD
OFFICE TRAILER
TRAILER
SUPPORT ZONE
N
PREVAILING WIND
N 995000
132298
LEGEND
PAVED ROAD
WETLAND
WATER MAIN
FENCE
EXCAVATION BOUNDARY
CONTAMINANT REDUCTION ZONE (CRZ)
SUPPORT ZONE
SCALE: 1" = 50'
FIGURE 1
SITE PLAN
PREPARED FOR
SENECA ARMY DEPOT
ROMULUS, NEW YORK
IT INTERNATIONAL TECHNOLOGY CORPORATION
© 1984 IT CORPORATION
ALL COPYRIGHTS RESERVED
"Do Not Scale This Drawing"

DRAWING NUMBER 519070-A2

CHECKED BY

APPROVED BY

DRAWN BY DJB 8/18/94

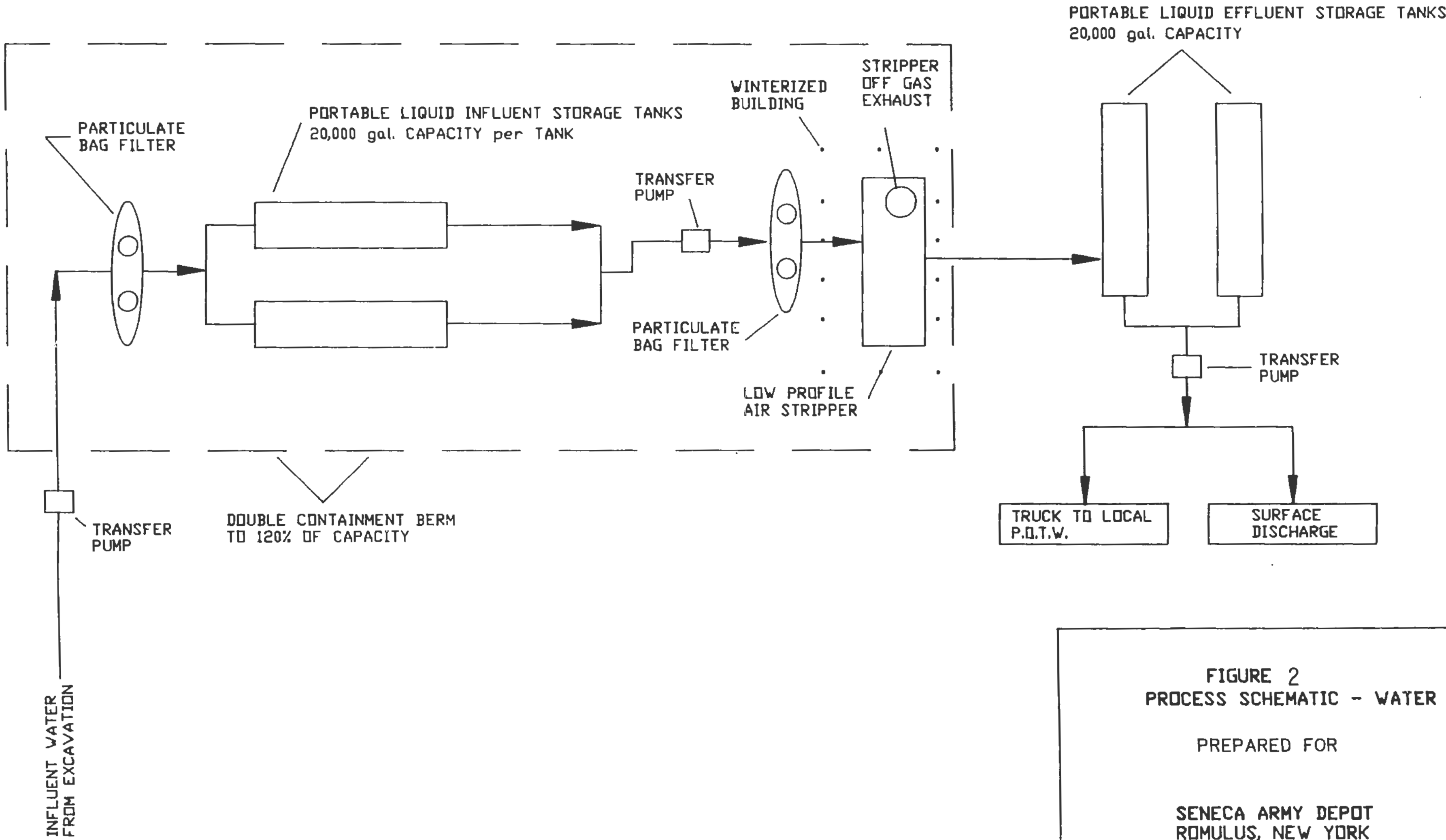
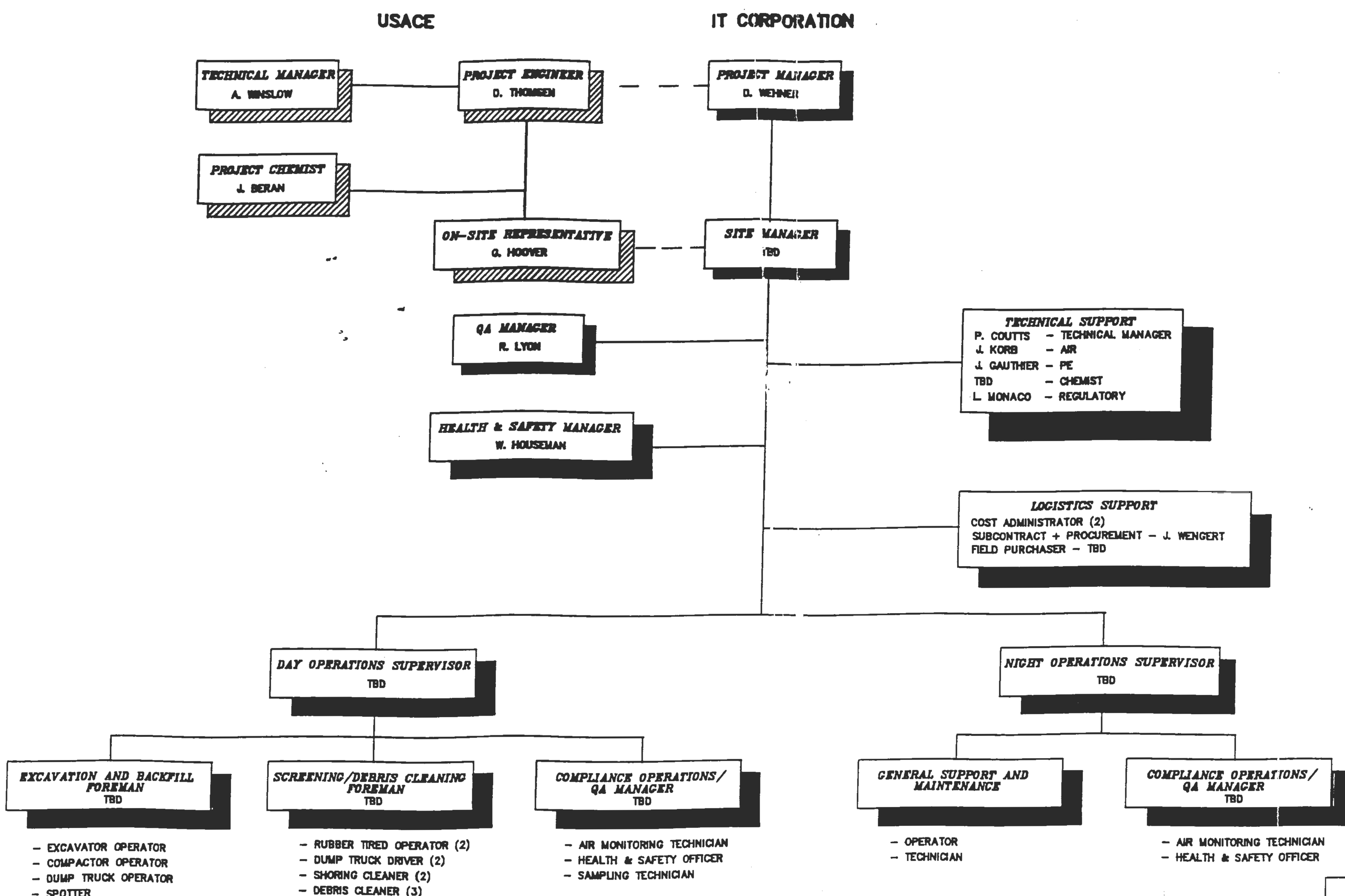


FIGURE 2
PROCESS SCHEMATIC - WATER

PREPARED FOR

SENECA ARMY DEPOT
ROMULUS, NEW YORK

INTERNATIONAL TECHNOLOGY CORPORATION



PROJECT ORGANIZATIONAL CHART
FOR THE ASH LANDFILL REMOVAL ACTION

FIGURE 3
PREPARED FOR

SENECA ARMY DEPOT
ROMULUS, NEW YORK

INTERNATIONAL TECHNOLOGY CORPORATION

DRAWING NUMBER 51907081

DRAWN BY DJB 8/18/94 | CHECKED BY | APPROVED BY

132298

FIGURE 4

Will be supplied

upon negotiations

APPENDIX A

SITE SAFETY AND HEALTH PLAN (SSHP)

INTERNATIONAL TECHNOLOGY CORPORATION

Project No. 519070
August 1994

Site Safety and Health Plan
Ash Landfill Removal Action

Seneca Army Depot
Romulus, New York

Contract No. DACW45-90-D-0002
Delivery Order No. 93

Prepared for:

Department of the Army
Omaha District Corps of Engineers
Omaha, Nebraska

Prepared by:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Site Safety & Health Plan

Ash Landfill Removal Action
Seneca Army Depot
Romulus, New York

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Prepared for:

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Omaha District Corps of Engineers
Omaha, Nebraska

Prepared by:

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2790 Mosside Boulevard
Monroeville, Pennsylvania 15146

August 1994
IT Project No. 519070

Table of Contents

List of Acronyms

ABCs	airway, breathing, and circulation
ABIH	American Board of Industrial Hygiene
ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APR	air purifying respirator
ATR	Army Technical Representative
CBC	Complete blood count
CFR	Code of Federal Regulations
CGI	combustible gas indicator
COTR	Contracting Officer Technical Representative
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	decibel A-scale
DCE	1,2-Dichloroethene
DOT	Department of Transportation
EPA	U. S. Environmental Protection Agency
EZ	exclusion zones
FM	Factory Mutual
GFCI	ground fault circuit interrupters
HEPA	high efficiency particulate air
IDLH	Immediately Dangerous to Life and Health
IT	IT Corporation
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets
MSHA	Mine Safety and Health Agency
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
OJTR	On-The-Job Training Record
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	Project Manager
PPE	personnel protective equipment
ppm	parts per million
PZ	piezoelectric
SCBA	Self-Contained Breathing Apparatus
SHM	Safety and Health Manager
SMAC	Sequential Multiple Analyzer Computer
SS	Site Superintendent
SSHC	Site Safety and Health Coordinator
SSHP	Site Safety and Health Plan
SZ	support zone
TCE	trichloroethene
TLV	Threshold Limit Values
TWA	time-weighted average
UL	Underwriters Laboratories
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Compound
WBGT	Wet Bulb Globe Temperature

Review and Approvals

Doug Wehner

Doug Wehner Project Manager IT Corporation	8/5/94 Date
Warren Houseman, CIH Warren Houseman, CIH Safety & Health Manager IT Corporation	8/4/94 Date

SSHP ACKNOWLEDGEMENT FORM

I have been informed of, and will abide by the procedures set forth in this SSHP for the Ash Landfill Removal Action taking place at the Seneca Army Depot in Romulus, New York.

Printed Name	Signature	Representing	Date

1.0 Introduction

1.1 Objective

This Site Safety and Health Plan (SSHP) establishes the work practices necessary to help ensure the protection of IT personnel and subcontractors during the remediation of contaminated soils at the Seneca Army Depot in Romulus, New York.

The objective of this plan is to provide a mechanism for the establishment of safe working conditions at the site. The safety organization and procedures have been established following an analysis of potential hazards at the site. Specific hazard control methodologies have been evaluated and selected in an effort to minimize the potential of occupational illnesses, accidents and injuries.

All site operations will be performed in accordance with applicable state, local, IT corporate regulations and procedures, OSHA requirements, and all USACE requirements. All IT employees and subcontractors must comply with the requirements set forth in this plan.

1.2 Site/Facility Description

Seneca Army Depot Activity (SEDA) is located in Romulus, New York. The depot is bordered to the west by State Route 96A and to the east by State Route 96. The city of Syracuse borders the site to the northeast, and Ithaca is located to the south.

The Seneca Army Depot was constructed in 1941 by the Department of the Army. From 1941 to 1974, uncontaminated trash was burned in burn pits near the abandoned incinerator building. From 1941 to the early 1960s, the ash from the pits was buried in the landfill. An incinerator was built in 1974. From 1974 to 1979, approximately 18 tons of domestic waste from depot activities and family housing was incinerated per week. The fly ash and residues were buried in the Ash Landfill, near the "bend-in-the-road" area. The incinerator was destroyed by a fire on May 8, 1979 and the landfill was closed.

1.3 Policy Statement

It is the policy of IT to provide a safe and healthful work environment for all its employees. IT considers no phase of operations or administration to be of greater importance than the prevention of injury and illness. Occupational health and safety takes precedence over expediency or shortcuts. Every illness, accident, and injury is avoidable, and IT will take every reasonable step to reduce the possibility of their occurrence.

This SSHP prescribes the procedures that must be followed by all site personnel. Operational changes which could affect the health or safety of personnel, the community or the environment will not be made without prior approval of the Project Manager and the H&S Manager.

The provisions of this plan are mandatory to all IT personnel, subcontractors, and visitors. Work conditions can change as operations progress; therefore, the H&S Manager will provide written addenda to this SSHP when changes occur and when additional site-specific information is available. No changes to the plan will be implemented without prior approval of the H&S Manager or his authorized representative.

1.4 References

This SSHP complies with applicable OSHA and EPA regulations. This plan follows the guidelines established in the following documents:

- Standard Operating Safety Guides [United States Environmental Protection Agency (EPA) July 1988]
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities [National Institute for Occupational Safety and Health (NIOSH) 85-115)]
- Title 29 of the Code of Federal Regulations, Part 1926.65 (29 CFR 1926.65); [United States Department of Labor/Occupational Safety and Health Agency (USDOL/OSHA)]
- Title 29 of the Code of Federal Regulations, Part 1926.62 (29 CFR 1926.62); [United States Department of Labor/Occupational Safety and Health Agency (USDOL/OSHA)]
- Safety and Health Requirements Manual EM 385-1-1 [United States Army Corps of Engineers (USACOE) Revised October 1992]
- Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices [American Conference of Governmental Industrial Hygienists (ACGIH) 1992-1993]

Contents of this plan are consistent with the following IT H&S Policies and Procedures:

IT Health and Safety Policies and Procedures

Procedure Number	Procedure Name
HS001	Safety Policy
HS010	Employee Safety and Health Work Rules
HS011	Contractor Safety and Health Rules
HS013	Health and Safety Procedure Variances
HS019	Injury and Illness Prevention Program (Revision 2)
HS020	Accident Prevention Program: Reporting, Investigation, and Review (Revision 3)
HS021	Accident Prevention Program: Management Safety Audits and Inspections (Revision 3)
HS022	Accident Prevention Program: Review of New Proposals, Projects, Operation, and Construction
HS040	Stop Work Authority
HS041	Embryo-Fetus Protection Program
HS050	Training Requirements
HS051	Tailgate Safety Meetings
HS052	Health and Safety Plans
HS060	Hazard Communication Program
HS080	Insurance Claims
HS090	OSHA Regulatory Inspections
HS091	Serious Injury and Fatality Reporting Requirements
HS092	Occupational Injury and Illness Reoccurred
HS100	Medical Policies and Procedures
HS101	Drug and Alcohol Testing (Revision 1)
HS102	Access to Employee Exposure and Medical Records
HS104	Employee Notification of Industrial Hygiene Monitoring Results
HS105	Occupational Injuries/Illnesses Procedures
HS106	First Aid Kits

Procedure Number	Procedure Name
HS300	Confined Spaces, Industrial
HS304	Compressed Gases
HS306	Handling Known Compressed Gas Cylinders
HS307	Excavation and Trenching
HS310	Hazardous Waste Operations at Uncontrolled Waste Sites
HS314	Hot Work in Hazardous Locations
HS400	Working in Hot Environments
HS401	Cold Stress
HS402	Hearing Conservation Program
HS505	Handling of Inorganic Lead, Inorganic Lead Compounds, and Organic Lead Soaps
HS512	Handling of Blood or Other Potentially Infectious Materials
HS513	Handling Radioactive Materials
HS600	Personal Protective Equipment
HS601	Respiratory Protective Program
HS602	Eye Protection - Prescription Safety Glasses
HS603	Maintenance of Survey Equipment
HS604	Use and Maintenance of Portable Electrical Equipment
HS606	Soil Density Gauges
HS800	Motor Vehicle Operation: General Requirements
HS810	Commercial Motor Vehicle Operation and Maintenance

These policies and their implementation are central to IT's accident prevention program. A copy of these procedures will be maintained at the job site.

2.0 Responsibilities

2.1 All Personnel

All personnel are responsible for continuous adherence to these H&S procedures during the performance of their work. No person may work in a manner that conflicts with the intent or the inherent safety and environmental precautions expressed in this SSHP. After due warnings, any person who violates safety procedures, will be dismissed from the site. IT employees and subcontractors are subject to progressive discipline and may be terminated for continued violations.

2.2 Project Manager

The Project Manager is ultimately responsible for ensuring that all project activities are completed in accordance with the requirements set forth in this plan.

2.3 Site Superintendent

The Site Superintendent supervises all IT activities at the site and is responsible for field implementation of this SSHP. This includes communicating site requirements to all personnel, ensuring field supervisors and subcontractors enforce all provisions of the plan and consulting with the H&S Manager regarding changes to the SSHP. Other responsibilities include:

- Reading and becoming familiar with this SSHP and IT Policies and Procedures
- Enforcing the SSHP and other safety regulations
- Stopping work as required to ensure personal and environmental safety and health
- Discussing potential H&S hazards with the H&S Manager and the Project Manager
- Implementing changes as directed by the H&S Manager and Project Manager.

2.4 Health and Safety Manager

The H&S Manager is responsible for developing and coordinating the site-specific SSHP and addenda as required. Other H&S Manager responsibilities include:

- General H&S program administration.

- Determining the level of personnel protection required.

- Updating equipment or procedures based on information obtained during site operations.

- Establishing air monitoring parameters based on expected contaminants.

- Establishing employee exposure monitoring notification programs.

- Investigating significant accidents and illnesses and implementing corrective action plans.

- Performing regular site inspections.

- Developing site-specific employee/community emergency response plans as required based on expected hazards

- Contact for regulatory agencies on matters of H&S.

2.5 Site Safety and Health Coordinator

The SSHC has the ultimate responsibility to stop any operation that threatens the health or safety of the team or surrounding populace or that causes significant adverse impact to the environment. Other responsibilities include but are not limited to:

- Enforcing all of the safety procedures contained within this SSHP

- Observing work party members for symptoms of exposure or stress

- Upgrading or downgrading, in coordination with the H&S manager and the Project Manager, the levels of personal protection based upon site observations and monitoring results

- Informing the project H&S Manager of significant changes in the site environment that require equipment or procedure changes

- Arranging for the availability of on-site emergency medical care and first aid, as necessary

- Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation

- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site

- Establishing contamination control zones

- Presenting daily Tailgate Safety Meetings

- Assuring that the respiratory protection program is implemented

- Assuring that decontamination procedures meet established criteria.

2.6 Subcontractors

All IT subcontractors and their personnel are responsible for understanding and complying with all site requirements. Subcontractors are required to follow the guidelines established in IT's General Safety Rules for Contractors and this SSHP.

2.7 Visitors

All visitors are required to comply with the provisions of this SSHP and are responsible for conducting themselves in a safe and healthful manner while on site. Visitors must sign the project log upon arrival and prior to leaving the site. The H&S Coordinator will brief visitors on the contents of this plan and provide a copy if desired.

3.0 Job Hazard Analysis

3.1 Scope of Work

IT will perform Low Temperature Thermal Desorption (LTTD) on soil contaminated with volatile organic, polynuclear aromatic, and lead compounds at the Seneca Army Deport. This will include the following tasks:

- Mobilization
- Boring
- Excavation/Backfilling
- Low Temperature Thermal Desorption (LTTD)
- Treatment of Debris
- Water/Soil Sampling
- Decontamination
- Site Restoration.

An Activity Hazard Analysis (AHA) for each of these major tasks can be found in Attachment C.

The AHA is an ongoing process from initiation of the SSHP to implementation and completion of field work. Unanticipated hazards not addressed in these AHAs will be added in the field by the SSHC. These modifications will be submitted to the SHM for approval. The AHAs provided in this SSHP are consistent with the requirements set forth in EM 385-1-1, Section 0.1.A.09. This SSHP also serves as the project's Accident Prevention Plan.

3.2 Chemical Hazards

This section discusses the chemical hazards associated with materials that are used on the site or are likely to be found on the site. The SHM will update this section as information developed during this project warrants. Previous field investigations indicate the presence of volatile organic compounds, semivolatile organic compounds, and lead.

The significant chemical hazards that have been identified in soil samples include trichloroethene (TCE), 1, 2-Dichloroethene (DCE), Polynuclear Aromatic Hydrocarbons (PAH), and Lead. Other contaminants were also detected, but at insignificant levels that do not impact workers' health. Although all routes of exposure may present potential risk to field personnel, it is anticipated that dermal contact with contaminated particulates and liquids and inhalation of contaminated particulates and vapors pose the greatest hazard.

Trichloroethene is a colorless liquid, unless dyed, with a sweet odor like chloroform. Target organs include the respiratory system, heart, central nervous system, liver, kidneys, and skin. Symptoms of acute exposure include headache, visual disturbance, tremors, nausea, vomiting, eye irritation, dermatitis, and tingling in the extremities. Trichloroethene is considered an occupational carcinogen.

1,2-Dichloroethene is a colorless liquid with an ether-like slightly acrid odor like chloroform. Routes of entry into body include inhalation, ingestion, and skin or eye contact. Symptoms of acute exposure include eye irritation, dizziness, nausea, skin irritation, and mucous membrane irritation.

Polynuclear Aromatic Hydrocarbons are a group of semivolatile organics that are rather persistent in the environment. Some PAHs are carcinogenic with inhalation as the primary exposure route. The greatest carcinogenic effect is at the point of contact (i.e., lungs, skin, stomach). Skin disorders may also result due to high concentration exposures. Exposure limits have not been established for many specific PAHs in this large group of compounds.

Xylenes are colorless liquids with an aromatic odor. Target organs include CNS, eyes, GI tract, blood, liver, kidneys and skin. Signs of acute exposure include dizziness, excitement, drowsiness, irritation of eyes, nose and throat.

Lead is a fairly common metal with a variety of industrial applications. The gastrointestinal tract, central nervous system, kidneys, blood, and gums are targets of lead exposure. Symptoms of exposure include lassitude, insomnia, constipation, abdominal pain, colic, anemia, hypertension, anorexia, low body weight, malnutrition, pallor, tremors, and paralysis of the wrist.

Established exposure guidelines for the various contaminants likely to be encountered during IT's activities can be found in Table 3-1.

4.0 Standard Operating Safety Procedures, Engineering Controls, and Work Practices

4.1 General Practices

- Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Stay away from any waste containers if possible. Protect equipment from contamination by bagging it.
- All contamination reduction zones (CRZ) and exclusion zones (EZ), as established on the site, shall be observed. Entry into a CRZ and EZ shall be by prior notification and authorization of the SS. All required PPE shall be worn prior to entering these zones.
- Contaminated equipment and PPE, such as respirators, gloves, boots, etc. (if not discarded) shall not be removed from the CRZ until they have been properly cleaned.
- Legible and understandable precautionary labels shall be affixed prominently to containers of contaminated scrap, waste, debris, and clothing.
- Contaminated materials shall be stored in tightly-closed containers in well-ventilated areas.
- No food or beverages shall be present or consumed in a CRZ or EZ. These are only allowed in designated areas of the support zone (SZ).
- No tobacco products shall be present or used, and cosmetics shall not be applied in a CRZ or EZ. These are only allowed in designated areas of the SZ, if areas have been designated.
- Beards, facial hair, or other facial obstructions that interfere with respirator fit will preclude admission to the EZ when respirators are required.
- Emergency equipment shall be located outside storage areas, in readily accessible locations, which will remain minimally contaminated.
- Field personnel must observe each other for signs of toxic exposure. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin discoloration
- Changes in coordination
- Changes in demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern.

- Field personnel shall be cautioned to inform each other of nonvisual effects of toxic exposure such as:

  - Headaches
  - Dizziness
  - Nausea
  - Blurred vision
  - Cramps
  - Irritation of eyes, skin, or respiratory tract.

- Any detected effects of toxic exposure shall be reported to the SSHC immediately.

- The wearing of contact lenses is not allowed in a CRZ or EZ.

- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury, splash, etc., must have approved eye wash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.

- If any on-site activities, including decontamination, continue later than dusk, adequate lighting must be provided. Work areas must have adequate lighting for employees to see to work and identify hazards (5-foot candle minimum). Personnel should carry flashlights in all normally dark areas for use in the event of a power failure.

- All electrical power must have a Ground Fault Circuit Interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

- Operations involving the potential for fire hazards shall be conducted in a manner as to minimize the risk of fire. Nonsparking tools and fire extinguishers shall be used or available as appropriate. Sources of ignition shall be removed. When necessary, explosion-proof instruments and/or bonding and grounding techniques will be used to prevent fire or explosion.

- Overhead and underground utility hazards shall be identified and or inspected prior to conducting operations involving potential contact with utility lines.

- If equipment is located in the vicinity of overhead power lines, Table 4-1 will be used to determine safe working conditions.

4.2 Buddy System

The "buddy system" will be used at all times by all field personnel in the EZ. No one is to perform field work alone. Maintain visual, voice, or radio communication at all times.

4.3 Hot Work

SSHC Responsibilities

- Based on fire potentials, the SSHC will establish approved areas for welding, cutting, and other hot work.
- The SSHC will be responsible for authorizing welding, cutting, and other hot work in areas not specifically designed or approved for such operations.
- The SSHC will ensure that only approved apparatus, such as torches, manifolds, regulators, or pressure reducing valves, and acetylene generators, be used on site.
- The SSHC will ensure that cutters or welders and their supervisors are properly trained in the safe operation of their equipment, the safe use of the process, and emergency procedures in the event of a fire.

Fire Prevention Precautions

- Cutting, welding, or other hot work shall be permitted only in areas that are or have been made firesafe.
- Cutting or welding shall NOT be permitted in the following situations:
  - In areas not authorized by the SSHC
  - In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared drums, tanks, or other containers, and equipment which has previously contained such materials.
  - In any area where CGI readings are in excess of 10 percent of the LEL.

- On storage or process vessels or lines in service which contain flammable or combustible liquids, gases, vapors, or solids.

Preparation and Permits for Hot Work

- Before any welding, cutting, or other hot work is permitted, the area shall be inspected by the SSHC to ensure that the following requirements have been met:

  - Cutting and welding equipment to be used shall be in safe operating condition and in good repair.

  - Where practical, all combustible material shall be relocated at least 50 feet horizontally from the work site. Where relocation is impractical, combustibles shall be protected with flame-proofed covers or otherwise shielded.

  - At a minimum, two fully charged and operable fire extinguishers, appropriate for the type of possible fire, shall be available at the work area.

  - Fire watchers shall be required whenever hot work is performed in hazardous locations.

  - CGI readings are taken and the work area is free of combustible gases and vapors.

  - The work area is free of toxic contaminants at concentrations in excess of established threshold limit values, or, all personnel who will work in the area have been provided respiratory protective devices and protective apparel appropriate for the degree of exposure.

  - When hot work is to be performed on tanks or other vessels that contain or have contained flammable or combustible liquids, the vessel shall be properly isolated, purged, and cleaned, as appropriate, to reduce the concentrations of flammable and toxic air contaminants to safe levels.

- A hot work permit will be completed by the SSHC, reviewed with personnel who will perform the hot work, and posted near the job site.

  - The hot work permit is good only for the date issued and is valid only for the 8-hour shift for which it is issued.

  - If at any time during the hot work operation a change in conditions at the work site is suspected, such a release of flammable gases or vapors in the work area, work shall be stopped immediately and the SSHC shall be notified. Such work stoppage invalidates the hot work permit, and a new permit shall be completed after inspections and test have been performed by the SSHC.

- No erasures or changes of dates on hot work permits shall be permitted.

4.4 Cold Stress

Some activities during the execution of this project may occur during the winter, likely exposing personnel to cold stress hazards.

Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures, or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a drop in the deep-core body temperature.

4.4.1 Signs and Symptoms

Employees should be protected from exposure to cold so that their deep-core body temperature does not fall below 98.6 degrees Fahrenheit (°F). A lower body temperature will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences.

Frostbite. Frostbite occurs when the extremities do not get sufficient heat from the central body stores. The fluids around the cells of the body tissues freeze from exposure to low temperatures. This condition can result in damage to, and loss of tissue. The most vulnerable areas are the nose, cheeks, ears, fingers, and toes.

Damage from frostbite can occur in either the outer layers of skin or in the tissue beneath these layers, and can be serious, resulting in scarring, tissue death, permanent loss of movement, or amputation.

There are three degrees of frostbite:

- First degree: freezing without blistering or peeling
- Second degree: freezing with blistering or peeling
- Third degree: freezing with skin tissue death and possible deeper tissue damage.

Symptoms of frostbite include:

- Skin color changes to white or grayish-yellow, to reddish-violet, and finally black as the tissue dies
- Pain may be felt at first, but subsides
- Coldness or numbness of the affected part.

Hypothermia. This is the most severe form of cold stress and results from a drop in the body's core temperature. The symptoms of hypothermia are:

- First, uncontrollable shivering and the sensation of cold
- Heartbeat slows and may become irregular
- Pulse weakens and the blood pressure changes
- As the body's core temperature drops, other signs may include cool skin, slow irregular breathing and apparent exhaustion
- When core temperatures are in the mid-range, the victim may become listless, confused, exhibit severe shivering, or develop severe pain in the extremities
- Final signs are a significant drop in blood pressure, fatigue, and shallow respiration.

4.4.2 Control Measures

When the ambient air temperature falls below 36°F, the following cold weather clothing requirements will be adhered to:

- If wind chill is a factor, the cooling effect of the wind shall be reduced by shielding the work area or providing employees an outer windbreak layer garment.
- Extremities, ears, toes, and nose shall be protected from extreme cold by protective clothing.
- Employees performing light work and whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water.
- Employees performing moderate to heavy work and whose clothing may become wet shall wear an outer layer of clothing which is water repellant.

- Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat.

- If clothing is wet, the employee shall change into dry clothes before entering a cold environment.

- Workers shall change socks and removable felt insoles at regular daily intervals or use vapor barrier boots.

- Workers who become immersed in water or whose clothing becomes wet shall immediately be provided a change of clothing and be treated for hypothermia if necessary. If the clothing becomes wet from sweating, the employee may finish the task which caused the sweating before changing into dry clothes.

- Employees will be provided with thermal underwear, insulated coveralls, gloves, socks, and boots.

When employees are working in air temperatures of -15°F or less, the guidance given in Table 4-2, Cold Weather Work/Warmup Regimen, will be followed.

Metal handles of tools and control bars will be covered by thermal insulating materials when temperatures fall below 30°F.

Whenever the site becomes covered with snow or ice, eyewear providing protection against ultraviolet light, glare, and blowing ice crystals will be worn by employees.

4.5 Heat Stress

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and individual characteristics. Extreme hot weather can cause physical discomfort, loss of efficiency, or personal injury.

Individuals vary in their susceptibility to heat stress. Factors that may predispose individuals to heat stress include:

- Lack of physical fitness
- Insufficient acclimation
- Age
- Dehydration
- Obesity

- Alcohol and/or drug use
- Medical conditions
- Infection
- Sunburn
- Diarrhea
- Chronic disease.

Reduced work tolerance and the increased risk of heat stress are directly influenced by the amount and type of PPE worn. PPE adds weight and bulk and severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure.

4.5.1 Signs and Symptoms of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild to fatal.

Heat related problems include:

- Heat rash - caused by continuous exposure to heat and humidity and aggravated by chafing clothes. Heat rash decreases the body's ability to tolerate heat as well as being a nuisance.

- Heat cramps - caused by profuse perspiration with inadequate electrolytic fluid replacement. Heat cramps cause painful muscle spasms and pain in the extremities and abdomen.

- Heat exhaustion - caused by increased stress on various organs to meet increased demand to cool the body. Heat exhaustion causes shallow breathing; pale, cool, moist skin; profuse sweating; and dizziness. Heat exhaustion can be alleviated by promptly moving the affected individual to a cool place to lie down and providing cool fluids to drink.

- Heat stroke - the most severe form of heat stress. Heat stroke symptoms include hot, dry skin; no perspiration; nausea; dizziness; confusion; strong, rapid pulse; and coma. The body must be cooled immediately to prevent severe injury or death.

4.5.2 Heat Stress Prevention

One or more of the following practices will help reduce the probability of succumbing to heat stress:

- Acclimate workers to heat conditions when field operations are conducted during hot weather.

- Provide plenty of liquids to replace the body fluids lost by perspiration. Fluid intake must be forced because, under conditions of heat stress, the normal thirst mechanism is not adequate to bring about a voluntary replacement of lost fluids.

- Provide cooling devices to aid natural body ventilation. However, these devices add weight and should be balanced against worker comfort.

- If possible, install mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.

- If possible, conduct field operations in the early morning.

- Train personnel to recognize the signs and symptoms of heat stress and its treatment.

- Rotate personnel to various job duties, if possible.

- Provide shade or shelter to relieve personnel of exposure to the sun during rest periods.

Individuals succumbing to the symptoms of heat stress will notify the SSHC coordinator or SS immediately. The onset of heat stress will preempt any of the aforementioned, halt activities and initiate treatment. Early detection and treatment of heat stress will prevent further serious illness or injury and lost work time. Proper and effective heat stress treatment can prevent the onset of more serious heat stroke or exhaustion conditions. Individuals that have succumbed to any heat related illness become more sensitive and predisposed to additional heat stress situations.

4.5.3 Acclimatization

The degree to which an employee's body has physiologically adjusted or acclimatized to working under hot conditions is extremely important in the hot and humid conditions. NIOSH recommends a progressive 6-day acclimatization period for unacclimatized workers before allowing them to work at their full capacity. Under this regimen, the first day of work on site is begun using only 50 percent of the anticipated workload and exposure time, and 10 percent is added each day through day six. Six days should be considered the average time needed for worker acclimatization due to each individual's physical condition and their ability to adjust to hot and humid environments. It is important to note that employees can lose acclimatization in a matter of days and should be subjected to a short reacclimatization period.

4.5.4 Wet Bull-Glove Temperature Monitoring

The Wet-Bull Globe Temperature (WBGT) Index technique will be used to measure heat stress potential for site employees. This method will require the use of a heat stress monitoring device such as the Wibget Heat Stress Monitor (Reuter-Stokes). WBGT measurements will be taken a minimum of four times per day when ambient air temperatures exceed 78°F and personnel are wearing PPE, including Tyvek coveralls. If impermeable garments are not worn, this monitoring will begin at 85°F. WBGT readings will be compared to the Threshold Limit Values (TLV) outlined in the ACGIH TLVs manual and a work/rest regimen established, as necessary, according to the WBGT obtained. Once the initial work/rest regimen has been established, and ambient air temperatures exceed 90°F, physiological monitoring will be conducted by the SSHC in order to make any necessary adjustments to the regimen. WBGT measurement methods and the establishment of work/rest regimens will be based on the information supplied in Attachment E. <u>Recommended Heat Stress Guidelines for Unacclimated/Acclimated Workers in Hot Environments.</u>

4.5.5 Physiological Monitoring

Ambient temperature and other environmental factors provide basic guidelines to implement work/rest periods. However, since individuals vary in their susceptibility to heat stress, IT will also utilize physiological monitoring to regulate each individual's response to heat stress when ambient temperatures exceed 90°F and impermeable garments are worn. The two physiological parameters that each individual will monitor are:

- Heart rate - Each individual will count his/her radial (wrist) pulse for 30 seconds as early as possible in the first rest period. If the heart rate of any individual exceeds 100 beats per minute at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.

- Oral temperature - Each individual will measure his/her oral temperature with a single-use clinical thermometer for 1 minute as early as possible in the first rest period. If the oral temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.

An individual is not permitted to return to work if his/her oral temperature exceeds 100.6°F.

Physiological monitoring information will be recorded on the Employee Record for Heat Stress. All monitoring will be performed by persons with a minimum of current Red Cross first-aid certification and individualized training to recognize the symptoms of heat stress.

4.5.6 Training

Personnel (including subcontractor employees) potentially exposed to heat stress conditions will have the following training during the site-specific training session.

- Employees
  - Sources of heat stress, influence of protective clothing, and importance of acclimation.
  - How the body handles heat.
  - Heat-related illnesses.
  - Preventive/corrective measures.
  - First-aid procedures.
- IT Supervisors
  - Physiological monitoring, WBGT measurement methods and establishment of work-rest regimes based upon information supplied in Attachment E. Recommended Heat Stress Guidelines for Unacclimated/Acclimated Workers in Hot Environments.

4.6 Hearing Conservation

A hearing conservation program will be implemented at the site when exposures equal or exceed an 8 hour time-weighted average (TWA) of 85 decibel A-Scale (dBA). Hearing loss caused by high sound levels is a problem that can be prevented. As part of the criteria for the medical surveillance program established for this site, audiometric testing is conducted to monitor each worker's ability to hear. Sound level measuring will be conducted initially on site and whenever new tasks are started or additional equipment is brought onto the site that has not previously had its sound level quantified.

Caution should be taken at or around loud locations. Engineering controls such as mufflers and baffles should be utilized when feasible to reduce noise. Hearing protection, such as E-A-R™ plugs (Noise Reduction Rating [NRR] of 29), is required to be worn by personnel working with or around heavy equipment and as sound level monitoring dictates.

4.7 Confined Space Entry

IT's procedure for confined space entry will be followed if such an activity is needed during the completion of this project. A confined space is defined as a space large enough and so configured that an employee can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Contaminated soil excavations, storage vessel entries, and other confined space work may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Excavation entry may pose the possibility of engulfment. IT has detailed training for confined space entry, and only personnel properly trained shall supervise and participate in confined space entry procedures or serve as standby attendants.

All confined spaces are initially considered permit required. Under certain conditions, a space may be reclassified as a nonpermit confined space provided the SSHC approves the reclassification and the space meets the criteria outlined in HS300 (Attachment D - Confined Space Entry Procedure).

4.8 Sanitation

A break area will be designated and provided in an area in the SZ (outside of contaminated zones). Outdoor and indoor areas may be designated. The designated areas will be clean and will facilitate the number of workers using it. Eating, drinking, and tobacco may be permitted in break areas. Smoking will only be permitted if it is done in an area that is approved by the SSHC.

4.8.1 Water

IT will provide an adequate supply of drinking water. The water will be dispensed in an approved potable water system and in a manner which prevents contamination between the consumer and dispenser. All outlets dispensing nonpotable water will be posted "Caution - Water Unfit for Drinking, Washing, or Cooking". Systems furnishing nonpotable water and systems furnishing potable water will be constructed and remain completely independent of each other.

4.8.2 Toilets

If permanent toilet facilities are not available (within 500 feet), IT will provide a chemical toilet for the personnel on site. Arrangements will be made for the routine servicing and cleaning of these units. Water and cleaning compounds will be made available for decontamination, washing face and hands, and sanitation purposes. The number of toilets provided will be as follows:

Number of Employees	Minimum Number of Facilities
20 or fewer	One
More than 20, fewer than 200	One toilet seat and one urinal per 40 workers
More than 200	One toilet seat and one urinal per 50 workers

It is anticipated that one chemical toilet will be made available at each site for use by project personnel.

4.8.3 Trash Collection

Adequate trash receptacles will be placed around the job site for trash collection. Contaminated trash must be segregated from sanitary trash. Sanitary trash receptacles should be labeled "Sanitary Trash" and hazardous waste should be labeled according to applicable regulations.

High housekeeping standards must be maintained. Trash receptacles shall be emptied on an as-needed basis.

4.9 Clearing - General Practices

If personnel are clearing brush using machetes, the following rules apply:

- When employees are using a machete to clear the area, no one is permitted within 30 feet of the person swinging the machete.
- Personnel will be instructed to not stand with their backs toward the active work area.
- All personnel must wear the appropriate PPE outlined in Chapter 5.0 and be familiar with the use of a machete.

When trees are being felled, the following rules must be adhered to:

- Before beginning the operation, alert all personnel in the area that the operation is about to commence. Then check that the area around the landing point of the tree is clear.
- Use a spotter to make sure the area remains clear.
- Check that there are no overhead power lines or obstructions that may catch or deflect the tree as it falls.
- Never turn your back on the tree while it is being felled.
- Watch for kickback from the saw and do not force the saw if it becomes stuck in the tree.

Never refuel hot equipment without using a funnel or a pour spout attached to the refueling can. All refueling handling equipment must be Underwriters Laboratories (UL) listed and Factory Mutual (FM) approved. A fire extinguisher must be located within 20 feet. The refueling must be done in a designated area to prevent contamination from minor spills and to reduce the risk of fires.

4.10 Drilling Procedures

All drillers performing work must possess the required state and/or local licenses to perform such work. The driller shall be responsible for the safe operation of the drill rig as well as the crew's adherence to the requirements of this SSHP. The driller must ensure that all safety equipment is in proper condition and is properly used. The members of the crew shall follow all instructions of the driller, wear all required PPE, and be aware of all hazards and control procedures. The drill crews shall participate in the daily tailgate safety meetings and shall be aware of all emergency procedures.

4.10.1 Rig Inspection

Each day, before work begins, the drill rig and associated equipment shall be inspected by the driller and/or work crew. The following items shall be inspected:

- Test operation of rig "kill" switches
- Vehicle condition
- Proper storage of equipment

- Condition of all wire and rope (if bad, need to replace)
- Fire extinguisher (needs to be fully charged and in good working order)
- First-aid kit (is it on rig and stocked?).

4.10.2 Rig Setup

The drill rig shall be properly blocked and leveled before raising the derrick. The rig shall be moved only after the derrick has been lowered. The leveling jacks shall not be raised until the derrick is lowered.

Site drilling will comply with the following rules:

- Before drilling, the existence and location of underground pipe, electrical equipment, and gas lines will be determined.

- A CGI will be used during drilling operations to monitor the ambient concentrations of flammable vapors within a one-foot radius of the opening of the boring. Drilling may continue as long as vapor readings are within the 0- to 10-percent lower explosive limit (LEL) range.

- If vapor readings exceed 10 percent of the LEL, drilling will stop, and all existing and potential ignition sources will be eliminated. Monitoring will continue next to the borehole and within the general work area where vapors might migrate or accumulate. If vapor concentrations do not naturally dissipate below the 10-percent LEL action limit within 10 minutes, or if the affected area continues to grow, the borehole will be properly abandoned. During abandonment, extreme care will be taken to eliminate any nonessential personnel or potential ignition sources from the area with vapor concentrations above the 10-percent LEL.

- If drilling is conducted in the vicinity of overhead power lines, a distance of 10 feet must be maintained between the lines and any point on the drill rig. If lines have appreciable sag, or if windy conditions exist, this distance shall be 20 feet.

- Drillers and helpers shall secure all loose clothing to prevent contact with moving machinery.

- All IT and subcontractor personnel must be shown the locations of emergency stop buttons and "kill" switches on the drill rig before beginning drilling operations.

- Traffic safety cones shall be positioned around the drill rig to protect field personnel from traffic. When drilling on or next to roadways, safety cones and traffic signs shall be positioned as specified by state and local regulations.

4.10.3 General Drilling Practices

- The departing driller should inform the oncoming driller of any special hazards or ongoing work that may affect the safety of the crew.

- If lubrication fittings are not accessible with guards in place, machinery should be stopped for oiling and greasing.

- Rigging material equipment for material handling should be checked prior to use on each shift and as often as necessary to ensure it is safe. Defective rigging should be removed from service.

- The area around the derrick ladder should be kept clear to provide unimpeded access to the ladder.

- Work areas and walkways should not be obstructed.

- The rotary table of the rig floor shall be kept free of obstruction and free of undue accumulation of oil, water, ice, or circulating fluids.

4.10.4 Hoisting Operations

- Drillers should never engage the rotary clutch without watching the rotary table and ensuring it is clear of personnel and equipment.

- Unless the draw works is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

- Drill pipe or casing should not be picked up suddenly.

- Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrick man has signaled that he may safety hoist the pipe.

- During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor, and no one should be on the rig or derrick.

- The brakes on the draw works of every drilling rig should be tested by each driller when he comes on shift to determine whether they are in good order. The brakes should be thoroughly inspected by a competent individual each week.

- A hoisting line with a load imposed should not be permitted to be indirect contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

- Workers should never stand near the well bore whenever any wire line device is being run.

- Hoisting control stations should be kept clean and controls labeled as to their functions.

4.10.5 Riding Hoisting Equipment

Under no circumstances will personnel be permitted to ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.

4.10.6 Cat Line Operations

- Only experienced workers will be allowed to operate the cat head controls. The kill switch must be clearly labeled and operational prior to operation of the cat line.

- The cat head area must be kept free of obstruction and entanglements.

- The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

- Personnel should not stand near, step over, or go under a cable or cat line which is under tension.

- Workers rigging loads on cat lines should:

  - Keep out from under the load

  - Keep fingers and feet where they will not be crushed

  - Be sure to signal clearly when the load is being picked up

  - Use standard visual signals only and not depend on shouting to coworkers

  - Make sure the load is properly rigged, since a sudden jerk in the cat line will shift or drop the load.

4.10.7 Pipe Handling

- Pipe should loaded and unloaded, layer by layer, with the bottom layer pinned or blocked securely or all four corners. Each successive layer should be effectively blocked or chocked.

- Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

- Workers should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

- Slip handles should be used to lift and move slips. Employees should not be permitted to kick slips into position.

- When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.

- Pipe stored in racks, catwalks, or on flatbed trucks should be chocked to prevent rolling.

4.10.8 Derrick Operations

- Personnel on the derrick should be tied off or otherwise protected from falling when working in an unguarded elevated position.

- All stands of pipe and drill collars racked in a derrick should be secured with rope or otherwise adequately secured.

- Tools, derrick parts, or materials of any kind should not be thrown from the derrick.

- The elevators must be properly clamped onto all joints prior to the driller engaging the load.

4.10.9 Making and Breaking Joints

- Tongs should be used for the initial making up and breaking of the joint. The rotary table should not be used for the initial breaking of a joint.

- Workers making or breaking joints should not be permitted to stand within the area of the tong handles when the tong pull line is under tension. Employees should handle the tongs only by the appropriate handles.

- Workers should be trained in the safe use of spinning chains. Spinning chains should not be handled near the rotary table while it is in motion.

4.11 Excavation Safety

All excavating and soil removal conducted by IT and subcontractors will comply with IT Procedures and OSHA regulations governing excavation and trenching.

All excavations will be performed from a stable ground position, and daily inspections of the excavation, if greater than four feet deep, will be made by a competent person who has received training in excavation safety. The inspector will determine the likelihood of a cave-in, and remedial action such as sloping or shoring will be taken if the walls appear to be unstable.

All spoil will be located at least 2 feet from the edge of the excavation to prevent it from falling back into the excavation. The excavation will be guarded on all sides by barricades or caution tape at least 2 feet from the edge.

Before excavating, the existence and location of underground pipe, electrical equipment, and gas lines will be determined. This will be done, if possible, by contacting the appropriate utility company and/or client representative to mark the location of the lines. If the client's knowledge of the area is incomplete, an appropriate device, such as a cable avoiding tool, will be used to locate the service line.

If excavation is located in the vicinity of overhead power lines, a distance of 15 feet must be maintained between the lines and any point on the equipment. If the lines have appreciable sag, or if windy conditions exist, this distance will be 20 feet.

Personnel entry into any excavation 4 feet deep or greater is only permitted if the walls are properly shored or sloped and a combustible gas/oxygen reading has been taken. A ladder shall be provided and placed at an angle not more than 30 degrees from vertical, and secured as necessary. Ladder side rails shall extend at least 3 feet above the ground surface.

Caution tape, barricades, or other means must be used to define and restrict access to the area of excavation.

4.12 Biological Hazards

Ticks. Ticks are vectors of many different diseases including; rocky mountain spotted fever, Q fever, tularemia, Colorado tick fever, and lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the workday employees will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with your bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.

- Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.

- Do not twist the tick as you pull and do not squeeze its bloated body. That may actually inject bacteria into your skin.

- Thoroughly wash your hands and the bite area with soap and water. Then apply an antiseptic to the bite area.

- Save the tick in a small container with the date, the body location of the bite, and where you think the tick came from.

- Notify the SSHC of any tick bites as soon as possible.

Poisonous Plants. Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All produce a delayed allergic hypersensitivity. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure resulting in burning or stinging, and weeping and/or crusted blisters. Should exposure to any of these plants occur, wash the affected area with a mild soap and water, but do not scrub the area. The best antidote for poisonous plants is recognition and avoidance.

Snakes. The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches.

The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt.

Flying Insects. Flying insects such as mosquitos, wasps, hornets, and bees may be encountered while site activities occur. Table 4-3 discusses problems associated with them.

5.0 Personnel Protective Equipment

5.1 Respiratory Protection

Respiratory protective equipment shall be Mine, Safety, and Health Administration (MSHA)/NIOSH-approved and respirator use shall conform to American National Standards Institute (ANSI) Z88.2, OSHA 29 CFR 1910.134, and OSHA 29 CFR 1926.62 requirements. IT Procedure HS601 further defines the respiratory protection program which details the selection, use, inspection, cleaning, maintenance, storage. and fit testing of respiratory protective equipment.

All personnel (including visitors) performing on-site activities, and using a full face negative pressure respirator must have successfully passed a quantitative respirator fit test at the time of initial fitting and at least every six months thereafter in accordance with OSHA 29 CFR 1926.62. Documentation of fit testing is the responsibility of each employer. Fit testing and any training related to respiratory protection for IT personnel will be documented on the IT Respiratory Training Completion Form.

5.2 Levels of Protection

The following is a brief description of the personal protective equipment which may be required during various phases of the project. The EPA terminology for protective equipment will be used; Levels A, B, C and D. At a minimum, four sets of appropriate personal protective equipment will be maintained at the site for USACE visitor usage.

5.2.1 Level A Protection **(Level A Protection use is not anticipated during this project.)**

Use of Level A personal protective equipment requires authorization from IT Corporate Health and Safety staff.

5.2.2 Level B Protection

Level B Protection is used when:

- A substance has been identified and requires a high level of respiratory protection but less skin protection than Level A
- Concentrations of chemicals in the air are immediately dangerous to life or health (IDLH) or above the maximum use limit of an air purifying respirator (APR) with full-face mask

- Oxygen deficient atmospheres (less than 20.0 percent) or potentially oxygen deficient atmospheres exist

- Confined space atmospheric test results require it.

Level B PPE at a minimum shall consist of:

- Surgical scrubs

- Saranex-coated tyvek coveralls with hoods and elastic wrists and ankles

- Steel-toed Neoprene boots

- Latex gloves (inner)

- Nitrile gloves (outer) or heavy butyl gloves when handling drums

- Pressure demand self-contained breathing apparatus (SCBA) or airline system with egress bottle

- Hearing protection (if necessary)

- Hard hat

- Ankles, wrists, and respirator taped with duct tape.

5.2.3 Level C Protection

Level C protection shall be used when:

- The same level of skin protection as Level B, but a lower level of respiratory protection is required

- The types of air contaminants have been identified, concentrations have been measured, and an APR is available that can remove contaminants

- The substance has adequate warning properties and all criteria for the use of an APR has been met.

Level C protective equipment at a minimum shall consist of:

- Surgical scrubs
- Steel-toed Neoprene boots

- Saranex coveralls with hoods and elastic wrists and ankles
- Latex gloves (inner)
- Nitrile gloves (outer)
- Full-face APR with organic vapor/high efficiency particulate air (HEPA) combination cartridges
- Hearing protection (if necessary)
- Hard-hat
- Duct tape openings (ankles, wrists, and respirator).

5.2.4 Modified Level C1 PPE

- Surgical scrubs
- Steel-toed neoprene boots
- Saranex coveralls with hoods and elastic wrists and ankles
- Latex gloves (inner)
- Nitrile gloves (outer)
- Full-face APR with organic vapor/high efficiency particulate air (HEPA) combination cartridges
- Splash shield
- Hearing protection (if necessary)
- Hard hat
- Duct tape openings (ankles, wrists, and respirator).

5.2.5 Level D Protection

Level D PPE shall be used when:

- The atmosphere contains no known hazard

- Work functions preclude significant splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals

- Atmospheric concentrations of contaminants are less than the TLV/permissible exposure limit (PEL).

Level D PPE at a minimum shall consist of:

- Standard work uniform or coveralls
- Steel-toed work boots
- Safety glasses
- Hearing protection (if necessary)

- Splash shield (if necessary)
- Hard-hat
- Leather palm gloves when handling materials.

Modified Level D1 PPE at a minimum shall consist of:

- Standard work uniform or coveralls
- Steel-toed neoprene boots
- Tyvek coveralls with hoods and elastic wrists and ankles
- Latex gloves (inner)
- Nitrile gloves (outer)
- Hearing protection (if necessary)
- Splash shield (if necessary)
- Hard-hat
- Safety glasses
- Duct tape openings (ankles, wrists).

Modified Level D2 PPE at a minimum shall consist of:

- Standard work uniform or coveralls
- Latex boot covers
- Steel toed work boots
- Safety glasses
- Hearing protection (if necessary)
- Nitrile gloves
- Hard hat.

5.3 Activity Specific Levels of Protection

The required level of protection is specific to the activity being conducted. The initial levels of PPE are as follows:

TASK	ACTIVITY	INITIAL LEVEL OF PPE
1.0	Mobilization	
1.1	Clearing and grubbing	D1-Modified
1.2	Work area identification	D2-Modified
1.3	Perimeter security fence erection	D
1.4	Contamination control zone delineation	D2-Modified
1.5	Equipment decontamination station set-up	D

TASK	ACTIVITY	INITIAL LEVEL OF PPE
2.0	Boring	C
3.0	Excavation	C
4.0	Low temperature thermal desorption	
	Unit Setup	D2-Modified
	Proveout	C
	Operation	C
	Materials segregation	C
5.0	Treatment of debris	C1-Modified
6.0	Water/Soil Sampling	D1-Modified
7.0	Equipment decontamination	Level C1-Modified
8.0	Site Restoration	D

As site activities progress, levels of PPE are subject to change or to modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Levels of PPE will not be downgraded without prior approval from the SHM and ATR.

5.4 Donning/Doffing PPE

All persons entering an EZ shall put on the required PPE in accordance with the requirements of this SSHP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, in order to minimize the spread of contamination.

5.4.1 Donning Procedures

These procedures are mandatory, for all personnel entering a EZ:

- Remove bulky outerwear. Remove street clothes and store in clean location.
- Put on disposable or IT issue (and laundered) work clothes or coveralls.
- Put on the required chemical protective coveralls.
- Put on chemical protective boots or boot covers.
- Tape the legs of the coveralls to the boots with duct tape.

- Put on chemical protective gloves.
- Tape the wrists of the protective coveralls to the gloves.
- Don respirator if required, and perform appropriate fit check or inspection.
- Put hood or head covering over head and respirator straps. Tape the hood to the face of the respirator.
- Don remaining PPE, such as safety glasses or goggles and hard hat.

5.4.2 Doffing Procedures

The following procedures are mandatory for all personnel exiting an EZ.

- Upon entering the CRZ, rinse contaminated material from the boots or remove contaminated boot covers.
- Clean reusable protective equipment (i.e., face shields, hard hats, etc.).
- Remove protective garments, equipment, leaving inner gloves on. All disposable clothing should be placed in plastic bags, and labeled as "contaminated waste".
- Remove respirator equipment
- Remove and dispose of inner gloves
- Wash face and neck.
- Proceed to clean area and dress in clean clothing.
- Clean and disinfect respirator with new latex gloves on and prepare for next use
- Proceed to the sign-out point.

All disposable equipment, garments, and PPE shall be bagged in a 6-mil plastic bag, and properly labeled for disposal.

6.0 Contamination Control Zones

The primary purpose for contamination control zones is to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials conditions by unauthorized persons. At the end of each workday, the entire site should be secured or guarded to prevent unauthorized entry. Site work zones will include a Support Zone, Contamination Reduction Zones, and Exclusion Zones. The SSHC will establish Contamination Control Zones for the project based on the location of contamination, accessibility, and site control. Barrier tape or fencing will be affixed in readily visible locations to delineate the EZ, CRZ and SZ.

6.1 Support Zone

The uncontaminated SZ or clean zone will be the area outside the EZ and CRZ and within the geographic perimeters of the site. The area is used for staging of materials, parking of vehicles, office facilities, sanitation facilities, and receipt of deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the EZ. All personnel arriving in the SZ will upon arrival, report to the site office and sign the site entry/exit log.

6.2 Contamination Reduction Zone

Personnel and equipment decontamination will be performed in a CRZ. All personnel entering or leaving the EZ will pass through this area in order to prevent any cross-contamination and for the purpose of accountability. Personal protective outer garments and respiratory protection will be removed in the CRZ and properly labeled. All water generated from equipment and personal decontamination will be contained on site, sampled, and disposed of using an appropriate method.

6.3 Exclusion Zone

An EZ is the area where contamination does or could occur during site activities. This zone has the highest potential for exposure to the contaminants by contact, ingestion, or inhalation. All employees will use proper PPE when working in these areas. EZ's will be defined areas where there is a possible respiratory and/or contact hazard. The location of each EZ will be identified by fencing or other appropriate means. An entry log is kept daily which records the time of entry and exit from the EZ for each person.

6.4 Emergency Entry and Exit

Contamination control zones, evacuation routes, and emergency equipment locations will be included on the map once initial site setup is complete. During an emergency the evacuation routes noted on the site map should be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, evacuate by the safest means available and decontaminate to the greatest extent possible. Additional emergency procedures can be found in Chapter 11.0.

6.5 Site Entry Requirements

In order to allow an individual into potentially contaminated areas of the site (CRZ and EZ) he/she must meet the following requirements.

- Documentation of completing training requirements as described in Chapter 9.0 (including review of this SSHP and signing off as such).
- Documentation of completing medical surveillance requirements as described in Chapter 10.0.
- Respiratory fit testing as necessary (Section 5.1).
- A hazard briefing which includes current operations at the site, hazards that exist and control measures to follow.
- Signing the site entry log.

6.6 Posting Site

Appropriate warning signs will be strategically placed where people enter the EZ and CRZ. Signs should read "DANGER-AUTHORIZED PERSONNEL ONLY, PERSONAL PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT" or similar. Signs may be more hazard specific as necessary. Additional signs will be posted at the perimeter of the site to alert passersby of potential dangers.

7.0 Decontamination

In general, everything that enters an EZ at this site must either be decontaminated or properly discarded upon exit from an EZ. All personnel must enter and exit an EZ through a CRZ. Prior to demobilization from a particular EZ, contaminated equipment will be decontaminated and inspected by the SSHC before it is moved into the SZ. This inspection shall be noted in the daily log.

The type of decontamination solution to be used is dependent on the type of contaminant. The decontamination solution anticipated for use at the Seneca Army Depot will include methanol, hexane and nitric acid if analysis of metals is warranted.

7.1 Procedures for Equipment Decontamination

Any item or vehicle taken into an EZ must be assumed to be contaminated and must be carefully inspected and/or decontaminated prior to leaving that particular EZ. A visual inspection of the frame and tires of all vehicles and equipment leaving an EZ will be completed. In order for a vehicle/equipment to pass inspection it must be in a broom-clean condition, water washed, and free of loose dirt or sludge material on tailgates, axles, wheels, etc.

An equipment decontamination area will be established in the CRZ. This area will be utilized to remove soil from all equipment leaving the work area. Decontamination procedures will consist of washing equipment to remove mud and/or dirt. A special "clean area" will be utilized by personnel who must come in contact with equipment during vehicle maintenance and repair. All equipment requiring maintenance or repair will be staged in a CRZ prior to servicing.

Equipment wash water residues will be contained on site, sampled, and disposed of in an appropriate manner.

Personnel assigned to vehicle decontamination will wear the protective equipment, clothing, and respiratory protection consistent with this SSHP. Seats and flooring in equipment and vehicles that are to be used in the EZ will be covered to the greatest extent possible with disposable polyethylene.

7.2 Procedures for Personnel Decontamination

These decontamination procedures apply to all personnel exiting an EZ. A field shower trailer will be established at each site for personnel decontamination. These are the minimum acceptable requirements:

- *Station 1: Equipment Drop*
  Deposit equipment used on site (tools, sampling devices and monitoring instruments, radios, etc.) on plastic drop cloths. These items must be decontaminated or discarded as waste prior to removal from an EZ.

- *Station 2: Outer Boot and Glove Removal*
  Remove outer boots and then gloves. If outer boots and gloves are disposable, deposit in container with plastic liner. If nondisposable, store in a clean dry place after cleaning.

- *Station 3: Outer Garment Removal*
  Remove hard hat and coveralls. Deposit disposable coveralls in a container lined with plastic. Decontaminate or dispose of splash suits as necessary. Wipe clean and store hard hat.

- *Station 4: Respiratory Protection Removal*
  Remove respirator face piece. APR cartridges will be discarded when breakthrough occurs or once per shift. Wash and rinse respirator after each use. Wipe off and store respirator in a clean, dry location.

- *Station 5: Inner Glove Removal*
  Remove inner gloves and deposit in container for disposal.

- *Station 6: Field Wash*
  Thoroughly shower at the end of each shift.

8.0 Exposure Monitoring/Air Sampling Program

According to 29 CFR 1926.65(h) Air Monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on site. The following sections apply unless the SHM deems that monitoring for a specific activity may be discontinued or omitted.

8.1 Routine Air Monitoring Requirements

- Upon initial entry to rule out IDLH conditions
- When the possibility of an IDLH condition or flammable/explosive atmosphere has developed
- When work begins on a different portion of the site
- Contaminants other than those previously identified are being handled
- A different type of operation is initiated
- During confined space work
- When respiratory protection is being used.

8.2 Site Specific Air Monitoring/Sampling Requirements

Measurements of airborne VOCs will be conducted in the work area by using an HNu photoionization analyzer with an 11.7 eV lamp. VOCs will be monitored in the breathing zones of employees.

Measurements of oxygen and combustible gases will be made using a combination oxygen/combustible gas monitor.

Real-time air monitoring will be performed for total airborne particulates using a Miniram aerosol monitor. Air monitoring results will be used to determine the effectiveness and/or need for dust control methods and to trigger action levels as specified in Table 8-1. The frequency and location of air monitoring activities can be found in Table 8-2.

An initial screening for ionizing radiation using a radiation survey meter will be performed during work area identification. Detection of activity above background will initiate a stoppage of work until the SHM is consulted.

Personnel air samples for lead will be conducted to potentially exposed IT personnel. Personnel samples will be taken whenever there has been a change of equipment, process, control, personnel or a new task has been initiated.

All lead air samples will be collected in accordance with NIOSH Method 7300.

All air monitoring equipment will be maintained and calibrated according to the manufacturer's recommendations. Calibration will be done before and after use each day and under the approximate environmental conditions the instrument will be used. All air monitoring activities will be documented on the equipment calibration log.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSHC shall be responsible for immediately removing the instrument from service and obtaining a replacement unit. The specific IT or subcontractor operation for which this equipment is essential shall cease until an appropriate replacement unit is obtained. The SSHC will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

When applicable, only manufacturer-trained and/or authorized IT personnel will be allowed to perform instrument repairs or preventive maintenance.

8.3 Perimeter Air Monitoring

All perimeter air monitoring will be done according to IT's Air Monitoring Plan which can be found in the Work Plan.

8.4 Other Hazardous Conditions

The SSHC will take affirmative action to limit exposures. If unknown chemicals or contamination is encountered, operations will cease until the situation is evaluated. The SSHC will contact the SHM to evaluate any potentially hazardous situations, or any situation with elevated contamination levels. Operations will only be resumed if they can be accomplished in a safe manner.

8.5 Record Keeping

The SSHC or his designee will be responsible for establishing and maintaining records of all required monitoring as described below:

- Date, time, location, pertinent task, and exposure information
- Description of the analytical methods, equipment used, calibration data
- Type of PPE worn
- Engineering controls used to reduce exposure
- Sampling location
- Work operations taking place during monitoring
- Meteorological data
- Signature of analyst/sample collector.

9.0 Training Requirements

9.1 General Training

The SSHC or a designated representative will be responsible for informing all personnel performing on-site activities an all visitors of the contents of this SSHP and ensuring that each person signs the SSHP Acknowledgement Form. By signing this form, individuals recognize the hazards present on site and the policies and procedures required to minimize exposure to hazards or adverse effects caused by hazards. Documentation of certification of training requirements will be reviewed by the SSHC, provided to the SS, and filed on site.

9.2 Hazardous Waste Operations Training

IT trains all field personnel according to 29 CFR 1926.65 before their initial assignment to any project. The following criteria is used to determine the level of training for IT employees, visitors, and subcontractors engaged in site activities.

- Personnel engaged in hazardous substance removal or other activities which expose or potentially expose them to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off site, and 3 days of supervised field experience.

- Personnel who perform limited activities at the site and are not potentially exposed to contaminate levels above the PEL shall receive a minimum of 24 hours of instruction off site, and 1 day of supervised field experience.

9.2.1 40-Hour Training

The following is a general list of topics covered in the 40-hour course:

- General site safety
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Key management positions responsible for site safety and health
- Safety, health and other hazards
- Use of PPE

- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards
- Worker Right-to-Know (Hazard Communication)
- Engineering controls and safe work practices
- Components of the site safety and health program
- Decontamination practices for personnel and equipment
- Confined space entry procedures
- Emergency Response Procedures.

9.2.2 24-Hour Training

The same topics presented in the 40-hour course are reviewed in the 24-hour course with less time spent on each topic.

9.2.3 Supervisor Training

Site supervisory personnel shall receive eight additional hours of specialized training on program supervision. The following topics are discussed:

- Overall safety and health program
- Personal protection equipment program
- Spill containment program
- Air monitoring techniques.

9.2.4 Refresher Training

Personnel covered by Sections 9.1.1 and 9.1.2 are required to complete 8 hours of refresher training annually on the following topics:

- Safe work practices
- Chemical hazard awareness
- Hearing conservation

- Hazard communication
- Respirator refresher
- Confined space entry procedures update.

9.2.5 Supervised Field Experience

Personnel covered by Section 9.2.1 will receive a minimum of 3 days actual field experience under the direct supervision of a trained, experienced supervisor. A minimum of 1 day is required for personnel who fall under the requirements of 9.2.2. This supervised field experience will be documented on the IT On-the-Job Training Record.

9.2.6 Exempt Personnel

Site access by personnel making deliveries or performing repairs to utilities, public or government officials, visitors, or local residents will be limited to support areas only. These persons will not be required to comply with the medical and training requirements as previously defined. SZ access will be limited to designated work, delivery, or observation areas to minimize any potential exposure to site contaminants. Site observation areas will be located upwind from predominant wind directions, and access to observations areas may be restricted by weather conditions or site activities. Authorization for limited site access will be determined on a case-by-case basis by the SSHC in consultation with the SHM and PM. Site access for such personnel will be limited to areas with no potential for exposure during routine operations. Exempt personnel will be escorted on site and will be strictly prohibited from entering the CRZ or EZ.

9.3 Tailgate Safety Meetings

The SSHC conducts a tailgate safety meeting the beginning of each shift or whenever new employees arrive at the job site once the job commences. The topics discussed at the tailgate safety meeting include safety and health considerations for the day's activities, necessary protective equipment, problems encountered and new operations. Attendance records and meeting notes are maintained with the project files.

9.4 Site Specific Training

IT provides site specific training for all personnel assigned to projects falling within the scope and application of 29 CFR 1926.65. The content of the training will be derived from information contained within this SSHP. All workers must also read and sign the SSHP acknowledging acceptance of site rules and understanding of site hazards before being permitted to enter an EZ. Emergency procedures contained within Chapter 11.0 will be rehearsed during this training.

9.5 Lead Exposure Training

IT will provide lead exposure site-specific training for all personnel in accordance with 29 CFR 1926.62. The content of the training will include:

- The content of the standard and appendices
- The specific nature of the operations which could result in exposure to lead above the action level
- The purpose and description of the medical surveillance program.

9.6 Hazard Communication

All personnel performing field activities shall receive hazardous communication training. IT personnel have received basic hazard communication training which involves a review of the IT written hazard communication program, Material Safety Data Sheets (MSDS), container labeling, and chemical health hazards. Personnel shall be trained on the hazards of chemicals on site by reviewing Section 3.2.

9.7 First Aid and CPR

At least two persons trained in a minimum of both American Red Cross first-aid techniques and CPR will be on site whenever activities occur. Refresher training in CPR is required annually and every 3 years for first aid. These two employees will meet both the training and vaccination requirement of IT's Bloodborne Pathogen Exposure Control Plan.

10.0 Medical Surveillance

IT will utilize the services of a Board-Certified Occupational Medicine physician for the medical surveillance requirements of this project. Dr. David Barnes (below) will review all medical examinations and will be available for medical consultation on an "as-needed" basis.

Dr. David Barnes
4360 Chamblee Dunwoody Road, Suite 207
Atlanta, Georgia 30341
(404) 455-0818 and (800) 229-3674

10.1 Medical Examination

As required by IT Policy and Procedure HS100 all personnel on site working within a CRZ or EZ will have successfully completed a preplacement or periodic/updated physical examination. The contents of this examination has been determined by Dr. David Barnes.

10.1.1 Preplacement Exam

This examination has been designed to meet 29 CFR 1926.65 requirements for hazardous waste site operations.

The IT medical surveillance program examination at a minimum consists of:

- Medical and occupational history questionnaire which includes information on past gastrointestinal, hematologic, renal cardiovascular, reproductive, immunological and neurologic problems.
- Physical examination.
- Blood pressure measurements.
- Complete blood count (CBC) and differential to include hemoglobin and hematocrit determinations, red cell indices, and smear of peripheral morphology.
- Blood urea nitrogen and serum creatinine.
- Sequential Multiple Analyzer Computer (SMAC) 24
- Pulmonary function test.

- Audiogram.

- EKG for employees over 35 years old or when other complications indicate the necessity.

- Drug and alcohol screening.

- Visual acuity.

All site workers participating in the medical surveillance program per 29 CFR 1926.65 will also take part in biological monitoring. The biological monitoring will include blood sampling and analysis for lead and zinc protoporphyrin levels. 29 CFR 1926.62 requires that all employees who are or may be exposed to at or above the 30 $\mu g/m^3$ action level for lead for more than 30 days in any consecutive 12 month period to participate in this biological monitoring. At a minimum pre- and post-project monitoring will be required for all affected employees. Dependent upon integrated air sampling results and the guidance provided in 29 CFR 1926.62, additional biological monitoring may be required.

The following information is, or has been, provided to the examining physician:

- Copy of 29 CFR 1926.65 and Appendices
- Description of employee's duties
- Anticipated chemical exposure and levels
- Description of the PPE to be used
- Information from previous medical exams.

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory equipment. Any employee found to have a medical condition which could directly or indirectly be aggravated by exposure to these chemical substances or by the use of respiratory equipment will not be employed for the project. A copy of the medical examination is provided at the employee's request.

The employee will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites.

10.1.2 Annual Exam

All IT employees receive an annual update exam meeting the requirements of 29 CFR 1926.65. The results of these exams are compared to previous results and the baseline physical to determine if any effects due to exposure have occurred. Appropriate actions are taken as recommended by the physician should the results indicate an exposure; otherwise, employees are cleared for continued work.

10.1.3 Exit Exam

IT offers exit physical exams for all employees involved in the medical surveillance program who are leaving the company for any reason to ensure they are in good health.

10.2 Subcontractor Requirements

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician on the Subcontractor Certification Form (Appendix I). The physical examinations will meet the requirements of 29 CFR 1926.65 and 29 CFR 1910.134 Respiratory Protection. Subcontractors will also supply copies of the medical examination certificate for each employee they have on site.

10.3 Medical Records

Medical and personal exposure monitoring records will be maintained according to the requirements of 29 CFR 1926.65 and will be kept for a minimum of 30 years. Confidentiality of employee medical records will be maintained. The written medical opinion from the occupational physician will be made available upon request to the ATR for any site worker.

10.4 Medical Restrictions

When a medical care provider identifies a need to restrict work activity, the employee's home office will communicate the restriction to the employee, the SS, SSHC, and the SHM. The terms of the restriction will be discussed with the employee and the SS. Every attempt will be made to keep the employee working, while not violating the terms of the medical restriction.

11.0 Emergency Response Plan and Contingency Procedures

Site personnel must be prepared to respond and act quickly in the event of an emergency or accidental contaminant release. Emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment. Preplanning measures will include employee training, fire and explosion prevention and protection, chemical spill and discharge prevention and protection, and safe work practices to avoid personal injury or exposure.

11.1 Personnel Roles/Lines of Authority

The roles and responsibilities of IT personnel for response to emergencies will be clearly defined and coordinated with IT subcontractors, USACE project personnel, and emergency response teams. The responsibilities of specific project individuals and the coordination of outside emergency services are defined as follows:

Site Supervisor/Emergency Coordinator. At all times during scheduled work activities, a designated Emergency Coordinator shall be present on site. This responsibility will be assigned to the SS for this project. This individual will be responsible for implementing these procedures. In most emergency situations, the Emergency Coordinator will be directly responsible for determining appropriate response actions. Depending upon the circumstances and time permitting, the Emergency Coordinator will review proposed response actions with the PM, the SSHC, and the ATR. Specific responsibilities for the Emergency Coordinator include:

- Evaluating and assessing emergency incidents or situations
- Assigning personnel and coordinating response activities on site
- Assuring that field personnel are aware of the potential hazards associated with the site
- Summoning appropriate emergency response teams
- Notifying the PM or, in his absence, the Program Manager of an emergency situation
- Coordinating response to an incident with the ATR
- Assuring that all emergency equipment is routinely inspected and functional

- Working with the SSHC regarding the correction of any work practices or conditions that may result in injury to personnel or exposure to hazardous substances

- Assuring that appropriate emergency response agencies are aware of the provisions made herein

- Evaluating the safety of site personnel in the event of an emergency, and providing evacuation coordination if necessary

- Maintaining site facilities and assisting site personnel in accessing those facilities.

The SS will direct all emergency response activities conducted or managed by IT. In addition to his responsibilities as Emergency Coordinator, the SS is responsible for field implementation and enforcement of health and safety policies and procedures as contained in this SSHP. The SS will be fully trained in health and safety procedures and maintain current certification in standard first aid and CPR. Other responsibilities include overall supervision and management of field activities.

Site Safety and Health Coordinator. The SSHC is responsible for implementing, communicating, and enforcing safety and health policies and procedures during the course of the project. The SSHC will review the fitness and training records of all field personnel for compliance with the established requirements and will assist in arranging proper training and medical examinations. He will also assist in evaluating safety and health concerns with respect to environmental releases and emergency response actions.

Project Manager. The PM will provide support to emergency responders and dedicate appropriate project resources to the response effort. If required, the PM will mobilize additional personnel and equipment to the site. The PM will notify and provide the ATR with recommendations concerning any additional action(s) to be taken.

Army Technical Representative. The ATR will provide field oversight in the event of a spill or discharge. The ATR will also be responsible for contacting and notifying pertinent regulatory agencies concerning emergencies at the site and potential releases.

11.2 List of Emergency Contacts and Notification

The designated Emergency Coordinator and SSHC will be notified immediately in the event of an emergency. The Emergency Coordinator will immediately evaluate the incident and, if necessary, notify the applicable emergency support services. If not previously notified, the PM and the SSHC will be advised of the situation. The SSHC or the Emergency Coordinator will notify the ATR. The ATR will notify other personnel as necessary. Telephone numbers for emergency contact personnel are listed in Table 11.1. The list will be maintained with current contacts, and telephone numbers will be posted along with other emergency phone numbers at all telephone locations at the site.

The information provided to the notified person should include the nature of the incident and the exact location and suspected contaminants or material involved. Information regarding the incident that should be reported to the emergency contacts includes the following:

- Name and telephone number of the individual reporting the incident
- Location and type of incident
- Nature of the incident (fire, explosion, spill, or release) and substances involved
- Number and nature of medical injuries
- Movement or direction of spill/vapor/smoke
- Response actions currently in progress
- Estimate of quantity of any released materials
- Status of incident
- Other pertinent information.

11.3 Hospital Transportation

In the event of physical or chemical injury, the local emergency services shall be summoned for emergency medical treatment and ambulance service. The hospital facility designated for this project is the Geneva General Hospital.

Hospital transportation routes and maps shall be posted in the project area and in each site vehicle.

11.4 Personal Exposure or Injury

Every precaution will be taken to aid in the prevention of injuries and/or exposure to contaminants. These precautions are detailed in this SSHP and generally consist of the following measures:

- Personnel will be properly trained for their work duties.

- Site personnel will wear appropriate PPE for each specific task or work assignment.

- Site personnel will follow the proper field safety protocols as defined.

- Site controls will be enforced so that only authorized personnel are able to access the work zones.

- Site personnel will be made aware of potential environmental and chemical hazards.

- Real-time air monitoring will be performed to evaluate the effectiveness of engineering controls and levels of personal protection.

- Proper decontamination procedures will be followed for personnel and equipment.

Pertinent information concerning site safety will be discussed daily with site personnel during tailgate safety meetings.

In the event of personal exposure to contaminants, the following general guidelines will be adhered to:

- Contact/Absorption: Copious amounts of distilled or tap water will be used to flush, for at least 20 minutes, contaminants from the skin. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. The condition of the individual will be assessed and transport to a medical center arranged if necessary. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.

- Inhalation: The victim will be moved immediately to an area providing fresh air. Decontamination of the victim and artificial respiration will be provided if necessary. The condition of the individual will be assessed and transport to a medical center arranged if necessary.

- Ingestion: Immediately contact local poison control center. The victim will be decontaminated, if necessary, and transported to a medical facility.

11.5 Fire Control

In the event of a fire or explosion, or imminent danger of fire or explosion, all activities shall halt, and the local emergency services shall be notified immediately. If it is safe to do so, site personnel may use fire-fighting equipment available on site to remove and isolate flammable or other hazardous materials which may contribute to the fire.

If the fire department has been summoned, upon their arrival, the Emergency Coordinator will advise the fire chief of the location, nature, and identification of the hazardous materials on site.

The following measures will be implemented during site field activities to minimize the risk of fire and/or explosion:

- Smoking is permitted on site only in the designated break areas.

- Waste containers will be used to prevent accumulation of rubbish and trash.

- Materials storage methods will be in accordance with manufacturers' recommendations.

- Flammable liquids will be stored in approved containers and cabinets only.

- All storage, handling, or use of flammable and combustible materials shall be conducted by trained personnel.

- Entry and exit pathways shall be kept clear of debris or obstacles.

- Work areas will be cleared of excess vegetation and obstructions.

11.6 Spills or Leaks

IT will maintain the following equipment and materials on site for use during spill response activities:

- Absorbent pillows, and/or pads
- Granular absorbent material (noncombustible)
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools.

If a hazardous waste spill or material release to the air, soil, or water at the site is observed, IT will immediately notify the ATR. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled and/or affected materials as follows:

- The spill or release area will be approached cautiously. Real-time air monitoring will be continuously performed in the spill vicinity.

- Hazards will be identified based on available information from witnesses or material identification documents (placards, MSDSs, logs). The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for response.

- If necessary, the release area will be evacuated, isolated, and secured.

- If possible, spill containment will initially be made without entering the immediate hazard area.

- Entry to the release area will be made with the PPE, personnel, methods, and equipment necessary to perform the work. Hazardous spill containment and collection will be performed in four steps as follows:

  - Contain the spill with absorbent socks, granules, or construction of temporary dikes.

  - Control the spill at the source by plugging leaks, uprighting containers, overpacking containers, or transferring contents of a leaking container.

  - Collect the spilled material with shovels or heavy equipment as necessary.

  - Store the spilled material for further treatment or disposal. Treatment and/or disposal options of the material will depend on the amount and type of material.

If site personnel cannot safely and sufficiently respond to an environmental release, evacuation of the area may be warranted. The decision to evacuate will depend upon the risk of exposure to SZ personnel and the severity of the release.

11.7 Site Evacuation Procedures

The authority to order personnel to evacuate the area rests with project management and health and safety personnel. In the event that site evacuation is required, a continuous, uninterrupted air horn will be sounded for approximately 1 minute. Air horns will be located in the work areas and SZs. Radio communication will also be used to alert site workers and provide special instructions.

Personnel working in the EZ or CRZ will immediately make their way to the predetermined rally point for a "head count." Depending on the severity of the event and allowable time, personnel exiting the EZ and CRZ may be instructed to forgo or modify decontamination procedures.

Personnel in the SZ will immediately report to the predetermined rally point for a "head count" and further instructions. The Emergency Coordinator and the SSHC will remain in constant radio contact to ensure that evacuation procedures are properly executed.

Situations requiring evacuation may include unusually severe weather conditions, fires, or significant chemical spills or releases. In the event of project evacuation, the ATR will be notified immediately.

11.8 Emergency Decontamination Procedures

Treatment of illnesses or injuries to personnel working within the contaminated areas of the site may be more difficult because of protective clothing requirements and the potential for exposure to the contaminants. The SSHC or Emergency Medical Care Provider must quickly assess the extent of the injury or illness of the victim. A determination will be made if lifesaving medical treatment is critical and if personal decontamination procedures will create additional injuries or aggravate the existing condition. Life threatening injuries must receive immediate medical attention. Decontamination procedures may be modified, simplified, or eliminated completely under such circumstances.

The following guidelines are established for responding to minor emergencies where an individual may have been injured or overcome by exposure to a hazardous substance. If a truly serious injury exists, only portions of these guidelines may be appropriate to ensure prompt medical treatment.

- Notify supervisory and safety personnel, and verify that the area is safe to remain.
- Select an emergency decontamination location upwind and/or uphill from any spills, and determine most effective pathway to emergency vehicles.
- Field decontamination should be performed in two stages: washing with soapy water followed by a clear water rinse.

- Upon arrival at the injured party, stabilize any life threatening problems such as spills or fires, and remove (i.e., brush or blot with absorbency pads) visible, gross contamination. If possible, prevent coming in contact with any contamination present at the scene. However, do not delay with this task, and be prepared to transport immediately to the decontamination area.

- Have support personnel perform real-time air monitoring.

- Determine type, nature, and extent of exposure or injury based on mechanism.

- Quickly cut or tear first layer of protective clothing (outer suit) off of the injured party and discard. If cutting, always cut away from the body toward the extremities to avoid inflicting further injury. To prevent unnecessary contamination to any injury or the individual, do not remove boots or gloves.

- Without delay, efficiently move the injured away from the accident scene, possible contamination, or any hazardous substances. Relocate to a nearby "clean" area to expedite removal of respiratory protection and establish communication.

- If the individual is unconscious, evaluate if an adequate airway exists and breathing and circulation are present (ABCs). If absent, commence rescue breathing or CPR without delay.

- Move the injured to the decontamination area and transfer responsibilities to support personnel.

- Using soapy solution, support personnel should carefully wash outer garments as needed and rinse.

- Spray outer protective clothing with clear water.

- Quickly remove tape from the injured's wrists and ankles—assume the individual is injured until an assessment indicates otherwise.

- Carefully, but quickly, cut second layer of protective clothing (inner suit, boots, and gloves) off injured party. Always cut away from the body toward the extremities to avoid inflicting further injury.

- Be prepared to turn emergency care over to EMS personnel. Otherwise, administer appropriate standard first aid to injuries.

- Following stabilization of any injuries, monitor and be on the alert for shock, wrap the injured in a warm blanket or other items to conserve body heat, and be prepared for vomiting.

- Cover any contact surfaces of transport equipment with a protective sheet or plastic.

- Inform all arriving personnel and transport crew of nature and extent of injuries and any potential hazards present.

11.9 Adverse Weather Conditions/Natural Disasters

Adverse weather can take many forms. Thunder and lightning storms, snow storms, hail, freezing rain, and tornados are a few examples. Sudden changes in the weather, extreme weather conditions, and natural disasters can create a number of subsequent hazards. Generally, poor working conditions arise, and slip, trip and fall hazards exist. Natural disasters can create many secondary hazards such as release of hazardous materials to the environment, structure failure and fires.

Routinely monitoring weather conditions and reports may help reduce the impact of severe weather and natural disasters. It may be necessary to halt certain hazardous operations or stop work altogether to allow the situation to pass. The SSHC or his designate must decide what operations, if any, are safe to perform based on existing conditions and anticipated conditions.

The best protection against most severe weather episodes and natural disasters is to avoid them. This means seeking shelter before the storm hits. Sufficient shelter should be identified on site just prior to beginning operations. Stay away from pipes and electrical equipment should lightning be a threat and watch for damage caused by lightning strikes nearby.

11.10 Critique and Follow-Up of Emergency Procedures

The ATR shall be verbally notified immediately and receive a written notification within 24 hours of all accidents or incidents including releases of toxic chemicals, fires, or explosions. The report shall include the following items:

- Name, organization, telephone number, and location of the Contractor

- Name and title of the person(s) reporting

- Date and time of accident/incident

- Location of accident/incident (i.e., site location, facility name)

- Brief summary of accident/incident including pertinent details such as type of operation ongoing at time of accident

- Cause of accident/incident, if known

- Casualties (fatalities, disabling injuries)

- Details of any existing chemical hazard or contamination

- Estimated property damage, if applicable

- Nature of damage, effect on contract schedule

- Action taken by Contractor to ensure safety and security

- Other damage or injuries sustained (public or private).

The SS and the SSHC will investigate the cause of the spill or discharge to prevent its reoccurrence. The investigation should begin as soon as practical after the incident is under control but not later than the first work day after the incident. Investigations will follow the procedures described below:

- Interview witnesses and participants as soon as possible or practical.

- Determine the chronological sequence of events (opinions as to cause should not be solicited at this time).

- Note the location, movement, displacement, liquid levels, sounds, noises, or other sensory perceptions experienced by the participants or witnesses.

- Obtain weather data.

- Ascertain the location and position of all switches, controls, etc.

- Verify the condition of all safeguards.

After the facts have been collected, causal factors should be identified. Two causal factors typically exist, apparent and contributing; and there may be several of each. Apparent factors are those which are self-evident or readily deduced. Contributing factors usually become apparent by questioning why the apparent causal factor was allowed to exist.

12.0 Record Keeping and Data Management

Proper record keeping and data management are essential in the implementation of this SSHP. The forms associated with the record keeping and data management requirements must be completed in an accurate, timely fashion and filed with the appropriate entities. It is the responsibility of the SS to ensure that the forms are properly completed. Completed forms will be kept and maintained by IT. These records shall be maintained for a 5-year period. Subcontractors will also be responsible for keeping a copy of the forms pertaining to their personnel. All site forms and logs have been provided in Attachment G.

12.1 Logs

The SSHC will maintain and complete a daily log for each day's work. The daily log will document chronologically each day's safety and health activities in sufficient detail for future reference as needed. Other relevant data and field information will be recorded on separate log forms for air monitoring, sampling, equipment calibration inspections, and incident reporting.

An EZ sign-in log will be maintained that will provide a project record of the following information for each work shift's activities:

- Worker's name
- Work area
- Duties performed
- Level of protection
- Time in/time out.

All personnel will be required to log in and out of the EZ.

A visitors sign-in log will be maintained in the project office and administration area. Visitors requesting access to hazardous field activities must have appropriate project approval, be medically qualified, and have the health and safety training prerequisites for hazardous waste operations.

12.2 Safety Inspections

IT's accident prevention is centered around the following key procedures:

- Project reporting, investigation, and review of all near misses, incidents, and accidents
- Management reviews of all incident/accident reports, corrective action, and project safety concerns
- Review of project, operations, and construction activities by safety and health professionals.

Safety reviews and inspections are conducted by all tiers of the management structure and are documented. A list of all corrective action items is required to be maintained showing the corrective action, responsible person, and the date action is to be completed. Follow-up inspections are conducted by safety and health personnel to ensure that corrective actions or measures have been implemented.

The SS or PM will inspect the site weekly and interview one or two site workers regarding areas of safety concerns or ideas for safety improvement. Site supervisory personnel will inspect site conditions and activities daily to identify changing conditions or potential hazards. Identified safety and occupational health deficiencies and suggested corrective measures will be brought to the attention of the SSHC. Safety review inspections will be recorded and filed for reference by project management and client personnel.

12.3 Accident Reporting and Investigation

All project personnel are required to report all near misses, injuries, illnesses, and accidents to their immediate supervisor. The SSHC shall immediately arrange appropriate medical care as required. Once immediate medical care for the injured personnel has been accomplished, the SSHC shall complete and submit the appropriate report forms within 24 hours. The appropriate form(s) to be completed may include:

- IT Supervisors Employee Injury Report
- IT Vehicle Accident Report
- IT General Liability, Property Damage, and Loss Report.

Copies of these forms are in Attachment G of this SSHP.

Identified safety and occupational health deficiencies and corrective measures shall be documented and filed on site for reference by the ATR or designated representative.

All near misses, injuries, illnesses, and accidents shall be investigated by on-site management personnel. The SS, PM, and SSHC will investigate the conditions which led to the accident. They will document how the accident occurred and identify unsafe acts or conditions that occurred or existed at the time of the accident. Corrective actions will be determined and implemented to prevent recurrence of the accident, and responsibility for implementation of corrective actions will be assigned. The investigation shall be started immediately, and all information shall be collected as soon as possible after the occurrence. The final report and required forms will be submitted to the ATR and other appropriate personnel.

12.4 Phase-Out Report

A phase-out report will be prepared by the SSHC and/or SHM. This report shall include a summary of work activities, health and safety activities, and field changes; and copies of medical clearance forms, air monitoring and calibration logs, analytical reports, and custody records. The report will be reviewed and signed by both the SHM and SSHC and will be submitted to the ATR.

TABLES

Table 3-1
Exposure Guidelines

Contaminants	OSHA PEL	ACGIH TWA
Lead	0.05 mg/m^3	0.15 mg/m^3
Trichloroethene	50 ppm	50 ppm
1,2-Dichloroethylene	200 ppm	200 ppm
Xylenes	100 ppm	100 ppm

Table 4-1
Minimum Clearance from Energized Overhead Electric Lines

Nominal System Voltage	Minimum Required Clearance
0-50 kV	10 feet
51-100 Kv	12 feet
101-200 kV	15 feet
201-300 kV	20 feet
301-500 kV	25 feet
501-750 kV	35 feet
751-1000 kV	45 feet

Table 4-2

Cold Weather Work/Warm-Up Regimen[a]

Air Temperature - Clear Sky	Wind Speed: Not Noticeable		5 mph		10 mph		15 mph		20 mph	
	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks
-15°F to -19°F	normal breaks	1	normal breaks	1	75 min.	2	55 min.	3	40 min.	4
-20°F to -24°F	normal breaks	1	75 min.	2	55 min.	3	40 min.	4	30 min.	5
-25°F to -29°F	75 min.	2	55 min.	3	40 min.	4	30 min.	5	nonemergency work should cease	
-30°F to -34°F	55 min.	3	40 min.	4	30 min.	5	nonemergency work should cease			
-35°F to -39°F	40 min.	4	30 min.	5	nonemergency work should cease					
-40°F to -44°F	30 min.	5	nonemergency work should cease							
-45°F and below	nonemergency work should cease									

[a]This table applies to moderate to heavy work activities with warm-up breaks, in a warm location, of 10 minutes. For light to moderate work, use the table entry which is one temperature range warmer than the actual temperature range.

Table 4-3
Flying Insects

Organism	Description	Habitat	Problem	Severity	Protection
Hornet	One inch long with some body hair. Abdomen is mostly black.	Round, paperlike nest hanging from trees, shrubs, or under eaves of buildings.	One nest may contain up to 100,000 hornets which will attack in force at the slightest provocation.	Severe pain, allergic reactions similar to bees.	Do not come near or disturb nest. If a hornet investigates you, do not move.
Mosquito	Small, dark, fragile body with transparent wings. From 1/8 to 1/4 inch long.	Where water is available for breeding.	Bites and sucks blood. Itching and swelling result.	Can transmit encephalitis and other diseases. Scratching causes secondary infections.	Use plenty of insect repellant and wear gloves. Stay in windy areas.
Wasp	Very thin waist. Color can be black, yellow or orange with stripes.	Underground nest. Paper-like honeycomb nest in abandoned buildings hollow trees, etc.	Stings. Some species will attack if you get too close to the nest.	Severe pain, allergic reactions similar to bees. Can be fatal.	Avoid Nest. Do not swat at them.
Bee	Generally has yellow and black stripes and two pair of wings.	Hollow logs, underground nest, old buildings,	Stings when annoyed. Leaves venom sac in victim.	If person is allergic, nausea, shock, constriction of the airway can result. Death may result.	Be careful and watch where you walk. Cover exposed skin. Avoid areas where bees are swarming. Avoid wearing sweet fragrances and bright clothing. Move slowly or stand still when bees are swarming about you.

Table 8-1
Action Levels

When in Level B PPE

Analyte	Action Level	Required Action
Dust	≥ 5 mg/m³	Stop work*/initiate dust suppression
Unknown VOC's	≥ 1000 ppm above background in breathing zone (BZ)	Stop work*
0_2	≥ 23% or ≤20%	Stop work*
LEL	≥ 10% of LEL	Stop work*

When in Level C Modified/C PPE

Analyte	Action Level	Required Action
Unknown VOC's	≥ 125 ppm above background in BZ	Level B PPE
0_2	≥ 23% or ≤20%	Stop work*
LEL	≥ 10% of LEL	Stop work*

When in Level D Modified/D PPE

Analyte	Action Level	Required Action
Dust	≥ 5 mg/m³	Level C PPE/Initiate dust suppression
Unknown VOC's	≥ 5 ppm above background in BZ	Level C PPE
O_2	≥ 23% or ≤ 20%	Stop work*
LEL	≥ 10% of LEL	Stop work*

When in Support Zone

Analyte	Action Level	Required Action
Unknown VOC's	≥ 1 ppm above background in BZ	Evacuate support zone and re-establish perimeter of EZ.

*Contact with the SHM must be made prior to continuance of work. The SHM may then initiate perimeter/integrated air sampling along with additional engineering controls.

Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

No one is permitted to downgrade levels of PPE without authorization from the SHM.

Table 8-2
Air Monitoring Frequency and Location

WORK ACTIVITY	INSTRUMENT	FREQUENCY	LOCATION
Clearing and Grubbing	O_2/LEL HNu Miniram	N/A Periodically Continuously	N/A BZ of Employees Perimeter of Work Area
Temporary Site Access Road Construction	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Field Office Establishment	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A
Work Area Identification	O_2/LEL HNu Miniram	N/A Periodically Continuously	N/A BZ of Employees Perimeter of Work Area
Perimeter Security Fence Erection	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A
Contamination Control Zone Delineation	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Personnel Decontamination Facility Establishment	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A
Equipment Decontamination Pad, Drum Handling Area, and Roll-Off Container Storage Area Construction	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Field Subsurface Survey	O_2/LEL HNu Miniram	N/A Periodically Continuously	N/A BZ of Employees Perimeter of Work Area
Excavation of Contaminated Materials	O_2/LEL HNu Miniram	Periodically Continuously Continuously	Surface Level BZ of Employees Perimeter of Work Area
LTTD	O_2/LEL HNu Miniram	N/A Periodically Continuously	N/A BZ of Employees Perimeter of Work Area
Hydroblasting of Debris	O_2/LEL HNu Miniram Radiation	N/A Periodically Continuously N/A	N/A BZ of Employees Perimeter of Work Area N/A
Soil Sampling	O_2/LEL HNu Miniram	Periodically Periodically Continuously	Surface Level BZ of Employees Perimeter of Work Area

Table 8-2
(Continued)

WORK ACTIVITY	INSTRUMENT	FREQUENCY	LOCATION
Equipment Decontamination	O_2/LEL HNu Miniram	N/A Periodically Continuously	N/A BZ of Employees Work Area
Site Restoration	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A
Backfill Material	O_2/LEL HNu Miniram	Periodically Periodically Continuously	Surface of Excavation BZ of Employees Perimeter of Work Area
Backfill Material Placement and Compaction	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Common Fill Placement	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Topsoil Placement and Final Grading	O_2/LEL HNu Miniram	N/A N/A Continuously	N/A N/A Perimeter of Work Area
Revegetation	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A

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Table 11-1
Emergency Phone Numbers

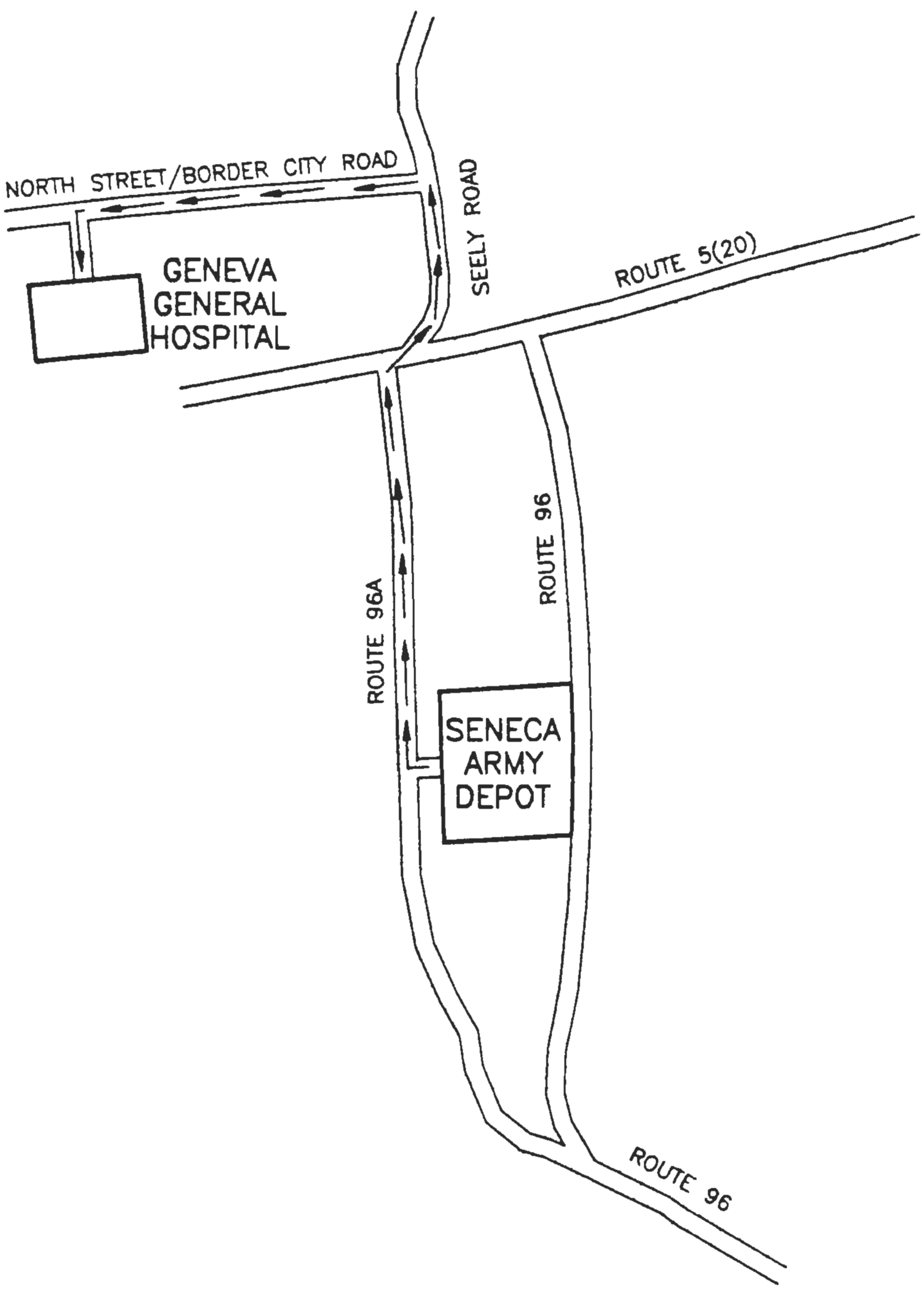
Seneca Sheriff Department	(315) 539-9241
Seneca Fire Department	(315) 539-9241
Geneva Fire Department	(315) 787-4000
Geneva General Hospital	(315) 787-4000
Poison Control Center	(800) 282-3171
National Response Center	(800) 424-8802
Chemtrec	(800) 424-9555
Project SHM - Warren Houseman	
Day	(412) 372-7701
Evenings	(412) 744-3489
Project Manager	(412) 372-7701

ATTACHMENT A

SSHP AMENDMENTS

ATTACHMENT B

SITE AND HOSPITAL LOCATION MAPS



DRAWN BY R. WEIBLE 28 JULY 94
CHECKED BY
APPROVED BY
DRAWING NUMBER 519070-A1

DIRECTIONS TO GENEVA GENERAL HOSPITAL
196 NORTH STREET (315)787-4000

- EXIT SITE AND PROCEED NORTH ON ROUTE 96A TO ROUTES 5 & 20
- TURN RIGHT AT LIGHT AND MAKE A QUICK LEFT ON SEELY ROAD
- TAKE NEXT LEFT ONTO BORDER CITY ROAD WHICH TURNS INTO NORTH STREET IN GENEVA
- HOSPITAL IS ON THE LEFT

"NOT TO SCALE"

APPENDIX A

ROUTE TO HOSPITAL FROM SENECA ARMY DEPOT

PREPARED FOR

USACE
ROMULUS, NEW YORK

INTERNATIONAL TECHNOLOGY CORPORATION

132298

"Do Not Scale This Drawing"

07-29-94
11:09 AM

ATTACHMENT C

ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS
SITE MOBILIZATION

Principal Steps	Potential Hazards	Recommended Controls
Installation of office and support structures	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip, and fall hazards	Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Noise	Hearing protection is mandatory above 85 dBA.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.
	Flying debris, dirt, dust etc.	Safety glasses/eye wash.
	Pinch points	Keep hands and feet clear of moving/suspended materials and equipment.
		Stay alert at all times!
		Beware of contact points.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	High winds	Mobile/portable facilities shall be anchored to withstand high winds.
Utilities	Proper installation	Above and underground utilities shall be located. A qualified person shall install required utilities in compliance with national, state, and local codes.
Install chain-link and barrier protection fences	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.

Principal Steps	Potential Hazards	Recommended Controls
Install chain-link and barrier fences		Look before you step, ensure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Falling objects	Hardhat, stay alert and clear of materials overhead, steel-toed boots.
	Flying debris, dust, dirt, etc.	Safety glasses, eye wash
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points/stay alert at all times.
	Cut hazards	Wear adequate hand protection.
	Biological hazards	Inspect work area carefully and avoid placing hands or feet into concealed areas.
		Be alert for bees, spiders, ticks, and snakes.
	Heat stress/cold stress	"Site Health and Safety Plan"
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Fuel will be transported and stored in approved containers.
	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.
	Hazard communications	Label all containers as to contents (fuel cans, etc.)
		Obtain Material Safety Data Sheets for materials brought on site.
	Noise	Sound levels above 85 dBA mandates hearing protection.

Principal Steps	Potential Hazards	Recommended Controls
Install chain-link and barrier fences	Cross contamination and contact with potentially contaminated materials	Technicians will wear proper protective clothing and equipment to safeguard against potential contamination.
		Only essential personnel will be in the work area.
		All personnel will follow good hygiene practices.
		Proper decontamination procedures will be followed.
		All liquid and materials used for decontamination will be contained and disposed of properly.
	Strains and sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while pulling on tools, materials, etc.
	Unattended worker	"Buddy system" visual contact will be maintained between technicians during fence installation.
	Heat stress/cold stress	"Site Health and Safety Plan"
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.

ACTIVITY HAZARD ANALYSIS
REMOVAL OF VEGETATION AND DEBRIS

Principal Steps	Potential Hazards	Recommended Controls
Falling trees	Dropping trees onto personnel	Only qualified personnel will drop trees.
		The work area shall be cleared to permit safe working conditions and an escape route planned before any cutting is started.
		Just before the tree or limb is ready to fall an audible warning shall be given to those in the area. All personnel in the vicinity shall be safely out of range.
		Employees shall work from the uphill side whenever possible.
		Prior to falling operations, the surrounding area, the shape of the tree, the lean of the tree, wind force and direction, and the location of other employees will be reviewed.
	Chainsaw operations	The chainsaw will not be fueled while running, when hot, or near open flame. The saw will not be started within 10 ft of a fuel container.
		The operator will hold the saw with both hands during all cutting operations.
		Operators must wear eye, ear, hand, foot and leg protection.
		The chainsaw must never be used to cut above the operator's shoulder height.
		The idle speed will be adjusted so that the chain does not move when the engine is idling.
		The operator will shut off the saw when carrying it over slippery surfaces, through heavy brush, and when adjacent to personnel.
		All chainsaws on-site shall have an automatic chain brake or kick back device.

Principal Steps	Potential Hazards	Recommended Controls
Clearing brush and debris	Slip, trip and fall hazards	Individuals must survey the terrain and look before stepping.
	Sharp objects	Individuals must be alert to sharp objects that may be lying under brush. Metal inserts may be used inside boots to make them puncture resistant.
	Poisonous plants, snakes and insects	Individuals must be aware of the potential for these hazards to be present. Precautionary measures to be taken will be addressed in daily tailgate safety meetings.
	Use of machetes	Keep other personnel clear of swing area. Use extreme caution when using.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size up the lift. Recommend wearing a back support if possible.
	Pinch points	Keep hands, fingers and feet clear of moving/suspended materials and equipment.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead; steel-toed boots.
	Flying debris, dirt, dust, etc.	Safety glasses/eye wash.
Heavy equipment operations	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

Principal Steps	Potential Hazards	Recommended Controls
Heavy equipment operations	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of control equipment	Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
	Movement of equipment	All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 B:C.
		Keep areas of equipment reasonably free from accumulation of oil, fuel, or other materials.

Principal Steps	Potential Hazards	Recommended Controls
Heavy equipment operations	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.
	Uneven terrain and poor ground support	Inspections or determinations of road conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.

ACTIVITY HAZARD ANALYSIS
BORING AND SHORING OPERATIONS

Principal Steps	Potential Hazards	Recommended Controls
Drill rig inspection	Faulty or damaged equipment being utilized to perform work	All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition.
		Equipment will be inspected before being put to use and at the beginning of each shift.
		Faulty/unsafe equipment will be tagged and if possible locked out.
Drill rig staging	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	Inspections or determinations of road conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Above and below ground utilities will be located prior to staging equipment.
		Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines will have the wheels chocked.
		Inspect brakes and tire pressure on drill rig before staging for work.
Drill rig operation	Unexperienced operator	Machinery and mechanized equipment shall be operated only by designated personnel.
	Jacks/outriggers	Insure proper footing and cribbing.
	Falling objects	Hardhats, remove unsecured tools and materials before raising or lowering the derrick.
		Stay alert and clear of materials suspended overhead.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!!!

Principal Steps	Potential Hazards	Recommended Controls
Drill rig operation	Fire	Keep areas adjacent to derricks reasonably free from accumulation of oil, fuel, or other materials (good housekeeping).
		Have fire extinguishers inspected and readily available.
	Fall hazards	Use safety belts and lifeline when working above 6 ft.
	Noise	Hearing protection is mandatory above 85 dbA.
	Contact with rotating or reciprocating machine parts	Machine guards, use long-handled shovels to remove auger cuttings.
		Safe lockout procedures for maintenance work.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.

ACTIVITY HAZARD ANALYSIS
EXCAVATION OF COVER MATERIAL

Principal Steps	Potential Hazards	Recommended Controls
Excavate and stage cover material	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		All lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Principal Steps	Potential Hazards	Recommended Controls
Excavate and stage cover material	Heavy equipment operations	All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C
	Contact with underground utilities	All underground utilities shall be located and marked prior to excavation operations.
	Open excavations	IT Policy and Procedure HS307 "Excavation and Trenching" will be adhered to at all times.
	Heat/Cold Stress	Be aware of signs and symptoms. Observe work parties during likely heat/cold stress ambient conditions (<36°F and >77°F)
	Noise	Hearing protection is mandatory above 85 dBA.
	Contact with contaminated materials	Real-time monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.

ACTIVITY HAZARD ANALYSIS
HEAVY EQUIPMENT OPERATION

Principal Steps	Potential Hazards	Recommended Controls
Heavy Equipment Operations	Faulty or Damaged Equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	Unqualified Operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of Control Equipment	Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation During Repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.

Principal Steps	Potential Hazards	Recommended Controls
Heavy Equipment Operations	Activation During Repairs	Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
	Movement of Equipment	All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 B:C.
		Keep areas of equipment reasonably free from accumulation of oil, fuel or other materials.
	Contact with underground utilities	All underground utilities shall be located and marked prior to excavation operations.
	Contact with potentially contimated materials	Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.
	Uneven terrain and poor ground support	Inspections or determinations of road conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!!!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
		Stay alert and clear of materials suspended overhead.
	Slip, trip and fall hazards	Individuals must survey the terrain and path taken on equipment prior to stepping off.

ACTIVITY HAZARD ANALYSIS
SETUP AND OPERATION OF LTTD

Activity	Potential Hazards	Recommended Controls
Job setup	Equipment operations	All lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
	Confined space	Policy and procedures for confined spaces, will be adhered to at all times.
	Contact with process chemicals	Proper protective clothing and equipment will be used.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary proper personal protective clothing and equipment will be utilized.
		Good Housekeeping will be stressed to safe guard against cross contamination of surrounding areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene.

Activity	Potential Hazards	Recommended Controls
Job setup	Contact with potentially contaminated materials	The work area will be demarcated. All unnecessary personnel will be kept out of the work area.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Strains and sprains	Use proper lifting techniques, lifts greater than 60 lbs. requires assistance or mechanical equipment. Size up the lift. Recommend wearing a back support if possible
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Burns	Keep all exposed body parts away from hot machine parts.
	Electrical hand tools/electrocution	Ground fault circuit interrupters inspect extension cords, hand tool inspection, lockout-tagout procedure.
	Contact with solvents	Be familiar with the materials you are working with. (MSDSs)
	Falls	Lanyards, lifelines, and ladder/scaffolding safety.
	Falling objects	Overhead protection hardhats

Activity	Potential Hazards	Recommended Controls
Soil treatment activities	Equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventative maintenance procedures recommended by the manufacturer shall be followed.
	Pressurized cylinders	Properly store and secure compressed gas cylinders.
Material storage	Flammable and combustible liquids	Store in NO SMOKING AREA and 50 ft from combustible construction materials.
		Fire extinguisher readily available.
		Properly grounded and bonded.
	Round stock	Secure from rolling, work from the top of the stack.
Material storage	Slip, trip, and fall hazards	Good housekeeping
	Sprains and strains	Safe lifting procedures
	Pinch points/cuts	Adequate hand protection and observation of contact points.
	Hazard communication	Proper labeling/MSDSs

ACTIVITY HAZARD ANALYSIS
PRESSURE WASHING

Activity	Potential Hazards	Recommended Controls
Job setup	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Fueling	Only UL/FM approved safety cans shall be used to store fuel.
		Do not refuel equipment while it is operating.
		Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
Hydroblasting	High pressures	IT Policy and Procedure HS303 "Hydroblasting" shall be adhered to at all times.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.

Activity	Potential Hazards	Recommended Controls
Hydroblasting	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
		Stay alert and clear of materials suspended overhead.
	Flying debris	Safety goggles/splash shield will be used.
	Contact with potentially contaminated materials	The IT-Health and Safety department will determine the appropriate protective clothing and equipment.
Hydroblasting	Confined space	IT Policy and Procedure HS300 "Confined Spaces, Industrial" will be adhered to at all times.
	Hot work	IT Policy and Procedure HS314 "Hot Work in Hazardous Locations" will be adhered to at all times during any operations involving hot work.

ACTIVITY HAZARD ANALYSIS
WATER/SOIL SAMPLING

Activity	Potential Hazards	Recommended Controls
Staging equipment	Slip, trip and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
		Look before you step, insure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard hat.
	Flying debris, dirt, dust etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Bees, spiders and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Fire/chemical exposure	All solvents will be transported in UL/FM approved containers and sources of ignition will be prohibited.
		Initial real time air monitoring will take place.
	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.

Activity	Potential Hazards	Recommended Controls
Staging equipment		Equipment will be laid out in an area free of traffic flow.
	Hazard communication	Label all containers as to contents and dispose of properly.
		Obtain Material Safety Data Sheets for solvents, etc. that are being used.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Electrical shock	All electrical circuits will be deenergized and locked out.
	Bees, spiders and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Cross-contamination and contact with potentially contaminated materials	Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.
		Only essential personnel will be in the work area.
		Initial real-time air monitoring will take place before and during sampling activities.
		All personnel will follow good hygiene practices.
		Proper decontamination procedures will be followed.
		All liquids and materials used for decontamination will be contained and disposed of in accordance with Federal, State and Local regulations.
	Cut hazards	Use care when handling glassware.
		Wear adequate hand protection.
	Hazard communication	Label all containers as to contents.
Sample Collection	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
	Strains/sprains	Avoid twisting/turning while pulling on tools, grates, manway covers, etc.

Activity	Potential Hazards	Recommended Controls
Sample collection	Spills/residual materials	Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	Adequate lighting will be provided to insure a safe working environment.
	Unattended worker	"Buddy System" - visual contact will be maintained with the sampling technician during sampling activities.
	Confined space	IT Policy and Procedure HS300 - "Confined Spaces, Industrial" will be adhered to at all times.
	Contact with potentially contaminated materials	Real-time air monitoring will take place. Appropriate PPE will be utilized.
		Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene by utilizing the decon facility on site.
		The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
		IT Policy and Procedure HS601 - "Respiratory Protective Devices" will be adhered to at all times.
Moving and shipping collected samples	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	Label all containers as to contents and associated hazards.

ACTIVITY HAZARD ANALYSIS
EQUIPMENT DECONTAMINATION

Principal Steps	Potential Steps	Recommended Controls
Job setup for decontamination of equipment	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.
	Strains/sprains	When pulling or lifting, do not turn or twist your back.
		Use the proper tool for the task being performed.
	Contact with potentially contaminated materials	Appropriate PPE protection will be required.
		Real time air monitoring will take place during decontamination activities.
		Keep airborne particulates to a minimum.
		Practice good housekeeping, avoid spreading potentially contaminated materials.
	Fueling	Only UL/FM approved safety cans shall be used to store fuel.
		Do not refuel equipment while it is running.

Activity	Potential Hazards	Recommended Controls
Job setup for decontamination of equipment	Fueling	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
Pressure washing equipment	High pressures	IT Policy and Procedure HS303 "Hydroblasting" shall be adhered to at all times.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Activity	Potential Hazards	Recommended Controls
Pressure washing equipment	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
		Stay alert and clear of materials suspended overhead.
	Flying debris	Splash shield will be used.
	Contact with potentially contaminated materials	Appropriate PPE will be utilized.
	Hot work (hot water/steam cleaning)	IT Policy and Procedure HS314 "Hot Work in Hazardous Locations" will be adhered to at all times during any operations involving hot work.
Stage-setup equipment for pumping liquids	Pinch points	Keep hands, fingers, and feet clear of moving parts.
	Heavy lifting	Any lifting over 60 lbs requires assistance or the use of a mechanical lifting device.
	Moving equipment	Signal person will assist in positioning equipment.
	Contact with potentially contaminated materials	Real time air monitoring will take place. Appropriate PPE protection will be required.
Pumping liquids	Faulty equipment	Equipment will be inspected prior to being placed into service and at the beginning of each shift.
	Pressurized systems	All discharge hoses and connections shall be routinely inspected.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Fire	A dry chemical fire extinguisher with a minimum UL rating of 5 A:B:C will be readily available.

Activity	Potential Hazards	Recommended Controls
Pumping liquids	Refueling	Proper bonding and grounding. Only UL/FM approved safety cans will be used.
Loadout of equipment	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting on or off any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shutdown and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Heavy equipment operations	All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
	Truck and Equipment Traffic	Site personnel will wear orange safety vests to identify themselves to traffic.
		Load out area will be properly demarcated.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing on/off equipment etc.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points. Stay alert at all times!
	Strains/sprains	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size-up the lift. Recommend wearing a back support if possible. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Ropes, slings, chains, and hooks	The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.
		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
		Rigging equipment, when not is use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Hoisting Equipment	All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
		At no time shall the hoisting equipment be loaded in excess of the manufacturers rating except during performance tests.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.
	Heat stress/Cold stress	"Site Health and Safety Plan"
	Bees, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Cut hazards	Wear adequate hand protection.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.

ACTIVITY HAZARD ANALYSIS
BACKFILLING AND SITE RESTORATION

Activity	Potential Hazards	Recommended Controls
Backfilling and site restoration	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.

Activity	Potential Hazards	Recommended Controls
Backfilling and site restoration	Heavy equipment operation	All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
	Open excavations	IT Policy and Procedure HS307 "Excavation and Trenching" will be adhered to at all times.
		Excavations will be backfilled as soon as possible.
	Dump truck operations	Dump truck bodies shall be fully lowered or blocked when maintenance is being performed or when not in use.
		Dump trucks will have back-up alarms.
		A signal person will be used when the point of operation is not in full view of the vehicle, machine or equipment operator; vehicles are backed more than 100 ft; terrain is hazardous; or 2 or more vehicles are backing in the same area.
		Operators of dump trucks will leave the cab while being loaded
		Dump trucks will not be loaded in a manner that obscures the operator's view ahead or to either side or that interferes with the safe operation of the vehicle.
		The load on every truck will be distributed, checked, tied down, or secured.
		Loads will be covered when there is a hazard of flying/falling dirt, rock, debris, or material.
		All dump trucks will be equipped with a holding device to prevent accidental lowering of the body.
		All hoist levers will be secured to prevent accidental starting or tripping of the mechanism.

Activity	Potential Hazards	Recommended Controls
Backfilling and site restoration	Dump truck operations	Trip handles for tailgates will be arranged to keep the operator in the clear.
	Contact with moving equipment	Ground personnel shall wear reflective vests.
	Noise	Noise levels above 85 dBA mandates the use of hearing protection.

ATTACHMENT D

CONFINED SPACE ENTRY PROCEDURE

PROCEDURE

(subject) CONFINED SPACES

1.0 PURPOSE AND SUMMARY

This procedure describes the procedures for identifying and working within confined spaces throughout IT and for complying with OSHA regulations 29 CFR 1910.146. Additional requirements for special confined space applications can be found in the following procedures:

- HS301 Confined Spaces, Marine
- HS302 Confined Spaces, Leaded Product

Key provisions of this procedure include the following:

- Identification and posting of confined spaces at IT facilities.
- HASP requirements.
- Entry permit requirements for confined space entries.
- Testing and monitoring.
- Personal protective equipment, including lifelines and harnesses.
- Lighting.
- MSDS requirements.
- Rescue and emergency services and procedures.
- Communication between entrants and attendants.
- Duties of personnel.
- Training requirements.
- Entrant location tracking systems.
- Recordkeeping and retention.
- Annual program review.

2.0 TABLE OF CONTENTS

3.0 RESPONSIBILITY MATRIX

3.1 **Procedure Responsibility.** The Corporate Director, Health and Safety is responsible for the issuance, revision and maintenance of this procedure.

3.2 **Action/Approval Responsibilities.** The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

4.1 **Acceptable entry conditions** means the conditions that must exist in a permit space to allow entry so that employees involved with a permit-required confined space entry can safely enter into and work within the space.

4.2 **Attendant** means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the IT permit space program.

4.3 **Authorized entrant** means an employee who is authorized by IT to enter a permit space.

4.4 **Blanking or blinding** means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

4.5 **Confined space** means a space that:

4.5.1 Is large enough and so configured that an employee can bodily enter and perform assigned work;

4.5.2 Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, pits, and excavations are spaces that may have limited means of entry); and

4.5.3 Is not designed for continuous employee occupancy.

See also definition 4.21.

4.6 **Double block and bleed** means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

4.7 **Emergency** means any occurrence (including any failure of hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.

4.8 **Engulfment** means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

4.9 **Entry** means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

4.10 **Entry Permit** (Attachment 3) means the written or printed document that is provided by IT to allow and control entry into a permit space and that contains the information specified in Paragraph 4.1 of this section.

4.11 **Entry Supervisor** means the person (such as the supervisor, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

4.12 **Hazardous atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

4.12.1 Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL);

4.12.2 Airborne combustible dust at a concentration that meets or exceeds its LEL;

NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

4.12.3 Atmospheric oxygen concentration below 20.0 percent or above 23.5 percent.

4.12.4 Atmospheric concentration of any substance for which a dose or a published exposure guideline is available (Permissible Exposure Limit, PEL, from OSHA, Threshold Limit Value, TLV, from ACGIH, and Recommended Exposure Limits, REL, from NIOSH), and which could result in employee exposure in excess of its dose or permissible exposure limit.

4.12.5 Any other atmospheric condition that is immediately dangerous to life or health.

4.13 **Hot work permit** means IT written authorization to perform hot operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition. This is a separate document from the entry permit.

4.14 **Immediately Dangerous to Life or Health (IDLH)** means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

4.15 **Inerting** means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

4.16 **Isolation** means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy, including hydraulic or electric; blocking or disconnecting all mechanical linkages; or physically restraining moving parts.

4.17 **Line breaking** means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

4.18 **Non-permit confined space** means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

4.19 **Oxygen deficient atmosphere** means an atmosphere containing less than 20.0 percent oxygen by volume.

4.20 **Oxygen-enriched atmosphere** means an atmosphere containing more than 23.5 percent oxygen by volume.

4.21 **Permit-Required Confined Space** (PRCS) means a confined space that has one or more of the following characteristics:

4.21.1 Contains or has a potential to contain a hazardous atmosphere;

4.21.2 Contains a material that has the potential for engulfing an entrant;

4.21.3 Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

4.21.4 Contains any other recognized serious safety or health hazard.

4.22 **Prohibited condition** means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

4.23 **Rescue service** means the personnel designated to rescue employees from permit spaces.

4.24 **Retrieval system** means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

4.25 **Testing** means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

5.0 TEXT

5.1 Scope and Applicability

This procedure contains the requirements for performing work in confined spaces throughout IT Corporation, specifically including construction.

5.2 Evaluate the Workplace

All facilities or project locations owned or operated by IT Corporation (including joint ventures) shall be evaluated to identify the presence of permit-required confined spaces. All such spaces shall be posted with a sign bearing the following or similar warning: "DANGER--PERMIT-REQUIRED CONFINED SPACE. DO NOT ENTER".

5.3 Non-Permit Confined Spaces

All confined spaces shall be initially considered permit-required confined spaces. Such spaces can be reclassified as non-permit confined spaces only under the following conditions:

5.3.1 Site-specific approval of an IT HS professional;

5.3.2 All contaminants, contaminated soils, and vessels containing contaminants have been removed;

5.3.3 All actual or potential atmospheric hazards have been eliminated, with testing verification;

5.3.4 Ventilation is not required to maintain control of atmospheric hazards;

5.3.5 All recognized hazards, including engulfment, within the confined space have been eliminated;

5.3.6 The confined space shall be re-evaluated (and reclassified to permit-required, if needed) whenever the use or configuration of the space changes in any way that might increase the hazards to the entrants. All entrants shall exit the space immediately when hazards are noted;

5.3.7 The entry supervisor shall make the certification that all hazards have been removed on the Entry Permit (Attachment 3); and

5.3.8 The Entry Permit (Attachment 3) shall be posted at the entrance to the confined space.

5.4 Permit-Required Confined Spaces

All confined space entries shall be considered permit-required until/unless the space meets the requirements in section 5.3.

5.4.1 Procedures and Practices for Permit Space Entry

Prior to beginning any confined space entry operation, a Health and Safety Plan (HASP) shall be developed and approved per IT Procedure HS052 requirements. The HASP must specifically address the following areas:

- Specify acceptable entry conditions. IT requires that combustible vapors shall not exceed 10.0 percent of the LEL and oxygen levels be between 20-23.5 percent by volume. Appropriate toxic gas/vapor action levels shall also be established (Level A or IDLH conditions require Corporate HS approval).

- Confined space isolation procedures.

- Lockout, tagout, tryout and return to service procedures for potential sources of hazardous energy at the specific project location (see also IT procedure HS315 Control of Hazardous Energy Sources).

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- Procedures and equipment for purging, inerting, flushing or ventilating the space for the control of atmospheric hazards. Continuous mechanical ventilation shall be used whenever entrants are in the PRCS.

- Procedures for inspecting, monitoring and testing the confined space to verify that acceptable conditions exist prior to and throughout the entry operation. This includes:

    - Specific atmospheric tests to be performed and frequency of tests (NOTE: Confined spaces shall be tested as often as necessary to verify entrant safety, whenever operations or conditions change [e.g., temperature change or product agitation, etc.], and <u>no less often than hourly</u>.);

    - Specific testing equipment required;

    - For confined spaces that cannot be completely isolated (e.g., sewers, etc.), continuous testing with real-time direct reading instruments shall be required; and

    - Priority for atmospheric hazard testing shall be oxygen, combustible gases, then toxic gases/vapors.

- Personal Protective Equipment:

    - Protective suits, boots, and gloves - including specification of the material of construction.

    - Face, head, and foot protection.

- Specify chest or parachute harness with approved lifelines at least one-half inch in diameter and 2,000 pounds test and meeting ANSI A10.14 requirements. (NOTE: Wristlets may be used only when an IT HS professional finds that a harness presents a greater hazard to the employee and wristlets are the safest, most effective alternative.) All lifelines shall be secured to a mechanical device or fixed point outside the confined space. Mechanical extraction devices shall be used for all vertical entry permit spaces greater than five (5) feet deep.

- Respiratory protection, per IT procedure HS601.

• Material Safety Datasheets (MSDS) to be provided to the medical facility when treating injured/exposed entrants.

• Lighting equipment required to safely illuminate the work and provide emergency egress.

NOTE: Lighting and electrical equipment shall be of the appropriate National Electrical Code (NEC) rating. Rating should be Class I, Division I unless the space specifically meets other rating class requirements.

• Protective barriers to be used to protect entrants from external pedestrian, vehicle or equipment hazards.

• Ingress and egress equipment such as ladders.

• Rescue and emergency services, procedures, equipment, and Exposure Control Plan (see IT Procedure HS512). The HASP must specify whether IT or another source will provide these services and equipment, and how to summon them. IT shall provide rescue services unless the client has a qualified rescue team in-plant which is available to IT and has been informed of the hazards of the confined space to be entered.

• Communications equipment to provide continuous communication between entrants and attendants. This can be done using the standard system of lifeline "tugs" below, so long as the attendants continuously hold the lifelines in their hands.

Lifeline "Tug" Signals

1 Tug = Are you OK?
2 Tugs = Yes, I am OK.
3 Tugs = Exit the confined space immediately.

Any other signal, or an unclear signal, shall require immediate exit of the PRCS.

Other standard hand signals are provided in Attachment 2.

An alternative system would be to provide all entrants and attendants with an air powered horn. Substituting horn blasts for tugs, equivalent signals to the lifeline "tug" signals, would be standard. Any other or uncertain signals require immediate exit.

If this is not practical or possible, powered communication equipment with the appropriate NEC rating shall be provided.

- Prescribe the number of attendants and other outside support personnel. Each confined space being entered shall have a minimum of one (1) dedicated attendant and one other support person (who may have other duties) within sight or call.

- Designate the duties of entrants, attendants, and entry supervisors as described below.

Duties of authorized entrants

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.

- Alert the attendant whenever:

  (1) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
  (2) The entrant detects a prohibited condition; and

- Exit from the permit space as quickly as possible whenever:

  (1) An order to evacuate is given by the attendant or the entry supervisor,
  (2) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
  (3) The entrant detects a prohibited condition, or
  (4) An evacuation alarm is activated.

Duties of attendants

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- Is aware of possible behavioral effects of hazard exposure in authorized entrants.

- Continuously maintains an accurate count of authorized entrants in the permit space so that the means used to identify authorized entrants accurately identifies who is in the permit space.

- Remains outside the permit space during entry operations until relieved by another attendant.

- Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.

- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

  (1) If the attendant detects a prohibited condition;
  (2) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
  (3) If the attendant detects a situation outside the space that could endanger the authorized entrants; or
  (4) If the attendant cannot effectively and safely perform all prescribed duties.

- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

  (1) Warn the unauthorized persons that they must stay away from the permit space;
  (2) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
  (3) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

- Performs non-entry rescues.

- Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

- Terminates the entry and cancels the permit as required.

- Verifies that rescue services are available and that the means for summoning them are operable.

- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

- Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

- Documents on the entry permit any incidents or circumstances requiring review of the confined space entry program. Such incidents include:

  (1) Unauthorized entry;
  (2) The detection of a condition/hazard not authorized by the permit;
  (3) The occurrence of an injury or near-miss during entry;
  (4) A change in use or configuration of the space; or
  (5) Employee complaints about the program.

- Prescribes procedures for coordination of entry when personnel from multiple employers will work simultaneously. IT subcontractors shall follow IT procedures.

5.4.2 **Permit System**

Before entry is authorized, the Entry Supervisor shall complete and sign an Entry Permit (Attachment 3) to document that all pre-entry requirements in the approved HASP have been met and that acceptable entry conditions exist. The completed permit shall be posted at the primary entrance to the confined space.

All Entry Permits are valid for a maximum of one (1) work shift, and shall be cancelled by the Entry Supervisor when the shift ends, confined space operations are complete, or whenever a prohibited condition arises in or near the space. All confined spaces shall be securely closed or barricaded whenever the entry permit is cancelled.

Entry Permits must be completely executed and include the following information:

- Identify the permit space to be entered;
- Purpose of the entry;
- Date and duration of the permit;
- Authorized entrants by name;
- Authorized attendants by name;
- The name and signature of the Entry Supervisor originally authorizing entry;
- The name and signature of the current Entry Supervisor;
- The hazards of the permit space to be entered;
- Measures used to isolate the permit space and control hazards;
- Acceptable entry conditions;
- Time and results of periodic atmospheric tests with the initials of the tester;
- Available rescue services and equipment, and how to summon;
- Communication procedures;
- Personal protective equipment, testing equipment and communications equipment; and
- Any additional permits issued to authorize work in the permit space.

Supplemental information regarding the location of each entrant shall be provided as described below:

- The current entry status of all entrants shall be logged on the Field Activity Daily Log (FADL), with a new entry made whenever the entry status of an entrant changes.

- Each entrant shall securely affix a tag bearing their name to the outside lifeline fitting which is attached to a secure point.

5.4.3 **Training**

- General

  Prior to assignment to confined space entry work, all employees shall receive training in the hazards of confined spaces, work practices to control these hazards, and duties to be performed. Employee proficiency shall be established by testing and/or practical demonstration.

  The IT Training Department shall maintain training records to include employee name and signature, date of training, and signature of the trainer.

  Basic training requirements shall include:

  - Entrants/Attendants: Hazards & Protection or Hazards Protection Limited & Site Remediation & Confined Space Update (or equivalent). Note that H&P done prior to April 1993 requires Confined Space Update.

  - Entry Supervisors and/or Personnel Conducting Atmospheric Testing: Qualified Person (or equivalent).

  - Rescue Service Personnel: Personnel assigned to provide emergency entry and rescue services shall be trained annually in the proper use of personal protective and rescue equipment. Such training shall include a simulated rescue exercise. In addition, rescue personnel shall be trained in the hazards and proper work practices for handling blood or other potentially infectious materials while providing first aid or CPR, and comply with the other requirements of IT Procedure HS512. All rescue personnel shall have current training and certification for first-aid and CPR.

  Equivalent training must be approved by the IT Training Department prior to assignment to entry duties.

  Personnel assigned to attendant duties shall be trained in non-entry rescue procedures.

- Site-Specific

  Health and Safety Plan orientation and Tailgate Safety meetings will be used to provide site-specific training.

5.5 Retention of Inspection and Test Logs

A copy of all Entry Permits and other documents related directly to the PRCS entry (e.g., hot work permits, FADLs, etc.) shall be forwarded to the local or project HS Department.

5.6 Confined Space Entry Program Review

Annually in January, the HS professional responsible for each location performing confined space entry operations shall review all entry permits for incidents or problems occurring during entry. Incidents or problems include injuries, accidents, unauthorized entries, or any other event potentially indicating that improvements can be made in the confined space entry program. After review with appropriate operations personnel, recommendations for program

revision shall be forwarded to the Corporate HS office for review by the Corporate Safety Council.

6.0 EXCEPTION PROVISIONS

Variances to this procedure (HS300) may be requested in accordance with the requirements of IT Procedure HS013 Health and Safety Procedure Variance.

7.0 CROSS REFERENCES

HS013 Health and Safety Procedure Variance
HS052 Health and Safety Plans
HS301 Confined Spaces, Marine
HS302 Confined Spaces, Leaded Product
HS315 Control of Hazardous Energy Sources
HS512 Bloodborne Pathogens
HS601 Respiratory Protective Program

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Hand Signals
3. Entry Permit

CONFINED SPACES
Responsibility Matrix

ATTACHMENT 1

Action	Procedure Section	Local HS	Corp HS	Training Dept.	Location Manager	Entry Supv	Manager
Identify and post all PRCSs at IT facilities	5.2	X			X		
Develop HASP, including establishing acceptable entry conditions	5.4.1	X					X
Approve HASP prior to work:	5.4.1	X					X
If IDLH or Leval A:	5.4.1	X	X				X
Provide adequate supplies of required equipment (e.g., rescue, air testing) at location	5.4.1				X		
Train adequate personnel in each category	5.4.3				X		
Retain training records	5.4.3			X	X		
Complete HASP requirements for entry, execuitve entry permit, and test/monitor	5.4.1					X	
Cancel entry permits	5.4.2					X	
Reclassify PRCS as non-permit-required	5.3					X	
Retain documents	5.5	X					
Program review	5.6	X	X		X		

ATTACHMENT 2

HAND SIGNALS

- THE VERY NATURE OF OUR WORK REQUIRES THE USE OF PROTECTIVE CLOTHING THAT IN ITSELF MAY RESTRICT OUR ABILITY TO COMMUNICATE ORALLY.
- IN AS MUCH AS CERTAIN VITAL COMMUNICATIONS ARE NECESSARY FOR A SAFE EFFICIENT OPERATION, A LIMITED NUMBER OF HAND SIGNALS HAVE BEEN DEVISED TO HELP RESOLVE THIS PROBLEM.
- SIGNALS COVERING TWO CATEGORIES, THOSE FOR PERSONAL SAFETY AND FOR OPERATIONAL USE WILL BE DISCUSSED.

Personal Safety

- IMMEDIATE PERSONAL SAFETY PROBLEMS COULD INCLUDE BREATHING AIR SYSTEM MALFUNCTION, LIFELINES PROBLEMS AND GENERAL DISTRESS.

THE FOLLOWING SIGNALS WILL BE USED FOR ALL IT EMPLOYEES

- BREATHING AIR PROBLEMS

ONE HAND HOLDING THROAT INDICATES A BREATHING AIR PROBLEM

BOTH HANDS HOLDING THROAT INDICATES A SERIOUS BREATHING AIR PROBLEM, SUCH AS NO AIR, VAPORS GETTING THROUGH, ETC.

HAND SIGNALS (con't)

- LIFE LINE TEST

  ONE TUG ON EITHER END OF A LIFE LINE MUST BE ANSWERED BY TWO TUGS. IF A TUG IS NOT ANSWERED IT INDICATES A FOULED LINE MAN MUST BE REMOVED AND LINE CLEARED.

  THREE TUGS , OR A STEADY PULL ON THE LINE INDICATES THAT THE MAN SHOULD LEAVE THE CONTAMINATED AREA.

- GENERAL PROBLEM

BOTH HANDS RAISED ABOVE THE HEAD ARE INDICATIVE OF SOME TYPE OF PROBLEM WHICH MAY REQUIRES EXIT FROM THE AREA AND REMOVAL OF PROTECTIVE CLOTHING.

ONCE THE SIGNAL IS RECEIVED AND UNDERSTOOD, THE PROBLEM CAN POSSIBLY BE FURTHER CLARIFIED BY POINTING TO AFFECTED AREA.

HAND SIGNALS (con't)

INDEX FINDER TWIRLING IN AN UPWARD MOTION WHILE OPEN PALM COVERS THE FINGER: OPEN SLOWLY

INDEX FINDER TWIRLING IN A DOWNWARD MOTION WHILE OPEN PALM COVERS THE FINGER : CLOSE SLOWLY

WHILE OPENING OR CLOSING VALVES, VENTS, ETC., THE FOLLOWING CAN BE USED:

INDEX FINGER TWIRLING IN AN UPWARD MOTION: OPEN NORMALLY

INDEX FINGER TWIRLING IN A DOWNWARD MOTION: CLOSE NORMALLY

Operational Safety
HAND SIGNALS (con't)

1 HAND MADE INTO FIST WITH THUMB DOWN : CLOSE EMERGENCY

1 HAND MADE INTO FIST WITH THUMB UP: OPEN EMERGENCY

CHECKING FOR MATERIAL IN A VESSEL WHILE IN PROTECTIVE CLOTHING CAN BE ANSWERED AS FOLLOWS:

TWO HANDS CLASPED IN FIST WITH THUMBS POINTING UP: VESSEL HAS MATERIAL IN IT.

HAND SIGNALS (con't)
Operational Safety

CHECKING FOR MATERIAL IN A VESSEL WHILE IN PROTECTIVE CLOTHING CAN BE ANSWERED AS FOLLOWS:

UMPIRE SIGNALING RUNNER SAFE:
VESSEL EMPTY

HAND SIGNALS (con't)

SLASHING SIGNAL ACROSS THROAT:
CLOSE DOWN WHATEVER YOU ARE DOING—STOP

FIST IN PUMPING MOTION:
CLOSE DOWN WHATEVER YOU ARE DOING—STOP

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ENTRY PERMIT
PERMIT-REQUIRED CONFINED SPACE (PRCS)

ATTACHMENT 3

Division/Location ______________________ Job No. ______________
Customer ______________________ Address ______________
Location of Job ______________________ Identity of PRCS ______________
Describe Hazards of PRCS (Chemical, Physical) ______________________

Chemical Introduced Into Space ______________________

Purpose This Permit Authorized ______________________

CHECKLIST	YES	DOES NOT APPLY
All lines leading to and from confined space have been blinded or disconnected		
Electrical service disconnected or locked out		
All grounding and bonding cables in place		
All lighting, fittings, power equipment, and extension cords are explosion-proof		
Ground Fault Circuit Indicator (GFCI) checked and functioning		
All ignition sources have been isolated		
All respiratory equipment and alarms checked and functional		
All safety harnesses and life lines checked		
All required PPE checked and in use		
All entrants are confined space trained		
All entrants are trained in the use, care, and limitations of respirators and PPE		
Attendant trained in emergency procedures		
Attendant(s) trained in rescue procedures		
Outside rescue service will be used and they have been notified of this entry		
Appropriate rescue equipment available and checked		
Ventilation system in use and effective		
Entrant(s) can achieve a gas-tight seal with respirator		
Entrant(s) are not wearing contact lenses		
All tests have been completed and indicate that entrance requirements have been met		
Appropriate warning signs have been posted and unauthorized personnel have been excluded from the PRCS and area		

IF THE ANSWER TO ANY OF THE ABOVE QUESTIONS IS NO, ENTRY IS NOT PERMITTED

PERSONAL PROTECTIVE EQUIPMENT
(Circle)

EYE/FACE
Chemical Goggles
Face Shield
Safety Glasses

EXTREMITIES
Hard Hat
Gloves (Material ______)
Hoods
Boots (Material ______)
Booties

BODY
Suit (Level ____, Material ______)

RESPIRATORY
SCBA
Air Line
Egress System
Air Purifying (Cartridge ______)
Powered Air Purifying (Cartridge ______)

OTHER
Hearing Protection
Harness & Lifeline
Chest or Parachute

RESCUE EQUIPMENT

Mechanical Extraction Device
First Aid Kit
SCBA
Other (Specify) ______

NON-IT RESCUE TEAM

Instructions to Summon Rescue ______

COMMUNICATION

Lifeline "Tug" Signals (See HASP)

Air Powered Horn Signals (See HASP)

Other ______

OTHER PERMITS ISSUED FOR WORK IN PRCS: ______________________

OTHER HAZARD CONTROL PROCEDURES OR INSTRUCTIONS: ______________________

Page ___ of ___

TEST DATA
Oxygen, Flammability and Toxic Contaminant(s)

Time	Percent Oxygen	Percent LEL	PEG ____	PEG ____	PEG ____	PEG ____	PEG ____	Initials	Comments

AUTHORIZED ENTRANTS

________________________ ________________________
________________________ ________________________
________________________ ________________________
________________________ ________________________
________________________ ________________________
________________________ ________________________

AUTHORIZED ATTENDANTS

____
____
____

RESCUE PERSONNEL

____
____
____

Diagram the confined space, indicate location of manways and ventilators. Indicate location(s) where tests conducted

) (- Manway
⇔ - Ventilator
X - Test Location

ACCEPTABLE ENTRY CONDITIONS

1) Entry Permit Completely Filled Out
2) Oxygen between 20-23.5%
3) Combustible Gases Below 10% LEL
4) Permissible Levels of Toxic Gases (List)
________ ________ ________
________ ________ ________

5) Other ________________________
____
____
____
____
____
____

PRCS SAFE FOR ENTRY

DATE/TIME ______/____ NAME ENTRY SUPERVISOR ____________________ SIGNATURE ______________

CURRENT ENTRY SUPERVISOR (IF DIFFERENT) ________________________________

ENTRY PERMIT EXPIRES DATE/TIME ______/_____ (No longer than 1 shift)

ENTRY PERMIT CANCELLED

DATE/TIME ______/______ SIGNATURE ________________________________

REASON (✓) _______ Work Complete _______ Authorized Conditions not met ______ Incident

DESCRIBE PROBLEMS DURING ENTRY AND RESOLUTION

____
____

RECLASSIFICATION TO NON-PERMIT-REQUIRED CONFINED SPACE
Describe hazard removal methods, without use of ventilation. ________________________
____

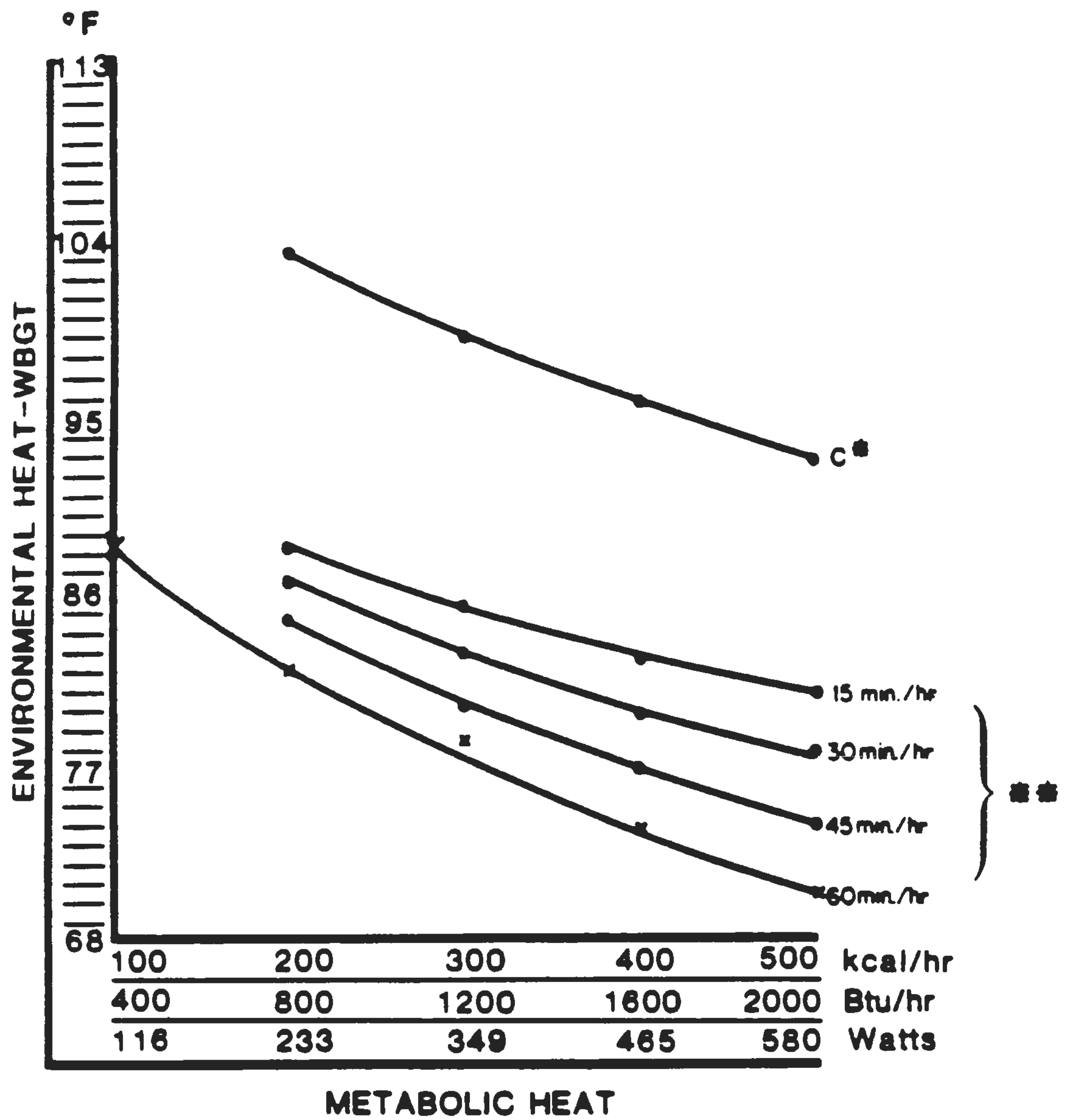
TESTING VERIFICATION SHOWN AT TIME ______________ ON TEST DATA CHART ABOVE.

DATE/TIME _____/_____ ENTRY SUPERVISOR SIGNATURE ________________________

REVIEWED BY ________________________________ DATE ________________

ATTACHMENT E

RECOMMENDED HEAT STRESS GUIDELINES FOR UNACCLIMATED/ACCLIMATED WORKERS IN HOT ENVIRONMENTS



Recommended Heat Stress Guidelines for Unacclimated Workers in Hot Environments

* C= Ceiling Limit - No work should be performed without body cooling provided

** Work-Rest Regimen - Minutes worked per hour

ASSESMENT OF EMPLOYEE WORK LOAD IN HOT ENVIRONMENTS

A. BODY POSITION AND MOVEMENT	kcal/min
Sitting	0.3
Standing	0.6
Walking	2.0-23.0
Walking uphill	add 0.8 per meter rise

B. TYPE OF WORK	Average kcal/min	Range kcal/min
Hand work		
Light	0.4	0.2-1.2
Heavy	0.9	
Work One Arm		
Light	1.0	0.7-2.5
Heavy	1.8	
Work Both Arms		
Light	1.5	1.0-3.5
Heavy	2.5	
Work Whole Body		
Light	3.5	2.5-9.0
Moderate	5.0	
Heavy	7.0	
Very Heavy	9.0	

C. BASAL METABOLISM	1.0

D. SAMPLE CALCULATION	Average kcal/min
Assembling work with heavy hand tools	
1. Standing	0.6
2. Two-arm work	3.5
3. Basal Metabolism	1.0

TOTAL 5.1 kcal/min x 60= 306 kcal/hr

EMPLOYEE PHYSIOLOGICAL MONITORING RECORD FOR HEAT STRESS

Attachment 4 (Guideline)
ITC Pro 9533.1

Employee Name ____________ Date ____________ Employee SS# ____________
Division ____________ Start Time ____________ Location ____________
P.C.# ____________ Stop Time ____________ Job Number ____________
Health & Safety Coordinator ____________ Supervisor ____________

TEMPERATURES

A. INITIAL READING
1. Ambient Air Temperature ________
2. Baseline Oral Temperature ________
3. WBGT ________

B. AFTER FIRST WORK PERIOD
1. Ambient Air Temperature ________
2. Oral Temperature ________
3. WBGT ________

C. AFTER SECOND WORK PERIOD
1. Ambient Air Temperature ________
2. Oral Temperature ________
3. WBGT ________

D. AFTER THIRD WORK PERIOD
1. Ambient Air Temperature ________
2. Oral Temperature ________
3. WBGT ________

E. AFTER FOURTH WORK PERIOD
1. Ambient Air Temperature ________
2. Oral Temperature ________
3. WBGT ________

F. AFTER FIFTH WORK PERIOD
1. Ambient Air Temperature ________
2. Oral Temperature ________
3. WBGT ________

HEART RATE

A. INITIAL READING
1. Baseline Heart Rate ________ B/min

B. AFTER FIRST WORK PERIOD
1. Heart Rate ________ B/min

C. AFTER SECOND WORK PERIOD
1. Heart Rate ________ B/min

D. AFTER THIRD WORK PERIOD
1. Heart Rate ________ B/min

E. AFTER FOURTH WORK PERIOD
1. Heart Rate ________ B/min

F. AFTER FIFTH WORK PERIOD
1. Heart Rate ________ B/min

This completed form should be retained in project file

B/min=Beats/ per minute

ATTACHMENT F

SITE FORMS

IT TAILGATE SAFETY MEETING

Division/Subsidiary ______________________ Facility ______________________

Date ______________ Time ______________ Job Number ______________

Customer ______________________ Address: ______________________

Specific Location ____

Type of Work ____

Chemicals Used ____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment ____

____

Chemical Hazards ____

____

Physical Hazards ____

____

Emergency Procedures ____

____

spital / Clinic ______________ Phone ( ) ______________ Paramedic Phone ( ) ______________

Hospital Address ____

Special Equipment ____

____

Other ____

____

ATTENDEES

NAME PRINTED	SIGNATURE

Meeting conducted by:

______________________ ______________________

NAME PRINTED SIGNATURE

Supervisor ______________________ Manager ______________________

36-8-85

INTERNATIONAL TECHNOLOGY CORPORATION

SUPERVISOR'S EMPLOYEE INJURY REPORT

This is an official document to be initiated by the employee's supervisor. Please answer all questions completely. This report must be forwarded to the employee's Regional Health and Safety office within 24 hours of the injury.

Injured's Name ______ Sex ____ S.S. No. ______ Birthdate ______
Home Address ______ City ______ State ______ Zip ______ Phone ______
Job title ______ Employee's P.C. ______ Hire date ______ Hourly wage ______

SUPERVISOR

Date of incident ______ Time ______ Time reported ______ To whom? ______
Client name ______ Client address ______ Time shift began ______
Exact location of incident ______ Did employee leave work? ☐ No ☐ Yes When ______
Has employee returned to work? ☐ No ☐ Yes When ______ Did employee miss a regularly scheduled shift? ☐ No ☐ Yes
Doctor/Hospital name ______ Address ______
Witness name(s) ______ Statements attached? ☐ No ☐ Yes
Nature of injury ______ Exact body part ______
Medical attention ☐ None ☐ First aid on site ☐ Doctor's office ☐ Hospital ER ☐ Hospitalized
Job assignment at time of incident ______ Job ______ Phase ______ Task ______ Subtask ______
Describe incident ______

What unsafe physical condition or unsafe act caused the incident? ______

What corrective action has been taken to prevent recurrence? ______

Supervisor/Foreman ______ (Print) ______ Signature ______ Date

MANAGER

Comments on incident and corrective action ______

Manager's name ______ (Print) ______ Signature ______ Date

HEALTH AND SAFETY

Concur with action taken? ☐ No ☐ Yes Remarks ______

OSHA Classification:
☐ Incident only ☐ First aid ☐ No lost workdays ☐ Lost workdays ☐ Restricted activity ☐ Fatality
Days away from work ______ Days restricted work ______ Total days charged ______
☐ State jurisdiction ☐ Federal L&H ☐ Date ER submitted ______ Which claims office ______
Coding: A. Injury type or illness ______ B. Injured body parts ______ C. Activity at time of accident ______ D. Injury cause code ______
E. Agent code ______ F. Safety rule violated code ______ G. Accident prevention code ______

Name ______ (Print) ______ Signature ______ Date

ITC FORM HSO20A (10/90)

White: Corporate Health and Safety Yellow: Regional Health and Safety Pink: Profit Cost Center

IT CORPORATION WORKERS COMPENSATION ACCIDENT CODING

A. TYPE OF INJURY OR ILLNESS

10 Laceration
12 Puncture
14 Contusion
16 Abrasion
18 Crushing Injury
20 Foreign Body
22 Burn-Thermal
24 Burn-Chemical
26 Fracture
28 Amputation
30 Hernia Inguinal
31 Hernia Other
32 Strain
34 Sprain
36 Dislocation
38 Heat Exhaustion Heat Stress
40 Drowning
42 Asphyxiation
44 Systemic Poisoning
46 Dermatitis
48 Inflammation, Irritation
49 Pneumoconiosis
50 Respiratory Condition Due to Toxic Agents
51 Radiation
52 Heart Disease
54 Liver Damage
56 Kidney Damage
58 Mental Stress Psychiatric
60 Repeated Trauma
62 Hearing Loss
64 Cancer
66 Other Occupational Disease
68 Fatality
70 Infectious Respiratory Disease
72 Miscellaneous-Not Otherwise Coded
[illegible] Not Work Related

B. INJURED BODY PARTS

10 Head
12 Face
14 Ear
16 Eye
17 Nose
18 Teeth Mouth
20 Neck
22 Shoulder
24 Chest
26 Abdomen
28 Upper Arm
30 Elbow
32 Lower Arm
34 Wrist
36 Hand
38 Thumb
40 Fingers
42 Back Spine
44 Hip Pelvis
46 Thigh
48 Knee
50 Lower Leg
52 Ankle
54 Heel
56 Metatarsal
58 Toes
60 Lungs
62 Heart
63 Liver
64 Other Internal Organs
66 Psyche
[illegible] Not Otherwise Coded

C. ACTIVITY AT TIME OF ACCIDENT

10 Driving
14 Operating Heavy Equipment
16 Hot Work
18 Hydroblasting
19 Washing
20 Cutting
22 Lifting Or Manual Carrying
24 Walking
26 Running
28 Jumping
30 Hammering
32 Sampling
34 Loading Unloading Vacuum Trucks
36 Pulling Vacuum Hoses
38 Climbing
40 Shoveling
41 Sweeping
42 Pulling
44 Pushing
46 Opening Or Closing
48 Reaching Or Stretching
50 Standing Observing Or Inspecting
52 Piling Or Stacking
54 Maintenance
56 Training
58 Chemical Packaging
60 Laboratory Analysis
62 Washing Glassware
64 Tank Cleaning
66 Asbestos Removal
68 Nuclear Decontamination
70 Drilling
72 Pond Maintenance
74 Using Hand Tools
76 Not Otherwise Classified

D. INJURY CAUSE CODE

STRUCK BY

01 Falling Object
02 Flying Object
03 Swinging Object
04 Tipping Sliding Or Rolling Object
05 Motor Vehicle
06 Altercation
07 All Other Moving Objects

STRAIN OR OVEREXERTION

10 Lifting (Back)
11 Lifting (Other Than Back)
12 Pulling Or Pushing
13 Reaching Twisting Or Over Extending
14 Cumulative Trauma

FALL FROM ELEVATION

20 Manway Opening
21 Ladder Or Scaffold
22 Machinery Or Stationary Equipment
23 Piled Materials
24 Stairs
25 Heavy Equipment
26 Vacuum Trucks
27 Other Trucks

FALL FROM SAME LEVEL

30 Slip
31 Trip

STRUCK AGAINST

40 Moving Object
41 Stationary Object
42 Sharp Object

CAUGHT IN, UNDER OR BETWEEN

80 Running Or Meshing Objects
81 Point Of Operation Machinery Or Equipment
82 Other Than Point Of Operation
83 Moving And Stationary Objects
84 Two Moving Objects

EXPOSURE TO

60 Cold
61 Heat
62 Electric Current
63 Chemicals
64 Radiation
65 Noise
66 Dust
68 Poison Oak Ivy

MISCELLANEOUS

70 Inhalation
71 Ingestion
72 Absorption
73 Job Stress
74 Insect Or Animal Bites

E. AGENT CODE

10 Grading Compacting Equipment
11 Excavating Drilling Equipment
12 Crane
14 Vacuum Truck
16 End Dump Truck
18 Automobile
19 All Other Motor Vehicles
20 Hand Tools
22 Power Tools
24 Laboratory Glassware
26 Laboratory Equipment
28 Sampling Equipment
30 Hoses
32 Hydroblaster
34 High Pressure Washing
36 Hand Truck
38 Ladder
40 Scaffold
42 Stairs
44 Slippery Surface
45 Ice Or Snow
46 Uneven Surface
48 Hot Liquid Gases
50 Toxic Material
52 Oxygen Deficient Atmosphere
54 Flammable Materials
56 Electric Current
58 Radiation
60 Door
62 Compressed Gas
64 Gas Cylinder
66 Respirator Breathing Apparatus
68 Protective Clothing
70 Other Clothing/Jewelry
72 Mobile Treatment Equipment
73 Fixed Treatment Facility

F. SAFETY RULE VIOLATED CODE

01 IT Safety Rule
02 Client Safety Rule
03 Compressed Air
05 Wire Rope Clips And Slings
06 Locking Out Equipment
07 Piling And Blocking Of Materials
08 High Voltage Rules
09 Eye And Face Protection
10 Portable Ladders
11 Underground Construction
[illegible]
12 [illegible]
[illegible]
14 [illegible]
16 [illegible]
17 Flammable [illegible]
[illegible]
18 [illegible]
19 Portable Electrical T[illegible]
21 Flammable Gases
22 Fall Protection
23 Grinding Area
24 Machine Guarding
25 Scaffolding
26 Handling Materials
27 Horse Play And Fighting
28 Housekeeping
29 Unauthorized Walkway
30 Welding Equipment
31 Machine Operations
32 Hand Tools
35 Crane Rules
37 Acids And Caustics
38 Tripping And Slipping Hazards
42 Respirator Protection
43 Hearing Protection
44 Confined Space
45 Late Report of Minor Accident
46 Temporary Cords And Lamps
47 Improper Operation Of Equipment
48 Hydroblast
50 Motor Vehicle
51 Driving Under the Influence Of D[illegible]
52 Fork Lifts
54 Air Compressors And Receivers
60 No Safety Rule Violation
62 Did Not Review Job With Health and Safety

G. ACCIDENT PREVENTION CODE

02 Install Guards Or Safety Devices
04 Install Warning System
06 Store Flammables And Combustibles In Approved Manner
08 Block Or Secure Material Or Machinery Against Unexpected Movement
10 Additional Housekeeping Needed
12 Remove Protruding Objects
14 Maintain Necessary Clearance
16 Control Or Remove Atmospheric Conditions
18 Maintain Proper Piling Or Stacking
20 Install Additional Illumination
22 Personal Protective Equipment
24 Review Project with Health & Safety

INSTRUCTION RE-INSTRUCTION IN

50 Use Of Equipment
52 Proper Operation Or Working Speed
54 Use Of Warning Devices
56 Proper Use Of Safety Devices
58 Use Of Tools In Good Repair
60 Proper Lifting Practices
62 De-Energizing Equipment Before Adjusting Or Repairing
64 Stay Off Moving Equipment
66 Horse Play
68 Wearing Of Personal Protective Equipment
70 Proper Chemical Handling Procedure
72 Safety Work Rules
74 IT Training Class

INTERNATIONAL TECHNOLOGY CORPORATION

"MUST BE COMPLETED WITHIN 72 HOURS"

ACCIDENT/INJURY INVESTIGATION

Date ____________ Profit/Cost Center ____________ Date of Accident/Injury ____________

Employee Name ____________________________

Supervisor Name ____________________________

Job Number/Name ____________________________

Location of Accident/Injury ____________________________

- Accident/Injury Classification

Injury
- ☐ Near Miss
- ☐ First Aid
- ☐ OSHA Recordable
- ☐ Lost Workday

Vehicle
- ☐ Chargeable
- ☐ Non-Chargeable
- ☐ Not at Fault

DOT
- ☐ DOT Vehicle
- ☐ DOT Reportable

General Liability ☐

- Description (Provide facts, describe how incident occurred, provide diagram (on back) or photos)

____

____

____

- Analysis 1 (What unsafe acts or conditions contributed to the incident?)

____

____

____

- Analysis 2 (What systematic or management deficiencies contributed to incident?)

____

____

____

- Corrective Action(s) (List corrective action items, responsible person, scheduled completion date)

____

____

____

- Witnesses (Attach statements or indicate why unavailable)

____

____

____

Investigated By ____________ ____________ ____________
Print Name / Signature / Date

Manager ____________ ____________ ____________
Print Name / Signature / Date

(Attach Additional pages if needed)

ITC Form [illegible] [illegible]

INTERNATIONAL TECHNOLOGY CORPORATION

GENERAL LIABILITY, PROPERTY DAMAGE, & LOSS REPORT

DIVISION/SUBSIDIARY ______________________ CENTER NO. __________ DATE __________

ADDRESS ____

HOW DID DAMAGE OR LOSS OCCUR: ____

DESCRIPTION & VALUE ($) OF DAMAGED/LOST/STOLEN PROPERTY: ____

LOCATION OF DAMAGED/LOST/STOLEN PROPERTY (Before Loss): ____

DATE & TIME OF DAMAGE, LOSS OR THEFT: Date: __________ Time: __________ a.m. / p.m.

OWNER OR DAMAGED/LOST/STOLEN PROPERTY:

Name ______________________ Phone No. ( ) __________

Address ______________________ City __________

Employer & Address ____

INJURED PARTIES (Also complete a Supervisors Employee Injury Report if an IT Employee):

1. Name ______________________ Phone No. ( ) __________

Address ______________________ City __________

Employer & Address ____

1. Name ______________________ Phone No. ( ) __________

Address ______________________ City __________

Employer & Address ____

WITNESSES:

1. Name ______________________ Phone No. ( ) __________

Address ______________________ City __________

Employer & Address ____

2. Name ______________________ Phone No. ( ) __________

Address ______________________ City __________

Employer & Address ____

WERE PICTURES TAKEN? ☐ YES ☐ NO

WERE POLICE NOTIFIED? ☐ YES ☐ NO DEPT. __________ REPORT NO. __________

COMPLETED BY: __________ (Print name) __________ (Signature) __________ (Date)

MANAGER __________ (Print name) __________ (Signature) __________ (Date)

ITC FORM HS020C 8/13/93

USE BACK SIDE IF NECESSARY

IT Corporation is a wholly owned subsidiary of International Technology Corporation

954

INTERNATIONAL TECHNOLOGY CORPORATION

VEHICLE ACCIDENT REPORT

IT Vehicle

DRIVER ______ ACCIDENT DATE ______ DRIVERS LICENSE ______ STATE ______

ADDRESS ______

CITY ______ STATE ______ STATE ______ ZIP ______

WORK PHONE # ( ) ______ SS# ______ PC# ______

VEHICLE # ______ YEAR ______ MAKE ______ MODEL ______ LICENSE PLATE # ______

STATE ______ VEHICLE OWNER: ☐ IT CORP ☐ LEASED/RENTED ☐ PRIVATE VEHICLE

VEHICLE TYPE: ☐ COMMERCIAL MOTOR VEHICLE ☐ NON-COMMERCIAL

IF NOT OWNED: OWNER ______ PHONE ( ) ______

ADDRESS ______ STATE ______ ZIP ______

VEHICLE DAMAGE ______

OF VEHICLES TOWED FROM SCENE ______ NUMBER OF INJURIES ______ NUMBER OF FATALITIES ______

WERE HAZARDOUS MATERIALS RELEASED? ☐ YES ☐ NO IF YES, DESCRIBE MATERIALS ______

Other Vehicle(s)
Use separate sheet if more than one

DRIVER ______ DRIVERS LICENSE ______ STATE ______

ADDRESS ______

CITY ______ STATE ______ STATE ______ ZIP ______

PHONE #( ) ______ SS# ______

OWNERS NAME (CHECK IF SAME AS DRIVER ☐) ______

ADDRESS ______

CITY ______ STATE ______ ZIP ______

INSURANCE COMPANY ______ POLICY # ______

AGENT'S NAME ______ PHONE # ( ) ______

ADDRESS ______

CITY ______ STATE ______ ZIP ______

VEHICLE: YEAR ______ MAKE ______ MODEL ______ PLATE # ______ STATE ______

VEHICLE DAMAGE ______

PASSENGERS: ☐ YES (List on reverse) ☐ NO INJURIES: ☐ YES (List names & addresses on reverse) ☐ NO

Accident Description

DATE ______ TIME ______ A.M. or P.M.

LOCATION (CITY, STATE) ______

DESCRIPTION OF ACCIDENT ______

______

______

WITNESS ______ PHONE # ( ) ______

ADDRESS ______

POLICE OFFICER'S NAME ______ DEPARTMENT ______

EMPLOYEE ______ (PRINT) ______ (SIGNATURE) DATE ______

EMPLOYEE ______ (PRINT) ______ (SIGNATURE) DATE ______

PHONE OR FAX TO CORPORATE HEALTH & SAFETY AND RISK MANAGEMENT
WITHIN 24 HOURS, OR NOT LATER THAN NEXT BUSINESS DAY.
IT PHONE: [illegible] — IT FAX: [illegible]

[illegible]

INTERNATIONAL TECHNOLOGY CORPORATION

NUMBERS TO KNOW:

EMERGENCY NUMBERS

Ambulance ....

Doctor ....

Hospital ....

Fire Dept. ....

Police ....

Sheriff ....

U.S. EPA (24 Hour Hotline) 800-424-8802

Chemtrec 800-424-9300

National Poison
Control Center 404-588-4400

....

....

....

UTILITY NUMBERS

Electric Co. ....

Water Co. ....

Gas Co. ....

INTERNATIONAL TECHNOLOGY CORPORATION ... *Creating a Safer Tomorrow*

6-7-85 230

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory civil penalties against employers of up to $7,000 for each serious violation and for optional penalties of up to $7,000 for each nonserious violation. Penalties of up to $7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $70,000 for each such violation. A minimum penalty of $5,000 may be imposed for each willful violation. A violation of posting requirements can bring a penalty of up to $7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of $10,000 or up to six months in jail or both.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable

Atlanta, GA	(404) 347-3573
Boston, MA	(617) 565-7164
Chicago, IL	(312) 353-2220

Lynn Martin

Washington, DC
1991 (Reprinted)
OSHA 2203

INTERNATIONAL TECHNOLOGY CORPORATION

RELEASE OF LIABILITY

The undersigned hereby acknowledges that he/she is entering on properties where International Technology Corporation personnel are and/or may have worked. Entry is at his/her sole risk. The undersigned agrees to indemnify and hold harmless IT Corporation, its officers, employees, and agents from any and all claims and damages whatsoever including attorneys' fees resulting directly or indirectly from such entry for any cause whatsoever.

The undersigned recognizes and is aware of the dangers inherent on the site and hazards, including the risks associated with hazardous waste materials related to ongoing work, and executes the above indemnity with full knowledge of its consequences.

Name ______________________________

Signature ______________________________

Date ______________________________

Witnessed By ______________________________

IT INTERNATIONAL TECHNOLOGY CORPORATION

CALIBRATION LOG

Project Name ______________________ By ______________________

Project No. ______________________ Page ______ of ______

Date/Time	Instrument	STD	STD CONC ppm	Meter Reading	Comments

INTERNATIONAL TECHNOLOGY CORPORATION

REAL TIME AIR MONITORING LOG

PROJECT NAME ______________ LOCATION ______________ PROJECT NO. ______________

Date	Analyst	Time	Instrument (Mfg/Model/ Serial No.)	Calibration Date & Cpd.	Compound Measured	Span Set or Sens. Cal.	Conc. (Units)	Location/Activity/Comments

IT CORPORATION

DAILY VEHICLE INSPECTION

Project Name/Number: ______________________________
Vehicle Type: ______________________________
License Plate #: ____________________
Mileage: ____________________

BRAKES		HOSPITAL LOCATION MAP	
SEAT BELTS		PROOF OF INSURANCE	
TIRES		LIGHTS/REFLECTORS	
HORN		WINDSHIELD WIPERS	
GLASS		BACKUP ALARM	
MIRRORS		FIRE EXTINGUISHER	
DEFROSTER		EXHAUST SYSTEM	
STEERING SYSTEM		FLUID LEVELS	
ELECTRICAL SYSTEM		VISIBLE DAMAGE	

✓ = OK
N/A = Not applicable
X = Defective

These items are to be checked each shift before operating this piece of equipment. Report ALL items requiring repair to Supervisor.

NOTES:

OPERATOR/INSPECTOR: ______________________________
DATE

PT/08-93/REM_D:forms*inspect.tmp

PERSONNEL TRAINING/MEDICAL LOG*

Name	Representing	Medical exam date	40 Hr date	8 Hr Refresher date	8 Hr Supervisor date	SSHP date	First Aid/ CPR date	Other:

*Include copies of all training certificates in this Attachment.

INTERNATIONAL TECHNOLOGY CORPORATION

ON-THE-JOB TRAINING RECORD (OJTR)

TRAINEE ______________________ DIVISION ______________________

S.S.# _____ - _____ - _____ LOCATION ______________________

Date: ___/___/___ Hrs. Training ________ Instructor ______________________

Mo. Day Year

SUBJECT: ______________________

KEY POINTS: ______________________

PERFORMANCE EVALUATION: ______________________

Instructing [illegible] Signature

Trainee Signature

ITC FORM [illegible] (8/87)

INTERNATIONAL TECHNOLOGY CORPORATION

UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name/Number ______________________________ Date __________

Location ______________________________

Prepared By ______________________ Project Manager ______________________

This checklist must be completed for any intrusive subsurface work such as excavating or drilling. It records the fact that a underground and overhead structures and utilities in the work area are identified and located. The Project Manager shall reque utility markouts before the start of field operations to allow the client and utility companies time to complete them. If complet information is not available, a magnetometer survey shall be performed to locate obstacles prior to excavating or drilling.

Procedure

A diagram of the project area depicting the proposed location of excavation or drilling sites must be attached to this form. Th diagram must clearly indicate the areas checked for underground structures/utilities, and overhead power lines. This form an the diagram must be signed by the Project Manager, the IT Field Supervisor, and the client representative.

Checklist

Type of Structure	Present	Not Present	Method of Markout
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Steam Line			
Sewer Line			
Drain Line			
Underground Tank			
Overhead Power Line			
Overhead Product Line			
Septic Tank/Drain			

Client Representative ______________________ Date __________

IT Project Manager ______________________ Date __________

IT Field Supervisor ______________________ Date __________

INTERNATIONAL TECHNOLOGY CORPORATION

RESPIRATOR TRAINING COMPLETION FORM

FIT TEST PROTOCOL:

☐ Standard

☐ Other (specify) ______________

FIT TEST CONDUCTED BY ______________________

LOCATION ______________________ DATE ______________

Initial only the appropriate blocks

NAME ______ (Please print) SIG. ______ S.S. # ______	SCBA Brand: Model: Size: S M L XL	AIRLINE PRESSURE DEMAND Brand: Model: Size: S M L XL	AIR PURIFYING FULL FACE Brand: Model: Size: S M L XL	AIR PURIFYING HALF MASK Brand: Model: Size: S M L XL	PAPR Brand: Model: Size: S M L XL	OTHER Brand. Model Size: S M L XL
1. I understand why respiratory protection is needed and where and when it should be used.						
2. I Know how to use this respirator properly.						
3. I know how to clean and inspect this respirator.	(only user level inspection)					
4. I understand the limitations and restrictions of the respirators I will be using.						
5. I wore this respiratory equipment in normal air and checked the faceplece fit.						
6. I wore this respiratory equipment in a test atmosphere generated by smoke or other means.						
7. I understand that a good gas-tight face seal cannot be achieved with obstruction such as facial hair or glasses (with full face mask). I understand that corrective lens with frames compatible with the fullface mask (Smokespec) are available upon request by my manager.						

ITC FORM 9561-1 (3/92)
Attachment B

TECHNOLOGY CORPORATION

HOT WORK PERMIT

Operating Area__________ Good for this date only__________ 19____

Specific vessel or equipment__________

Work to be done__________

TESTS

STATE EXACT LOCATION OF TEST	TIME	PERCENT LOWER EXPLOSION LIMIT	PERCENT OXYGEN	OTHERS ____	OTHERS ____	INITIA

CHECK LIST

	Initial: Yes	Initial: Does Not Apply
Operations/plant personnel have been informed of work to be performed		
All tanks/lines/valves are disconnected, blinded, or locked out.		
Equipment and all attached piping has been cleaned and purged with: (check blank) Water____ Steam____ Inert gas____ Air		
Electrical service has been locked out and tagged.		
All grounding/bonding wire in place.		
Surrounding equipment and operations are safe for hot work.		
No open vessels or lines within 35 feet of hot work area.		
No combustible items within 35 feet of hot work area or covered with wetted tarpaulins.		
Fire Watch has been provided by Contractor.		
No flammable gases greater than 10% LEL in hot work area.		
All requirements of ITCPRO 9531 for Confined Space Entry have been met and ITC Form 9531-1 has been completed and posted.		
If vessel contains leaded product, all requirements of ITCPRO 9531.3 have been met.		

PERSONNEL PROTECTIVE EQUIPMENT

EYES
- ☐ Chemical Goggles
- ☐ Face Shield
- ☐ Safety Glasses
- ☐ Welders Mask

BODY
- ☐ Environmental Suit: ☐ PVC ☐ But
- ☐ Heavy Suit: ☐ PVC ☐ Neoprene
- ☐ Light PVC Suit
- ☐ Yellow Tyvek Suit
- ☐ White Tyvek Suit

EXTREMITIES
- ☐ Hard Hat
- ☐ Gloves
- ☐ Boots ☐ PVC ☐ Neoprene
- ☐ Hoods ☐ PVC ☐ Neoprene
- ☐ Foot Coverings, Disposable

RESPIRATORY
- ☐ Self-Contained Respirator
- ☐ Hose Line Respirator
- ☐ Hose Line W/Egress
- ☐ Cartridge Respirator
- Cartridge Type ______
- ☐ Dust Respirator

EQUIPMENT REQUIRED
- ☐ Fire Extinguisher
- ☐ Fire Blanket
- ☐ Charged Water Hose
- ☐ Combustible Gas Indicator

Special Instructions:__________

____

____

____

Completed by:__________ __________ __________

Name Printed Signature Date

____

Manager

ITC FORM 9571-1
CS/103-5-85

195-

ATTACHMENT G

SUBCONTRACTOR CERTIFICATION

SUBCONTRACTOR CERTIFICATION

I, ____ as an agent of ____, do hereby certify that the following employees comply with the medical and training provisions of 29 CFR 1926.65. Individual copies of certification of successful completion of the required training and medical examination are attached for each employee.

Signature ____________________ Date__________

Subcontractor Employee Name	Medical Clearance Expiration Date	24-Hr or 40-Hr OSHA Training	Refresher Training Expiration Date

APPENDIX B

CHEMICAL SAMPLING AND ANALYSIS PLAN (CSAP)

Draft
Chemical Sampling and Analysis Plan

Seneca Army Depot
Romulus, New York

Prepared for:

U.S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
140 Allens Creek Road
Rochester, New York 14618

Project No. 519070

August 1994

List of Figures

AA	Atomic Absorption Spectrophotometry
AIHA	American Industrial Hygiene Association
ARAR	Applicable or Relevant and Appropriate Requirements
AS	Semi-Automated Spectrophotometric Analysis (for cyanide)
ASP	Analytical Services Protocol
ASTM	American Society for Testing and Materials
BFB	Bromofluorobenzene
BNA	Base/Neutral/Acid Compound
CC	Continuing Calibration Sample
CCB	Continuing Calibration Blank(s)
CCV	Continuing Calibration Verification Sample(s)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
CLP SOW	Contract Laboratory Program Statement of Work
CRA	Contract Required Analysis (for AA)
CRDL	Contract Required Detection Limit
CRI	Contract Required Analysis (for ICP)
CRQL	Contract Required Quantitation Limit
CSAP	Chemical Sampling and Analysis Plan
CV	Cold Vapor AA
DFTPP	Decafluorotriphenylphosphine
DQO	Data Quality Objective
DS	Data System
ECD	Electron Capture Detector
EICP	Extracted Ion Current Profile
ELAP	Environmental Laboratory Approval Program
FADL	Field Activity Daily Log(s)
FB	Field Blank
FID	Flame Ionization Detection
FR	Field Replicate Sample
FS	Feasibility Study
GC	Gas Chromatography
GC/MS	Gas Chromatograph/Mass Spectrophotometer
H&S	Health and Safety
ICB	Initial Calibration Blank(s)
ICP	Inductively Coupled Plasma Spectroscopy
ICV	Initial Calibration Verification (Initial Calibration Check) Sample(s)

ID	Identification
IDL	Instrumental Detection Limit(s)
IEC	Interelement Corrections for ICP
L	Liter
LCS	Laboratory Control Sample(s)
LTTD	Low Temperature Thermal Desorption
MB	Method (Preparation/Extraction) Blank(s)
MD	Matrix Duplicate Sample
MDL	Method Detection Limit
mg/kg	Milligram per Kilogram
ml	Milliliter
MS	Matrix Spike Sample
MSD	Matrix Spike Duplicate Sample
NRC	Nuclear Regulatory Commission
NTU	National Testing Unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyl(s)
PE	Performance Evaluation
POTW	Public Owned Treatment Works
PSARCC	Precision, Sensitivity, Accuracy, Representativeness, Comparability, and Completeness
QA	Quality Assurance
QAO	Quality Assurance Officer
QC	Quality Control
RFA/COC	Request for Analysis/Chain-of-Custody
RI	Remedial Investigation
RL	Laboratory Specific Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SARA	Superfund Amendments and Reauthorization Act
SDG	Sample Delivery Group(s)
SEDA	Seneca Army Depot Activity
SOP	Standard Operating Procedure(s)
SOW	Statement of Work
SSHP	Site Safety and Health Plan
SSO	Site Safety Officer
SVOA	Semi-Volatile Organic Analysis
SVOC	Semi-Volatile Organic Compound
TB	Trip Blank

TCL	Target Compound List
TSDF	Treatment Storage Disposal Facility
μg/kg	Microgram per kilogram
μg/L	Microgram per liter
μg/m^3	Microgram per cubic meter
μl	Microliter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
WP	Water Pollution (Reference to USEPA PE)
WS	Water Supply (Reference to USEPA PE)

1.1 Introduction

This Chemical Sampling and Analysis Plan (CSAP) presents a summary of the sampling and analysis procedures that will be used by IT Corporation (IT) in support of the Work Plan and Scope of Services for the Rapid Response interim remedial measure at the Seneca Army Depot in Romulus, New York. The CSAP has been prepared to guide the work performed by IT for the U.S. Army Corps of Engineers (USACE), Omaha District, so that it meets the requirements detailed in Delivery Order No. 93, under Rapid Response contract number DACW45-90-D-9002. This document is included in the project Work Plan as Appendix B.

The CSAP is the governing document of quality assurance (QA) practices to be implemented for the Seneca Army Depot (SEDA) Ash Landfill remediation project. This document includes the quality objectives, the requirements for work performance to meet these objectives, and the means for verifying that the objectives have been met. In addition to the above, all work performed on this project will be conducted in strict accordance with the Site Safety and Health Plan (SSHP).

1.2 Site Location and History

The Seneca Army Depot facility is located in Romulus, New York near the eastern shore of Seneca Lake, where it was constructed in 1941. Prior to ownership by the Department of the Army, the site was used for farming. Below, a summary of the site history and condition is presented. Specific details on the location, history, and condition of the depot and landfill area can be found in the Draft Scope of Services document prepared by the USACE, Omaha District in August, 1994. Figure 1-1 presents a map of the Seneca Army Depot facility and surrounding areas.

The Ash Landfill site encompasses approximately 130 acres of the 10,587 acre Seneca Army Depot, near the southwestern corner of the facility. The site consists of the abandoned landfill area, including the Ash Landfill and the Non-Combustible Landfill, a burned out incinerator building and stack, and a nearby cooling pond. Residences and farmland border the area on the western side and beyond that lies Seneca Lake. The

SEDA railroad runs to the east of the site and SEDA has undeveloped land to the south. Cemetery Road bounds the area to the north.

The subject of this Rapid Response action is the "Bend-in-the-Road" Landfill located near the western boundary of the Seneca Army Depot. The Ash landfill was established to dispose of ash generated from burning of the facilities' trash from 1941 to the early 1960's. In 1974, an incinerator was built to treat the refuse from facility operations and the ash from the incinerator was also buried in the "Bend-in-the-Road" landfill area. A fire in May of 1979 destroyed the incinerator and the landfill was closed at the same time. Since that time, the landfill area has been capped with various layers of soils, but was never closed with an engineered cover or cap.

In addition to the burning pit and incinerator ash disposed of in the Ash Landfill, it is suspected that other types of facility refuse and domestic wastes have also been buried in the landfill. The amount and type of debris varies greatly, with household trash such as bottles and cans to construction-type debris present.

1.3 Project Description

The Seneca Army Depot Activity (SEDA) was listed on the NPL in July, 1989 based on the threats posed by contaminated soils and debris contributing to the groundwater contamination problem at the Ash Landfill site. This project will execute a Rapid Response removal action that will address the contaminated soils at the Ash Landfill, thus potentially alleviating the groundwater degradation problem at the "Bend-in-the-Road" Landfill area. A USACE Scope of Services document (USACE, Draft Scope of Services for Ash Landfill, August, 1994) presents the scope of work for the Rapid Response Project. The project will proceed in two phases. The first phase will involve surveying and performance of soil borings designed to confirm the extent and delineation of the contaminated soil and debris areas. Phase 2 will include dewatering activities, excavation of soil volumes, and treatment of the contaminated soil by low temperature thermal desorption, as well as support activities such as quality assurance/quality control, health and safety, and air emission monitoring. At the completion of treatment and site restoration activities, the project will conclude with the preparation of a final project report.

1.4 Project Objectives

The primary objectives of this project are to:

- Confirm the extent of the known soil contamination areas in order to delineate with confidence the removal of all contaminated soils and debris for treatment;
- Treat contaminated soils by low temperature thermal desorption (LTTD) to remove halogenated volatile organic compounds (VOCs) and polynucleated aromatic hydrocarbons (PAHs) to prescribed treatment cleanup levels; and,
- Backfill the Ash Landfill with treated soils.

IT's project organization is structured to include experienced professional and technical specialists in various disciplines. The project organization chart is shown in Figure 2-1. IT will be responsible for conducting the field activities, sample collection and handling, and chemical analysis, final data review, and meeting all reporting requirements. An analytical laboratory with New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and USACE Missouri River Division (MRD) Laboratory certification for all categories of Contract Laboratory Program (CLP) will perform the required analyses. Additionally, a qualified team will conduct data validation and review activities to establish the appropriate level of objectivity for all analytical results generated during the project. Specific information on the project organization and responsibilities are discussed in detail in the project Work Plan.

The generation of valid data required for full-scale design, system operation, and performance of the low temperature thermal desorption treatment technology, as well as appropriate emissions monitoring, must be accomplished through an established quality assurance/quality control (QA/QC) program. IT has developed and implemented a formal QA Program to provide direction for corporate operations so they will be performed in a controlled manner. This program, established in 1973, operates in compliance with the Code of Federal Regulations (CFR), 10 CFR 50, Appendix B; American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities;" and current United States Environmental Protection Agency (U.S. EPA) guidelines and recommendations (e.g., QAMS-005/80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans"). The purpose of the program is to establish policies that facilitate the implementation of regulatory requirements and to provide internal means for control and review, thus ensuring that the work performed by IT complies with all requirements.

Site-specific QA/QC procedures will be in accordance with the following documents:

- IT Engineering Operations QA Manual, Revision 2, July 1, 1994.
- U.S. EPA, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," QAMS-005/80.
- USACE, "Chemical Data Quality Management for Hazardous Waste Remedial Activities", ER-110-1-263, October, 1990.

QA/QC procedures prescribed in USEPA, New York State Department of Environmental Conservation (NYSDEC) and American Society of Testing Materials (ASTM) methods will be used in all sampling and analysis. IT will review all data package QA/QC documentation to ensure data quality. Only data that conforms to the standards specified in this CSAP will be used to evaluate site conditions and remediation effectiveness.

The purpose of a QA program is to establish policies for the implementation of regulatory requirements and to provide an internal means for control and review such that the work performed is of the highest professional standard. This CSAP describes the project organization structure and specifies the procedures, documentation requirements, sample custody requirements, acceptance criteria, audit and corrective action provisions, etc. to be applied to provide confidence that all operations and activities meet the intent of USEPA and NYSDEC regulatory guidelines, as well as USACE requirements. The responsibility for the overall implementation of the QA program rests with the Quality Assurance Officer (QAO). The QAO is responsible for maintaining the project QA/QC program and verifying its implementation through audits and surveillances.

This CSAP has been prepared in direct response to the project quality goals. This plan describes the QA program to be implemented and the QC procedures to be followed by the Rapid Response contractor and any other subcontractors during the course of this project for the USACE.

3.1 Intended Uses of Acquired Data

The intended uses of the acquired data are to assess the condition of the site and the degree and extent of potential problems resulting from past activities at the site, to qualitatively evaluate the potential hazard to human health and the environment, and to identify and evaluate the alternative remedial actions. These objectives can be effectively met by completing the following tasks:

The intended uses of project chemical data include the following:

- Confirmation of the areal extent of soil to be remediated;
- Confirmation that treated soil is suitable for backfill;
- Confirmation of treatment efficiency of low temperature thermal desorption unit during prove-out and normal treatment operations; and,
- Characterization of soil and debris for off-site disposal;
- Characterization of wastewater generated during remedial activities for proper disposal;

- Confirmation that air emissions generated by site activities are controlled and not migrating off-site.

3.2 Data Quality Objectives

The overall data quality objectives (DQOs) of the sampling and analysis program for this project are to generate data of sufficient quality to support remediation and to confirm closure of the site. This plan provides the necessary quality assurance/quality control (QA/QC) guidance to ensure that the data collected by IT will be sufficient and of adequate quality for their intended use. Table 3-1 presents the primary DQOs for this project.

3.3 Project Quality Assurance Objectives

The primary purpose of the QA program is to provide data of sufficient quality and quantity to achieve project intended use objectives. These quality assurance objectives will be met through a comprehensive QA and data validation program encompassing sampling through data analysis and reporting. Data quality and quantity are measured through comparison of resulting data with established acceptable limits for data precision, sensitivity, accuracy, representativeness, comparability, and completeness (PSARCC) as described in USEPA/540/G-87-003,1987, titled "Data Quality Objectives for Remedial Response Activities." Data that may be outside PSARCC QA objectives will be evaluated to determine if the data can be defensibly used to meet the project objectives. The project quality assurance objectives are:

- Data will be gathered and developed in accordance with procedures appropriate for the intended use of the data;

- Data will be of known and acceptable precision, sensitivity, accuracy, representativeness, comparability, and completeness, as required by the project data quality objectives; and,

- Data will be legally and scientifically valid.

3.4 Analytical Quality Assurance Objectives for Data

PSARCC have been developed for organic analyses of wastewater, soil, and air based on sample objectives, analytical methods, historical data, and published guidelines for NYSDEC's Analytical Service Protocols (ASP, 1991). Data Quality Objectives for soil and water media, as they relate to this project, are summarized on Table 3-1. Tables 3-2, 3-3 and 3-4 detail precision and accuracy objectives for organic and inorganic analyses. Table 3-5 provides "DQO Levels," as defined by USEPA (USEPA, 1987), for each analysis or measurement to be completed during this project. PSARCC parameter objectives will be achieved through the use of standardized sample collection and analysis procedures and close adherence to the quality assurance procedures outlined in this CSAP and the analytical laboratory's standard quality practices manual attached to this text.

To meet the project objectives outlined in Section 1.4 and the quality assurance objectives detailed in Section 3.0, the sampling program for this project will be conducted in two phases, outlined as follows:

Phase 1

- Sampling of soil headspace for VOCs using a portable gas chromatograph; and,
- Collection of soil samples from soil borings;

Phase 2

- Collection of groundwater samples and samples of discharge water, generated as a result of excavation dewatering, for chemical analysis.
- Collection of confirmatory soil samples from excavation areas.
- Sampling of soil prior to and following treatment in a Low Temperature Thermal Desorption (LTTD) system.
- Measurement of air emissions from the project activities.

The field-sampling teams will collect samples according to protocols defined in the Soil Boring Work Plan and this CSAP, document field measurement and sampling procedures, and follow strict request for analysis/chain-of-custody (RFA/COC) procedures. The QAO and the Project Manager will provide real-time QA for this program through field audits and daily coordination with the field-sampling teams.

The number of soil and wastewater samples to be collected for chemical analyses, and the types of analyses to be performed on each are given in Table 4-1 and the Work Plan. Details of sample collection, including sampling points, required sample containers, preservation, holding times, preparation of sampling equipment and containers, sample handling and shipment, and field sample custody procedures, are given in Table 4-2. After sample collection, all samples must be delivered to the laboratory within 24 hours from the time of collection.

4.1 Field Activities - Phase 1

Soil borings and attendant soil sampling will be accomplished on the perimeter of the two cells of the Ash Landfill site to confirm that the proposed limits of excavation of the cells meet specified performance standards. All field activities are in accordance with the General Geology Scope of Services. IT will obtain soil samples along the perimeter of the two areas to be excavated. A total of 31 soil boring locations, set at 50 foot intervals on the perimeters of two areas of excavation, will be performed. Each boring will be augered to the top of bedrock with a total depth of approximately 10 feet for each boring is anticipated.

Three (3) soil samples will be collected from each boring location for submission to an on-site portable gas chromatograph (GC) for screening. If GC screening results indicate that the three samples from a particular boring either contain less than soil clean up concentrations or no detectable concentrations of site-specific volatile organic compounds (VOCs), then subsamples of the three samples will be submitted to an off-site analytical laboratory for confirmational testing. If on-site GC results indicate that site-specific VOCs are present in any one of the three soil samples at concentrations higher than soil cleanup levels then a second boring will be performed at a location on a new perimeter located ten feet further out and away from the original investigation perimeter.

Soil borings will be performed using the hollow-stem auger technique. All borings will be drilled in accordance with all federal, state, and local requirements. Soil samples will be screened in the field using an organic vapor analyzer (OVA) flame ionization detector (FID) and a portable gas chromatograph (GC) to test the headspace in a 40 mL VOA vial containing the soil sample to semi-quantitatively identify the possible presence of site specific VOCs in soil. Protocols for drilling, sampling, and all other aspects of the investigation are outlined in Appendix C - Soil Boring Plan.

4.2 Field Activities - Phase 2

Phase 2 sampling activities with involve the following:

- sampling of untreated water generated from dewatering activities, which will be influent to an air stripper water treatment unit, and the subsequently treated effluent water;

- sampling of soil prior to and following treatment in the LTTD system; and,

- sampling of soil in excavation areas.

- sampling of air emissions from project activities.

Subsections 4.2.1 through 4.2.4 provide additional detail on the Phase 2 sampling activities.

4.2.1 Wastewater Sampling - Dewatering Activities

Water generated as a result of dewatering activities will be routed to 20,000 gallon capacity "Baker tanks" located inline prior to the air stripping water treatment (stripper) unit. Treated water will be routed directly from the stripper into similar tanks. Samples of both the influent and effluent water from the stripper will be sampled from their respective Baker tanks by means of a bailer which will be lowered into the tank through an access port located on the upper surface of the tank. The following procedures will be followed when sampling the Baker tanks:

- Tank locations and numbers will be recorded on a Sample Collection Log or similar document.

- The field personnel will don latex inner gloves and nitrile outer gloves.

- The access port cover on the tank will be removed. Readings of VOC levels in both the access port and the surrounding ambient air will be obtained. These readings will be recorded in the Field Activity Daily Log.

- Tank sampling will be accomplished by the use of new, dedicated, PVC bailers or new, dedicated, Teflon® bailers. One bailer will be dedicated to each tank for the duration of the project. New polypropylene rope will be used to lower the bailer into each tank.

- Prior to collecting the sample, ensure that the required preservative is present in each sample bottle. Label all containers and stage the collections setup to minimize extraneous sampling time.

- Influent and effluent water samples will be collected and placed in sample containers which will be prepared by the laboratory and delivered to the site. The sampler will quickly add the sample into the sample container, while minimizing aeration and potential loss of volatile contaminants. Samples collected for analysis of volatile constituents will be collected first.

- When a sample bottle is filled, the bottle must be tightly capped as soon as possible.
- Efficiency and care must be utilized to obtain representative samples for volatile organic analysis. Unnecessary delays or poor sampling technique will lead to loss of the volatile constituents from the sample. Prevent unnecessary stripping of volatile constituents from the sample by minimizing turbulence and aeration when filling the bailer and when filling the sample container. For VOC samples, quickly fill the sample container until a positive meniscus is achieved above the rim of the container and cap the container immediately. Gently tap the sample container to dislodge any air bubbles and verify that no bubbles are present. If bubbles are detected, immediately uncap the sample, add additional sample, and check the sample for bubbles. Repeat this step until the volatile organics sample contains no bubbles and all required samples are obtained.
- As soon as samples are collected, promptly prepare the samples for shipment.
- After the tank has been sampled, the access port cap will be replaced and secured.
- The time and date of each sampling event will be recorded in the Sample Collection Log and also on the sample chain-of-custody form.
- After each sampling event, disposable sampling equipment such as gloves and rope, and plastic sheeting will be collected and containerized.

Water samples will be submitted to the off-site laboratory for analysis as required by the project discharge authorization.

4.2.2 Soil Sampling

Soil samples will be collected from stockpiles during the start-up/prove-out event for the LTTD system and also during on-going treatment of soils to confirm successful treatment of the soil. Soil sampling during the prove-out phase will consist of collection of treated and untreated soil for analysis for volatile and semivolatile organic compounds at a rate of 1 sample per 150 tons of untreated soil and 1 sample per 150 tons of treated soil. This protocol will be altered to acquiring 1 sample of soil per 150 tons of treated soil following prove-out. Post prove-out soil sampling and analytical protocol will also include collection and analysis of 1 sample per 750 tons of treated soil for TCLP toxicity analysis by USEPA SW846 Method 1311. The following procedure will be followed to obtain soil samples:

- Record the sampling locations, date and time, and sample number on the Sample Collection Log

- Using a decontaminated stainless steel shovel, excavate at least two feet into the soil pile and collect a soil sample for volatile organic analysis in a separate sample jar/container for later compositing at the laboratory. Continue collecting composite samples until four individual locations on the soil pile have been sampled.

- Continue this procedure until the required sample volume is collected depending upon the sample volume required for the analysis to be performed

- Composite (mix) all collected soil in the stainless steel bowl with a decontaminated stainless steel spoon/trowel. Only soil collected for analyses other than volatiles will be composited on-site in a stainless steel bowl

- Put on disposable latex gloves and place the composited sample material into the laboratory containers

- The time and date of each sampling event will be recorded in the Sample Collection Log and also on the sample chain-of-custody form.

- After each sampling event sampling gloves will be collected and containerized.

If necessary duplicate of split samples of soil (and water) media will also be collected for submittal to USACE MRD to complete required quality assurance checks.

4.2.3 Excavation Soil Sampling

In addition to the above, confirmatory soil samples will be collected from project excavation areas. Soil samples will be collected from the bottom of the excavation at a rate of one sample for every 2500 yards excavated. Samples will be collected by compositing soil from several discrete locations in the active excavation areas. Samples will be analyzed for volatils organic compounds and semivolatile compounds.

4.2.4 Air Emissions Sampling

Air emissions from project activities will be sampled to demonstrate compliance with required air media action levels and to evaluate potential migration of contaminated air media off-site. Details regarding air emissions sampling are presented in Appendix F - Air Monitoring Plan.

An essential part of any sampling/analytical scheme is the ability to document sample history. Chain-of-custody establishes the documentation and control necessary to identify and trace a sample from collection to final analysis. Such documentation includes labeling to prevent sample misidentification, container seals to prevent unauthorized tampering with contents, secure custody, and the necessary records to support potential litigation and refute challenge of the data. These precautions are crucial for a valid chain of custody.

The sample custody and sample documentation procedures implemented during the project will meet the requirements specified in the appropriate guidelines. Sample custody and traceability will be the responsibility of IT personnel from the time of sample collection until the samples are received at the analytical laboratory. Thereafter, custody will be maintained by the laboratory performing the analysis. Samples archived on-site will be handled and stored in an appropriate manner and remain in the custody of the QAO until released for analysis or disposal.

5.1 Field Custody Procedures

The following will be used in the chain-of-custody process for sample tracking and field activities:

- Sample identification and labeling;
- Sample chain-of-custody form;
- Field Activity Daily Log form;
- Laboratory request for analysis form, and
- Sample collection log.

5.1.1 Sample Identification and Labeling

All samples will be adequately marked for identification from the time of collection and packaging through shipping and storage. Marking will generally be on the sample container (jar, bottle, etc.), but may be applied directly to the sample, or on a tag or label attached to the sample or container, depending on the type of sample and its intended use. Sample identification will include, as appropriate:

- Project name and number;

- Unique sample number;
- Sample location (e.g., boring, excavation area, depth or sampling interval, and field coordinates);
- Sampling date and time;
- The initials of the individual(s) performing the sampling;
- Sample preservative used; and,
- Parameter analysis.

Labels will be placed on all sample containers prior to sample collection. To uniquely identify and track each sample with its corresponding analytical results, an alphanumeric sample number will be affixed to the sample container in duplicate, one on the sample label and the other on the container lid. A third sample number, identical to the sample numbers on the sample label and lid, will be placed in the field sample logbook along with all pertinent sample identification information. An example of a sample label is illustrated in Figure 5-1.

5.1.2 Sample Chain-of-Custody Record

Documentation of the sample chain-of-custody is provided by the use of request for analysis/chain-of-custody (RFA/COC) forms which record the sampling location, the type and amount of samples collected, requested analyses, the date and time of sample collection, the name(s) of the person(s) responsible for sample collection, the date and time of all custody transfers, the signature of the person relinquishing and accepting sample custody, and other pertinent information.

Chain-of-custody procedures document sample possession from the time of collection to disposal. A sample is considered in custody if it is:

- In one's actual possession;
- In view, after being in physical possession;
- Locked so that no one can tamper with it, after having been in physical custody; and,
- In a secured area, restricted to authorized personnel.

A chain-of-custody record will be initiated in the field and will accompany each group of samples during shipment to the laboratory. An example RFA/COC form is shown in Figure 5-2. Each time custody of the sample changes, the new custodian will sign the record and indicate the dates of transfer. The RFA/COC forms will be completed, signed, and distributed as follows:

- One copy will be retained by the Sampling Team Supervisor for inclusion in the project files.

- The original will be sent to the analytical laboratory with the sample shipment. and will be returned with the analytical report to be included in the project file.

Upon sample receipt at the laboratory, the laboratory coding custodian will inventory each shipment of samples before signing and dating the original custody form. The laboratory analytical coordinator will then make a note on the custody form of any discrepancy in the number of samples or breakage of samples. The Sampling Team Supervisor will be notified immediately of any problems identified with shipped samples. The laboratory will initiate an internal sample tracking procedure to follow the procession of the sample within the various areas of the laboratory. The laboratory will archive and maintain custody of the samples as required by the contract or until notified by the Project Manager or QAO to dispose of them.

All original chain-of-custody forms, analytical data, and other project documentation will be maintained in a project file. A legible copy of the field chain-of-custody record will be maintained by IT. Once samples are received in the laboratory, chain-of-custody forms will be signed by a designated representative of the laboratory and copies of the signed chain-of-custody forms will be submitted to IT's central file location.

5.1.3 Sample Collection Log

A sample collection log will be completed for each sample collected. Each sample collection log will contain, at a minimum, the following information:

- Project name
- Unique sample number
- Collection date and time
- Sample collector
- Sample location and type
- Container type
- Source
- Grab number
- Field observations

- Compositing information
- Weather conditions
- Problems encountered.

The sample collection logs will be filed in the project files sequentially by field sample number. An example of the sample collection log that will be used during the project is shown in Figure 5-3. This documentation will provide an inventory and field sampling record of each sample collected during field sampling activities and will allow monitoring of the timeliness and completeness of all sampling activities in the field on a real time basis. The sampling procedures, the types of samples collected, and the sample containers used will be monitored following collection of samples. This documentation will also be used as an inventory checklist by which the shipment of all samples to the analytical laboratory will be verified.

5.1.4 Field Activity Daily Log

Field activities including sampling, field measurements, and screening will be documented on a Field Activity Daily Log (FADL) form. The Field Activity Daily Log will serve as the chain-of-custody for field activities. Entries in the log will be made in water-resistant ink and will include, but not be limited to:

- Date, time, and personnel present;
- A detailed chronology of the day's field activities;
- Documentation of existing weather conditions;
- Unusual events;
- Sample location and number;
- Visitors on site;
- Communication with regulatory agencies, or others; and,
- Changes to plans and specifications.

The Day and Night Operations Supervisors will maintain a bound logbook to document sampling activities. Eventually, on completion of the project, all FADLs will be bound together as part of the permanent project records. An example of the FADL is shown in Figure 5-4.

5.2 Laboratory Custody Procedures

5.2.1 Laboratory Sample Receipt

Upon receipt in the laboratory, the Sample Custodian, or representative, shall unpack the shipping containers, compare the contents with the chain-of-custody record, and sign and date the record. The Sample Custodian will also record the carrier and waybill number on the original chain-of-custody form, if it is not already present. Figure 5-5 presents a Sample Receiving Checklist that the Sample Custodian will complete for each Sample Delivery Group (SDG) received at the laboratory. Upon sample receipt, the Sample Custodian or designee shall:

- Examine all samples and determine if proper temperature has been maintained during shipment. The receiving temperature will be recorded on the chain-of-custody form. If samples have been damaged during shipment, the remaining samples shall be carefully examined to determine whether they were affected. Any samples suspected of being affected shall also be considered damaged. It will be noted on the chain-of-custody record what specific samples were damaged and that the samples were removed from the sampling program. Field personnel will be notified in writing as soon as possible that samples were damaged and that they must be resampled, or the testing program changed. Evaluation of the cause of damage must be prepared;

- Compare samples received against those listed on the chain-of-custody/request for analysis form;

- Verify that sample holding times have not been exceeded. If the sample holding time has been exceeded, the Sample Custodian, or designee, will telephone the Operations Supervisor as soon as possible. In addition, he will notify in writing to the field personnel that this has occurred and will prepare a Nonconformance Report as described in Section 13.0;

- Sign and date the chain-of-custody form and attach the waybill to the chain-of-custody form;

- Place the samples in adequate laboratory storage;

- Log the samples into a computerized information management system which will contain, at a minimum, the following information:

  - Project identification number
  - Sample numbers

- Type of samples
- Date received in laboratory
- Sampling date;

- Notify the laboratory manager or group leaders of sample arrival;

- Place the completed chain-of-custody records in the laboratory project file.

If samples collected arrive without chain-of-custody or incorrect chain-of-custody records, the following actions shall be taken by the Sample Custodian:

- If the chain-of-custody form is incorrect, a telephone call will be made as soon as possible, and a memorandum to the Operations Supervisor will be prepared outlining the deviations from accepted procedure. The memorandum must be signed and dated by the person originating the chain-of-custody and the Sample Custodian. The memorandum will serve as an amendment to the chain of custody. If the information on the chain-of-custody form cannot be corrected by the Sample Custodian or the field personnel, the samples affected are subject to possible removal from the sampling program based on a mutual decision which will be made by the Sample Custodian and the QAO.

- If the chain-of-custody form was generated but not shipped with samples, the field personnel shall be immediately contacted by the laboratory Sample Custodian and a memorandum prepared by the Operations Supervisor which lists the persons involved in collecting, shipping, and receiving the samples and the times, dates, and events. Each person involved must sign and date this memorandum. The chain-of-custody form shall be immediately forwarded (via telefax) to the laboratory and the memorandum attached to it and placed in the file; and,

- If a sample set arrives at the laboratory without a chain-of-custody form and it is determined that a chain-of-custody form was not prepared for the respective sample set, the affected samples shall be removed from the sampling program and a subsequent set of samples shall be collected and submitted to the laboratory along with a chain-of-custody form.

5.2.2 Sample Analysis and Disposal

The laboratory director will inspect the paperwork and, if all is in order, will direct the laboratory sections to begin analysis. If problems are noted, the laboratory project manager will resolve them with the Project Manager. After log-in, samples will be placed in refrigerated storage pending analysis.

Sample chain-of-custody is maintained throughout the laboratory by a system of door locks. All external doors to the laboratories will be kept locked at all times. Access will require use of a key issued to company employees. Thus, in order to gain access to the laboratories, one must either be an employee or be escorted by an employee. Laboratory personnel will comply with all internal laboratory chain-of-custody procedures as outlined in the laboratory's standard practices manual to be appended to this document.

Samples and extracts are to be retained by the laboratory for six (6) months following data submission.

5.2.3 Laboratory Analytical Results

Analytical results for each sample submitted to the laboratory will be reported along with all associated analytical quality assurance data. Laboratory analytical results documentation will be issued by the laboratory for all project samples and will contain the following:

- Field sample number
- Laboratory sample number
- Sampling date
- Sample prep date
- Sample analysis date
- Sample results in appropriate units
- Detection limits
- Referenced method
- Quality control documentation.

5.3 Project Change

In order to ensure personnel and equipment safety, and maintain continuity of ongoing work, a method of documenting and approving on-the-spot (field) changes to technical plans and procedures is required. Any changes, either in the field or at the discretion of the USACE, SEDA, or the IT Project Manager must be documented, evaluated, and reported as necessary. It is necessary to manage change so that the actual course of the project, not the original plan, can be demonstrated and justified. Changes must be documented so that the actual course of work is known and the effect of the change upon the course of work can be evaluated.

It is the responsibility of project personnel to appropriately record the change or variance and to make the documentation available as appropriate to project or laboratory management. The effect of the change upon the project shall be evaluated by the Project Manager, Operations Supervisor, Laboratory Director, QAO, and/or subcontractor management as required.

The effect of change or variance on the project should be evaluated by management prior to implementation. Review and written approval for changes which affect the project activities should be provided by management. Following the review and approval process, notification of the change should be made to appropriate personnel and affected documents revised as necessary to reflect the work as actually performed.

Within five business days of verbally approving a critical field change, a formal written record of the change will be prepared by the Operations Supervisor, reviewed by the Project Manager, and submitted to the appropriate agencies.

Calibration procedures for the sampling and analytical instrumentation used during a project are provided in the method procedure documents. Each referenced analytical method further defines the calibration procedures and frequency requirements as well a recommended routine maintenance schedule. The standard operating procedures written by the laboratory for instruments currently being used will also be referenced for calibration procedures and frequency. All sampling and analytical instrumentation will be calibrated according to the suggested frequencies unless the associated data quality control indicators or professional judgment suggest otherwise. The manufacturer's calibration instructions will be followed during the implementation of the calibration procedures.

All calibration procedures and frequencies will comply with DQO requirements (USEPA, 1987). All field equipment will be calibrated and will be maintained and repaired in accordance with the manufacturer's specifications. In addition, prior to use, each major piece of equipment will be cleaned, decontaminated, checked for damages, and repaired as needed. These activities will be noted in the Field Activity Daily Log book or laboratory log.

A unique identification number shall be assigned to each piece of testing equipment. The equipment identification number shall be recorded by the user on appropriate calibration, field and/or laboratory data sheets, or on other record forms. This procedure will serve as a basis for determining past performance of equipment.

6.1 Field Monitoring Equipment

Field monitoring equipment used to collect and record data will be calibrated periodically according to the procedures and frequencies suggested by the instrument manufacturer. Inspection and maintenance procedures for process instruments pertinent to routine data acquisition will be conducted in accordance with manufacturers' requirements. These instruments may include equipment such as a water level probe, portable GC, air sampling pumps, dust/aerosol monitor, HNus, OVAs, LEL/oxygen meters, flowmeters, weigh scales, thermocouples, and pressure sensing devices associated with the project. All calibration data for each instrument will be documented and will include the calibration procedures implemented if different from the procedures recommended by the manufacturer. These data will also include:

- Device being calibrated
- Identification number (serial number or tag number)
- Reference device
- Date reference device last calibrated
- Identification of reference device (serial number, lot number, etc.)
- Date calibration performed
- Name of the technician performing calibration.

6.2 Laboratory Analytical Instrument Calibration

Analytical instrumentation will undergo rigorous calibration checks and re-checks of performance. Initial and continuing calibrations will be performed to determine linearity of response versus concentration of standards with known analyte or compound concentrations.

The NYSDEC ASP analytical methods selected for use in this investigation specify the types and frequency of calibrations. The specific method references are provided in Section 7.0. Table 6-1 summarizes the quality control checks for the analytical instruments. For accessory analytical equipment such as balances and ovens that are required in preparation procedures, calibrations will be performed per manufacturers' instructions and guidelines.

The acceptance criteria for both initial and continuing calibration will be evaluated before sample analysis. If acceptance criteria for initial and continuing calibrations are not met, sample analysis will not proceed until the analytical problem has been rectified and the criteria met. Linearity checks will be used to verify that response has not shifted significantly from the most recent calibration. The instrument initial calibration procedures and acceptance criteria will be those established in the analytical methods detailed in the USACE Scope of Services document. Additionally, internal standards will be analyzed to evaluate instrument and method performance.

Whenever possible, recognized procedures, such as those published by the American Society for Testing and Materials (ASTM), the USEPA, or procedures provided by manufacturers, will be utilized. At a minimum, the procedures shall include:

- Equipment to be calibrated;
- Reference standards used for calibration;
- Calibration technique and sequential actions;
- Acceptable performance tolerances;
- Frequency of calibration; and,
- Calibration documentation format.

Specific laboratory calibration procedures (as outlined in the laboratory's standard practices and quaility assuarance manuals) will be attached to this CSAP.

TABLE 6-1
QUALITY CONTROL CHECK SUMMARY

QC Checks	Frequency
Field Blank (FB)	1 per matrix per parameter per 20 samples
Rinsate Blank (RB)	1 per matrix per parameter per 20 samples
Trip Blank (TB)	1 per 20 or SDG (volatiles only) per cooler
Field Duplicate (FD)	1 per matrix per parameter per 20 samples
Method (Preparation) Blank (MB)	1 per 20 or prep/analysis batch per SDG
Matrix Spike (MS)	1 per matrix per 20 or SDG
Matrix Spike Duplicate (MSD)	1 per matrix per 20 or SDG (organics only)
Matrix Duplicate (MD)	1 per matrix per 20 or SDG (inorganics only)
Laboratory Control Sample (LCS)	1 per analytical batch not to exceed 20 samples (inorganics only)
Continuing Calibration Check (CC)	Every 12 hrs or per shift not to exceed 12 hrs (organics only)
Performance Evaluation (PE) Samples	Once during project
Initial Calibration Verification Check (ICV)	1 per analytical run immediately following calibration (inorganics only)
Initial Calibration Blank (ICB)	1 per analytical run immediately following the ICV (inorganics only)
Continuing Calibration Verification Check (CCV)	Every 10 samples during analytical run (inorganics only)
Continuing Calibration Blank (CCB)	Every 10 samples immediately following CCV (inorganics only)
Surrogate Spike	Every analytical run (organics only)

Laboratory analytical procedures used for this project will be selected from those listed in Table 7-1 and discussed in Section 7.2 and 7.3. These methods represent industry-recognized analytical procedures from source documents established by USEPA and NYSDEC. Any changes in the documented procedure will constitute a project variance; the IT Project Manager and USACE Rapid Response Technical Manager must be notified.

7.1 Laboratory Requirements

The laboratory that will conduct the analytical portion of this project must meet certain criteria in order to perform these activities. These criteria include:

- Meet overall acceptance criteria of the NYSDEC and receive approval from the NYSDEC;
- Maintain NYSDOH ELAP certification for all categories of CLP, including for VOCs and SVOCs, as well USACE laboratory certification and,
- Must have in place standard procedures to notify the QAO of any analytical/laboratory protocol deviations.

7.2 Analysis of Soil and Water Samples

The consistency of analytical measurements over the period of project performance is critical. The analytical methods specified must be strictly adhered to when used for this project. Laboratory analytical methods and quality control procedures are referenced ftrom NYSDEC ASP volumes 1-8 (1991) requirements. All laboratory analytical methods will strictly follow NYSDEC ASP 1991 procedures. The analytes and detection limits required for this project will conform to the Superfund-CLP-Organics protocols as listed in NYSDEC ASP 1991. A summary of the methods to be utilized for the analytical portion of this project is presented in Table 7-1. Contract required quantitation limits (CRQL) and contract required detection limits (CRDL) for the analytes measured by these methods are listed in Table 7-2.

For volatile organic compounds, the laboratory ***will report all detected levels*** in all samples for all matrices. Values of positive results below the CRQL will be flagged with a "J" as required by ASP protocols to indicate uncertainty in the quantitation below the CRQL. Values of results which do not meet ASP compound identification criteria (e.g. spectral matching) will be reported with a "P" flag to indicate the possible presence of the compounds. As appropriate, the raw data will be reviewed during data validation to confirm the presence or absence of "P" flagged compounds. Values below 1 μg/L for liquids and 1 μg/kg for solids will be reported as non-detected. For all other ASP laboratory analyses, ASP protocols will be followed in analytical reporting. The laboratory will report values found below the CRQL with "J" flags.

The laboratory must follow the approved methods closely. If matrix problems necessitate the dilution of a sample for quantitation, the laboratory will perform the lowest dilution possible to maintain the lowest possible detection limits for the sample analytes or compounds.

7.3 Analysis of Air Samples

Air samples collected as part of the air monitoring task over the duration of the project are discussed in detail in the Appendix F, Air Monitoring Plan. Specific sampling protocols and analytical methods are presented as well as appropriate QA/QC, data validation and reporting measures. For additional information, refer to the appended Air Monitoring Plan.

The following sections describe the protocols to be used in data reduction, verification, analysis and management for the Ash Landfill project.

8.1 Data Reduction

The data reduction procedures given by NYSDEC ASP, ASTM, and other methods referenced in this plan will be followed where applicable. These procedures specify the methods used to obtain and reduce analytical data including calculations of method internal standard recoveries, surrogate recoveries, response factors, peak identification, calibration curves, and sample results. If a deviation from these referenced methods is made, the deviation will be documented and described in the project files. Data reduction will include provision of periodically updated summary tables containing the following information to the QAO:

- Collection Date
- Sample Identification Number
- Sample Description
- Sample Location
- Laboratory Number
- Parameter
- Concentration and units
- Analysis Date

Interpretation of raw data and calculation of results are signed and dated by the laboratory scientist performing the data reduction on the data report forms. The laboratory must verify the results and sign for the data before it is released. The laboratory QA staff is required to perform an audit of 5% of the data generated.

8.2 Data Validation

Data validation is the process of reviewing data and accepting, qualifying, or rejecting it on the basis of sound criteria. The data generated during this program must be validated according to established guidelines in NYSDEC ASP (1991) and appropriate EPA guidance. The data validation approach will consist of a systematic review of the analytical results, associated quality control methods and results, and all of the supporting data. Professional judgment in any area not specifically addressed by

NYSDEC ASP guidelines will be utilized as necessary. At a minimum, the data validation process will address the following:

- Completeness: data completeness is a measure of the extent to which the data base resulting from a measurement effort fulfills the data requirement objectives. For this project, completeness will be defined as the number of valid sample results as a percentage of the number of samples submitted for analysis. Completeness is assessed by the following equation:

$$Completeness, \% = \left(\frac{D_r}{D_c} \right) x\ 100$$

Where:

D_r = number of samples for which valid results are reported
D_c = number of valid samples that are collected and reach the laboratory for analysis.

The completeness objective will help to evaluate the accuracy and precision of the analytical measurements.

- Accuracy: review of laboratory control samples (LCS) and matrix spiked (MS) samples and blank spike samples (where applicable) to determine accuracy based on % recovery of a known spiked compound. Accuracy is calculated by using the following equation:

$$\%\ recovery = \frac{(spiked\ sample\ value\ -\ sample\ value)}{spike\ added}\ x\ 100\%$$

- Precision: review of laboratory matrix duplicates (MD), matrix spike duplicates (MSD) and field duplicates (FD) where applicable. Based on relative percent difference (RPD) between the duplicate values. Precision is calculated by using the following equation:

$$RPD = \frac{sample\ value - duplicate\ value}{\left(\frac{sample\ value + duplicate\ value}{2}\right)} x\ 100\%$$

- Detection Limits: review of data reporting limits with CSAP specific requirements.

- Blank Contamination: review of all blanks (field blanks, rinsate blanks, trip blanks, method/prep blanks, laboratory analytical blanks) to assess validity of the data based on criteria set for blank levels in the CSAP.

The data acceptance limits for LCS, MS/MSD, MD, all blanks, ICVs and CCVs are defined within the methods and this CSAP. QC charts will be plotted for % recovery of LCS and matrix spikes samples. RPD of MD and MSD samples will be charted for this program as well. QC charts will be submitted to the QAO for review during this program.

It is imperative that quantitation limits be kept as low as possible for all analyses. It is expected that the quantitation limits defined in Section 7.0 will be met. Precision and accuracy requirements have been defined in Section 3.0. Guidelines for acceptable surrogate standard recoveries in both waters and soils/sediments, spike recoveries and RPD of duplicates have been defined in this CSAP based on NYSDEC ASP, EPA Region II criteria and technical references as listed in Section 15.0. These guidelines will be used in evaluating data quality.

In addition to the above directives, protocols from the following documents will be used to validate the organic data:

1. CLP Organics Data Review and Preliminary Review. January 1992, SOP No. HW-6, Rev. #8. USEPA Region II.

2. New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP), September 1989, volumes 1-8, amended December 1991.

If there are inconsistencies in criteria between the USEPA and NYSDEC guidelines, the NYSDEC ASP guidelines will be considered the precedent documentation.

8.3 Data Reporting

The analytical results received from the laboratories will be reported in terms of mass/unit volume, mass/unit weight, or total analyte mass per sample. The results will be submitted to the data validator in a format which provides the field sample identification number, laboratory sample number, sample description, sample date, sample prep date, analysis date, tabulated results, concentration units used, detection limits, method referenced, associated QC data, and the appropriate QC data qualifiers assigned to each value.

Data reports for each sample analyzed will include the following information at a minimum:

- Final analyte concentration.
- Laboratory sample ID#, field sample ID#, location.
- Percent solids (for soil/sediment samples).
- Final volume of extract or prepared sample.
- Preparation or extraction and analysis dates for holding time verifications.
- Calibration information, including (where applicable):
    - calibration curve
    - correlation coefficient, and
    - concentration response data of the calibration check standards.
- Results of the second column chromatography check including chromatograms.
- Amount of surrogate spiked and percent recovery of each surrogate.
- For matrix spike samples, the amount spiked and % recovery of each compound or analyte spiked.
- For matrix duplicate or spike duplicate samples, % RPD calculated for each compound or analyte.
- For laboratory control samples, true values and % recovery of each analyte quantitated.
- Blank results for method blanks, field blanks, rinsate blanks, trip blanks, and laboratory analytical blanks.
- All raw data preparation and extraction logs must include:
    - analyst initials and date
    - initial and final sample volumes or weights
    - sample description artifacts (e.g. stones, standing water in sediment samples, color)
    - amount and concentration of stock spike solutions added to MS/MSD or LCS samples
    - Vendor or Lot Number identification for all initial and continuing check samples and true value concentrations of these check standards (ICV, CCV, etc.).

- All raw data analysis printouts and logs must include:
  - analyst initials and date
  - Model Number and type of instrument used for analysis
  - conditions of instrument (e.g. wavelength for atomic absorption analyses, retention times for GC, etc.)
  - time of start of analysis, time for all QC samples, time of end of analysis
  - Method Number or SOP reference
  - dilutions performed and amount of sample analyzed or injected
  - calibration standards labeled and time recorded
  - QC samples and blanks clearly labeled.

Note: All NYSDEC reporting forms as contained in volume 8 of the ASP (1991) must be used for final data reporting.

8.4 Field Data

Field data will be validated by review of the project documentation to check that all forms specified in the CSAP have been completely and correctly filled out and that documentation exists for the required instrument calibration. This documentation will be considered sufficient to demonstrate that proper procedures have been followed during the field investigation. The QAO has the responsibility to validate field compliance with the CSAP.

8.5 Records Management

Both the Rapid Response contractor (IT) and the analytical laboratory are responsible for establishing and maintaining a secure records management system for the duration of the project. The records management system implemented will provide data that is secure, easily retrievable, and complete. All records will be held secure at the project site, or for the laboratory, from the time of sample receipt through reporting and disposal, and will be available and stored in a manner that safeguards their integrity from tampering or physical damage or loss. All documentation that is associated with a given project will be available for review by the USACE, SEDA and IT. This documentation includes associated operational and project specific data generated in the field and by the laboratory.

To demonstrate that quality has been achieved, the analytical laboratory will maintain a records management system that includes documents which verify the performance of the laboratory. These records include documents that are specific to a project or a group of samples within an ongoing project and documents that demonstrate overall laboratory operations. To accomplish this, the laboratory will assign an individual responsible for the records management system. This individual will initiate new project files, update files as necessary with additional information, and assist laboratory personnel in withdrawing and returning records. To maintain control of these records within the laboratory, a master sign-out sheet will be maintained. This sheet will contain at a minimum the project file check out, file designation, date check out, person borrowing records, and date returned to project files. Unless otherwise specified, this laboratory will maintain records associated with specific projects where the analysis performed was for site mitigation activities for a period of 10 years.

All associated quality assurance documents maintained by the Rapid Response contractor and the laboratory will be available for review. The laboratory(ies) will be required to demonstrate their records management capabilities during any IT or USACE laboratory audit of their facilities.

Internal Quality Control (QC) procedures include both field and laboratory check samples and procedures designed to ensure and document the overall quality of the data. QC check samples are controlled samples, introduced into the analytical system at specific points. The results of the QC checks are used during data validation to evaluate the precision, accuracy, sensitivity, and representativeness of the overall sampling and analytical program. The type and frequency of QC checks required for this project are summarized in Table 6-1. Table 9-1 provides a quick reference of which QC checks are applicable to each parameter analyzed/measured in the course of the project.

9.1 Field Quality Control Checks

To verify the performance of field sampling activities, QC samples are collected for laboratory analysis. Field QC checks consist of controlled samples that are introduced to the laboratory from the field. Four types of samples will be used: field blanks, rinsate blanks, trip blanks, and field duplicates (collocated samples). Blanks will be labeled as such on the RFA/COC form. Criteria that blank and field duplicate analyses must meet are given in Tables 3-2 through 3-4.

9.1.1 Field Blanks

Field blanks measure the amount and type of contamination introduced from ambient air during the sampling process. Field blanks are collected by opening and leaving the sample container(s) open to ambient air during the collection of a field sample. The sample is then sealed, preserved, and labeled in the same manner as a field sample. In order to generate "worst case" results for comparison to sample results, field blank collection should be conducted in an area expected to be the most contaminated.

Field blanks must be analyzed for the same parameters as the associated samples. Associated samples are defined as up to 20 samples of the same matrix collected by the same procedure. Field blanks must be prepared at a minimum frequency of one (1) for each set of associated samples to a maximum of 20 samples (minimum 5% frequency). Field blanks for all matrices and parameters tested will consist of analyte-free (distilled/deionized) water.

9.1.2 Rinsate Blanks

Rinsate blanks measure the amount and type of contamination introduced at any point throughout the entire sampling and analysis process, including sample handling and transport. Rinsate blanks are collected by filling the field-cleaned sampling device with the designated blank source water to the volume normally attained when an actual sample is taken. The water is allowed to remain in the sampling device for a period of time approximating the length of time that an actual sample remains in the device. Appropriate sample container(s) are then filled, preserved, capped and labeled in the same manner used for field samples.

Rinsate blanks must be analyzed for the same parameters as the associated samples. Associated samples are defined as up to 20 samples of the same matrix collected by the same procedure (same equipment). Rinsate blanks must be prepared at a minimum frequency of one (1) for each device (piece of sampling equipment or tool).

9.1.3 Trip Blanks

Trip blank results are used as an indicator of contamination originating from the proximity of sample containers to one another during shipment and storage. Trip blanks will be collected and analyzed for volatile organic compounds only.

A trip blank consists of a sample container filled with the designated blank source-water. A trip blank will accompany each set of up to 20 sample containers to be used for VOC sample collection or analysis from the laboratory, to the field, and back to the laboratory without being opened until it is to be analyzed. There must be at least one trip blank in every cooler used to ship samples to the laboratory for VOC analysis.

9.1.4 Field Duplicates

Field duplicates provide a measure of the reproducibility (precision) of the sampling procedures and the representativeness of the samples. Two sets of samples from a single sample location are obtained (collocated samples) and prepared and analyzed by the laboratory. Each sample is labeled with a unique sample number, and both are submitted to the laboratory for the appropriate analyses. The target frequency for field duplicate collection is one for every set of 20 samples, and for each matrix collected by the same procedure (minimum 5% frequency). Criteria for field duplicates precision are summarized in Tables 3-2 through 3-4.

9.2 Laboratory Quality Control Checks

Laboratory QC checks include the analysis of blanks, spiked samples (matrix spikes and matrix spike duplicates), duplicate samples (inorganics only) and initial and continuing calibration checks. The laboratory will maintain a quality-control program that will contain, at a minimum, those QC checks listed in Table 6-1 and described briefly below. Criteria that laboratory-blank and spike-sample analyses must meet are given in Tables 3-2 through 3-4. Criteria that initial calibrations and calibration checks must meet are detailed in the ASP methodologies. All laboratory QC checks will follow strictly ASP methodologies for organic analyses (ASP 1991). For non-CLP (ASP) methodologies, where applicable, calibrations must meet linear regression criteria of $r \geq 0.995$; an initial calibration verification (ICV) check standard must be analyzed following calibration and meet criteria of 90 to 110 percent recovery (%R); continuing calibration verifications (CCV) must be analyzed every 10 samples with a criteria of 90 to 110 percent recovery; and laboratory blanks [Internal Calibration Blank (ICB), Continuing Calibration Blank (CCB)] must be analyzed following each ICV and CCV and meet criteria of a reported concentration less than the laboratory specific reporting limit (RL).

9.2.1 Method and Analytical Blanks

Method or preparation blanks are generated within the laboratory during the processing of the field samples. These blanks are processed using the same reagents and procedures and at the same time as the samples being analyzed. Contamination found in the preparation blank would indicate that similar contamination found in associated samples may have been introduced in the laboratory, and not actually be present in the samples. Method blanks will be analyzed at a minimum frequency of one per 20 samples per matrix per parameter, per preparation/analysis batch or per SDG. Criteria for method blank (MB) acceptance are given in Tables 3-2 through 3-4.

Analytical blanks (ICB and CCB) are required by inorganic ASP methods only as QC defined in this CSAP. Blanks consist of laboratory reagent-grade water and acid solutions to match sample digestates analyzed at the beginning, intervals during, and at the end of an analytical sequence to assess contamination and instrument drift. The ICB is analyzed at the beginning of the analytical run following the calibration and ICV. The CCB is analyzed prior to sample analyses, every 10 samples, thereafter, throughout the analytical run, and at the end of the analytical sequence.

9.2.2 Matrix Spikes, Matrix Spike Duplicates, and Matrix Duplicates

All matrix-spike QC samples will be assigned in the field and listed on the chain-of-custody for the analytical laboratory. Matrix spike/matrix spike duplicate analyses are performed in association with all samples analyzed for organic and inorganic compounds, except for soil vapor samples.

Matrix spikes (MS) are prepared by placing a known quantity of analytes into a field sample. The MS is then processed in a manner identical to the other samples. Percent recovery of each of the spiked compounds or analytes reflects the ability of the laboratory and method to accurately determine the quantity of that analyte in that particular sample (i.e., is a measure of accuracy in the specific sample matrix). Note that it does not reflect the ability to determine the analyte in other, even similar samples. If a quantity of the spiked analyte exists in the sample prior to addition of the spike, this quantity is subtracted from the matrix spike result to determine the quantity of the spike that has been "recovered." Tables 3-2 and 3-3 define accuracy criteria for organic constituents in the MS, and Table 3-4 defines criteria for inorganic parameters being tested for this program.

Matrix spike duplicate (MSD) samples, prepared as QC checks on the precision of organic analyses, are identical to matrix spikes. A second aliquot of the same field sample used for the MS is fortified with the same quantity of the spiking compounds and is processed in an identical manner. The results for the MS/MSD pair provide a measure of the precision of the determinations by assuring the availability of positive results for comparison. Tables 3-2 and 3-3 define precision criteria for the MS/MSD pair for organic constituents.

For all inorganic analyses, a matrix duplicate (MD) sample is prepared and analyzed to provide a measure of precision by comparing the relative percent difference (RPD) between the sample result and the matrix duplicate sample result. Table 3-4 defines precision criteria for the sample/MD pair.

A MS/MSD pair analysis will be performed for organic parameters at the frequency of 1 per 20 samples per matrix or per SDG (minimum 5% frequency). A MS/MD pair will be analyzed for inorganic parameters at the minimum 5% frequency or per SDG (Table 6-1).

Additional sample volumes for MS, MSD, or MD analyses will be collected at the frequency of one set per 20 samples or per SDG (minimum 5% frequency). The chain of custody record must indicate which sample is to be used for the MS, MSD, or MD analyses.

9.2.3 Surrogate Spikes

Every analytical sample to be analyzed for organic compounds will have surrogate compounds added to it before analysis on extraction, if applicable, as specified by the NYSDEC ASP (1991). The recovery of these samples aids the analyst in determining matrix effects on recovery of compounds in each sample. Tables 3-2 and 3-3 define surrogate spike criteria on the percent recovery of organic constituents. This, too, is a measure of accuracy.

9.2.4 Laboratory Control Samples

Laboratory Control Samples (LCS), are samples containing known amounts of inorganic analytes which the laboratory prepares and analyzes concurrently with project samples. The recovery of analytes or compounds in these samples provides a measure of method accuracy in the absence of matrix effects (compare MS samples). For water samples, a water LCS is analyzed; for soil samples, a solid LCS is analyzed. LCS frequency is one (1) per preparation batch or SDG, whichever is more frequent, not to exceed 20 samples per batch. Table 3-4 defines LCS acceptance criteria for inorganic ASP analytes.

9.2.5 Calibration Checks

Calibration checks will include the following: 1) multilevel initial calibrations of instruments to establish calibration curves; 2) continuing calibration (CC) standards at least once every 12 hours of instrumental analysis for accurate quantitation, and recalibration if these do not meet CLP criteria; 3) calibration of GC's and GC/MS's, according to the appropriate ASP methods; and 4) tuning of GC/MS systems every 12 hours to meet ASP's criteria using BFB (bromofluorobenzene) for volatile organics analysis, and DFTPP (decafluorotriphenyl- phosphine) for semivolatile organics analysis.

9.3 Third Party Quality Assurance

In the event additional quality assurance provisions are required for the project, it may be necessary to provide quality assurance samples of pertinent media to the USACE MRD laboratory. QA protocols established under ER-1110-1-263, "Chemical Data Quality Management for Hazardous Waste Remedial Activities", USACE, October 1990 will be incorporated.

To verify compliance with CSAP requirements, regularly scheduled audits of project activities will be performed. These audits will consist, as appropriate, of an evaluation of QA procedures and the effectiveness of their implementation, an evaluation of work areas and activities, and a review of project documentation.

The laboratory(ies) selected for the project may be subject to an IT and/or USACE systems audit and be given the opportunity to respond to all comments before receipt of samples. The laboratories will also be closely monitored during sample analysis by IT. Any laboratory-specific Attachment to the project Quality Assurance documentation or to this CSAP from participating laboratories will be submitted upon request for review by the USACE. Any project or technical concerns arising from the review of such documents will be addressed appropriately.

10.1 Field Audits

Specific elements of the field audit include the verification of the following items:

- Completeness and accuracy of sample RFA/COC forms;
- Completeness and accuracy of sample identification labels;
- Completeness and accuracy of field notebooks;
- Following specific decontamination procedures for this program;
- Following specific collection, preparation, preservation and storage procedures;
- Following specific calibration and analytical procedures for field parameters; and,
- Following handling and shipping procedures.

10.2 Laboratory Audits

The Contract Laboratory conducting the analyses for this program will be audited under the direction of the QAO. The selected laboratory may be audited if necessary during the program if problems are suspected. Typical items addressed in the audit include:

- Sample flow through laboratory and internal sample tracking;
- Chain-of-Custody;
- Sample storage;
- Sample preparation/extraction and analysis including;
  - SOPs

- Log-books or benchsheets for all preparation procedures of samples, calibration standards, QC standards/check samples, blanks
- Log-books or benchsheets for all analytical procedures for samples, calibrations, QC checks, matrix QC samples, blanks

- Appropriate documentation, including:
  - Analyst initials and date
  - Single-line cross-out for corrections, initials and date
  - Units recorded
  - Method reference number or SOP reference;
- QC samples documentation inclusive of items above and for all blanks, calibrations, calibration verification check samples, laboratory control samples, spikes, duplicates, spike duplicates, surrogates, control charts (where applicable);
- Data file storage including hard copy of all data, other media (disk, tape, etc);
- Laboratory safety procedures; and,
- Laboratory QA procedure including internal audits, corrective-action forms, and QC control charts.

Following completion of an audit, the auditor(s) shall prepare and submit an audit report to the appropriate project personnel. This report shall serve to notify the Project Manager of the audit results. If corrective action is required by the audit report, the corrective action shall be undertaken and completed on schedule.

10.3 Corrective Action

The need for corrective action occurs when a circumstance arises that has a negative impact on the quality of the analytical data generated during sample analysis. For corrective action to be initiated, awareness of a problem must exist. In most instances, the personnel conducting the field work and the laboratory analysis are in the best position to recognize problems that will affect data quality. Awareness on their part can frequently detect minor instrument changes, drifts, or malfunctions, which can then be corrected, thus preventing a major breakdown in the quality control system in place. If major problems arise, they are in the best position to decide upon the proper corrective action and initiate it immediately, thus minimizing data loss.

Ultimately, the personnel performing and checking the sampling and analysis procedures and results must participate in decisions to take corrective actions. To reach the proper decision, each individual must understand the project analytical objectives and data quality required to meet these objectives. Completion of corrective action shall be verified by the auditor(s) through written communication, re-audit, or other appropriate means. After acceptance and verification of corrective actions, an audit closure report shall be issued to the same individuals receiving the audit report. After acceptance and verification of all corrective actions, an audit closure report is issued by the QAO.

The field sampling and laboratory analysis personnel will have a prime responsibility for recognizing a nonconformance and the need for corrective action. Each nonconformance shall be documented by the personnel identifying or originating it. For this purpose, a Variance Log (see Section 13.0), testing procedure record, notice of equipment calibration failure, results of laboratory analysis quality assurance tests, audit report, internal memorandum, or letter shall be used as appropriate. In a situation requiring corrective action, the following corrective action system will be used:

- Define the problem
- Assign responsibility for investigating the problem
- Investigate and determine the cause of the problem
- Determine corrective action course to eliminate the problem
- Assign responsibility for implementing the corrective action
- Determine the effectiveness of the corrective action and implement the correction
- Verify that the corrective action has eliminated the problem
- If not completely successful, begin back at first step.

Documentation in the form of a Nonconformance Report (see Section 13.0) shall be made available to the responsible organizations. All project samples affected will be listed on the Nonconformance Report. When a corrective action is taken by any of the operations or analytical laboratory personnel, they will be responsible for notifying the QAO so that, if deemed necessary, quality assurance surveillance of the affected sampling or analytical system can be intensified.

11.0 Preventive Maintenance

11.1 Laboratory Instrumentation

Laboratory staff will be familiar with the maintenance requirements of the instrumentation they employ. This familiarity is the result of technical education, specialized courses and laboratory experience. Wherever possible, the laboratory will maintain a complete inventory of replacement parts needed for preventive maintenance and spare parts that routinely need replacement. It is the laboratory's responsibility to maintain maintenance log books for each instrument used in this program. These will be checked during the laboratory audits and must be kept current with information on routine and non-routine maintenance procedures.

Preventive maintenance schedules for analytical instrumentation will be specific to the laboratory's instrument manufacturer's specifications. Maintenance procedures and schedules will be outlined in the laboratory's SOPs and will be strictly adhered to for this program. A summary of the project schedule of preventitive maintenance for air monitoring equipment is provided in Appendix F. Many of the laboratory's instruments are maintained on service contracts. Records of maintenance visits and procedures are maintained in the laboratory.

11.2 Field Instrumentation

Field sampling personnel will be familiar with the field calibration, operation and maintenance of the equipment, and will perform the prescribed field operating procedures outlined in the manufacturer's instructions accompanying the respective instruments. All equipment will be inspected at least twice daily, once before start-up in the morning and again at the end of the workshift. All preventive maintenance performed will be entered in individual equipment maintenance logs.

11.3 Support Equipment

Support equipment includes items such as safety devices, storage and transportation containers, cameras, and vehicles that may be required for completing an environmental monitoring or measurement task. Support equipment will be periodically inspected to maintain the performance standards necessary for proper and efficient execution of all tasks and responsibilities.

11.4 Recordkeeping

All preventative maintenance activities will be documented in a separate maintenance log book established for both field and laboratory instrumentation. The records will include information on the specific instruments, identification number, date of activity, and the maintenance activity performed.

Chemical data generated from sample analyses performed in support of this project will be assessed for accuracy, precision and completeness in terms of both the analytical laboratory and field-sample collection programs. The goal of these programs is to routinely provide data that are representative of in-situ conditions. To meet this goal, a combination of statistical procedures and qualitative evaluations will be used to check the quality of the data. No data will be eliminated from the database based on the results of the statistical analyses. If problems arise and data are found to deviate from expected results, the affected data points will be so annotated with appropriate qualifiers. Reanalysis may be used as a corrective action or to refute or confirm a spurious result as deemed appropriate by the QAO and the Project Manager.

The data will be validated based upon guidelines in USEPA 1992 documents for data validation in Region II. Additionally, NYSDEC ASP (1991) and this CSAP will be used to perform the data validation. If discrepancies exist among these documents, the order of application will be: site-specific CSAP, NYSDEC ASP (1991), and USEPA (1992a, 1992b).

Results for QC sample analyses, including blanks, spikes, and duplicates (as described in Section 9.0) will be evaluated as described below to determine the validity and useability of the data.

12.1 Review of QC Sample Data

When the analyses of a sample set are completed, the results will be reviewed and evaluated to assess the validity of the data set. The review is described below on the following criteria.

12.1.1 Precision

Precision is frequently determined by the comparison of replicates, where replicates result from an original sample that has been split for identical analyses. Standard deviation of a sample is commonly used in estimating precision:

where:

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

n	=	total number of measurements
$\bar{x}$	=	mean concentration of the measurements
x_i	=	concentration value of the with measurement

The relative standard deviation, RSD (or sample coefficient of variation, CV), which expresses standard deviation as a percentage of the mean, is generally useful in the comparison of three or more replicates.

$$RSD = 100\ (s/x)$$

or

$$CV = 100\ (s/x)$$

where:

RSD	=	relative standard deviation, or
CV	=	coefficient of variation
s	=	standard deviation
x	=	mean

In the case of laboratory duplicates or MDs (samples that result when an original sample has been split into two for identical analyses), field duplicates (collocated field samples), and matrix spike duplicates the relative percent difference (RPD) between the two samples will be used to estimate precision.

$$RPD = \frac{D_1 - D_2}{\left(\frac{D_1 + D_2}{2}\right)} \; x \; 100\%$$

where:

D_1 = first sample value

D_2 = second sample value (duplicate)

All analyses performed in this program will have a measure of precision in terms of matrix duplicates, matrix spike duplicates, and field duplicates.

12.1.2 Accuracy

The determination of accuracy of a measurement requires a knowledge of the true or accepted value for the signal being measured. Accuracy may be calculated in terms of bias as follows:

$$Bias = \bar{X} - T$$

$$\% \ Bias = \frac{100(\bar{X} - T)}{T}$$

where:

$\bar{X}$ = average observed value of measurement

T = "true" value

Accuracy may also be calculated in terms of the recovery of spiked samples as in the case of matrix spike samples or LCSs for this program:

$$\% \ Recovery = \frac{(spiked\ sample\ value - sample\ value)}{spike\ added} \times 100$$

Additionally, blanks will be used to evaluate whether laboratory or field procedures represent a possible source of contamination in the field samples. Unmonitored contamination can allow false positive results to be reported and treated as true sample components, when in fact they are not; this type of error will adversely affect the accuracy of the reported results. Several types of blanks (field blanks, rinsate blanks, trip blanks, method blanks, and laboratory analytical blanks) will be used throughout the project, as described in Section 9.0.

For the laboratory, MB, ICB, and CCB for the applicable analyses have specific criteria that must be met for compliance as listed in ASP (1991). In the data validation, all blank samples will be evaluated. The general procedure for assessing blank samples is as follows:

1. Tabulate the target compound or analyte results for all blank samples.
2. Identify all blank samples for which target compounds or analytes are reported above the CRQL for organic compounds or above the IDL for inorganic analytes following USEPA guidelines.
3. If no compounds or analytes are detected in any of the blank samples, the data are reported unqualified for blank contamination.
4. If any compounds or analytes are found in any of the blank samples, their concentration(s) will be reported in the data-validation narrative and assessed according to USEPA data validation criteria. No data will be removed from the database on the basis of compounds being detected in blank samples. Appropriate qualifiers will be added to the data summary tables in the validation reports.
5. Criteria for blank detection review are delineated in the USEPA Functional Guidelines for data validation for organic and inorganic analyses (USEPA 1992a, 1992b) and are summarized as reviewing all analytes > IDL for inorganics and > CRQL for organics in all associated blank samples.

12.1.3 Completeness

To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. Less obvious is whether the data are sufficient to achieve the goals of the project. All data are reviewed to determine if the data base is sufficient to achieve the goals of the project. Following data validation, the percent completeness can be obtained as the following calculation:

$$\% \ Completeness = \frac{valid\ data\ obtained}{total\ data\ planned} \times 100$$

12.2 QC Sample Evaluation

- Reagent/Method Blank Evaluation - The reagent and/or method blank results are evaluated for high readings characteristic of background contamination. If high blank values are observed, laboratory glassware and reagents will be checked for contamination and the analysis halted until the system is brought under control before further sample analysis proceeds.

- Field, Rinsate, and Trip Blank Evaluation - Field, rinsate, and trip blank results are evaluated for high readings similar to the reagent and/or method blanks described above. If high field and/or rinsate blank readings are encountered, the procedures for sample collection, equipment decontamination, shipment, and laboratory analysis should be reviewed. If both the reagent and/or method blanks, and the field and/or rinsate blanks exhibit significant background contamination, the source of contamination is probably within the laboratory. High field and/or rinsate blank readings may also be due to contaminated sample bottles or cross contamination due to sample leakage and poorly sealed sample containers.

- Matrix Spike Evaluation - The observed recovery of the spike versus the theoretical spike recovery is used to calculate accuracy, as defined by the percent recovery. If the accuracy value exceeds the acceptance criteria for the given parameters, the QAO is notified. The sample set may be reanalyzed for the parameter in question.

- Calibration Standard Evaluation - The calibration curve is evaluated to determine linearity through its full range, and to verify that sample values are within the range defined by the low and high standards. If the curve is not linear, careful evaluation will be required to determine the source of error and proper corrective action will be provided.

- Duplicate Sample Evaluation - Duplicate sample analysis for the sample set is used to determine the precision of the analytical method for the sample matrix. The duplicate results are used to calculate the precision as defined by the relative percent difference (RPD). If the precision value exceeds the acceptance criteria for the given parameter in question, the reason for the nonconformance must be determined; corrective action may include reanalysis. Attainable precision limits will be specified by the QAO and updated periodically following review of data.

- Reference Standard Evaluation - Standard Reference Materials analyses are compared with true values and acceptable ranges. Values outside the acceptable ranges require corrective action to determine the source of error and provide corrective action. All sample analyses should be halted pending this evaluation. Following correction of the problem, the Standard Reference Material should be reanalyzed.

- Check Standard Evaluation - The results of check standard analysis are compared with the true values, and the percent recovery of the check standard is calculated. If correction is required, the check standard should be reanalyzed to demonstrate that the corrective action has been successful.

- Surrogate Standard Evaluation - The results of surrogate standard determinations are compared with the true values spiked into the sample matrix prior to extraction and analysis and the percent recoveries of the surrogate standards are determined.

12.3 Evaluation of GC/MS Data Using NYSDEC ASP QC Criteria

Approved NYSDEC ASP QC criteria will be applied to analyses for volatile and extractable organics. These criteria will be used so that data of known quality and integrity are generated, and to minimize the loss of data due to out-of-control conditions.

12.3.1 Internal Standard Response and Retention Time Monitoring

Internal standard responses and retention times in samples must be evaluated immediately after or during data acquisition. If the retention time for any internal standard changes by more than 30 seconds, the chromatographic system must be inspected for malfunctions and corrections made as required. If the extracted ion current profile (EICP) area for any internal standard changes by more than a factor of two (minus 50 percent to plus 100 percent), from the latest daily (12 hour) calibration standard, the mass spectrometric system must be inspected for malfunction and corrections made as appropriate. When corrections are made, reanalysis of samples analyzed while the system was malfunctioning is necessary.

12.3.2 Method Blank Analysis

A method blank for volatile analysis must contain no greater than five times the detection limit of common laboratory solvents (methylene chloride, acetone, and 2-butanone). A method blank for semivolatile analysis must contain no greater than five times the detection limit of common phthalate esters. For all target analytes not listed above, the method blank must contain less than the detection limit of any single parameter. If a laboratory method blank exceeds criteria, the analytical system is out of control. The source of the contamination is investigated and appropriate corrective measures must be taken and documented before further sample analysis proceeds. All samples processed with a method blank that is out of control (i.e., contaminated) must be reextracted/repurged and reanalyzed.

12.3.3 Surrogate Spike Response Monitoring

Surrogate standard determinations are performed on samples and blanks. Samples and blanks are fortified with surrogate spiking compounds before purging or extraction to monitor preparation and analysis of samples.

Each sample (including matrix spike and duplicate) and blank are spiked with surrogate compounds prior to purging or extraction. The surrogate spiking compounds shown in Tables 3-2 and 3-3 are used to fortify each sample or blank with the proper concentrations.

Surrogate spike recovery must be evaluated for acceptance by determining whether the concentration (measured as percent recovery) falls inside the contract required recovery limits listed in Tables 3-2 and 3-3.

12.3.3.1 Method Blank Surrogate Spike Recovery

The laboratory must take the actions listed below if any one of the following conditions exist:

- Recovery of any one surrogate compound in the volatile fraction is outside the required surrogate spike recovery limits

- Recovery of any one surrogate compound in either the base/neutral or acid fraction is outside surrogate spike recovery limits

- Check calculations for errors; check internal standard and surrogate spiking solutions for degradation, contamination, etc.; also check instrument performance.

If either of these two situations occur, corrective actions should be:

- Recalculate or reinject/repurge the blank or extract if steps above fail to reveal the cause of the noncompliant surrogate recoveries.
- Reextract and reanalyze the blank.

If the measures listed above fail to correct the problem, the analytical system must be considered out of control. The problem must be corrected before continuing.

This may mean recalibrating the instrumentation but it may also mean more extensive action. The specific corrective action should be defined by the GC/MS operator with the concurrence of the Laboratory QAO.

12.3.3.2 Sample Surrogate Spike Recovery

The laboratory must take the actions listed below if any of the following conditions exists:

- Recovery of any one surrogate compound in the volatile fraction is outside of the surrogate spike recovery limits
- Recovery of any one surrogate compound in either the base neutral or acid fraction of the BNA analysis is below 10 percent
- Recoveries of two surrogate compounds in either acid or base neutral fractions are outside of the surrogate spike recovery limits

If either of these three situations occur, corrective actions should be:

- Check calculations for errors; check internal standard and surrogate spiking solutions for degradation, contamination, etc.; and, check instrument performance.
- Recalculate or reanalyze the sample or extract if the steps above fail to reveal a problem. If reanalysis of the sample or extract solves the problem, then only submit the sample data from the analysis with surrogate spike recoveries within the acceptable limits.
- Reextract and reanalyze the sample if none of the above resolve the problem.

Report the surrogate spike recovery data and the sample data from both extractions when reanalysis substantiates a matrix effect.

12.3.4 Matrix Spike Analysis

To evaluate the matrix effect of the sample upon the analytical methodology, the USEPA has developed the standard mixes and recovery limits listed in Tables 3-2 and 3-3 to be used for matrix spike analysis. Matrix spike analysis will be performed at a frequency of one per group of twenty or fewer investigative samples or SDG per matrix.

At various times throughout this program, situations may arise that will require some degree of corrective action, ranging from simple corrections on routine field documentation to systematic problems that necessitate shutting down sample analyses until the problem is identified and corrected. The following paragraphs describe how situations requiring corrective action are to be handled and documented in both the field and the laboratory for the purposes of this project.

13.1 Nonconformance

Nonconforming items and activities are those which do not meet the project requirements, procurement document criteria, or approved work procedures. Nonconformances include malfunctions, failures, deficiencies, and deviations. Nonconformances may be detected and identified by:

- Project Staff
  During the performance of field investigation and testing, supervision of subcontractors, performance of field inspection, and preparation and verification of numerical analyses

- Laboratory Staff
  During the preparation for and performance of laboratory testing, calibration of equipment, and QC activities

- Quality Assurance Officer
  During the performance of audits and other quality assurance activities

13.2 Field Corrective Action

In the field, situations such as equipment or instrument malfunction may occur and require subsequent corrective action. Additional problems may also be identified as a result of the field audit. Wherever possible, immediate corrective action should be taken; immediate corrective actions taken must be clearly described in the field log book, but no other formal documentation is required unless further corrective action is deemed necessary.

Any problem or situation which cannot be solved through immediate corrective action will fall into the long-term corrective-action category. The steps for long-term corrective action are as follows:

- Identification and definition of the problem;
- Investigation and determination of the cause of the problem;
- Determination and implementation of a corrective action to eliminate the problem; and,
- Verification that the corrective action has eliminated the problem.

Documentation of the problem is important to the system. A Field Corrective Action Request Form (shown on Figure 13-1) or equivalent will be completed by the person finding the quality problem. This form identifies the problem, possible causes, and the person responsible for action on the problem. The responsible person will be the Site Operations Supervisor.

The Corrective Action Request Form includes a description of the corrective action planned, the date it was taken, and space for follow-up. The Site Supervisor will check to be sure that initial action has been taken, appears effective, and at an appropriate later date check again to see if the problem has been fully solved. The Operations Supervisor will receive a copy of all Field Corrective Action forms, will enter them in the Corrective Action Log. This permanent record will aid the Operations Supervisor in follow-up action and this log will be reviewed by the QAO during program audits.

13.3 Laboratory Corrective Action

As a result of a system audit, a case audit, or observation of or by laboratory personnel, discrepancies may be found which affect the validity or quality of analytical data. Corrective actions will be implemented to correct the deficiency or weakness and to identify any analytical data that may have been affected. Wherever possible, immediate corrective action procedures will be employed. Immediate corrective actions taken must be noted in laboratory logbooks, but no other formal documentation is required unless further corrective action is deemed necessary.

If a problem persists or cannot be readily identified, a formal corrective action procedure is initiated. The Laboratory QAO shall use this procedure to provide that the condition is reported to a person responsible for correcting it, who is part of a closed-loop action and follow-up plan.

The essential steps in the closed-loop corrective action system will include:

- Identification and definition of the problem;
- Delegation of responsibility for investigating the problem;
- Investigation and determination of the cause of the problem;
- Determination of a corrective action to eliminate the problem;
- Delegation and acceptance of responsibility for implementing the corrective action;
- Establishment of effectiveness of the corrective action and its implementation; and,
- Verification that the corrective action has eliminated the problem.

A Corrective Action Request may be initiated by an analyst, supervisor, Laboratory QAO, or during a laboratory audit by the QAO. A Laboratory Corrective Action Request Form shown on Figure 13-2, or equivalent, will be completed by the person finding the quality problem. This form identifies the problem, possible causes and the person responsible for action on the problem. The responsible person may be an analyst, supervisor, or the Laboratory QAO. If no person is identified as responsible to implement the correction action, the Laboratory QAO will investigate the situation and determine the course of action for resolution.

The Corrective Action Request Form includes a description of the corrective action planned, the date it was taken, and space for follow-up. The Laboratory QAO will check that initial action has been taken, appears effective, and at an appropriate later date will, check again to see if the problem has been fully solved. The Laboratory QAO will receive a copy of all Laboratory Corrective Action forms, and will enter them in the Corrective Action Log. This permanent record will aid the Laboratory QAO in follow-up action and this log will be reviewed by the QAO during program audits.

13.4 Variances

Variances from standard, approved field operational procedures and plans will be documented in a Variance Log (Figure 13-3). It is recognized that procedures such as work plans cannot be prepared which properly foresee all conditions encountered during a field program. A variance is a difference or a partial change in a procedure or plan.

Any project member may initiate a Variance Log entry. Items recorded in the Variance Log require the approval of the Project Manager, or his designee, and the QAO. Approval by the Project Manager can be initiated on a verbal basis via telephone. The Variance Log will contain: date and nature of the variance, applicable document, and the person initiating the variance. If a variance is proposed by CDT, it will be so recorded.

Formal approval of the Variance Log will be in writing. The Operations Supervisor will be provided with a copy of all entries made in the log. Upon receipt, the Site Operations Supervisor will review a copy of the log and, when in agreement, indicate approval by signing and dating the log. The copy will be forwarded to the QAO for review, signing, and dating and then returned to the Site Operations Supervisor for inclusion in the project files. Originals of the Variance Log will also be kept in the project files.

QA reports will be prepared by the QAO in conjunction with the Project Manager, and submitted to the Project Director to demonstrate that project QA/QC objectives are being met. The reports will include an assessment of the status of the project in relation to the agreed-upon timetable, for field sampling, and laboratory analysis, document audits, an assessment of the precision, accuracy, and completeness of sample batches analyzed to date, significant quality problems discovered and the status of any necessary corrective action procedures, and any required changes to the CSAP. Figure 14-1 presents an example of a Quality Assurance Report form.

Reports for field and laboratory audits will be submitted to the Project Manager within 10 days following the audit. Serious deficiencies will be reported within one day from when nonconformance items identified. The audit-reporting process will include a summary of audit results that will be developed from audit checklists.

Sample analysis results will be submitted to the Project Manager following QA/QC review and data validation as described in Section 9.0. The QAO will review the data validation reports and all project activities (e.g., laboratory audits, field audits, project interrogatives), and then use his best professional judgment as to the data useability. The results will include a tabulation of analytical data and an explanation of any sampling conditions or quality-assurance problems and their possible effects on data quality.

ANSI/ASME. NQA-1, Quality Assurance Program Requirements for Nuclear Facilities.

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USEPA. Solid Waste Analytical SW-846 ....

Tables

TABLE 3-1
DATA QUALITY OBJECTIVES

DQO Parameter	Objective
Precision	Tables 3-2 through 3-5
Accuracy	Tables 3-2 through 3-5
Sensitivity	See section 9 of the CSAP
Representativeness	Volatile Organic Compounds < 30% RPD (water), < 50% RPD (soil)
	Semivolatile Organic Compounds < 30% RPD (water), < 50% RPD (soil)
	Organic-Pesticides/PCBs < 30% RPD (water), < 50% RPD (soil)
Completeness	90%
Comparability	Based on Precision and Accuracy and Media Comparison

Notes:

RPD = Relative Percent Difference for field duplicate samples as defined in Sections 10.1.3 and 14.1.1.
CRDL = Contract Required Detection Limit

TABLE 3-2
ACCURACY AND PRECISION DATA QUALITY OBJECTIVES FOR WATER ASP ORGANIC COMPOUND ANALYSES

Parameter	QC Compounds	Field Duplicate Precision (%RPD)	MS/MSD Precision (% RPD)	Blanks	MS/MSD Accuracy (% Recovery)	Surrogate Accuracy (% Recovery)
VOC Analysis	All analytes	<30		<5xCRQL for MeCl, acetone, toluene, 2-butanone ≤CRQL for all other compounds		
	1,1-dichloroethylene		<14(95%CI)		61-145	
	trichloroethylene		<14		71-120	
	benzene		<11		76-127	
	toluene		<13		76-125	
	chlorobenzene		<13		75-130	
	D_4-1,2-dichloroethone					76-114
	D_8-toluene					88-110
	bromofluorobenzene					86-115
Semivolatile Analysis	All analytes	<30		<5xCRQL phthalates ≤CRQL all other compounds		
	phenol		<42		12-110	
	2-chlorophenol		<40		27-123	
	1,4-dichlorobenzene		<28		36-97	
	N-nitroso-di-n-propylamine		<38		41-116	
	1,2,4-trichlorobenzene		<28		39-98	
	p-chloro-m-cresol		<42		23-97	
	acenaphthene		<31		46-118	
	4-nitrophenol		<50		10-80	
	2,4-dinitrotoluene		<38		24-96	
	pentachlorophenol		<50		9-103	
	pyrene		<31		26-127	
	d_5-nitrobenzene					35-114
	2-fluorobiphenyl					43-116
	D_{14}-terphenyl					33-141
	D_5-phenol					10-110
	2-fluorophenol					21-110
	2,4,6-tribromophenol					10-123
	d_4-2-chlorophenol					33-110
	d_4-1,2-dichlorobenzene					16-110
Pesticide Analyses	All analytes	<30		<CRQL		
	lindane		<15		56-123	
	heptachlor		<20		40-131	
	aldrin		<22		40-120	
	dieldrin		<18		52-126	
	endrin		<21		56-121	
	4,4'-DDT		<27		38-127	
	decachlorobiphenyl					60-140
	tetrachloro-m-xylene					60-140

TABLE 3-3
ACCURACY AND PRECISION DATA QUALITY OBJECTIVES FOR SOIL ASP ORGANIC COMPOUND ANALYSES

Parameter	QC Compounds	Field Duplicate Precision (% RPD)	MS/MSD Precision (% RPD)	Blanks	MS/MSD Accuracy (% Recovery)	Surrogate Accuracy (% Recovery)
VOC Analysis	All analytes	<50		<5xCRQL for MeCl, acetone, toluene, 2-butanone ≤CRQL for all other compounds		
	1,1-dichloroethylene		<22(95%CI)		59-172	
	tricloroethylene		<24		62-137	
	benzene		<21		66-142	
	toluene		<21		59-139	
	chlorobenzene		<21		60-133	
	D_4-1,2-dichloroethone					70-121
	D_8-toluene					84-138
	bromofluorobenzene					59-113
Semivolatile Analysis	All analytes	<50		<5xCRQL phthalates ≤CRQL all other compounds		
	phenol		<35		26-90	
	2-chlorophenol		<50		25-102	
	1,4-dichlorobenzene		<27		28-104	
	N-nitroso-di-n-propylamine		<38		41-126	
	1,2,4-trichlorobenzene		<23		38-107	
	p-chloro-m-cresol		<33		26-103	
	acenaphthene		<19		31-137	
	4-nitrophenol		<50		11-114	
	2,4-dinitrotoluene		<47		28-89	
	pentachlorophenol		<47		17-109	
	pyrene		<36		35-142	
	d_5-nitrobenzene					23-120
	2-fluorobiphenyl					30-115
	D_{14}-terphenyl					18-137
	D_5-phenol					24-113
	2-fluorophenol					25-121
	2,4,6-tribromophenol					19-122
	d_4-2-chlorophenol					20-130
	d_4-1,2-dichlorophenol					20-130

TABLE 3-4
ACCURACY AND PRECISION DATA QUALITY OBJECTIVES FOR ASP INORGANIC WATER ANALYSES

Parameter	QC Compounds	Field Duplicate Precision (% RPD)	Sample/MD Precision (% RPD)	MS Accuracy (% Recovery)	Blanks	LCS Accuracy (% Recovery)
Metals and Cyanide	All analytes	< 30 water < 50 soil	< 20% RPD for results > 5xCRDL; difference < ±CRDL for results < 5xCRDL	75-125[a]	< ±CRDL	80-120%[b]

Notes:

[a]Unless the sample concentration exceeds the spike added concentration by a factor of 4 or more.
[b]Solid LCS must fall within established EPA control limits for EPA-LV solid LCS. No water LCS is required for mercury or cyanide.
NA = Not Applicable
CRDL = Contract Required Detection Limit
RPD = Relative Percent Difference

TABLE 3-5
DATA QUALITY OBJECTIVE LEVELS FOR ANALYSES AND MEASUREMENTS

DATA USE	TECHNIQUE	SAMPLE MATRIX	APPROPRIATENESS	DQO LEVEL[1]
Health & Safety Field Personnel Protection	OVA / HNu / Miniram Screening	Air	Surface soil and cuttings from borings.	Level I
Physical / Chemical Characterization of Soil during the sampling process	Headspace screening	Air	Soils	Level I
Characterization of surfacewater for potential contamination	Volatile Organic Analysis	Water	Surfacewater	Level IV
Characterization of surfacewater for potential contamination	Semivolatile Organic Analysis	Water	Surfacewater	Level IV
Characterization of surfacewater for potential contamination	TCL - Pesticides/PCBs	Water	Surfacewater	Level IV
Characterization of surfacewater for potential contamination	Inorganic Analytes (Metal, Classified Chemistry)	Water	Surfacewater	Level IV
Further characterization of site contamination	Volatile Organic Analysis	Soil	Soil from new borings, surface and subsurface soil	Level IV
Further characterization of site contamination	Semivolatile Organic Analysis	Soil	Soil from new borings, surface and subsurface soil	Level IV
Characterization of treated and untreated soil	Volitile Organic Analysis	Soil	Excavated soil before and/or after treatment.l	Level IV
Characterization of treated and untreated soil	Semivolitile Organic Analysis	Soil	Excavated soil before and/or after treatment	Level IV
Comparision of treated soil to LDR	TCLP - Volatile Organic Analysis	Soil	Treated Soil	Level IV
Comparision of treated soil to LDR	TCLP - Semivolatile Organic Analysis	Soil	Treated Soil	Level IV

TABLE 3-5 (Continued)

DATA USE	TECHNIQUE	SAMPLE MATRIX	APPROPRIATENESS	DQO LEVEL[1]
Comparision of treated soil to LDR	TCLP - Pesticides	Soil	Treated Soil	Level IV
Comparision of treated soil to LDR	TCLP - Inorganic Analytes	Soil	Treated Soil	Level IV
Comparision of treated soil to LDR	TCLP - Herbicides	Soil	Treated Soil	Level IV

[1] Data Quality Objective (DQO) Levels are defined by USEPA in "Data Quality Objective for Remedial Response Activities", USEPA/540/G-87-003. Definitions applicable to DQO levels for this project are as follows:

- Level I = Field screening. This level is characterized by the use of portable instruments which can provide real-time data to assist in the optimization of sampling point locations and for health and safety gsupport. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.
- Level III = Laboratory analyses using methods other than ASP RAS. This level is used primarily in support of engineering studies using standard EPA approved procedures.
- Level IV = ASP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data.
- Level V = ASP Special Analytical Services (SAS). This level is characterized by rigorous, method specific QA/QC protocols and documentation.
- LDR =

TABLE 4-1
SUMMARY OF ANALYTICAL CHEMISTRY PROGRAM

Matrix	Number of Samples	Parameters	FD	FB	TB	RB
Soil (Borings, Proveout, and treated)	334	ASP Volatile organics	17	17	A	17
		ASP Semivolatile organics	17	NA	NA	17
Soil - TCLP/Total* (treated)	45	Volatile organics	3	3	A	3
		Semivolatile organics	3	NA	NA	3
		Pesticides	3	NA	NA	3
		Herbicides	3	NA	NA	3
		Metals	3	NA	NA	3
Wastewater	60	ASP-Volatile organics	3	3	A	3
		ASP-Semivolatile organics	3	NA	NA	3
		ASP-Metals	3	NA	NA	3
		ASP-Classical Chemistry	3	NA	NA	3
		ASP-Cyanide	3	NA	NA	3

FD = Field Duplicate
FB = Field Blank
TB = Trip Blank
RB = Rinsate Blank
A = One trip blank will accompany and be analyzed for each cooler containing samples for volatile organic analysis.
NA = Not applicable.
* = TCLP extraction does not apply to the field blank and rinsate blank samples, but will be analyzed according to the same protocal as the soil sample extract.

Comments:

- Matrix spike/matrix spike duplicate (MS/MSD) samples are required for organic analysis. Samples designated for MS/MSD analysis will be collected at a frequency of one per group of 20 or fewer investigative samples.
- The number of MS/MSD, duplicate, and blank samples are not included in the matrix total.

TABLE 4-2
SAMPLE VOLUMES, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Matrix	Volume and Container	Preservative	Holding Time[1]
Organics				
Volatiles	Water Soil	3 x 40 ml glass VOA vials; teflon-lined septum 2 x 4 oz. jars	Cool 4°C Cool 4°C	7 d to analysis 30 d
Semivolatiles	Water Soil	2 x 1/2 gallon amber glass bottle; teflon-lined cap 8 oz. amber glass jar; teflon-lined cap	Cool 4°C Cool 4°C	5 d to extraction/40 d to analysis
Pesticides/PCBs	Water Soil	2 x 1/2 gallon amber glass bottle; teflon-lined cap 8 oz amber glass jar; teflon-lined cap	Cool 4°C Cool 4°C	5 d to extraction/40 d to analysis
Inorganics				
Metals (except mercury)	Water	1000 ml polyethylene bottle; poly or teflon-lined cap	HNO^3 to pH<2 Cool 4°C	180 d to analysis
Mercury	Water	Will be aliquoted by the first from the metals container	HNO^3 to pH<2 Cool 4°C	26 d to analysis
Cyanide	Water	500 ml polyethylene bottle; poly or teflon-lined cap	NaOH to pH>12 Cool 4°C	12 d to analysis
Other				
TCLP	Soil	8 oz glass jar; teflon-lined cap	NA	NA

Notes:
1. Holding times are from verified time of sample receipt (VTSR) and the same for water and soil.

NA Not Applicable
d = days

TABLE 6-1
QUALITY CONTROL CHECK SUMMARY

QC Checks	Frequency
Field Blank (FB)	1 per matrix per parameter per 20 samples
Rinsate Blank (RB)	1 per matrix per parameter per 20 samples
Trip Blank (TB)	1 per 20 or SDG (volatiles only) per cooler
Field Duplicate (FD)	1 per matrix per parameter per 20 samples
Method (Preparation) Blank (MB)	1 per 20 or prep/analysis batch per SDG
Matrix Spike (MS)	1 per matrix per 20 or SDG
Matrix Spike Duplicate (MSD)	1 per matrix per 20 or SDG (organics only)
Matrix Duplicate (MD)	1 per matrix per 20 or SDG (inorganics only)
Laboratory Control Sample (LCS)	1 per analytical batch not to exceed 20 samples (inorganics only)
Continuing Calibration Check (CC)	Every 12 hrs or per shift not to exceed 12 hrs (organics only)
Performance Evaluation (PE) Samples	Once during project
Initial Calibration Verification Check (ICV)	1 per analytical run immediately following calibration (inorganics only)
Initial Calibration Blank (ICB)	1 per analytical run immediately following the ICV (inorganics only)
Continuing Calibration Verification Check (CCV)	Every 10 samples during analytical run (inorganics only)
Continuing Calibration Blank (CCB)	Every 10 samples immediately following CCV (inorganics only)
Surrogate Spike	Every analytical run (organics only)

Table 7-1.
Analytical Methods

Matrix	Parameters - ASP	Method
Soil (Borings, Proveout, and Treated)	Volatile Organics	8240
	Semivolatile Organics	8100
Soil - TCLP (Treated)	TCLP Extractions	1311
	Volatile Organics	8240
	Semivolatile Organics	8270
	Metals	6010/7000
	Pesticides	8080
	Herbicides	8150 or 8080
Wastewater	Semivolatile Organics	8240
	Semivolatile Organics	8100
	Metals	6010/7000
	Classical Chemistry	Various
	Cyanide	9010

TABLE 7-2
ANALYTE QUANTITATION AND DETECTION LIMITS

VOLATILE ORGANIC COMPOUNDS

	Water (µg/L)	Soil (µg/kg)
Chloromethane	10	10
Bromomethane	10	10
Vinyl Chloride	10	10
Chloroethane	10	10
Methylene Chloride	10	10
Acetone	10	10
Carbon Disulfide	10	10
1,1-Dichloroethene	10	10
1,1-Dichloroethane	10	10
1,2-Dichloroethene (Total)	10	10
Chloroform	10	10
1,2-Dichloroethane	10	10
2-Butanone	10	10
1,1,1-Trichloroethane	10	10
Carbon Tetrachloride	10	10
Bromodichloromethane	10	10
1,2-Dichloropropane	10	10
cis-1,3-Dichloropropene	10	10
Trichloroethene	10	10
Dibromochloromethane	10	10
1,1,2-Trichloroethane	10	10
Benzene	10	10
Trans-1,3-Dichloropropene	10	10
Bromoform	10	10
4-Methyl-2-pentanone	10	10
2-Hexanone	10	10
Tetrachloroethene	10	10
Toluene	10	10
1,1,2,2,-Tetrachloroethane	10	10
Chlorobenzene	10	10
Ethyl Benzene	10	10
Styrene	10	10
Xylenes (Total)	10	10

TABLE 7-2 (continued)

SEMIVOLATILE ORGANIC COMPOUNDS

	CRQL Water (µg/L)	CRQL Soil (µg/kg)
Phenol	10	330
bis(2-Chloroethyl)ether	10	330
2-Chlorophenol	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
1,2-Dichlorobenzene	10	330
2-Methylphenol	10	330
2,2'-oxybis(1-Chloropropane)*	10	330
4-Methylphenol	10	330
N-Nitroso-di-n-dipropylamine	10	330
Hexachlorethane	10	330
Nitrobenzene	10	330
Isophorone	10	330
2-Nitrophenol	10	330
2,4-Dimethylphenol	10	330
bis(2-Chloroethoxy)methane	10	330
2,4-Dichlorophenol	10	330
1,2,4-Trichlorobenzene	10	330
Naphthalene	10	330
4-Chloroaniline	10	330
Hexachlorobutadiene	10	330
4-Chloro-3-methylphenol	10	330
2-Methylnaphthalene	10	330
Hexachlorocyclopentadiene	10	330
2,4,6-Trichlorophenol	10	330
2,4,5-Trichlorophenol	25	800
2-Chloronaphthalene	10	330
2-Nitroaniline	25	800
Dimethylphthalate	10	330
Acenaphthylene	10	330
2,6-Dinitrotoluene	10	330
3-Nitroaniline	25	800
Acenaphthene	10	330
2,4-Dinitrophenol	25	800
4-Nitrophenol	25	800
Dibenzofuran	10	330
2,4-Dinitrotoluene	10	330
Diethylphthalate	10	330
4-Chlorophenyl-phenyl ether	10	330
Fluorene	10	330
4-Nitroaniline	25	800
4,6-Dinitro-2-methylphenol	25	800

	CRQL Water (µg/L)	CRQL Soil (ug/kg)
N-nitrosodiphenylamine	10	330
4-Bromophenyl-phenylether	10	330
Hexachlorobenzene	10	330
Pentachlorophenol	25	800
Phenanthrene	10	330
Anthracene	10	330
Carbazole	10	330
Di-n-butylphthalate	10	330
Fluoranthene	10	330
Pyrene	10	330
Butylbenzylphthalate	10	330
3,3'-Dichlorobenzidine	10	330
Benzo(a)anthracene	10	330
Chrysene	10	330
bis(2-Ethylhexyl)phthalate	10	330
Di-n-octylphthalate	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(a)pyrene	10	330
Indeno(1,2,3-cd)pyrene	10	330
Dibenz(a,h)anthracene	10	330
Benzo(g,h,i)perylene	10	330

* Previously known by the name bis(2-Chloroisopropyl) ether

Note: Semivolatile organic compounds include acid compounds and base/neutral compounds as delineated in Table 3-1.

TABLE 7-2 (continued)

PESTICIDES/PCBS	CRQL Water (µg/L)	CRQL Soil (µg/kg)	INORGANIC ANALYTES	CRDL Water (µg/L)	CRDL Soil (mg/kg)
alpha-BHC	0.05	1.7	Aluminum	200	40
beta-BHC	0.05	1.7	Antimony	60	12
delta-BHC	0.05	1.7	Arsenic	10	2
gamma-BHC (Lindane)	0.05	1.7	Barium	200	40
Heptachlor	0.05	1.7	Beryllium	5	1
Aldrin	0.05	1.7	Cadmium	5	1
Heptachlor epoxide	0.05	1.7	Calcium	5000	1000
Endosulfan I	0.05	1.7	Chromium	10	2
Dieldrin	0.10	3.3	Cobalt	50	10
4,4'-DDE	0.10	3.3	Copper	25	5
Endrin	0.10	3.3	Iron	100	20
Endosulfan II	0.10	3.3	Lead	3	0.6
4,4'-DDD	0.10	3.3	Magnesium	5000	1000
Endosulfan sulfate	0.10	3.3	Manganese	15	3
4,4'-DDT	0.10	3.3	Mercury	0.2	0.1
Methoxychlor	0.50	17.0	Nickel	40	8
Endrin ketone	0.10	3.3	Potassium	5000	1000
Endrin aldehyde	0.10	3.3	Selenium	5	1
alpha-Chlordane	0.05	1.7	Silver	10	2
gamma-Chlordane	0.05	1.7	Sodium	5000	1000
Toxaphene	5.0	170.0	Thallium	10	2
Aroclor-1016	1.0	33.0	Vanadium	50	10
Aroclor-1221	2.0	67.0	Zinc	20	4
Aroclor-1232	1.0	33.0	Cyanide	10	5
Aroclor-1242	1.0	33.0			
Aroclor-1248	1.0	33.0			
Aroclor-1254	1.0	33.0			
Aroclor-1260	1.0	33.0			

Notes:

CRDL = Contract Required Detection Limits
CRQL = Contract Required Quantitation Limits
RL = Laboratory Specific Reporting Limit

Figures

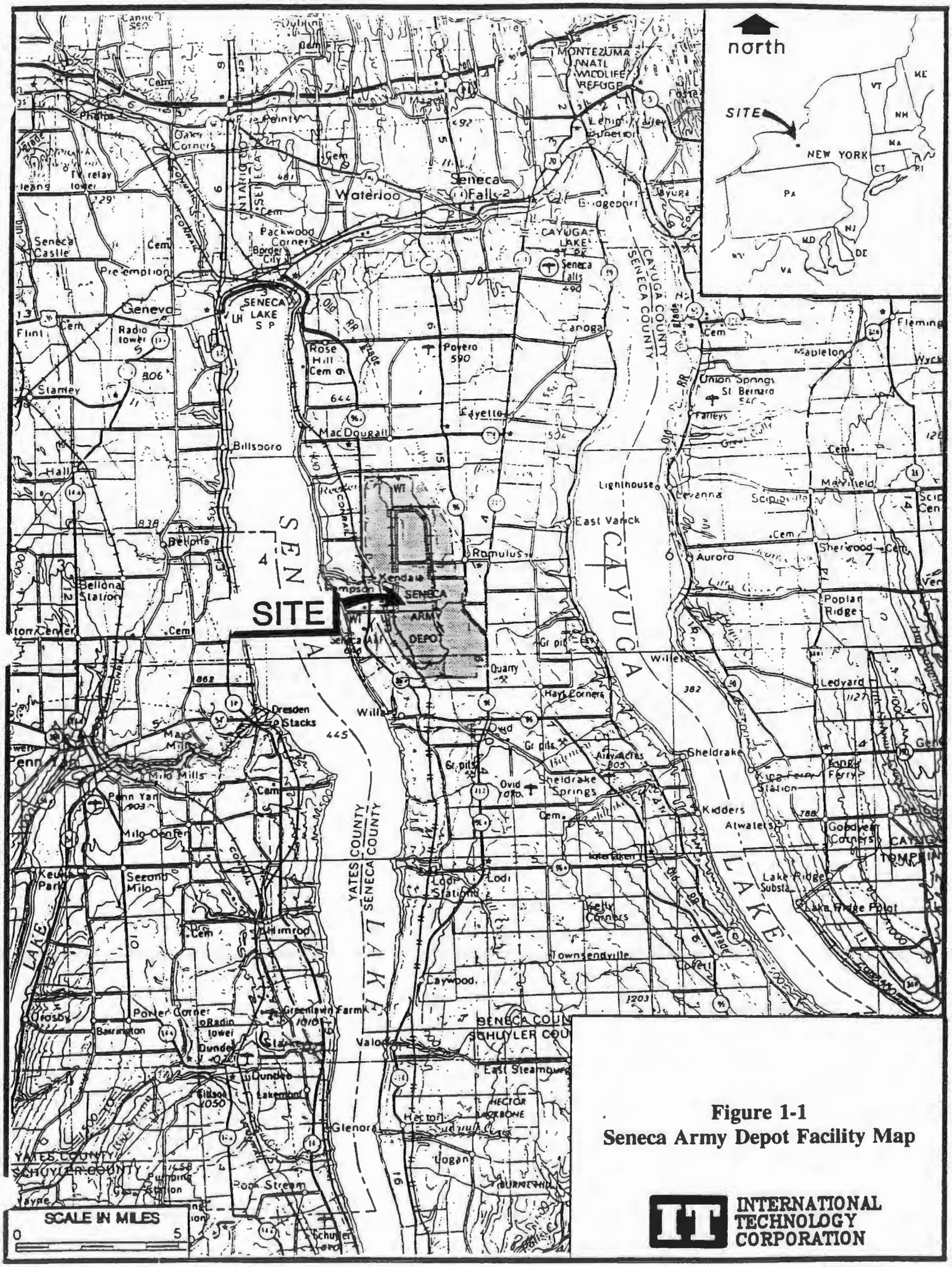


Figure 1-1
Seneca Army Depot Facility Map

INTERNATIONAL TECHNOLOGY CORPORATION

Figure 5-1
Example Sample Label

SAMPLE LABELS

SITE NAME	DATE
ANALYSIS	TIME
	PRESERVATIVE

Lot # 9062023

SPECIALTY CLEANED CONTAINER

SITE NAME	DATE
Atlas Missile Site	6/1/89
ANALYSIS	TIME
	1200
Total Metals	PRESERVATIVE
Sampler KC	HNO3

Lot # 9058773

SPECIALTY CLEANED CONTAINER

SAMPLE TAGS

Proj. Code
Station No.
Month Day Year
Time
Designate. Comp. Grab
Samplers (Signatures)
Station Location

Preservative:
Yes ☐ or No ☐

ANALYSES	
BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No.	Lab Sample No.

Project Code: WBS 310.C01 / 21.SM10.0
Station No.: MW 26 / SS-11(8)
Month/Day/Year: 5-28-93
Time: 1007
Designate: Comp. / Grab ✓
Samplers (Signatures): Jane Doe
Station Location: Monitoring Well #26 Split Spoon # 11

Preservative:
Yes ☐ No ☑

ANALYSES	
BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	X
Priority Pollutants	X
Volatile Organics	X
Pesticides	X
Mutagenicity	
Bacteriology	

Remarks: Case 1746
ITR # HE0637
Bottle Lot # 631292

Tag No.	Lab Sample No.
H0502	

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 346363
Page 1 of ___

Project Name/No. 1
Sample Team Members 2
Profit Center No. 3
Project Manager 4
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7
Lab Destination 8
Lab Contact 9
Project Contact/Phone 12
Carrier/Waybill No. 13

Bill to: 5

Report to: 10

ONE CONTAINER PER LINE

Sample 14 Number	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre- 19 servative	Requested Testing 20 Program	Condition on 21 Receipt	Disposal 22 Record No.
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by 28 (Signature/Affiliation)	Date: Time:	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

White: To accompany samples Yellow: Field copy

*See back of form for special instructions.

Figure 5-2
RFA/COC Record

U.S. Army Corps of Engineers — Chain of Custody Record

(ER 1110-1-263)

Proj. No.	Project Name	Number of Containers								Remarks
Sampler: (Signature)										
Date	Time	Pres.	Grab	Comp	Site Code/Sample Number					

FOR ILLUSTRATION PURPOSES ONLY

(Local reproduction authorized - blank masters available from local FMO)

Sampler Relinquished by:	Date/Time	Received by: (Sig.)	Date/Time	Hazards Associated with Samples
Relinquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:
Custody Seal No.		Lab case No.:		

ENG Form 5021-R, Oct 90 — Proponent: CEMP-RT

Figure 5-2
RFA/COC Record

Figure 5-3
Sample Collection Log

INTERNATIONAL TECHNOLOGY CORPORATION

DATE	
TIME	
PAGE ____ OF ____	
PAGE	
PROJECT NO.	

SAMPLE COLLECTION LOG

PROJECT NAME ______________________________

SAMPLE NO. ______________________________

SAMPLE LOCATION ______________________________

	CONTAINERS USED	AMOUNT COLLECTED
SAMPLE TYPE ____________		
COMPOSITE ____YES ____NO		
COMPOSITE TYPE ____________		
DEPTH OF SAMPLE ____________		
WEATHER ____________		

COMMENTS:

PREPARED BY: ____________

INTERNATIONAL TECHNOLOGY CORPORATION

Figure 5-4

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE			
NO.			
SHEET OF			

PROJECT NAME	PROJECT NO.
FIELD ACTIVITY SUBJECT:	
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:	
VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
IT PERSONNEL ON SITE:	
SIGNATURE	DATE:

327A-7-86

FIGURE 5-5
SAMPLE RECEIVING CHECKLIST
SHIPMENT CONDITION INSPECTION UPON ARRIVAL

Control #: ______________________ Date Received: ________________
Job Code: ______________________ Date Inspected: ________________
Inspected by: ______________________ Time Inspected: ________________
(print name)

Paperwork	Yes	No	Intact	Broken
Airbill	____	____		
Cooler Custody Seals:	____	____	____	____
Bottle Custody Seals:	____	____	____	____
Chain of Custody:	____	____		
Traffic Reports:	____	____		
Sample Tags:	____	____		
Tags Listed on RFA/COC:	____	____		

Sample Condition

	Cool	Warm	Hot	Degrees C
Cooler Temperature:	____	____	____	____

	Yes	No	
Ice:	____	____	Melted
Bottles Broken:	____	____	
Bottles Leaking:	____	____	

Preservation pH:	____	____	____
	OK	Not OK	Not Checked

Other ____

Shipment Condition:	____	____	____	____
	OK	Not OK	Major	Minor

Problems and Comments

____

____

____

____

________________________________ ________________________________
Signature Date

Figure 13-1 FIELD CORRECTIVE ACTION REQUEST FORM

Corrective Action Request Form No. ________________

Originator ________________ Date ________________________________

Person Responsible
for Replying ________________ Contract
Involved ________________________________

Description of problem and when identified: ________________________________

____

____

____

State cause of problem if known or suspected: ________________________________

____

____

____

<u>Sequence of Corrective Action</u>: (If no responsible person is identified, notify QA Manager immediately. Submit all CA forms to QA Manager for initial approval of CA.)

State Date, Person, and Action Planned:

____

____

____

____

____

____

____

____

CA Initially Approved By: __________ Date ________________________________

Follow-up Dates: ____

Final CA Approval By: __________ Date ________________________________

____

Information copies to:

RESPONSIBLE PERSON/DEPARTMENT QC COORDINATOR: ________________

QA MANAGER: ____

DEPARTMENT MANAGER: ____

Figure 13-2

LABORATORY CORRECTIVE ACTION REQUEST FORM

1. Department:______________________________ Report No.:________

   Agenda/Checklist Item:______________________________

2. Attention:______________________________ Reply By:__________

3. Auditor:______________________________ Date:____________

- -

4. Observation:

5. Recommendation:

6. Corrective Action Reply:

7. Date Action Will Be Completed:______________________________

8. Signature of Dept Representative:______________________________

   Date:____________

- -

9. Evaluation of Corrective Action Response:

   Acceptable _____ Not Acceptable _____ Other _____

10. Quality Assurance Auditor:________________ Date:______________

- -

11. Corrective Action Complete:

    Verified By:____________________ Date:____________

Figure 13-3
Variance Log

RECORD OF TECHNICAL CHANGE

Technical Change No. ____________________ Page_____ of_____

Project/Job No. ____________________ Date ____________

Project/Job Name ____________________

Phase/Task ____________________

The following technical changes (including justification) are requested by:

____________________ ____________________
(Name) (Title)

The project time will be (Increased)(Decreased)(Unchanged) by approximately ____________ days

Applicable Project-Specific Document(s):

CC:

Approved By: ____________________ Date ________
(Project Manager)

____________________ Date ________
(Quality Assurance Officer)

Client Notified Yes_____ No_____ Date ________

Contract Change Order Required Yes_____ No _____

Contract Change Order No. ____________________

Figure 14-1
Quality Assurance Report Form

(SAMPLE FORMAT)

A-E DAILY QUALITY CONTROL REPORT

DATE ____________

DAY	S	M	T	W	TH	F	S

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

COE PROJECT MANAGER ____________

PROJECT ____________

JOB NO. ____________

CONTRACT NO. ____________

SUB-CONTRACTORS ON SITE:

EQUIPMENT ON SITE.

WORK PERFORMED (INCLUDING SAMPLING):

SHEET ____ OF ____

Figure 14-1
Quality Assurance Report Form

(Continuation Sheet)

PROJECT. ______________________ REPORT NO. __________

JOB NO. ______________________ DATE __________

QUALITY CONTROL ACTIVITIES (INCLUDING FIELD CALIBRATIONS)
HEALTH AND SAFETY LEVELS AND ACTIVITIES.
PROBLEMS ENCOUNTERED/CORRECTION ACTION TAKEN:
SPECIAL NOTES.
TOMORROW'S EXPECTATIONS:

BY __________________ TITLE __________________

APPENDIX C

SOIL BORING PLAN

Draft Soil Boring Work Plan

Seneca Army Depot
Romulus, New York

Prepared for:

U.S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
140 Allen's Creek Road
Rochester, New York 14618

Project No. 519070

August 1994

1.0 Introduction

This Work Plan details the soil boring and soil sampling activities which are to be performed under the Rapid Response contract between IT Corporation (IT) and the USACE at the Seneca Army Depot in Romulus, New York. The soil borings and attendant soil sampling will be accomplished on the perimeter of two cells of a former ash landfill to confirm that the proposed limits of excavation of the cells meet specified performance standards. It is the responsibility of all IT and Subcontractor field personnel associated with this project to be thoroughly acquainted with the requirements of this Work Plan.

IT will obtain soil samples along the perimeter of the two areas to be excavated. A total of 31 soil boring locations, each set at 50 foot intervals and set back a distance of 5 feet from the previously delineated perimeters of two areas of excavation, will be performed. Soil boring locations are shown on Figure H-1 of this Soil Boring Work Plan. Each boring will be augered to the top of bedrock and a total depth of approximately 10 feet for each boring is anticipated. Three discreet (3) soil samples will be collected from each boring location for submission to an on-site portable gas chromatograph (GC) for screening. If GC screening results indicate that the three samples from a particular boring either contain concentrations less than soil clean up criteria or no detectable concentrations of site-specific volatile organic compounds (VOCs), then subsamples of the three discreet samples will be submitted to an off-site analytical laboratory for confirmational testing. If on-site GC results indicate that site-specific VOCs are not present in any one of the three soil samples at concentrations higher than soil cleanup levels, then the boring location will be considered as clean and the limit of contamination will be considered to be the original perimeter of the excavation area. If on-site GC results indicate that site-specific VOCs are present in any one of the three soil samples at concentrations higher than soil cleanup levels then a second boring will be performed at a location on a new perimeter located ten feet further out and away from the original investigation perimeter.

Soil borings will be performed using the hollow-stem auger technique. All borings will be completed in accordance with all federal, state, and local requirements. Soil samples will be screened in the field using an organic vapor analyzer (OVA) flame ionization detector (FID) and a portable gas chromatograph (GC) to semi-quantitatively identify the possible presence of volatile organic compounds (VOCs) in soil. Protocols for drilling, sampling, and all other aspects of this investigation are outlined in subsequent sections of this SOS. Any modifications or deviations from this SOS will require approval by the USACE Project Geologist.

2.0 Soil Borings

Thirty-one (31) soil boring locations have been chosen based on information regarding site history and operations and from the results of previous investigations. Test borings will be performed in unconsolidated sediments using the hollow-stem auger drilling method. The hollow-stem auger method will be utilized in order to allow for an accurate determination of the depth to groundwater surface. Based on previous testing performed in the investigation area it is anticipated that the depth to groundwater is approximately 4 feet below grade. If groundwater is encountered, an accurate determination of the depth to groundwater surface will be made by the on-site geologist. Drilling will be conducted by a qualified drilling subcontractor under the direct supervision of a qualified geologist. Subsurface soil samples will be collected on a continuous basis from the test borings to characterize the subsurface stratigraphy and to identify the possible presence of degraded soil. Soil samples will be field screened by a sampling technician/geologist using an OVA/FID to detect the presence of total VOCs.

Additionally, soil samples will be containerized and screened in a field laboratory established in a field vehicle, using a portable GC to detect specific VOCs. Soil borings will be required to investigate the vertical and horizontal extent of site-specific contaminants. All relevant field activities will be performed following the guidance obtained from CEMRD Policy Letter #90-001 Installation of Groundwater Monitoring Wells and Exploratory Borings at Hazardous Waste Sites. All borings for soil sampling will be drilled and sampled according to the requirements presented in Sections 2.2 through 2.8 of this SOS..

2.1 Boring Location Survey

All boring locations will be surveyed in the X, Y and Z coordinates and subsequently staked prior to initiation of the boring program. The survey subcontractor, Niagara Boundary and Mapping Services, New York-licensed and registered surveyors, will perform all surveys required of this project and will supply IT and the USACE with the original or a legible reproducible copy of the surveys and field books.

Coordinates and elevations will be established for each soil boring location. The coordinates will be to the closest 1 foot and referenced to the two available benchmarks, SEAD-2 and SEAD-3. A ground elevation to the closest 0.10 foot and an elevation for the ground surface to the closest 0.01 foot will be obtained at each boring location. These elevations will be referenced to mean sea level (msl), specifically to the National Geodetic Vertical Datum (NGVD) of 1983. If the 1983 datum is not available, the NGVD 1929 datum will be used. All positions and coordinates of all permanent points within the control traverse will be shown.

At the conclusion of the soil boring program all boring locations outside of the original survey perimeters will be staked by IT personnel to clearly define the new perimeter of the contaminated area.

2.2 Regulatory Requirements

All borings will be drilled in accordance with all federal, state, and local requirements as determined by IT. If the specifications as set forth in this SOS do not meet state or local requirements, the USACE Technical Manager (USACE-TM) will be contacted for resolution of differences.

2.3 Utility Clearances and Permits

IT will obtain and coordinate all utility clearances and drilling permits. Although available site information indicates that the presence of utilities in the investigation area is not a concern, if it is necessary to move a boring in order to avoid utilities, IT will direct the drilling subcontractor to relocate the boring to a suitable location which accomplishes the intent of the original location. The new location will be as close as possible to the original location. Both locations will be shown on the boring log. IT and the drilling subcontractor will take all reasonable precautions to protect persons and property near the drill site.

2.4 Drilling Methods and Equipment Decontamination

Soil borings will be completed in unconsolidated material using the hollow-stem auger drilling method. Hollow-stem augers will be used to drill into the overburden and split-barrel (split spoon) samples are to be collected. Auger diameters will have minimum inside dimensions of 2.75 inches. Continuous split spoon sampling of subsurface soil, from ground surface to boring termination depth, will be collected to characterize the subsurface stratigraphy and to identify the possible presence of degraded soil. Split-barrel soil samples will be collected in accordance with a modification to the American Society of Testing and Materials (ASTM) Procedure D1586-84. A split-barrel sampler 24 inches in length and with a minimum O.D. of 2 inches will be used for sample collection. The split-barrel sampler will be driven by a 140-pound hammer dropping a distance of 30 inches. The sample will be logged by the geologist and the soil classified in accordance with the Unified Soil Classification System (USCS). These soil samples will be screened in the field using a photoionization detector (PID)/flame ionization detector (FID) to detect the presence of VOCs. A total of 31 soil boring locations are depicted on Figure 1.

The subcontractor will be responsible for assembling a decontamination (decon) area at an on-site location as specified by the IT geologist. All sampling equipment will be steam cleaned prior to initial use and reuse thereafter. All drill pipe, drilling tools, etc. will be free of potentially contaminating materials (i.e., grease, oil, paint, etc.) and will be steam cleaned prior to use at each boring location. The rig will be free of leaks which could contaminate the holes (i.e., hydraulic fluid, oil, gas, loose paint, etc.). No grease will be used on drill pipe joints. The use of any lubricants will be submitted for approval in the subcontractor work plans and will be noted on the boring logs. The subcontractor will be responsible for collecting and containerizing all wash waters.

2.5 Soil Sampling Requirements

Subsurface soil samples will be collected during performance of test borings for the following primary purposes:

1) to characterize geologic and hydrogeologic conditions around each area to be excavated; and,
2) to assess the possible presence and the nature and extent of VOCs in soil in order to confirm that the proposed limits of the two former landfill cells meet specified performance standards.

2.6 Boring Logs

The geologist present during performance of each boring will maintain a detailed log of the subsurface boring. HTW Drilling log forms will be utilized. The log will serve as a record of sample collection, location, depth, drilling procedures, and subsurface stratigraphy. The boring log will be prepared as follows:

- Logs will be prepared in the field, as borings are drilled, by a qualified, experienced geologist. Each log will be signed by the preparer.

- All log entries will be printed. Photo reproductions will be clear and legible. One legible copy of each field log will be completed and sent to the USACE within 5 days of completion of field work.

- Borehole depth information will be from direct measurements accurate to 1/10 of a foot.

- Logs will be prepared on the HTW Drilling Log form (CSAP Figure X-X).

- All relevant information blanks in the log heading and log body will be completed.

- Log scale will be 1 inch to 1 foot.

- Each and every material type encountered will be described in column c of the log form. (Material types are to be logged directly from samples and indirectly interpolated using professional judgement, drill cuttings, drill action, etc., between sampling intervals.)

- Unconsolidated materials will be described as outlined below and in the following sequence:

    - Descriptive USCS classification in accordance with ASTM D 2488 - 4

    - Consistency of cohesive materials or apparent density of noncohesive materials

    - Moisture content assessment, e.g., moist, wet, saturated, etc.

    - Color

    - Other descriptive feature (bedding characteristics, organic materials, macrostructure of fine-grained soils, e.g., root holes, fractures, etc.)

    - Depositional type (alluvium, till, loess, etc.)

- Stratigraphic/lithologic changes will be identified in column c by a solid horizontal line at the appropriate scale depth on the log which corresponds to measured borehole depths at which changes occur, measured, and recorded to the nearest 1/10 foot. Gradational transitions, changes identified from cuttings, or methods other than direct observation and measurement will be identified by a horizontal dashed line at the appropriate scale depth based on the best judgment of the logger. All lines will be drawn with a straight edge and not by free hand.

- Logs will clearly show in columns e and f the depth intervals from which all samples are retained.

- Logs will identify the depth at which water is first encountered, the depth to water at the completion of drilling, and the stabilized depth to water. The absence of water in borings will also be indicated. Stabilized water level data will include time allowed for levels to stabilize.

- Logs will show borehole and sample diameters and depths at which drilling or sampling methods or equipment change.

- Logs will show total depth of penetration and sampling. The bottom of the hole will be clearly identified on the log with the notation "Bottom of Hole."

- Logs will show depths and types of any temporary casing used.

- Logs will identify any intervals of hole instability.

- Intervals of intact soil sampling attempts will also be shown in column e, including depths from which attempts were made and length of sample recovered from each attempt.

- Any special drilling or sampling problems will be recorded on logs, including descriptions of problem resolutions.

- Logs will include all other information relevant to a particular investigation, including but not limited to:
  - Odors
  - PID/FID measurements or other field screening or test results
  - Any observed evidence of contamination in samples, cuttings, or drilling fluids.

- Copies of the field logs will be included in the Draft Project Report; drafted boring logs will be submitted in the Final Project Report.

2.7 Borehole Grouting and Backfilling

Abandoned borings will be backfilled with grout. The borings will be backfilled immediately after the sampling is completed unless saturated conditions have been encountered. In borings encountering saturated conditions, a 24-hour groundwater level will be measured before backfilling. Borings left open overnight will be covered to lessen the potential for injury to personnel and to minimize the potential for any surface drainage entering the boring.

Once all samples are acquired and water levels (if water is present) are obtained, each boring will be filled with a bentonite and cement mixture to within 6 inches of the surface. The remaining 6 inches will be filled with native material.

These sample collection procedures will be followed throughout the performance of the boring, using clean decontaminated equipment as described in Section 2.4.

After sample collection, the sample location will be backfilled to grade with concrete grout according to the boring abandonment procedure described in Section 2.7.

Cement grout used for backfill will consist of a mixture of Portland cement (ASTM C 150) and water in the proportion of not more than 7 gallons of approved water per bag of cement (94-pound bag). Additionally, 3 percent by dry weight of sodium bentonite powder will be added unless prohibited by state or local regulations. Grout will be placed by pumping through a tremie pipe with the lower end of the tremie pipe located within 3 feet of the bottom of the boring. Pumping will continue until undiluted grout has been emplaced to within 6 inches of the ground surface.

3.0 Sampling Techniques

During drilling of all borings, soil sampling will be performed continuously over the entire depth of the boring to allow for accurate logging of the soil lithology and an assessment of the chemical characteristics of the soil. Subsurface soil samples will be collected during the investigation by means of a hollow stem auger drill rig equipped with a split-spoon sampler.

3.1 Soil Sampling

Sampling will be performed using a split-spoon sampler, using the techniques given in ASTM D 1586-84. A split-spoon sampler, measuring 24-inches in length and having minimum dimensions of 2-inches O.D., will be advanced through the hollow-stem auger and driven to the desired depth by repeatedly dropping a 140-pound hammer a distance of 30 inches. Samples will be collected continuously from surface grade to boring termination (approximately 10 feet below grade). One soil sample will be obtained from ground surface to 2 feet below grade, the second will be obtained from the approximate mid-point of the boring and the third sample will be obtained from the interval directly above bedrock.

Upon reaching the desired depth the split spoon will be removed from the boring and opened to reveal the sample. Each split spoon containing soil samples will be screened for the presence of VOCs using a PID and/or FID or equivalent instrument. The field sampling technician will screen soil samples in the split spoon sampler for volatile organic compounds in the field at the time of sample collection. Field screening will utilize an organic vapor analyzer equipped with either a photoionization detector (PID) or a flame ionization detector (FID). If a high humidity condition exists during the time period when field activity is to be performed, the FID is recommended since a PID is not reliable screening instrument under these conditions. The ionization potential of lamp for the PID will be optimum for the contaminants of concern. Sampling will be done immediately upon opening the split spoon, and will be done as soon as possible once the split-spoon sample is taken from the boring. The sample will be visually described and classified, by the geologist, in accordance with the USCS soil classification system.

After the material in the split-spoon sampler has been visually described and classified, the entire contents of the split spoon will be placed in an appropriately labeled 40 ml VOA vial for on-site GC analysis and, for those 93 samples which are to be sent to the laboratory, placed in clean sample containers for possible submission to an off-site laboratory. Soil samples will be analyzed following SW-846 Method 8240 for volatile compounds and SW-846 Method 8270 for semi-volatile compounds. The portion of the split-spoon which represents slough will not be subsampled. An amount of soil adequate for all analytical requirements will be collected from each split-spoon sampler. If the sample volume of the first sample is not adequate, another sample will be attempted from immediately below the previous sample or from the same depth in a boring drilled immediately adjacent to the boring in which the sample failed.

3.2 Portable GC Soil Testing

In order to determine the possible presence and concentration of site-specific VOCs in soil, three discreet soil samples from each boring will be analyzed on-site using a portable GC. Discreet sample intervals from 0 to 2 feet below grade, the midpoint of each boring, and from the interval directly above bedrock will be submitted for on-site portable GC analysis. The portable GC will be located in a dedicated field laboratory vehicle parked at an approximate distance of 100 yards from the boring locations. The measurement of the concentration of the site-specific volatile constituents from the soil sample will serve as a semi-quantitative indicator of VOC contamination present in the sample and will be used to determine if an additional boring, set an additional 10 feet back away from the excavation area from the location of the original boring, must be performed to delineate the limits of the excavation boundary.

Readings from the PID/FID screen performed on the soil in the split spoon will provide a total VOC concentration and will be used to guide the sample size injected into the GC. This will help to prevent the GC system from being saturated with highly contaminated samples. The GC unit will be a Photovac 10S50 portable GC or equivalent, equipped with a photoionization detector (PID); zero air will be used as a carrier gas. Soil samples will be analyzed sequentially after each has equilibrated to ambient temperature in the field vehicle.

The portable GC will be calibrated for five site-specific target volatile organic compounds (VOCs) known to be present on site. The five VOCs are; 1,2-dichloroethene (1,2-DCE); trichloroethene (TCE); toluene (TOL); xylene (XYL); and vinyl chloride (VCM). The GC will initially be calibrated with known standards and recalibrated at midpoint of sample runs. A duplicate sample analysis will be performed on the portable GC at a frequency of one per every 10 sample analyses, or for approximately 10 percent of the total samples analyzed.
Syringe blanks will be performed as appropriate to prevent carryover on the analytical column and injection media. The syringe bore will be purged with ultra-pure carrier grade air between samples and for a period of approximately one minute following the analysis of samples that contain greater than one part per million (ppm) total volatiles. Ambient air blanks will be performed after approximately every fifth sample to determine the concentration of site-specific volatiles in the ambient air. Aliquots of site-specific standards will be injected as appropriate to monitor retention time changes caused by fluctuations in ambient temperature.

The following protocol will be observed for soil samples collected for portable GC headspace screening:

- A subsample of soil will be immediately placed in a 40 mL VOA vial upon opening of the split-spoon sampler. The vial cap, incorporating a Teflon® septum, will be immediately secured on the vial.

- The sample will be taken to the field vehicle where the internal temperature will be maintained, and allowed to equilibrate to approximately 20 degrees Celsius [°C]) for at least 1 hour.

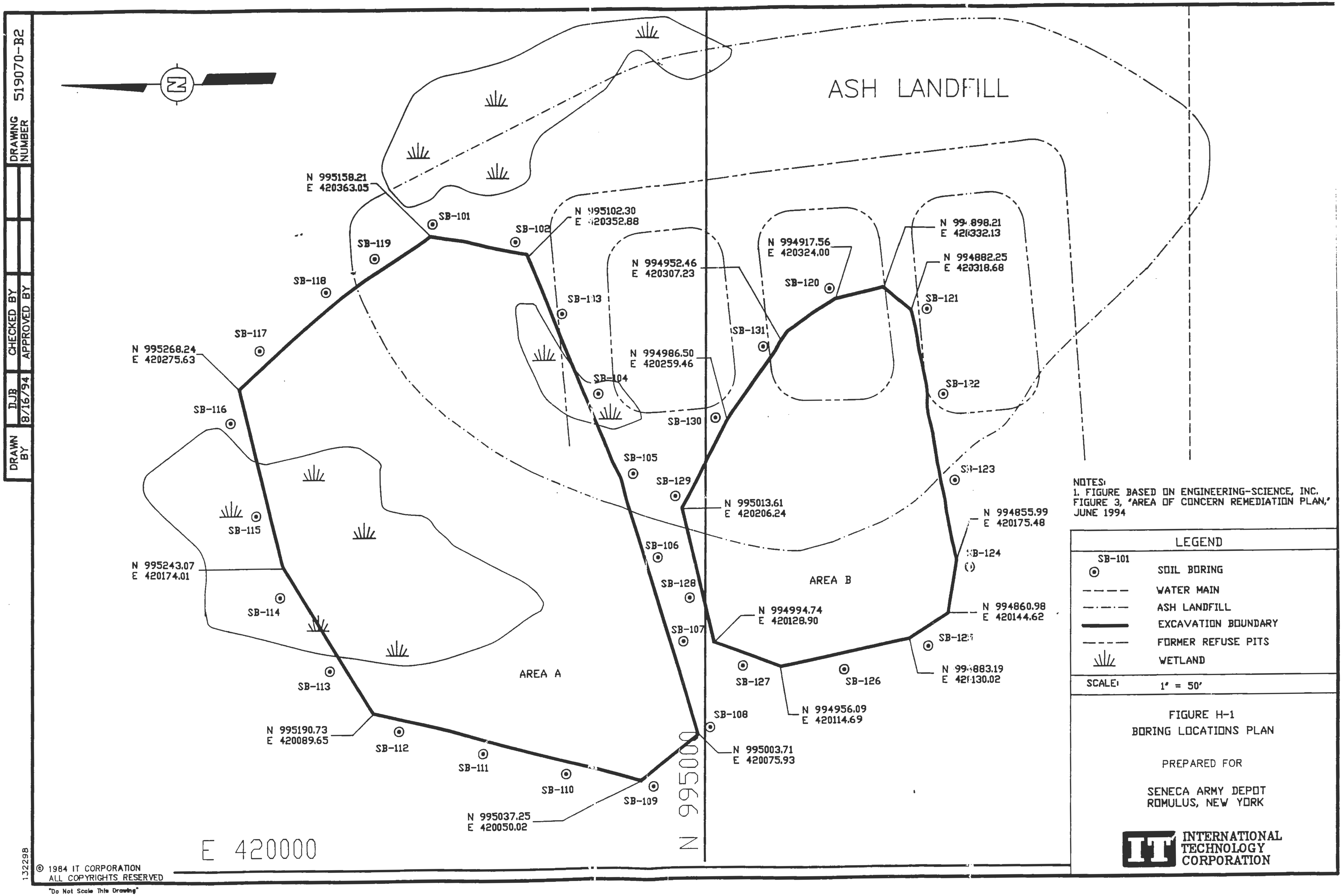
- The septum will be pierced with a clean syringe needle and an aliquot of the headspace air above the soil sample will be drawn into the syringe. The aliquot will then be injected into the portable GC calibrated for the five site-specific VOCs to measure their concentration(s) in the headspace above the sample.

- The observed constituent concentration will be recorded on a Headspace Screening Log form.

- The vial will be labeled, cataloged, and stored.

3.3 Water Level Measurement in Boreholes

If groundwater is encountered during performance of the soil boring, the geologist will direct the drilling contractor to secure the borehole location after drilling and sampling activities have concluded, and the borehole will be left open until the next day. The drilling contractor will erect temporary barriers surrounding the borehole to ensure that the open hole does not represent a hazard. The borehole will be examined by the geologist on the day after it was drilled, and if it remains open the sampling technician will use the PID/FID instrument to measure the total VOC concentration in and near the borehole before obtaining a water level measurement. A decontaminated Solinst® electronic water level meter will be used to measure the depth to water in the borehole and the measurement will be recorded by the sampling technician on the borehole log form.



ASH LANDFILL
AREA A
AREA B
N 995158.21 E 420363.05
N 995102.30
N 994952.46 E 420307.23
N 994917.56 E 420324.00
N 994882.25
N 995268.24 E 420275.63
N 994986.50 E 420259.46
N 995013.61 E 420206.24
N 994855.99 E 420175.48
N 995243.07 E 420174.01
N 994994.74 E 420128.90
N 994860.98 E 420144.62
N 994956.09 E 420114.69
N 995190.73 E 420089.65
N 995003.71 E 420075.93
N 995037.25 E 420050.02
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APPROVED BY
DRAWN BY DJB 8/16/94
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"Do Not Scale This Drawing"
NOTES:
1. FIGURE BASED ON ENGINEERING-SCIENCE, INC. FIGURE 3, "AREA OF CONCERN REMEDIATION PLAN," JUNE 1994
LEGEND
SB-101 SOIL BORING
WATER MAIN
ASH LANDFILL
EXCAVATION BOUNDARY
FORMER REFUSE PITS
WETLAND
SCALE: 1" = 50'
FIGURE H-1
BORING LOCATIONS PLAN
PREPARED FOR
SENECA ARMY DEPOT
ROMULUS, NEW YORK
INTERNATIONAL TECHNOLOGY CORPORATION

TAILGATE SAFETY MEETING

Division/Subsidiary ______________________ Facility ______________________

Date ______________ Time ______________ Job Number ______________

Customer ______________________ Address: ______________________

Specific Location ____

Type of Work ____

Chemicals Used ____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment ____

____

Chemical Hazards ____

____

Physical Hazards ____

____

Emergency Procedures ____

____

H ial / Clinic ______________ Phone ( ) ______________ Paramedic Phone ( ) ______________

Hospital Address ____

Special Equipment ____

____

Other ____

____

ATTENDEES

NAME PRINTED	SIGNATURE

Mee g conducted by:

______________________ ______________________

NAME PRINTED SIGNATURE

Supervisor ______________________ Manager ______________________

36-8-85

HTW DRILLING LOG

HOLE NO.

PROJECT

INSPECTOR

SHEET OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

PROJECT

HOLE NO

HTW DRILLING LOG

HOLE NO.

1. COMPANY NAME	2. DRILLING SUBCONTRACTOR	SHEET 1 OF SHEETS
3. PROJECT	4. LOCATION	
5. NAME OF DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED	11. DATE COMPLETED
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS	**VOC**	**METALS**	**OTHER (SPECIFY)**	**OTHER (SPECIFY)**	**OTHER (SPECIFY)**
					21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE	**BACKFILLED**	**MONITORING WELL**	**OTHER (SPECIFY)**	**23. SIGNATURE OF INSPECTOR**	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

PROJECT

HOLE NO.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 308436
Page 1 of ____

Project Name/No.[1] ____
Sample Team Members[2] ____
Profit Center No.[3] ____
Project Manager[4] ____
Purchase Order No.[6] ____
Required Report Date[11] ____

Samples Shipment Date[7] ____
Lab Destination[8] ____
Lab Contact[9] ____
Project Contact/Phone[12] ____
Carrier/Waybill No.[13] ____

Bill to:[5] ____

Report to:[10] ____

White: To accompany samples

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Pre-servative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

Yellow: Field copy

Special Instructions:[23]

Possible Hazard Identification:[24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:[25]
Return to Client ☐ Disposal by Lab ☐ Archive ____ (mos.)

Turnaround Time Required:[26]
Normal ☐ Rush ☐

QC Level:[27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): ____

1. Relinquished by[28] (Signature/Affiliation)	Date: Time:	1. Received by[28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

*See back of form for special instructions.

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

CALIBRATION LOG

Project Name ______________________________ By ______________________________

Project No. ______________________________ Page ________ of ________

Date/Time	Instrument	STD	STD CONC ppm	Meter Reading	Comments

INTERNATIONAL TECHNOLOGY CORPORATION

DATE						
TIME						
PAGE ____ OF ____						
PAGE						
PROJECT NO.						

SAMPLE COLLECTION LOG

PROJECT NAME ____________________

SAMPLE NO. ____________________

SAMPLE LOCATION ____________________

SAMPLE TYPE ____________________

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE ____________________

DEPTH OF SAMPLE ____________________

WEATHER ____________________

CONTAINERS USED	AMOUNT COLLECTED

COMMENTS:

PREPARED BY: ____________________

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE			
NO.			
SHEET	OF		

PROJECT NAME	PROJECT NO.
FIELD ACTIVITY SUBJECT:	
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:	
VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
IT PERSONNEL ON SITE:	
SIGNATURE	DATE:

327A-7-86

APPENDIX D

EXCAVATION, BACKFILLING, COMPACTION AND GRADING PLAN

DRAFT
EXCAVATION, BACKFILLING, COMPACTION AND GRADING PLAN

SENECA ARMY DEPOT ASH LANDFILL
ROMULUS, NEW YORK

Prepared for :

U.S. Army Corps of Engineers
Omaha District
215 N. 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246

Project No. 519070

August 1994

Table of Contents

1.0 INTRODUCTION

This excavation plan describes IT's approach to all phases of activities associated with the removal of contaminated soils from the Ash Landfill, treatment, and return of the soils. These activities include:

- Shoring the perimeter
- Dewatering the excavation
- Excavating and transporting soils to Process Area
- Screening and decontamination of debris
- Stockpiling contaminated soil for treatment
- Stockpiling treated soils
- Backfilling, compacting and grading
- Final grading

The following sections further describe each of these activities in detail and Figure 1 depicts the process flow.

1.1 Sheeting the Perimeter

In order to fully delineate the areas to be excavated, and to minimize the amount of clean soil to be processed by the LTTD, IT shall sheet pile Area A and Area B along the perimeter as delineated from the soil boring activity. IT shall employ a subcontractor with proven experience in this type of piling installation.

The piling will be made of steel and will conform to ASTM A328 specifications. The piling will also be continuous interlocking Z-type. The pilings shall be 14′ in length and driven into the bedrock to a depth of approximately 1′. In the event that refusal is encountered prior to obtaining the 1′ depth, 4′ long toe pins will be installed. The sheeting will be stabilized by whalers, and a 10′ deadman attached by a 1″ tie rod. The intent of using the 14′ sheeting is to leave a minimum 3′ above existing grade to act as a barrier to personnel and equipment near the excavation.

To minimize the rental costs of sheeting material, the shoring will be driven in four intervals. The eastern half of Area B will be driven first; when backfilling is nearing completion on this half, the same sheeting shall be pulled and driven on the western half. When backfilling is nearing completion on the western half, the sheeting will be pulled and driven in the eastern half of Area A, and the sequence will end in the western half of Area A (follows excavation sequence described in Section 1.3). The sheeting shall be dry decontaminated by brushing with brooms while in place, prior to backfilling with treated soils.

1.2 Dewatering the Excavation

Groundwater and rainwater or snow encountered in the open excavation will be pumped to the water treatment system in the Process Area with a 2 inch trash pump. The floor of the excavation will be notched with the excavator bucket, to allow water to collect at a sump within the excavation, which will be periodically emptied as required.

The water will be pumped via 2 inch firehose to the influent frac tanks at the water treatment system, and treated on a batch basis.

1.3 Excavating and Transporting Soils to Process Area

Due to groundwater's east to west flow, IT will excavate the contaminated soils from Area B's eastern half first, then Area B's western half, upon completion of Area B, IT will then move to Area A's eastern half, and finally Area A's western half.

1.3.1 Excavation Grid

Based on IT's calculations on air emissions 75' by 75' square excavation cells shall be appropriate to maintain emissions levels below NYSDEC guidelines. IT has identified a grid system of Areas A and B detailed on Figure 1, starting with Cell 1 in the Area B"s southwestern corner and progressing to cell 18 in Area A's northwestern corner. The cells will be excavated in order to progress in from 1 to 18. These cell numbers will be used in tracking the contaminated soils through the Process Area , and back into the excavation. This excavation grid shall be staked out prior to the beginning of intrusive activities.

1.3.2 Excavation of Soils

Each cell will be excavated with a CAT 312 tracked excavator and the contaminated soils will be placed into a 5-7 cubic yard dump truck. Initially IT will have two dump trucks available for transporting the soils to the Process Area until sufficient soils have been treated and certified clean, at that time one truck shall be released. All Excavation shall be done in accordance with measures identified in the Erosion/Dust Control Plan (Appendix E). The excavator will begin each cell by berming the perimeter of the cell with 1-2 feet of cover to prohibit surface run-off from entering the excavation. This berm shall be maintained throughout the duration of cell excavation. The excavator shall complete the cell, by removing as much loose material as possible from the fractured bedrock floor prior to moving to the next cell. Closure samples shall then be obtained prior to backfilling in accordance with the CSAP. At no time shall the open excavation exceed the 75′ by 75′square area.

1.3.3 Abandonment of MW-44

When the cell containing MW-44 is encountered, MR-44 will be destroyed by the excavator till flush with the bedrock. IT will then grout the remaining void space with hydrated bentonite grout. Cement grout for backfill will consist of a mixture of Portland Cement (ASTM C150) and water in the proportion of not more than seven (7) gallons of approved water per bag (94 pound bag). Additionally, three (3) percent by dry weight of sodium bentonite powder will be added unless prohibited by state or local regulations.

1.3.4 Transporting Soils to the Process Area

Dump truck(s) will transport the contaminated soils to the contaminated debris/soil staging area. The truck driver shall maintain a daily log showing the date, quantity and cell location of each load delivered to this staging area. This information will be used in tracking the batches of soil returned to excavation as backfill.

1.4 Screening and Decontamination of Debris/Stockpiling Soils

The soil at the debris/soil staging area will have three (3) technicians sorting out large debris. Excessive sized material will be cut to manageable size with a chop saw. The large debris will be placed on the decontamination pad at Decon Area 1 for rinsing. A CAT 956 rubber tired loader or equivalent machinery equipped with a four-in-one bucket will assist in sorting out the debris. The remaining soil/debris will be picked up by the loader and dumped into the screening machine. The screened soil will be stockpiled in the contaminated soil staging area, and the debris will go to the decontamination pad. The stockpiled soils will then be covered with 6 mil poly and secured.

The debris will be triple rinsed with a 2,000 psi hot water pressure washer, and placed into the two staged non-hazardous rolloff bins staged nearby, pending off-site disposal at a properly permitted sanitary landfill.

The LTTD subcontractor will then be responsible for moving the soil from the contaminated soil stockpile, processing the soil, and delivering the soil to the clean stockpile for testing.

1.5 Stockpiling Treated Soils

Once delivered to IT, the treated soils will be managed on the soil staging pad through use of a grid system, utilizing 16 grids. A CAT 956 rubber tired loader or equivalent will move the delivered soilpile to an open grid. The sample technician will coordinate the placement of the individual 150 cubic yard soilpiles, and upon placement will sample that pile in accordance with the CSAP. The individual stockpile will then be covered with 6 mil black poly and secured, until the sample technician has received favorable analytical results that will allow the release of the soilpile as clean backfill.

1.6 Backfilling, Compacting and Grading

Backfilling will begin as soon as the sample technician releases the soil from the post treatment staging area. The soil will be loaded with the CAT 956 rubber-tired loader onto a 5-7 cubic yard dump truck and returned to the approximate originating cell. The truck driver will maintain a daily log of the quantities delivered to the open excavation cell. The log will maintain the cell identification that has been associated with it throughout the entire process, as well as quantity, date, and new backfilling location.

The same grid used in excavation will be maintained for backfilling, but the grid cells will contain a "B" prefix (B1, B2, ...B18.).

The excavation will be dewatered prior to backfilling, and the soil will be placed in 8" loose lifts, and compacted with a sheep's foot compactor. No compaction testing is included in this Scope of Work.

1.7 Final Grading

Final grading will be performed using a CAT D3 bulldozer or equivalent, and shall allow for proper drainage after any estimated subsidence of the backfilled material takes place.

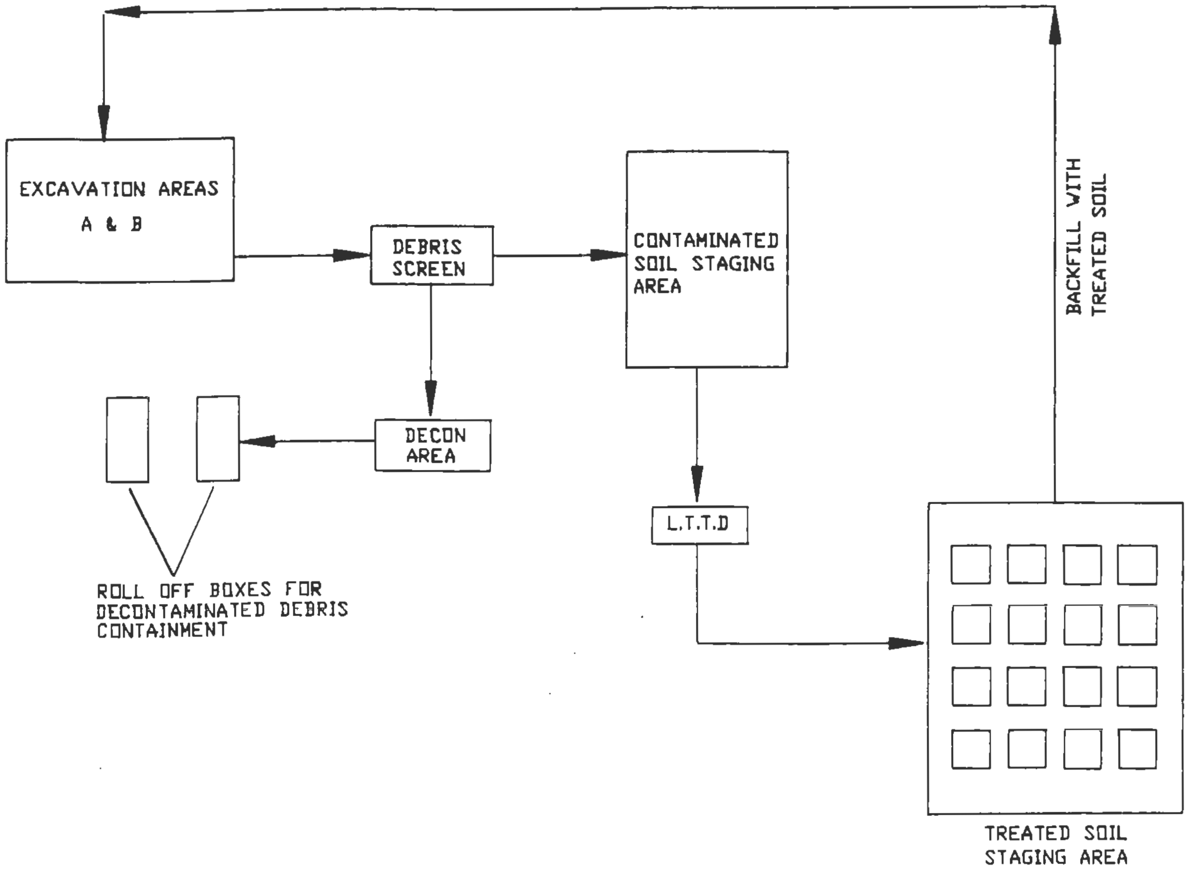


FIGURE 1
PROCESS SCHEMATIC - SOIL

PREPARED FOR

SENECA ARMY DEPOT
ROMULUS, NEW YORK

INTERNATIONAL TECHNOLOGY CORPORATION

DRAWN BY	DJB	8/17/94
CHECKED BY		
APPROVED BY		
DRAWING NUMBER	519070-A1	

132298

"Do Not Scale This Drawing"

4.0 Investigation Derived Wastes (IDW)

Drill cuttings, excess sample materials, and water removed from a boring will be drummed, appropriately labeled, and staged on site for removal by the USACE at a later date. The subcontractor will develop field protocols to minimize the amount of waste generated, and will also attempt to segregate clean materials from potentially contaminated materials.

All materials generated during field activities which are segregated as potentially contaminated will be placed in water-tight containers supplied by the subcontractor. Drums will be new, Department of Transportation (DOT)- and Environmental Protection Agency (EPA)-approved for transport of hazardous materials. Any drum used will be sealed, labeled, and recorded so that its contents can be identified as to material and source. At a minimum, drums will be labeled as to type of material contained, site number and location, boring number (and depths for soils), point of contact and telephone, and date. All materials will be segregated in separate drums (i.e., soil, water, personnel protective equipment (PPE), etc.). Labelling will be of a permanent nature, unaffected by exposure to outdoor elements for an extended period of time. Labels will be placed on the side of the drum and positioned so as to be easily viewed when drums are staged.

All potentially contaminated IDW will be transported to a secured centralized location, on site, at the completion of each boring, or daily. Drums will be secured on wooden pallets.

The following field documentation will be maintained during field activities conducted during the performance of the soil borings. Example field forms are provided in Appendix A.

Field Activity Daily Logs (FADLs)
FADLs will be used to document all site activities each day in the field. The data recorded will include the project name and number, the names of all field personnel, a description of all field activity on a regular basis throughout the day, any site visitors, phone calls made, change of plans, and a brief description of weather conditions. Entries will be made in ink and will include sufficient detail to reconstruct site activities without reliance on memory.

Sample Collection Logs
Sample Collection Logs will serve to document all appropriate data collection activities at each site. All measurements and samples collected will be recorded. Log entries will include the location of the sampling point, the depth of the sample, observed character of the material, any field measurements taken at the site, and other appropriate information. Information related to samples collected from soil borings will be documented on Visual Classification of Soils forms.

The equipment used to collect samples will be noted, as well as the sampling time, sampling description, sample depth, field screening results and volume, number of containers, sample number, preservation, analyses requested, corresponding blanks or duplicates, and decontamination procedures.

HTW Drilling Logs
HTW Drilling logs will be completed for each boring and the data will be recorded on these forms. The geologist will document a description of the soil lithology from ground surface to the termination depth of the boring, including each sampled interval. Soil descriptions will be done by a visual examination of split spoons and will include all specified information as detailed in section 2.6 of this SOS.

The location, identification, coordinates, and elevations of monuments will be plotted on maps with a scale large enough to show their location with reference to other structures at the individual sites. A tabulated list of monuments, copies of all field books, and all computation sheets will be prepared and submitted to the USACE-TM. The tabulation will consist of the designated number of the monument, the X and Y coordinates, and all the required elevations. These items will be submitted to the Omaha District no later than the Draft Project Report.

6.0 Quality Assurance

Quality-assurance objectives for the investigation will be met through a real-time comprehensive QA and data validation program encompassing sampling through data analysis and reporting. A description of the Quality Assurance program for the investigation is contained in the Chemical Sampling and Analysis Plan (CSAP). In general, the project quality assurance objectives are that:

- Data will be legally and scientifically valid;
- Data will be gathered or developed in accordance with procedures appropriate for the intended use of the data; and,
- Data will be of known and acceptable precision, sensitivity, accuracy, representativeness, comparability, and completeness, as required by the project data quality objectives.

Field measurement data will be generated during field activities that are incidental to collecting samples for analytical testing. The objective of these measurements is to generate data to guide sampling efforts and thereby provide samples to the on-site and off-site laboratories that are representative of in-situ conditions. In addition, when using direct reading instruments in the field, these parameters are important to gauge whether the instrument is operating properly. These activities are summarized as follows:

- documentation of time and weather conditions;
- location and determination of sampling depths;
- field GC headspace screening of soil boring samples for volatile organic compounds;
- determination of groundwater elevations in boreholes; and,
- determination of ambient air and breathing zone concentrations of VOCs.

The general QA objectives for field measurement data are to obtain reproducible and comparable measurements to a degree of accuracy consistent with the intended use of the data through the documented use of standardized procedures.

The sampling program for this investigation will include collection of soil samples, for on-site and off-site chemical analysis. Soil headspace screening, using a portable GC, for volatile organic compounds will take place during soil boring activities.

Field activities including sampling, field measurements, and screening will be documented on a Field Activity Daily Log (FADLs) or similar documentation. The Field Activity Daily Log will serve as the chain-of-custody for field activities. Entries on the log will be made in water-resistant ink and will include, as a minimum:

- Date, time, and personnel present;
- A detailed chronology of the day's field activities;
- Documentation of existing weather conditions;
- Unusual events;
- Sample location and number;
- Visitors on site;
- Communication with regulatory agencies, or others; and,
- Changes to plans and specifications.

Details of sample collection, including sampling points, required sample containers, preservation, holding times, preparation of sampling equipment and containers, sample handling and shipment, and field sample custody procedures, are given in the CSAP. After sample collection, the samples must be delivered to the laboratory within 24 hours from the time of collection.

A sample collection log will be prepared for each sample to record information pertaining to the location, condition, and collection of a sample. The following information is required on the sample collection log, as appropriate:

- Project name and number;
- Date and time of sample collection;
- Sample identification number, location, and type;
- Depth of sample; and,
- Weather conditions.

Chain-of-custody (COC) establishes the documentation and control necessary to identify and trace a sample from collection to final analysis. Such documentation includes labeling to prevent sample misidentification, container seals to prevent unauthorized tampering with contents, secure custody, and the necessary records to support potential litigation and refute challenge of the data.
A chain-of-custody record will be initiated in the field and will accompany each group of samples during shipment to the laboratory. Each time custody of the sample changes, the new custodian will sign the record and indicate the dates of transfer.

All samples will be adequately marked for identification from the time of collection and packaging through shipping and storage. All original chain-of-custody forms, analytical data, and other project documentation will be maintained in a project file. Project files will be stored in a central filing system pending disposition by IT.

A legible copy of the field chain-of-custody record will be maintained by IT. Once samples are received in the laboratory, chain-of-custody forms will be signed by a designated representative of the laboratory and copies of the signed chain-of-custody forms will be submitted to IT's central file location.

For volatile organic compounds, the laboratory will report all detected levels in all soil samples. Values of positive results below the Contract Required Detection Level (CRQL) will be flagged with a "J" to indicate uncertainty in the quantitation below the CRQL. Values of results which do not meet compound identification criteria (e.g. spectral matching) will be reported with a "P" flag to indicate the possible presence of the compounds. As appropriate, the raw data will be reviewed during data validation to confirm the presence or absence of "P" flagged compounds. Values below 1 $\mu g/L$ will be reported as non-detected. The laboratory will report values found below the CRQL with "J" flags for organics and values found between the CRDL and the laboratory's Instrument Detection Limit, IDL, with "B" flags for inorganics.

A Health and Safety Program has been designed and a Site Safety and Health Plan (SSHP) written which establishes the work practices necessary to help ensure protection of on-site project personnel during the performance of the soil boring activities at the Seneca Army Depot in Romulus, New York. The objective of the SSHP is to provide a mechanism for the establishment of safe working conditions during the investigation. Specific hazard control methodologies have been evaluated and selected in an effort to minimize the potential of accident or injury.

All investigation activities will be performed in accordance with applicable state, local and IT Corporate regulations and procedures, OSHA requirements, and USACE requirements. All IT Corporation employees shall comply with the requirements of the plan and all other personnel involved in the investigation shall, at a minimum, comply with the requirements of the plan.

All project team members must attend the daily Tailgate Safety Meeting and sign the Tailgate Safety Meeting form, and be familiar with the emergency procedures and phone numbers. All information regarding work to be performed, emergency procedures, and health and safety hazards will be reviewed before the work begins during this daily Tailgate Safety meeting. No work will be performed before this meeting has taken place. All team members shall be responsible to understand and comply with all site H&S requirements.

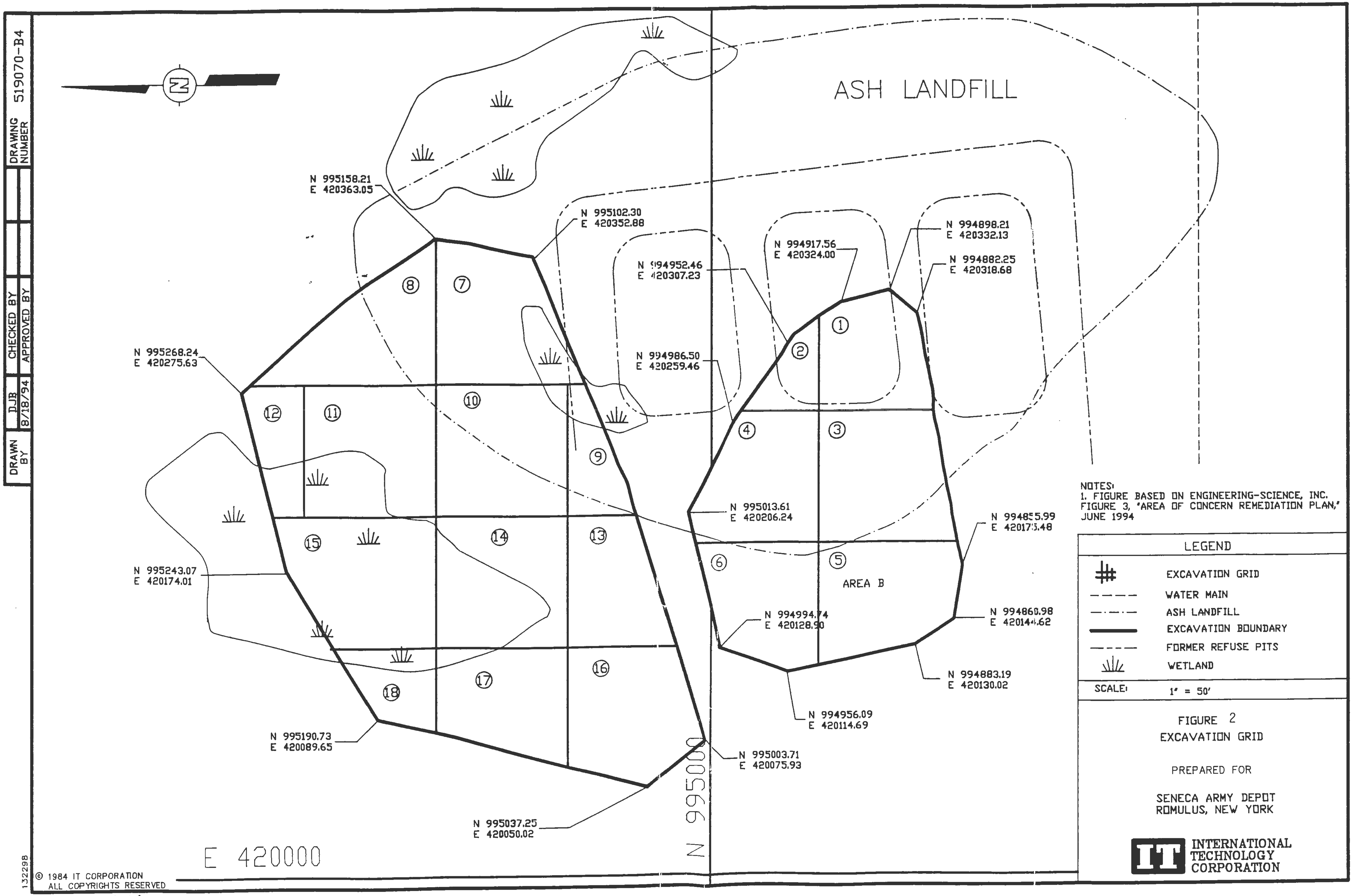
The site Project Supervisor shall be responsible for field implementation of the HSP. This shall include communication of site requirements to all IT personnel, interaction with USACE representatives and regulatory agencies.

Specific levels of protection will be used to safeguard IT and subcontractor employees from potential hazards. It is anticipated that Level D protection will be utilized for the majority of work. The determination for project personnel of any required level of protection will be based upon the hazards and conditions of the worksite.

Smoking, eating or drinking will not be permitted on the premises or in the vicinity of any sampling location, except in the support area.

Work areas in the vicinity of the drilling rig may, depending on the results of air monitoring and soil sample headspace screening, be divided into three separate zones: an exclusion ("hot") zone, a contamination reduction zone, and a support zone. Refer to the SSHP for details regarding the criteria and protocols for implementation of these zones.

ATTACHMENT A
SAMPLE FIELD FORMS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CHECKED BY
APPROVED BY
DRAWN BY
DJB 8/18/94
ASH LANDFILL
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E 420352.88
N 994952.46
E 420307.23
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E 420114.69
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E 420089.65
N 995003.71
E 420075.93
N 995037.25
E 420050.02
AREA B
E 420000
N 995000
NOTES:
1. FIGURE BASED ON ENGINEERING-SCIENCE, INC. FIGURE 3, "AREA OF CONCERN REMEDIATION PLAN," JUNE 1994
LEGEND
EXCAVATION GRID
WATER MAIN
ASH LANDFILL
EXCAVATION BOUNDARY
FORMER REFUSE PITS
WETLAND
SCALE: 1" = 50'
FIGURE 2
EXCAVATION GRID
PREPARED FOR
SENECA ARMY DEPOT
ROMULUS, NEW YORK
INTERNATIONAL TECHNOLOGY CORPORATION
132298
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"Do Not Scale This Drawing"

APPENDIX E

EROSION/DUST CONTROL PLAN

Draft
Erosion/Dust Control Plan

Seneca Army Depot
Romulus, New York

Prepared for:

U.S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
140 Allen's Creek Road
Rochester, New York 14618

Project No. 519070

August 1994

Table of Contents

1.0 Introduction

The remediation of contaminated soils and other materials at Seneca Army Depot may pose special problems for the site cleanup personnel and off-site population without proper control of dust and erosion. These problems include controlling potential fugitive emissions that are created where soils and materials are being excavated, thermally treated, stored, and backfilled. This plan identifies appropriate dust and erosion control products and methods to be utilized in minimizing the release of dust and erosion of soil during site operations.

2.0 Dust Control

This section discusses methods to be utilized in minimizing the release and migration of dust during site operations.

2.1 Dust Control Products

The following dust control products will be used to control fugitive emissions at the site:

2.1.1 Tarpaulins

Tarpaulins will consist of 6 mil plastic sheeting and will be used to cover excavated areas, untreated material piles, and treated material piles as described in Section 2.2. Tarpaulins will be weighted down to prevent movement.

2.1.2 Water

Water will be applied to the areas described in Section 2.2 to reduce dust emissions. All areas require the use of clean water free from oil or other deleterious material. Water application equipment will consist of a tank, spray bar with hoses and mist nozzles.

2.1.3 Coarse Aggregate

Coarse aggregate or asphalt may be used in the construction of site access roads. The use of coarse aggregate will minimize dust emissions resulting from project traffic activity. Coarse aggregate will conform to the New York State Department of Transportation specifications for roadways.

2.2 Dust Control Areas and Dust Control Methods

The following sections describe the areas of concern and methods for controlling dust during the following activities:

- Excavation and backfilling
- Material handling
- Demobilization.

2.2.1 Excavation and Backfilling

The following methods will be used to suppress dust emission in the different areas of excavation and backfilling:

- Water will be applied, as required, with more frequent applications during dry weather. Care will be taken to minimize the occurrence of water saturation of material. The tank and spraying equipment will be located so that the misting operation will be effective in dust suppression, yet not interfere with current excavating activities or equipment.

- Tarpaulins will be placed on top of any open excavation areas not in use or piles of excavated materials that are being staged. Weights will be used to anchor the tarpaulins in place.

- Coarse aggregate may be applied during construction of site access roads to minimize dust generation from traffic.

- Care in handling of materials and equipment will be employed at all times and in all areas so that dust emissions will be controlled.

- If air monitoring indicates a stop-work condition due to excessive dust as specified in Section 2.4, water will be utilized to suppress the dust. Work will resume when ambient dust levels return to below action level thresholds.

2.2.2 During Material Handling Activities

Certain areas be monitored for the need to implement dust suppression methods as defined in the following subsections. The need for water, tarpaulins, and coarse aggregate for dust suppression will be determined by individual location requirements; care in handling will be employed in all areas.

2.2.2.1 Excavation Areas

It is anticipated that dust release and migration during excavation activities will be minimal since groundwater is expected to be encountered at approximately four feet below grade and de-watering methods will be in use. However, water will be applied to any area which becomes dry and where dust release may occur.

2.2.2.2 Contaminated Soil Staging Area

As the majority of excavated soil is anticipated to be moist, dust release and migration is not expected to occur at higher levels. However, the staged soil awaiting thermal treatment will be monitored and will be covered with tarpaulins as needed.

2.2.2.3 Treated Soil Storage Area

Treated soil from the thermal treatment unit will be stockpiled while awaiting sampling and analysis and backfilling. As this soil will be dry, dust control methods may be necessary. Each pile of treated soil will be covered with a tarpaulin. The tarpaulin will be weighted along the edges to prevent movement. If necessary, IT will apply water to the treated soil prior to initiating backfilling activities.

2.2.3 Access Roads Within the Exclusion Zone

Clean water will be applied to site access roads as required to control dust generation. Additional coarse aggregate may be placed in areas which have become eroded. The site speed limit will be set at five (5) miles per hour so that dust creation will be minimized.

2.2.4 During Demobilization

During demobilization, dust control efforts comparable to those used during construction and excavation and backfilling will be implemented to prevent off-site migration of dust. Water and tarpaulins will be applied in the same manner as described above.

2.3 Water Application Procedures

The following water application procedures will be followed during the excavation and backfilling operations:

- Spray bar height, nozzle spacing, and spray pattern will be arranged to provide complete coverage of area with water while not interfering with equipment or operations.

- Water will be dispersed through nozzles on the spray bar at a pressure of 20 pounds per square inch (psi) minimum. Areas will be kept damp without creating nuisance conditions such as ponding or mud.

2.4 Monitoring

Monitoring guidelines described in NYSDEC TAGM HWR-89-4031, "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites," October 27, 1989 will be followed. Specific information is provided in teh Air Monitoring Plan in Appendix F of this document.

3.0 Erosion Control

This section describes methods to be utilized in controlling erosion, including run-off and run-on.

3.1 Erosion Control Products

The following products will be utilized in controlling soil erosion and run-off and run-on at the excavation site:

3.1.1 Tarpaulins

Tarpaulins will consist of plastic sheeting and will be used to cover excavated areas, untreated material piles, and treated material piles as described in Section 2.1. Tarpaulins will be anchored to prevent movement.

3.1.2 Hay Bales

Hay bales may be used as necessary in sloped areas or other areas prone to run-off to assist in preventing soil from washing away.

3.1.3 Steel Sheet Piling

Steel sheet piling will be utilized around the entire perimeter of the defined excavation areas. The sheet piling will be placed to the top of bedrock (approximately 10 feet). The sheet piling will assist in preventing groundwater and rainwater from entering and exiting the excavation areas.

3.2 Erosion Control Areas and Methods

Since the site is relatively flat, it is not anticipated that erosion and run-off and run-on will be a major concern during site operations. However, the following areas will be controlled as necessary using the methods described above:

3.2.1 Excavation Areas

Sheet piling as described above will be used around the perimeter of each excavation. This will limit any water flowing in or out of the excavation area. Groundwater entering the excavation will be pumped to the water treatment unit. Hay bales may be used as necessary in areas where the potential for erosion exists.

3.2.2 Contaminated Soil Staging Area

Contaminated soil awaiting treatment will be covered with tarpaulins as necessary to prevent soil from being eroded by wind or rain.

3.2.3 Treated Soil Storage Area

Treated soil will be covered with tarpaulins while awaiting backfilling to prevent soil from being eroded by wind or rain.

3.2.4 Drainage Swale

The treated water will be discharged in batches to the drainage swale along the southern portion of the site at a rate of approximately 30 gallons per minute. The swale will be lined with riprap along an appropriate length to prevent erosion from the flow of discharge water.

APPENDIX F

AIR MONITORING PLAN

Draft
Air Monitoring Plan

Seneca Army Depot
Romulus, New York

Prepared for:

U.S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
140 Allens Creek Road
Rochester, New York 14618

Project No. 519070
Revision: 0

August 1994

PLAN APPROVAL

_______________________________ Date ___________________

Mr. Andrew Winslow
U.S. Army Corps of Engineers
Technical Manager

_______________________________ Date ___________________

???
U.S. Army Seneca Army Depot
Commanding Officer

_______________________________ Date ___________________

Mr. Douglas Wehner
IT Project Manager

_______________________________ Date ___________________

Mr. Peter Coutts
IT Technical Manager

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Table of Contents

1.0 Introduction

1.1 Introduction

This Air Monitoring Plan (AMP) is a brief presentation of the air media sampling and analytical procedures that will be used by IT Corporation (IT) in support of the Work Plan and Scope of Services for the Rapid Response interim remedial measure at the Seneca Army Depot in Romulus, New York. The AMP has been prepared to guide the work performed by IT for the U.S. Army Corps of Engineers (USACE), Omaha District, so that it meets the air monitoring requirements detailed in Delivery Order No. 93, under Rapid Response contract number DACW45-90-D-9002. This document is a subset of the Site Safety and Health Plan (SSHP), which is included in the project Work Plan as Appendix C.

The AMP is the governing document for the performance of air monitoring and modeling tasks to be implemented for the Seneca Army Depot (SEDA) Ash Landfill remediation project. This document includes the quality objectives, the requirements for work performance to meet these objectives, and the means for verifying that the objectives have been met. All work performed on this project will be conducted in strict accordance with the SSHP.

1.2 Site Location and History

The Seneca Army Depot facility is located in Romulus, New York near the shores of Seneca Lake, where it was constructed in 1941. Prior to ownership by the Department of the Army, the site was used for farming. Below, a summary of the site history and condition is presented. Specific details on the location, history, and condition of the depot and landfill area can be found in the Scope of Services document prepared by the U.S. Army Corps of Engineers (USACE), Omaha District in August, 1994. AMP Figure 1-1 presents a map of the Seneca Army Depot facility and surrounding areas.

The Ash landfill site encompasses approximately 130 acres of the 10,587 acre Seneca Army Depot, near the southwestern corner of the facility. The site consists of the abandoned landfill area, including the Ash landfill and the Non-Combustible landfill, a burned out incinerator building and stack, and a nearby cooling pond. Residences and farmland border the area on the western side and beyond that lies Seneca Lake. The SEDA railroad runs to

Figure 1-1 Site Map

the east of the site and SEDA has undeveloped land to the south. Cemetery Road bounds the area to the north.

The subject of this Rapid Response action is the "Bend-in-the-Road" landfill located near the western boundary of the Seneca Army Depot. The Ash landfill was established to dispose of ash generated from burning of the facilities' trash from 1941 to the early 1960's. In 1974, an incinerator was built to treat the refuse from facility operations and the ash from the incinerator was also buried in the "Bend-in-the-Road" landfill area. A fire in May of 1979 destroyed the incinerator and the landfill was closed at the same time. Since that time, the landfill area has been capped with various layers of soils, but was never closed with an engineered cover or cap.

In addition to the burning pit and incinerator ash disposed of in the Ash landfill, it is suspected that other types of facility refuse and domestic wastes have also been buried in the landfill. The amount and type of debris varies greatly, with household trash such as bottles and cans to construction-type debris is present.

1.3 Project Description

The Seneca Army Depot Activity (SEDA) was listed on the National Priority List (NPL) in July, 1989 based on the threats posed by contaminated soils and debris contributing to the groundwater contamination problem at the Ash landfill site. This project will execute a Rapid Response removal action that will address the contaminated soils at the Ash landfill, thus potentially alleviating the groundwater degradation problem at the "Bend-in-the-Road" landfill area. The project will proceed in two phases. The first phase will involve investigatory boring work and surveying, designed to confirm the extent and delineation of the contaminated soil and debris areas. Phase 2 will include dewatering activities, excavation of soil volumes, and treatment of the contaminated soil by low temperature thermal desorption, as well as support activities such as quality assurance/quality control, health and safety, and air emission monitoring. At the completion of treatment and site restoration activities, the project will conclude with the preparation of a final project air monitoring report.

For the overall project, air monitoring will be performed throughout the duration of the project in order to assess potential migration of volatile compounds and fugitive dusts from specific work activities and from the site in general. Air monitoring will also provide information on potential exposure to site-specific chemicals or dusts that may impact project workers or the surrounding community. The overall objective of the air monitoring portion of the project is to assist in protecting the safety and health of site employees and the nearby community.

1.4 Task Objectives

The primary objectives of the air monitoring task are:

- Provide real-time (direct) reading of volatile organic compounds (VOCs) and fugitive dust levels near to work activity and at the site perimeter, integrating results over a 24-hour period;

- Establish on-site, site-specific meteorological data in order to characterize typical weather patterns at the SEDA facility and assist in estimating emissions generated from site activities;

- Assist in assessing and controlling the migration of VOCs and dusts from the project site, thus limiting the transport of contaminants from the work area; and,

- Protect or minimize the risk of excessive exposure from site-specific VOCs and dusts to workers and the surrounding community.

2.0 Project Responsibilities

IT's project organization is structured to include experienced professional and technical specialists in various disciplines. The project organization chart is shown in Figure 2-1. IT will be responsible for conducting the field activities, sample collection and handling, and chemical analysis, final data review, and meeting all reporting requirements for the air monitoring portion of the project. An analytical laboratory with NYSDOH ELAP certification and USACE laboratory certification will perform the required air media analyses. Additionally, a qualified team will conduct data validation and review activities to establish the appropriate level of objectivity for all analytical results generated during the project. Specific information on the project organization and responsibilities are discussed in detail in the project Work Plan.

3.0 Air Data Quality Objectives

The generation of valid data required for emissions monitoring must be accomplished through an established sampling and analysis plan. To support this effort, a comprehensive quality assurance/quality control (QA/QC) program has been developed. IT Corporation (IT) has developed and implemented a formal QA Program to provide direction for corporate operations so they will be performed in a controlled manner. This program, established in 1973, operates in compliance with the Code of Federal Regulations (CFR), 10 CFR 50, Appendix B; American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities;" and current United States Environmental Protection Agency (USEPA) guidelines and recommendations (e.g., QAMS-005/80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans"). The purpose of the program is to establish policies that facilitate the implementation of regulatory requirements and to provide internal means for control and review, thus ensuring that the work performed by IT complies with all requirements.

3.1 Project Quality Objectives

Overall site-specific QA/QC procedures are described in the Chemical Sampling and Analysis Plan (CSAP) as part of this Work Plan. The performance for air monitoring activities at SEDA will be in accordance with the following documents:

- IT Engineering Operations QA Manual, Revision 2, June 1, 1994.
- Ambient Monitoring Guidelines for Prevention of Significant Deterioration, USEPA, EPA-450/4-87-007.
- Quality Assurance Handbook for Air Pollution Measurement System, USEPA, Volumes I-IV.
- NYSDEC Draft Air Guide-19, Oversight of Private Air Monitoring Networks.
- NYSDEC Community Air Monitoring Plan guidelines.
- NYSDEC Technical and Administrative Guidance Memorandum HWR-89-4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites, October 27, 1989.

In addition, sampling and QA/QC procedures prescribed in USEPA and NIOSH air sampling methods will be used in sampling and analysis as required. IT will review all data package QA/QC documentation to ensure data quality. Data that conforms to the standards specified in this AMP will be used to evaluate emissions at the site and determine the effectiveness of controls that limit emissions and prevent off-site migration of emissions.

3.2 Intended Uses of Acquired Data

The intended uses of the acquired data are to assess the air emissions created by site activities, both in the immediate work area and at the perimeter of the site, to quantitatively estimate the potential risk to worker and community health from transported emissions, and to identify and evaluate viable control actions to control emissions. These objectives can be effectively met by completing the following tasks: characterize baseline meteorological data and ambient/background levels of VOCs and dusts at the work site; identify sources, evaluate emission potential of sources, and utilize models to estimate worst case and operating emissions; and perform continuous and source testing of emissions for all phases of site activity.

3.3 Air Data Quality Objectives

This AMP provides additional detail, in support of the Work Plan, the CSAP, and the SSHP, in outlining the proposed air monitoring program for the Ash Landfill remediation project. This AMP has been prepared in direct response to the project quality goals. This plan describes the sampling and analysis program that will be implemented and the QA/QC procedures that will be followed by the Rapid Response contractor and any other subcontractors during the course of this project for the USACE.

The overall data quality objectives (DQOs) of the air media sampling and analysis task for this project are to generate data of sufficient quality to quantitatively evaluate emissions generated from site activities and to assess the possible transport of chemicals and materials away from the site. The AMP will outline the necessary sampling protocols and quality assurance/quality control (QA/QC) guidance to ensure that the data collected by IT will be sufficient and of adequate quality for their intended use. Table 3-1 presents the primary DQOs for this project.

TABLE 3-1
DATA QUALITY OBJECTIVE LEVELS FOR ANALYSES AND MEASUREMENTS
SEDA RAPID RESPONSE PROJECT
ROMULUS, NEW YORK

DATA USE	TECHNIQUE	SAMPLE MATRIX	APPROPRIATENESS	DQO LEVEL[1]
Health & Safety Field Personnel Protection	PID/ FID; mini-RAM Screening	Air	Soil, excavation, cuttings staging, treatment, restoration.	Level I
Site Air Monitoring- Work Area and Perimeter Monitoring	PID/ FID; mini-RAM with strip charts and alarms	Air	Soil, excavation, cuttings, staging, treatment, restoration.	Level I
Site Air Monitoring- Work Area and Perimeter Monitoring	High volume sampling- PM_{10}	Air	Soil, excavation, cuttings, staging, treatment, restoration.	Level III
Site Air Monitoring- Baseline Characterization of VOCs, PAHs, and particulate matter	SUMMA®-passivated canisters; high volume sampling- XAD-2 resin; high volume sampling- PM_{10}	Air	Pre-project activities	Level III
Site Air Monitoring- Localized Meteorological Data Collection	Meteorological Station- collecting wind speed, wind direction, temperature, precipitation, and relative humidity data	Air	Prior to and during all project activities	Level III
Source Emission Testing of LTTD System during Start-Up/Prove-Out Event	USEPA Emission Source Reference Method Sampling Trains for: Method TO-14 Modified SW-846 8270 and BIF Method 0050	Air	Air emissions generated from operation of low temperature thermal desorption treatment system	Level III

[1] Data Quality Objective (DQO) Levels are defined by USEPA in "Data Quality Objective for Remedial Response Activities", USEPA/540/G-87-003. Definitions applicable to DQO levels for this project are as follows:

- Level I = Field screening. This level is characterized by the use of portable instruments which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.
- Level III = Laboratory analyses using methods other than ASP RAS. This level is used primarily in support of engineering studies using standard EPA approved procedures.
- Level IV = ASP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data.
- Level V = ASP Special Analytical Services (SAS). This level is characterized by rigorous, method specific QA/QC protocols and documentation.

The primary purpose of the QA program is to provide data of sufficient quality and quantity to achieve project intended use objectives. These quality assurance objectives will be met through a comprehensive QA and data validation program encompassing sampling through data analysis and reporting. Data quality and quantity are measured through comparison of resulting data with established acceptable limits for data precision, sensitivity, accuracy, representativeness, comparability, and completeness (PSARCC) as described in EPA/540/G-87-003, 1987, titled "Data Quality Objectives for Remedial Response Activities." The project quality assurance objectives include:

- Data will be gathered or developed in accordance with procedures appropriate for the intended use of the data;

- Data will be of known and acceptable precision, sensitivity, accuracy, representativeness, comparability, and completeness, as required by the project data quality objectives; and,

- Data will be scientifically valid.

Real-time or direct air monitoring will be performed for worker safety and health around the project site. This monitoring will be used as a screening tool to protect workers from excessive exposures and is rated a DQO Level I activity. Perimeter air monitoring with direct reading instruments will assess potential off-site migration of fugitive dusts and particulates as well as VOCs generated from site activities. These measurements are also DQO Level I activities. Particulate monitoring required under NYSDEC TAGM HWR-89-4031 includes PM_{10} high volume sampling and is a DQO Level III activity. On-site meteorological data collection requires instrument tolerance and acceptability criteria to determine appropriateness of the data and is a DQO Level III activity. Specialized operations occurring at the site include: 1) the LTTD system operation which will require emission source air monitoring during the start-up/prove-out of the system and these tests are a DQO Level III activity; and 2) the baseline data collection prior to the start of site activities will include EPA Methods TO-13 and TO-14, as well as PM_{10} sample collection and these tasks are DQO Level III activities.

4.0 *Field Equipment*

To adequately measure site-specific air contaminants, the proper instrumentation and equipment must be utilized and kept in good operating condition. The following equipment, at a minimum, is required to perform the air monitoring tasks required for this project:

- <u>On-Site Meteorological Station</u>-

  1 meteorological station with:
  - temperature sensor
  - wind direction vane
  - wind speed sensor
  - barometric pressure gauge
  - relative humidity sensor
  - precipitation gauge

  1 datalogger (with computer)

- <u>Instrumentation/Monitors</u>-

  3 high volume samplers with PM_{10} capability
  1 high volume samplers with XAD-2 resin/PUF cartridge
  1 SUMMA® canister and certified samplers
  3 mini-RAMs or RAMs with PM_{10} capability with dataloggers
  3 PIDs or FIDs with strip chart/datalogger capability and attached remote alarm
  3 low volume air sampling pumps plus 1-2 backups
  3 personal sampling pumps plus 1-2 backups

- <u>Emission source testing equipment</u>-

  1 Method TO-14 canister sampler for volatile organic compounds
  1 Modified SW-846 8270 sampling train for PAHs
  1 BIF Method 0050 sampling train for particulate and HCl emissions
  1 Set of equipment for performance of Methods 1-4

All appropriate calibration equipment for the above equipment must also be provided. Changes or variations of equipment to the equipment list must be approved by the IT Project Manager and the USACE Technical Manager prior to utilization. In the event that additional sampling is required, the AMP equipment list will be modified as necessary.

5.0 Sampling and Analytical Program

The following section outlines the air monitoring protocols to use for collection of air emissions data generated as the result of project activities at the site.

5.1 Sampling Objectives

As discussed previously in Section 3.0 of the AMP, the primary objectives of the air sampling and monitoring programs developed for this project will be to collect air media data that is representative of the emissions from the site and to provide an indication of possible off-site transport of VOCs and particulate matter.

5.2 Sampling and Analysis Program Outline

The project sampling program for the Ash Landfill Rapid Response project will include health and safety real-time monitoring and specific work activity testing, perimeter monitoring and specific emission source monitoring throughout the duration of the project. In addition, localized meteorological data will also be collected. Table 5-1 presents a summary of the air monitoring program.

Monitoring activities will be implemented according to the requirements of the Work Plan and the Scope of Services document. As the project progresses, the emissions will decrease as the contaminated soil is removed and treated. Air emissions monitoring will commence at the initiation of the project and will be scaled back as necessary if emission levels show a significant decreasing trend.

The air monitoring program will be performed in three parts. The first part will include: 1) a review of historical meteorological data to determine general weather patterns and trends for the concurrent time frame as the project will be conducted; and, 2) the collection of baseline meteorological data and ambient, baseline concentrations of site-specific contaminants. Air dispersion modeling may also be performed at this time. This part will occur prior to initiation of the second phase of field activities for the project. Part 2 of the air monitoring program will be conducted during the start-up/prove-out portion of the project and will include the initiation of perimeter monitoring as well as the performance of the emission source testing of the LTTD system. Part 3 will consist of the continuation and updating of the air monitoring program as the project progresses.

TABLE 5-1
SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
SEDA RAPID RESPONSE PROJECT
ROMULUS, NY

ACTIVITY	METHOD
Part 1 Baseline Data	
Meteorological data historical review for area	
Meteorological data collection- 3 days	- Meteorologic sensors
Ambient VOC collection- 3 days	- Method TO-14 with SUMMA®-passivated canisters
Ambient PAH collection- 3 days	- Method TO-13 with XAD-2 resin samples
Ambient dust/particulate matter collection- 3 days	- High volume samplers for PM_{10}
Part 2 Start-Up/Prove-Out Data	
Source sampling of LTTD emissions- one time event	- BIF Method 0050 for particulate matter & HCl gas - Method TO-14 for VOC speciation - Modified Method SW-846 8270 for PAHs
Part 3 Project Duration	
Work area monitoring for health and safety	- PIDs/FIDs for workplace exposure around project site
Perimeter monitoring at three locations	- PIDs/FIDs with strip chart recorders for total VOC - mini-RAM for particulate matter & PM_{10} - High volume samplers for PM_{10}
Meteorological data collection	- Meteorologic sensors

Localized meteorological (MET) data will be collected for the entire duration of the project. The data will include measurements of temperature, barometric pressure, wind direction, wind speed, relative humidity, and precipitation. The MET station will first collect baseline data of ambient weather condition at the Seneca Army Depot area prior to project initiation and will collect data the remainder of the project as well. A datalogger/computer will store MET data for future use.

5.2.1 Sampling Program Duration and Schedule

The air monitoring program will continue until the SEDA Rapid Response in-field activities are completed. Detail on the sampling durations is presented below.

Meteorological Data

All meteorological data parameters will be collected and stored continuously and datalogged as 5-minute averages. MET data will be collected via the datalogger, which will calculate and store hourly averages. MET data will be collected for the duration of the project' field activities.

Ambient Parameter Data

Ambient air samples will be collected by PIDs/FIDs and dust monitors continuously and recorded on strip charts for every 24-hour cycle. PM_{10} samples will be collected on twenty four hour shifts (noon to noon, nominal) at the perimeter sampling stations. Data collection will continue through to the completion of field activities for the project.

The schedule for ambient sampling for the perimeter monitoring includes initial background monitoring for three (3) days prior to the start of site activities, continuous sampling activities during the initial excavation and the start-up/prove-out event, and continued sampling during LTTD operation, continued excavation, and site restoration.

Other testing included as part of this AMP will be conducted as follows: emission source testing for LTTD system operations will occur during the start-up/prove-out event; and personnel sampling and health & safety sampling will occur throughout the project. Additional detail on the personnel sampling can be found in the SSHP.

5.2.2 Sampling Program Site-Specific Compounds

The air monitoring program outlined in this AMP has been developed to measure and provide data on emissions or releases to the air of specific compounds. A list of these compounds is presented below. The list is created from the potential emission sources at the site and from soil data that previous investigations delineated contaminant compounds as being present. The compounds include, but may not be limited to:

Volatile organic compounds (VOCs)
- Trichloroethylene or TCE
- 1,2-Dichloroethylene or DCE
- Vinyl chloride
- Hydrogen chloride (as an acid gas)
- Toluene
- Xylene

Polynucleated aromatic hydrocarbons (PAHs)
- Bis(2-ethylhexyl) phthlate
- Benzo(a)Pyrene
- Indeno(1,2,3-c,d)Pyrene

Particulate Matter

5.2.3 Sampling Program Perimeter Stations and Siting

Perimeter monitoring stations and the meteorological station will be established at selected locations at the site in order to house the necessary sampling and data collection equipment. The fixed perimeter stations will be located, at a minimum, near the closest boundary to the LTTD system and at the shortest distance from the center of the site to the boundary. A total of two to four stations may be required, depending on the overall area that needs to be sampled, prevalent meteorological conditions, and other siting requirements. Stations for the excavation area and an upwind (background) station may also be required at the discretion of the IT Project Manager and USACE Technical Manager.

Perimeter locations for the monitoring stations (and the meteorological station) will be determined by the appropriate siting and location of the work zone around the excavation pits and the staging/treatment areas. A chain-link fence (erected for site security reasons) will serve as the site perimeter. Guidance on the siting of the meteorological station is provided in the Handbook for Air Pollution Measurement System: Volume IV, Meteorological Measurements, USEPA, EPA-600/4-82-060, August, 1989. The meteorological station will be placed in accordance to this guidance and NYSDEC Draft Air Guide-19 guidelines. Specific siting arrangements for the initial start-up of site activities are as follows:

- Background sampling-
  Stations will be placed in general perimeter area to collect baseline samples of VOCs, PAHs, and particulate matter.

- Week 1-
  Stations will placed in designated siting locations (determined at time of site set-up); four stations in work area, including two at perimeter, one at excavation area, and one station upwind to collect background.

- Week 2-
  Stations will remain in designated place; Three stations will operate, including one station at the site perimeter, one station in excavation area, and one in the upwind position.

This strategy will allow comparison between the high volume samplers and the mini-RAMs for particulate matter sampling and allow the USACE Technical Manager and IT Project Manager make the determination if the high volume samplers will be needed for the remaining portion of the project. Data from both types of samplers will be compared to make this determination. The remainder of the on-site field activities will continue to have perimeter stations in operation in accordance with the following:

- Duration of On-Site Activities-
  Stations will remain operational, continuing to collect ambient data, with one station located at the perimeter, one nearest to the excavation area, and one upwind to collect background data.

5.2.4 Sampling Program Air Dispersion Modeling Support

Support for the air monitoring program will be completed with the use of selected air dispersion modeling, as needed. Dispersion modeling can provide screening and informational support to on-site emissions data for both particulate and volatile organic compounds. The modeling will incorporate ambient baseline data, on-site meteorological data, average and worst-case analytical data, and any necessary modeling assumptions to complete the task. A modeling protocol will be developed to implement the dispersion modeling support for the project. The modeling protocol will outline selection of appropriate models, model classification schemes, and other parameters in order to conduct the modeling. The protocol will be subject to approval by the IT Project Manager and the USACE Technical Manager before modeling would begin.

Initial modeling may also be used to develop or define potential off-site emission transport risks resulting from anticipated site activities. Preliminary modeling such as this can assist in the development of appropriate sampling programs and perimeter station siting. The modeling can also provide pertinent information necessary to refine on-going monitoring activities. Preliminary models such as SCREEN2 or TSCREEN can be used for this project at the discretion of the IT Project Manager and USACE Technical Manager. If performed, a similar protocol (summarized above) will be developed to perform the modeling/screening.

5.3 Sampling and Analysis Protocols

Air monitoring will occur utilizing the air monitoring equipment and instrumentation described in Section 4.0. Monitors will be calibrated daily or according to manufacturer's instructions. A summary of field equipment calibration requirements is presented in
Table 5-2. Specific protocols are described in the USACE Scope of Services document and are summarized below.

5.3.1 Real-Time, Direct Monitoring/Portable Equipment

Monitoring will be performed by portable, real-time or direct monitors like PIDs or FIDs in various locations across the site. Sampling events will be collected continuously and will be conducted as specified in the SSHP. Specific sampling near the excavation perimeter will be conducted throughout the duration of the project. Personnel samples will be collected over the course of several days for specific, high-risk work tasks. More detail on this type of sampling is provided in the SSHP.

5.3.2 Ambient Monitoring

Baseline VOC, PAH and particulate concentration measurements will be required as part of the baseline data collection step described above. Appropriate testing methods were selected from the USEPA's Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/600/4-89/017, June 1988. EPA Compendium Method TO-13 will be utilized to collect and analyze for PAHs. EPA Compendium Method TO-14 will

TABLE 5-2
CALIBRATION OF FIELD EQUIPMENT
SEDA RAPID RESPONSE PROJECT
ROMULUS, NY

INSTRUMENT	FREQUENCY	CALIBRATION PROCEDURE
Air sampling pump	Daily; before and after use	Calibrate with gilibrator to check flow rate.
mini-RAM monitor	Daily; before and after use	According to manufacturer's specifications.
PID/FID	Daily; before and after use.	According to manufacturer's specifications.
High volume sampler- PM_{10}	Daily; before and after use.	According to manufacturer's specifications.
High volume sampler- TO-13	Daily; before and after use	According to manufacturer's specifications.
SUMMA® sampler- TO-14	Daily; before and after use.	According to manufacturer's specifications.

be utilized to collect and analyze for VOCs. The analyses will be performed for the full suite list of analytes for each of these methods. Particulate monitoring will be conducted by real-time monitors recording time-integrated data on dataloggers.

5.3.3 Perimeter Monitoring

Perimeter monitoring will occur at several locations around the work site perimeter and upwind from the area. Each station will house collocated PIDs/FIDs to test for VOCs, a high volume sampler for PM_{10} sampling, and a mini-RAM for particulate monitoring. Calibration of all equipment will be performed daily or at a frequency described in the manufacturer's instructions.

Each monitor will be equipped with a local and remote alarm to sound in the event airborne action levels are exceeded. The action level for particulate matter is **150 ug/m^3**; for total VOCs, it is **5 ppm**. If the alarm(s) sound, the air monitoring technician will examine the alarm conditions and determine the cause of the alarm. Visual verification of exceedance of either of the respective action levels will cause the air monitoring technician to immediately implement the Vapor/Particulate Response Plans as part of the New York State Department of Health (NYSDOH) Community Air Monitoring Plan attached to this AMP as Appendix A. Site personnel will obey all commands to immediately evacuate the work area if so indicated in this event. The air monitoring technician will investigate the situation as required by the Response Plan and file a summary situation report with the Operations Supervisor at the end of the day as required under Section 11.3.1.

Of special importance to the performance of the perimeter monitoring portion of this project is the capability to assess and control fugitive dust transport and migration off-site. The PM_{10} monitoring activities at the perimeter have been designed to perform this task. Guidance on this task is presented in NYSDEC TAGM HWR-89-4031. During the project, particulate monitors will be employed to collect PM_{10} samples, both as real-time samples and by high volume samplers. The specifications of the real-time samplers include:

Object Measured:	Dusts, mists, aerosols less than ten (10) microns
Size Range:	< 0.1 to 10 microns
Sensitivity:	0.001 mg/m^3
Range:	0.001 to 10 mg/m^3
Accuracy:	+/- 10% (based on gravimetric analysis of reference dust)
Operating Conditions:	Temperature: 0 to 40 degrees Celsius
	Humidity: 10 to 99% relative humidity

As an added precaution, in order to prevent particulate action levels exceedance, provisions for dust control and suppression may require implementation. Specific detail on these methods are presented in the Erosion and Dust Control Plan, included as part of this Work Plan.

5.3.4 Start-Up/Prove-Out Sampling

Specific emission source sampling is required to test the operation of the air pollution control device of the LTTD system. The source sampling will occur during the start-up/prove-out event. Testing will include Method 5 for particulate matter, Method 18 by gas chromatograph for volatile organic compounds and Method 26 for emission of the off-gas hydrogen chloride, a by-product of LTTD operation. Sampling protocols for this testing are required to be submitted to IT Project Manager and USACE Technical Manager for approval thirty (30) days prior to performance of the tests.

Field activities for air monitoring for the Ash Landfill remediation project will occur in three parts. These tasks or activities are described below:

Activity 1- Preliminary Tasks

IT will set up and calibrate the meteorological station and one perimeter monitoring station for the collection of data prior to the initiation of on-site field activities. The meteorological station will collect background, localized MET data for a period of three (3) days to identify and characterize typical weather patterns in the immediate area of SEDA. This data will be used to determine the siting of monitoring stations for the project.

The monitoring station will have a full complement of sampling equipment in operation in order to establish a representative baseline of ambient concentrations at the SEDA site. This station will also operate for a period of three (3) days. Ambient samples of the appropriate target compounds listed in Section 5.2.2 will be collected via USEPA Compendium Methods TO-13 for PAHs and TO-14 for VOCs, as outlined in 40 CFR Part 50 Appendices B and J. High volume samples for PM_{10} will also be collected. In addition, periodic confirmatory sampling will also be performed while the station is in operation by conducting site walkovers with portable PIDs/FIDs and mini-RAMs to supplement and further document baseline conditions.

Initial, preliminary air dispersion modeling may also be conducted at this time to support the baseline data collected above.

Activity 2- Start-Up/Prove-Out

Monitoring stations will be sited appropriately, calibrated and started to collect data as on-site activities are beginning. Meteorological data collection will continue uninterrupted to the completion of on-site field activities. Initial site excavation will require monitoring near the excavation area as well as perimeter monitoring. The start-up/prove-out event will require emission source testing of the air pollution control device associated with the LTTD system. This testing will occur at the time the LTTD system is functional, performing the start-up/prove-out operations. The source testing will proceed according to the testing protocol submitted prior to the testing (see Section 5.3 for additional information). Specific additional emission testing may also be performed at this time.

Activity 3- Project Duration

On-going monitoring will continue at the work site, including work area monitoring, perimeter monitoring and meteorological data collection. Additional monitoring requirements that are not anticipated at this time may arise from on-site activities, requiring addendum to this AMP. Any changes to the scope of monitoring described in this AMP must be written and submitted to the IT Project Manager and USACE Technical Manager for approval prior to implementing such changes.

7.0 Sample Collection Procedures

Sample collection shall proceed and be completed on-site by the air monitoring technician(s) from the guidelines presented in this AMP and by pertinent manufacturer's instructions. The air monitoring technician is the person responsible for all sampling equipment operation and upkeep, preventative maintenance, and sample collection and QA/QC steps. The air monitoring technician will accurately record sample information, conduct routine calibrations and maintenance as provided, perform field installation and removal of samples and instrument read-outs, and oversee all operations of the air monitoring system in place at the site, including alarms. In addition, the technician will be responsible for verifying and recording the validity of each collected sample by inspecting the sampling mechanism with sample exchange, recording sampling conditions, anomalies, or other events that occurred during the sampling run, and providing basic sampling run information in the field daily log.

Sampling procedures are method specific and are not presented in detail in this AMP. However, project-specific requirements are detailed in the sections below. Requirements based on specific method protocols should be followed appropriately.

7.1 Sample Collection Results

To insure accurate sample tracking, the air monitoring technician will record the following information with each sample collection onto the Field Activity Daily Log (FADL) sheet:

- Station Name or number;
- Sample date and number;
- Equipment serial number;
- Technician name;
- Elapsed time of sample;
- Instrument readings if pertinent, i.e., flow rate or pressure;
- Maximum and minimum temperatures during sampling period;
- General conditions of the station, sampling mechanism, sample and weather;
- Any abnormalities of site, sample, or equipment.

7.2 Sample Handling

Specific procedures to maintain sample integrity are required. Careful sample handling can minimize the risk of cross-contamination of the sample or breakage. In the event that more appropriate procedures for sample handling are needed, the IT Project Manager will append them to this AMP and require the air monitoring technicians to attend a training session on safe sample handling.

7.3 Ambient Monitoring

For baseline ambient data collection, specialized samplers will be used as part of the sampling process. The air monitoring technician must calibrate the samplers according to the specific reference method. Method TO-14 also requires pre-certification of the samplers prior to shipment and use in the field. Samplers will be started and flow rate recorded at the beginning of each shift. Sampling will be stopped when required by the method and the technician will record flow rate and pressure measurements.

7.4 Real-Time Monitoring

Monitors collecting real-time or direct reading data for this project will be operated with a datalogging/strip chart system that will record concentration levels over a course of time. The air monitoring technician will calibrate each machine daily or according to manufacturer's specifications, start the instrument, recording the start time. At the completion of the 12-hour shift, the technician will return to each station, record the shut-off time, and conduct a post-calibration of the instrument, removing the recorded data strip chart and checking and replacing, if needed, the strip chart paper for the next 12-hour shift.

7.5 High Volume Sampling

Monitors collecting particulate data for PM_{10} monitoring for this project will operate with a

filter in place to collect particulate matter. The filter must be carefully removed from the sampler at the end of its sampling period, packaged and sent to the laboratory for analysis. The filters for these instruments are specialized, each containing a unique number on the filter as well as being highly sensitive to picking up ambient dusts or dirt from human handling. The technician must record the filter number for each filter used, and only handle the filters with tweezers to prevent cross-contamination. The high volume samplers also have a pressure gauge system that will record pressure drop levels over a course of time. The air monitoring technician will calibrate each machine daily or according to manufacturer's specifications, start the instrument, recording the start time and pressure. At the completion of the 12-hour shift, the technician will return to each station, record the shut-off time and pressure, and conduct a post-calibration of the instrument, removing the recorded pressure strip chart and checking and replacing the strip chart paper for the next 12-hour shift.

7.6 Source Sampling

Sampling protocols for emission source sampling are method-specific and will be discussed in greater detail in the source testing protocol submitted 30 days prior to the performance of the sampling.

All air samples collected as part of this project will be analyzed by a laboratory approved by the USACE and IT. The laboratory will be a USACE-approved and a NYSDOH-certified laboratory, and will be subject to review and approval by the USACE. The laboratory procedures for sample preparation and analysis, turnaround times, sample control, and appropriate quality assurance/quality control procedures are primary criteria for approval and selection.

Analytical requirements for this project are minimal. Samples will be collected mostly by real-time instruments and dataloggers to provide time integrated measurements. Analysis of samples collected during the baseline data part and for the start-up/prove-out event will be needed. The filters for the PM_{10} monitoring will require laboratory analysis. Specific analytical requirements are summarized below:

- Full suite of VOCs for Method TO-14- analysis of SUMMA®-passivated canister via gas chromatograph

- Full suite of PAHs for Method TO-13- analysis of XAD-2 resin via gas chromatograph/mass spectrophotometer

- Particulate Matter for PM_{10}- weighing of filter to determine mass

- QC samples for BIF Method 0050- analyze impinger QC samples of emissions samples with ion chromatograph

- QC samples for VOCs via Method TO-14- analyze grab samples with gas chromatograph (GC)/mass spectrophotometer (MS); grab samples will also be analyzed in the field with a GC

- QC samples for PAHs via Modified Method SW-846 8270- analyze QC samples of emissions samples with GC/MS

Air media analytical procedures performed during the project will conform with all requirements outlined in each specific reference method (see 40 CFR Part 50, Appendices B and J).

9.0 Quality Assurance/Quality Control

One of the most important aspects of any sampling and analysis program is the implementation of a quality assurance/quality control (QA/QC) program. A comprehensive QA/QC program provides the basis that allows the data generated during a project to be considered useful and valid. The QA/QC methods for this AMP are described below. In aggregate, implementation of the methods in conjunction with the specified equipment should ensure that the project QA objectives will be met.

The data retrieval objective for the project is **90 percent**. Both analytical and meteorological data collection must meet this goal for completeness. Monthly reports will include a tabulation of the completeness of all data. If data retrieval falls below the stated objective, the situation will be investigated and appropriate corrective actions taken.

9.1 Meteorological QA/QC

Data collected at the meteorological station will be required to meet specific QA/QC requirements. MET parameters will be reviewed to demonstrate compliance with the instrument tolerances presented below in Table 9-1. Data retrieval must meet the program completeness goal. Retrieved data will be validated according to criteria found in Table 9-2.

TABLE 9-1
METEOROLOGICAL PARAMETER TOLERANCES
SEDA RAPID RESPONSE PROJECT
ROMULUS, NY

Variable	Accuracy	Resolution	Range
Wind Speed	+/- 0.25 m/s	0.1 m/s	0.5 to 40 m/s
Wind Direction	+/- 5 degrees	0.1 degrees	360 degrees
Temperature	+/- 0.5° C	0.1° C	-20 to +50° C
Time	+/- 10 min/yr	0.1 min	N/A
Precipitation	+/- 0.1"	+/- 0.01" (per hour)	0 to 197"
Relative Humidity	+ 1- 1.5%	0.1%	0 to 100%

TABLE 9-2
METEOROLOGICAL DATA REJECTION CRITERIA
SEDA RAPID RESPONSE PROJECT
ROMULUS, NY

Variable	Criteria
Wind Speed	1) If < 0 or > 25 m/s 2) Does not vary > 0.1 m/s for 3 consecutive hours. 3) Does not vary > 0.5 m/s for 12 consecutive hours.
Wind Direction	1) If < 0 or > 360 degrees 2) Does not vary > 1 degree for more than 3 consecutive hours.
Temperature	1) > local record high temperature 2) < local record low temperature 3) > 5 degrees change from previous hour 4) Does not vary > 0.5 degrees for 12 consecutive hours.
NOTE: Violation of any criterion does not automatically call for rejection of data; however, an investigation into the circumstance is warranted.	

9.2 Real-Time Monitoring QA/QC

Real-time or direct monitoring must meet operating specification criteria found in the respective instructions manuals. Calibration or measurement results outside of manufacturer's specifications may result in invalidating collected data. Some direct measurements will be taken in the identical time frames and locations as ambient monitoring and these results will be compared to each other to demonstrate accuracy and representativeness of both types of measurements.

9.3 Ambient Monitoring QA/QC

For the different types of ambient monitoring being performed for the project, a full suite of QA/QC samples will be collected and analyzed to help confirm the appropriateness of the collected raw measurements. QA/QC samples will be required to be collected as part of the sampling and analysis protocols specific to each method utilized during the project. QC samples such as field blanks, duplicates or collocated samples, and required matrix spikes and matrix spike duplicates will be analyzed by laboratory as needed. Other QC parameters such as method detection limits and percent recovery from samples will also be determined.

Specifics on the appropriate QA/QC requirements for the limited ambient and source sampling to be performed on this project will be provided in protocols developed and submitted to the IT Project Manager and USACE Technical Manager prior to the performance of these activities. These protocols will be addended to the AMP.

9.4 Preventative Maintenance

Preventative maintenance activities are an important step in ensuring proper operation of monitoring equipment and the collection of valid data. Each sampler or piece of equipment used in support of the objectives of the AMP will undergo periodic preventative maintenance according to the schedule presented in Table 9-3. The air monitoring technician will be resposnible for performing this task as well as reporting any unusual events associated with equipment operation at the time of the maintenance review.

TABLE 9-3
SCHEDULE OF PREVENTIVE MAINTENANCE FOR FIELD EQUIPMENT
SEDA RAPID RESPONSE PROJECT
ROMULUS, NY

INSTRUMENT	FREQUENCY	ACTION ITEM
mini-RAM monitor	daily	Check batteries Check calibration and operation
Air Sampling Pump	daily	Check batteries Check calibration and operation

Photoionization Analyzer (HNu Model PI-101) or Organic Vapor Analyzer (Model OVA - 128 Century, Foxboro Company)	weekly monthly	Check batteries Check calibration and operation Check alarms Check hydrogen fuel (if OVA) Run and recharge for 8 hours
High volume sampler- PM_{10}	weekly monthly	Check flow rate recorder Check calibration and operation
SUMMA sampler	daily	Check calibration and flow rate recorder

9.5 Sample Storage, Holding Times, and Preservation

Sample storage and preservation will follow the program mandates outlined in the laboratory's Standard Practice Manual, or equivalent, submitted previously as part of the laboratory selection process for the project, and the respective reference method for which the samples are being analyzed. Sample receipt, log-in, and storage will follow laboratory SOPs.

Sample holding times are restricted by the appropriate reference method requirements. In general, the project analytical testing will be required to meet a rapid turnaround of three (3) to five (5) days time.

10.0 Sample Custody/Shipping

Sample custody procedures for this project will comply with all applicable IT corporate practices and sample custody/handling procedures outlined in the CSAP. Primarily, this will be accomplished through the Request for Analysis/Chain-of-Custody (RFA/COC) form that records each sample and the individuals responsible for sample collection, shipment, receipt and analysis.

11.0 Data Reporting and Validation

The system to use for data verification and validation will ensure accurate and complete documentation and reporting. IT will be responsible for the collection, verification, validation, and reduction of raw data from air media sampling activities.

11.1 Data Verification

Data verification of sampling and analysis data will be performed both in the laboratory and as part of the review of field generated data. Data verification activities will be included as part of the laboratory Standard Operating Procedures (SOPs), which consist of the steps taken within the analytical laboratory so that reported results correctly represent the analysis performed. The two basic verification steps include:

- The processing of quality control sample results to demonstrate that analyses are within laboratory-prescribed bounds for accuracy, precision, and completeness.
- The performance of data validation to demonstrate that numerical computation of data is correct and that it is reported correctly.

After review by the laboratory supervisor or project manager, the laboratory will then provide IT with the analytical data.

Data generated in the field, including but not limited to PID/FID and mini-RAM readings and meteorological data collection, will undergo data verification by reviewing sample collection sheets and Field Activity Daily Log sheets to ensure proper calibration steps were performed, that instrument operation was normal, and that no unusual operating conditions or events could have affected equipment operations or results. Field data will be reviewed daily by the Operations Supervisor to ensure the completeness and accuracy of the data. Anomalies will be recorded in the Daily Log and reported to the USACE Technical Manager.

11.2 Data Validation

Field data validation will include a comparison between the field technician's observations and records to the sample results. Validation of laboratory analytical data and meteorological data will be performed by IT. After this initial validation, the validated data will be forwarded to the IT Project Manager and undergo a final review.

The IT Project Manager, or appointee, will review the data for anomalies with respect to the following criteria:

- Unusually high or low concentrations of the target compounds or parameters
- Verification of proper equipment operation during the sampling period
- Verification of properly recorded, transmitted, and transcribed data
- Data completeness or causes for missing data
- QA of data calculations

Data will be considered valid and acceptable after the completion of this validation review. In the event that a corrective action is needed, the IT Project Manager will return the data to the data validation team for correction and additional review. The corrective action(s) will be documented and verified as complete by the IT Project Manager prior to release of the validated data.

11.3 Data Reporting

All raw air media data will be summarized daily by the air monitoring technician and included in the daily submittals to the USACE and Seneca Army Depot representative. Air monitoring validated data will be tabulated in weekly and monthly reports to the IT Project Manager and USACE Technical Manager. A summary of air monitoring results will be provided at the weekly project meetings.

11.3.1 Daily Air Monitoring Reports

The air monitoring technician will report all pertinent activities and event of each day/shift to the Operations Supervisor prior to exiting the site. The summary of activities and any events will be utilized as part of the daily submittal to the USACE and SEDA by the Operations Supervisor.

11.3.2 Weekly Summary Reports

The weekly reports will contain information that has finished the verification and validation process and is approved by the IT Project Manager. The weekly reports will address available data from the previous week. The weekly reports will contain:

- Field, analytical and QA/QC data in tabular form with statistics;
- Meteorological data in tabular form with statistics;
- Summary of project activities, events, problems, and corrective actions; and,

- Analysis of project results and trends.

11.3.3 Monthly Summary Reports

The monthly reports will present a compilation of data from the previous four weeks (30 days, nominal) activities. This report will include summaries of the weekly reports, all QA/QC performed during the period and any required explanations of invalid samples and data. The monthly reports will also provide additional detail on project progress for air monitoring activities, the tasks performed during the previous month to implement the AMP, and a meteorological data summary and monthly wind roses.

11.3.4 Anomaly and Failure Events

In the event there occurs an anomaly or unusual event during the implementation of the AMP, such as a failed instrument or incomplete sample collection, a preliminary written notification report must be completed by the air monitoring technician and submitted to the Operations Supervisor on the same day the event occurred. The Operations Supervisor will inform the IT Project Manager and decide the proper corrective action, if needed. The Operations Supervisor must include the preliminary notification report in the daily submittal to the USACE. The Operations Supervisor and Project Manager are responsible to assign personnel to correct any problem and verify that the corrective action has been completed.

12.0 Air Monitoring Report

At the completion of all air monitoring activities, a final Air Monitoring Report will be developed. This Report will contain all applicable information and data collected over the course of the project. Specific information will include compilation of all previous reports and data, project air monitoring results and analysis, meteorological data summary and analysis, and overall summary of the project. The final Air Monitoring Report will be submitted to the USACE 30 days after the completion of field activities at the site.

13.0 References

American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME). NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

Code of Federal Regulations (CFR). Title 40, Part 50, Appendix B.

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IT Corporation. Engineering Operations QA Manual, Revision 2, June 1, 1994.

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New York State Department of Environmental Conservation (NYSDEC). Technical and Administrative Guidance Memorandum HWR-89-4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites, October 27, 1989.

New York State Department of Health (NYSDOH). Community Air Monitoring Plan guidelines.

U.S. Army Corps of Engineers (USACE), Omaha District. Seneca Army Depot Ash Landfill Removal Action, Rapid Response Contract No. DACW45-90-D-0002, Scope of Services, July 17, 1994.

U.S. Environmental Protection Agency (USEPA). Ambient Monitoring Guidelines for Prevention of Significant Deterioration, USEPA, EPA-450/4-80-012.

U.S. Environmental Protection Agency (USEPA). Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, USEPA, EPA/600/4-89/017, June 1988.

U.S. Environmental Protection Agency (USEPA). Data Quality Objectives for Remedial Response Activities, EPA/540/G-87-003, 1987.

U.S. Environmental Protection Agency (USEPA). QAMS-005/80, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans.

U.S. Environmental Protection Agency (USEPA). Quality Assurance Handbook for Air Pollution Measurement System, USEPA, Volumes I-IV. Volume IV, Meteorological Measurements, USEPA, EPA-600/4-82-060, August, 1989.

APPENDIX A
NYSDOH
COMMUNITY AIR MONITORING PLAN

Community Air Monitoring Plan

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. The plan must include the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area daily at 2 hour intervals. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 $\mu g/m^3$ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume but more frequent intervals of monitoring, as directed by the Safety Officer, must be conducted. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 ft..downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background, and

- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the work area, 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 residential or commercial structure 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 work area or half the distance to the nearest residential or commercial property, 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 residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if any of the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect if organic vapor levels are approaching 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minutes 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.

APPENDIX G

START-UP PROVEOUT PLAN

Draft
Start-Up Proveout Plans

Seneca Army Depot
Romulus, New York

Prepared for:

U.S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246

Project No. 519070

August 1994

WILL BE PROVIDED AT

A LATER DATE

APPENDIX H

SITE CONTROL AND SECURITY PLAN

DRAFT
SITE CONTROL AND SECURITY PLAN

SENECA ARMY DEPOT ASH LANDFILL
ROMULUS, NEW YORK

Prepared for :

U.S. Army Corps of Engineers
Omaha District
215 N. 17th Street
Omaha, Nebraska 68102

Prepared by:

IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246

Project No. 519070

August 1994

Table of Contents

1.0 OVERVIEW

Security measures incorporated at the project site are designed to accomplish the following:

- Protect the public
- Control ingress and egress at the site including personnel, equipment, deliveries, and visitors
- Provide a safeguard against theft and/or destruction of equipment and facilities.

Security measures shall include fencing, but shall not require guards, as 24 hour operations will mean that the site is always manned.

1.1 General Security Rules

All employees are subject to the following rules:

- It shall provide to the SEDA designated representative a list of all IT employees, subcontractors, and suppliers indicating firm name and address. Form 268 shall be executed for each employee and subcontractors' personnel, and will be submitted 72 hours prior to commencement of work.
- Camera permits shall be obtained through the SEDA designated representative.
- IT shall provide vehicle information of all vehicles entering SEDA to include name of individual driving, year, make, model, color and license plate.
- Traffic laws of the State of New York shall apply (subject to road conditions) and the following: Speed limits as posted, 5 mph in Ammo Area, and Limited/Exclusion Area 25 mph.
- Matches or other spark producing devices will not be introduced into the Limited/Exclusion or Ammo Area except when the processor of such items is covered by a properly validated match or flame producing device permit.
- All vehicles and personal parcels, lunch pails, etc. are subject to routine security inspections at any time while on depot property.

- All building materials, equipment and machinery must be cleared by the Director of Engineering and Housing who will issue a property pass for outgoing equipment and materials.

- Security Police (Ext. 30448/30366) will be notified at least two hours in advance of any installation or movement of slow moving heavy equipment that may interfere with normal traffic flow, parking or security.

- All personnel must receive a guest pass at the main gate.

- All personnel are required to sign in and out at the secure area main gate once a day.

- Employees authorized to bring personal tools and/or equipment onto the site must provide an inventory list at the start of their assignment.

- Company vehicles (site trucks) will not be permitted out of the main gate unless authorized on project-related activities.

- Materials, tools, and equipment will not be permitted to leave the site without proper authorization.

- Breaches in security are to be immediately reported to the operations supervisor and local authorities as appropriate. Property damage or loss will be thoroughly investigated and reported in accordance with IT procedures. These incidents shall be entered in a log specifically maintained for security incidents.

1.2 Breaches of Security

In the event unauthorized personnel are discovered on site, they shall be properly identified, and detained if possible, until the site manager can be notified. A detailed description of the incident shall be entered into the daily and/or security log. Should the site boundary be penetrated, immediate repairs shall be made. An attempt to locate unauthorized personnel shall be conducted, and the incident will be documented in the daily and/or security log noting time, date, actions taken, and any additional pertinent information.

1.3 Site Visitors

Entrance into the site proper and zones will be restricted as follows:

- The access road to the site shall be the primary entrance point

- Personnel entering the EZ must log in and out in accordance with the SSHP

- Equipment entering the site will be logged in and out as required throughout the different phases of the project

- No visitors will be allowed access without the approval of the USACE-OSR or IT's SS.

1.4 Unauthorized Visitors

Should unauthorized persons attempt to gain access to the site, the site manager shall be notified. The site manager shall decide if access by this individual is necessary. If he determines that this individual's presence is needed on site, he shall so notify the USACE-OSR for his approval. (NOTE: All personnel entering the site are required to read the proper portion and sign the site-specific safety plan. The signature of the Site-Specific Safety Plan shall acknowledge that the visitor understands the potential hazards associated with site entry.)

2.0 SITE ZONES

The site will be divided into three zones. Accessibility into these zones will be in accordance with the SSHP for the project. Figure 2-3 at the end of this chapter shows a general layout of the site and the approximate delineation of the three zones. The zones will be identified by signs and are as follows:

- Exclusion zone (EZ): This area is the potentially hazardous zone(s) with respect to contamination. The EZ may vary, based on the site construction activities, from day to day, and may be in multiple locations. The excavation process area, and stockpiles will be considered in this zone.

- Contamination reduction zone (CRZ): This area will include the following:
  - Personnel decontamination area
  - Equipment decontamination pad
  - Walkways from the EZ to the decontamination area
  - Walkway to the Support zone

- Support Zone: This will include all areas outside of the remediation zone including office and storage trailers, break areas, comfort facilities, etc. with Local Authorities

APPENDIX I

QUALITY ASSURANCE PLAN (QAPP)

Part I
Quality Control Management Plan

(PROJECT)

***

PREPARED
by
IT Corporation

Approved by: ______________________________ Date: ____________
IT QA/QC Manager

Approved by: ______________________________ Date: ____________
IT Project Manager

Approved by: ______________________________ Date: ____________
Client Representative

***

Original Issue Date: __________

Last Issue Date __________ Rev. __

Part I - QUALITY CONTROL MANAGEMENT PLAN

0.0 Statement of Policy

0.1 Management Policy

The management of IT is firmly committed to meeting the technical and economic needs, satisfying contractual and regulatory requirements, and implementation of this Standard Quality Control Management Plan (SQCMP) for Remediation Projects. This statement of policy directs that the procedures, policies and practices set forth in the SQCMP be adhered to and specifically applied to all quality-related work on a project. It is the responsibility of all personnel performing work on a project to be familiar with and implement the requirements of the contract-specific plan and the supporting procedures, plans, and technical requirements referenced in the plan or otherwise specified for the project.

1.0 Introduction

1.1 General

This SQCMP has been developed as a standard document to be used in the development of contract-specific QC plans for Remediation projects. The plan provides general procedures, policies, guidelines, and practices for the control of equipment, materials, and services during construction, operation, and analytical activities on a project.

The plan is developed to establish a systematic program of actions which, when implemented, provide objective evidence of compliance to contract requirements and specified regulatory requirements for a project including required permit(s), U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), and other government agencies.

Included as an integral part of the SQCMP are separate plans for Construction Quality Control (Construction QC) and Chemical Quality Control (Chemical QC). The plans may be used together or separately to develop a program to meet the needs of each project undertaken.

1.2 References

The following plans and applicable technical specifications are included as a part of the SQCMP by reference.

1.2.1 Contract Technical Specifications

1.2.2 Applicable Regulatory Standards, Codes, and Guidelines

2.0 *Purpose and Scope*

2.1 *Purpose*

This SQCMP establishes requirements for developing the overall site-specific QC system to be implemented on a project. The contract-specific SQCMP (CSQCMP) will provide the requirements to be implemented to execute and document compliance with the project specifications, drawings, QCs, referenced standards, and other requirements established by the contract. As a minimum, the CSQCMP will establishe the controls for:

- QC staff organization and authority
- Personnel qualifications
- Procedures, guidelines, checklists and forms
- Definable features of work
- Records
- Inspections and tests
- Noncompliances
- Documentation
- Audits.

2.2 *Scope of Work*

This CSQCMP will be implemented during all phases of the project, including construction, operation, remediation, and closure activities.

2.3 *Acceptance of SQCMP*

Work performed within the scope of this plan will not be started prior to the acceptance of the CSQCMP by the Client.

Any changes to the accepted plan will require review and acceptance by the Client prior to implementation of the changes. Revisions to the plan will be in accordance with Section 4.1.1 of this plan.

3.0 Organization and Responsibilities

3.1 Quality Control Organization

A typical organization chart, **Figure 3.1-1**, is included in this SQCMP and defines the lines of authority as well as reporting functions of personnel performing quality related activities.

The size and type of the QC system staff may vary to cover work phase needs, shift work, and other activities affected by the CSQCMP. An organization chart will be prepared and submitted to the Client along with the resumes of QC personnel for review and acceptance prior to performing QC functions. The organization chart will be revised as necessary to reflect current staff functions and the revised chart submitted to the Client along with the qualifications of QC personnel for review and acceptance prior to implementation.

3.2 Quality Control Responsibilities

It is the responsibility of all project personnel to report any activities that could adversely affect the QC requirements set forth by the contract. The project QC staff is specifically responsible for identifying, reporting, and documenting activities affecting quality, and for verifying correction of materials and activities that do not conform to the specified contract requirements. The QC staff will maintain a close working relationship with the project management, keeping them advised of all situations which, if not corrected or controlled, could affect the overall quality of the project.

3.3 Project Organization and Responsibilities

It is the responsibility of all personnel involved in project activities that may affect the quality of construction, operation, or other quality related functions to be aware of and implement the quality policies and practices set forth by the CSQCMP.

The qualifications and duties of personnel performing specific QC functions are found in **Part I: Appendix A** of this plan.

The following provides a summary of the responsibilities of key project personnel performing activities which could affect the quality of the project.

3.3.1 QA/QC Manager (QA/QCM)

The IT Construction and Remediation Division QA/QC Manager (QA/QCM) reports to the IT Vice President Quality and Health Services for functional direction. The QA/QCM is responsible for the planning, development, implementation, and effectiveness of the project-specific QC program, including this SQCMP. The effectiveness of the program is measured through the use of audits, surveillances, document reviews, and other QA monitoring activities defined throughout this SQCMP.

The QA/QCM's duties include, but are not limited to, the following:

- Review and approval of the SQCMP and all revisions thereto
- Review of supporting QC procedures
- Evaluating effectiveness of the SQCMP
- Direction and support of project QC management staff
- Training and qualifications
- Audits.

3.3.2 Project Quality Control System Manager (QCSM)

The project QCSM reports directly to the QA/QCM on all matters affected by the CSQCMP and is responsible for the overall management of the on-site QC program. Unless otherwise specified, the QCSM will not have any other duties or responsibilities than those defined in the SQCMP. The QCSM or his authorized designee will be physically at the project site whenever quality related activities are in progress. An example of the letter describing the QCSM's responsibility and authority is included as **Figure 3.3-1** of this plan.

Duties of the QCSM include, but are not limited to the following:

- Implementing the SQCMP
- Identifying and reporting nonconforming items or activities
- Initiating or recommending corrective actions
- Directing site QC staff
- Training and qualification of QC staff

- Monitoring on-site and off-site subcontractors
- Evaluating effectiveness of the SQCMP
- Overview of Chemical QC Plan
- Monitoring sampling activities.

3.3.3 Project Quality Control Staff (QCS)

A staff of qualified QC technicians will be maintained as necessary to perform the construction and operation QC functions specified for the project and will report directly to the QCSM. The type and number of the QCS personnel will vary, depending upon work phase needs, shift work, or other operations that may require QC coverage. The QCS personnel will be fully qualified by verified training and experience to perform their assigned duties. The duties of the QCS may include but not be limited to:

- Performing and documenting construction inspection activities
- Monitoring operation activities for compliance with contract requirements
- Performing or monitoring sampling activities
- Monitoring laboratory testing activities
- Identifying and reporting nonconforming conditions.

3.3.4 Laboratory Representative

The Laboratory Representative, when applicable, reports to the QCSM for on-site direction and to the Chemical QA/QC Director for laboratory activities. The Laboratory Representative is responsible for the coordination of sampling activities, including handling, storage, transfer, and recording at the project site. The Laboratory Representative's duties include but are not limited to:

- Collecting samples
- Logging samples
- Initiating and maintaining Chain-of-Custody documentation
- Arranging for shipment of samples to the laboratory
- Verifying receipt and processing of samples.

3.3.5 Project Manager

The Project Manager reports directly to the Director of Projects for each project as applicable, and is responsible for the administration of the overall project including compliance with the QC requirements set forth in the CSQCMP. The Project Manager provides a single point of contact between IT and the Client and responsibilities include but are not limited to:

- Executing the project effectively
- Reviewing and approving project plans
- Project document control
- Planning and scheduling
- Subcontractor control
- Project quality requirements
- Project closeout.

3.4 Additional Responsibilities

Additional organizational structure and responsibilities for QC personnel performing construction QC functions, sampling, or chemical analytical QC functions are addressed separately in the appropriate section of this plan.

3.5 Personnel Qualifications and Training

All personnel assigned to the project will have the education, training, and experience appropriate to their assigned duties.

Personnel performing quality control (QC) functions will be properly trained and qualified to perform their assigned duties. The QCSM is responsible for identifying the training needs and providing the appropriate training. Training will be documented and training records maintained by the QCSM.

3.6 Submittal of Qualifications

When required, the qualifications of the QCSM and personnel performing QC functions, including subcontractor personnel, will be submitted to the Client for review and acceptance prior to the performance of any QC functions by the individuals.

4.0 Site-Specific Quality Control System

4.1 Quality Control Management

The CSQCMP establishes specific policies and practices to be implemented on a project for controlling and documenting all activities which affect the QC requirements. The CSQCMP is applicable to on-site and off-site activities, including those of subcontractors, fabricators, laboratory, and suppliers.

This SQCMP has been developed as a 3-part document:

PART I provides the requirements for overall management of the project QC system, including interaction with the construction and chemical QC system programs.

PART II provides specific requirements to be implemented during the construction activities and certain activities during the operation phase as defined in the Construction QC Plan.

PART III provides the Chemical QC Plan, a stand-alone document, to be implemented for the performance of the required sampling, chemical, and analytical testing at the project site and the off-site laboratory.

4.1.1 Control of the CSQCMP

The CSQCMP is a controlled document and measures are included to maintain the currency and use of the plan so that the QC functions defined in the CSQCMP are in accordance with the latest specified requirements. Distribution of the plan is controlled so that all revisions to the plan are issued to the plan holders and the superseded requirements removed from the existing plans.

When required, the plan will be submitted to the Client for review and acceptance prior to starting any work affected by the plan. Issue and distribution of the plan will be controlled by the QCSM and only controlled copies of the plan will be issued. Each controlled copy will be assigned a control number in a sequential order. The plan will be transmitted to each plan holder and the transmittal document will reference the control number assigned.

A log will be maintained which indicates the control number, revision number, and corresponding plan holder. Receipt of the plan will be acknowledged and noted in the log. Controlled copies will be located in specific locations and available to the individuals performing the work.

Revisions to the plan will be made by sections or by the addition of supplements or amendments, and, where required, will be submitted to the Client for review and acceptance prior to implementation. The SQCMP index will be revised each time any section of the plan is revised. The index will indicate the revised status of each Section. Revised portions of the plan will be indicated by a line adjacent to the revised portions in the right-hand margin of the plan. All accepted revisions to the plan will be transmitted to plan holders. Each individual or organization designated as a plan holder will be responsible for updating their copy of the plan. Superseded sections will be returned to the QCSM, or destroyed. Superceded sections may be retained for information purposes as permitted by the QCSM. These sections will be clearly marked *"Information Only"* on each page, and will not be used for C&R activities.

4.2 Measures for Controlling Quality

4.2.1 Management and Control Measures

The CSQCMP establishes the measures for management and control of items or activities affecting quality in order to verify and document compliance to the specified requirements. The measures include, but are not limited to, the following:

- QC inspection
- Document/record controls
- Nonconforming conditions/corrective actions
- Submittals
- Completion inspections
- Chemical/analytical testing
- Geotechnical testing
- Audits.

The methods for implementing these measures are defined in the applicable sections of the CSQCMP. The CSQCMP may be supplemented by procedures, guidelines, and written instructions. Specific measures pertaining to construction or chemical QC are included in Parts II and III of this SQCMP.

4.3 Construction and Installation Quality Control

The QCSM is responsible for the implementation and control of the QC Program during construction, remediation, operation, closure, and all other activities which could affect the quality or operation of the facility.

4.3.1 Construction Inspection/Testing

Construction inspection and testing will be performed for those activities shown in the Definable Features of Work, Table 3.1.1 of the Construction Quality Control Plan (QCP) Part II of the SQCMP. The types of inspections to be performed will include:

- Preparatory inspection
- Initial inspection
- Followup inspection
- Completion inspection.

On-site testing other than chemical sampling and analysis will be performed in accordance with Part II, Section 4.0 of the SQCMP. Examples of geotechnical and material tests for a project are shown in Part II, Appendix A, Quality Control Tests.

The project QCSM is responsible for the administration and direction of the Construction QC Plan.

4.4 Chemical Sample Collection/Testing/Analysis

Chemical sample collection, testing, and analysis will be performed in accordance with the Chemical QC Plan (CQCP).

The project QCSM is responsible for the control, coordination, and monitoring of the work activities performed within the scope of the CQCP for compliance to the contract and regulatory requirements. All revisions to the plan will be transmitted to the QCSM for submittal to the Client for review and acceptance, where required.

5.0 Document Control

5.1 Documentation

The project QCSM will establish a document control system to provide measures for the control of issue, distribution, storage, and maintenance of documents relating to quality, including those of subcontractors, off-site fabricators, laboratory suppliers, vendors, and other suppliers.

Preparation, review, issuance, and revisions to documents affecting quality will be controlled to the extent necessary to determine that the documents include the specified client, regulatory, and permit requirements and provide adequate procedures or guidelines to perform the intended activities. Such documents may include, but are not limited to:

- Drawings
- Procedures
- Plans
- Reports
- Specifications.

The QCSM or designee will review the documents to verify inclusion of the appropriate QA requirements.

5.2 Construction Quality Control Daily Report (CQCDR)

5.2.1 Preparation and Submittal of CQCDR

A CQCDR will be completed daily to document all project activities. The report will cover both conforming and nonconforming work and, where required, will include a statement of certification that all materials, supplies, and work complies with the contract requirements. The CQCDR will include the results of the Daily Quality Control Reports described in Part I, Part II, and Part III of the SQCMP as applicable. The project QCSM or authorized designee will sign the CQCDR to validate the certification. A legible copy of the CQCDR will be furnished to the Client as required by the contract, and may include, but not be limited to:

- Type and number of control activities
- Results of inspections and tests
- Types of defects/causes for rejection
- Corrective actions - proposed/taken
- Trades/personnel working-type and number
- Weather conditions
- Delays and causes
- Verbal instructions.

An example of a CQCDR is included as **Figure 5.2-1**.

Additional documentation (i.e., test reports, subcontractor daily reports, nonconformance reports, and other pertinent documentation) may be included as attachments to the CQCDR.

5.3 Records

5.3.1 Evidence of Contract Compliance

QC records will be prepared to furnish documented evidence that the construction and operation activities, including laboratory analysis, are in compliance with the quality requirements of the contract. The records will be consistent with the applicable sections of the specification and may include, but not be limited to:

- Technical reviews
- Inspection and test results
- Audits
- Monitoring and surveillance activities
- Personnel qualifications
- As-built drawings
- Nonconformance reports/corrective actions
- Other specified documents.

5.3.2 Storage of Records

Records will be maintained and stored in fire-resistant storage facilities at the project site until turnover to the Client. The records will be readily retrievable for review and audit purposes by IT, the Client, or regulatory agencies. The records will be controlled in a manner which precludes loss, damage, or other detrimental conditions of the records.

5.3.3 Indexing and Filing of Records

Indexing and filing of records will be performed only by authorized personnel and maintained in a central filing system under the direction of the Project Manager.

The project record files will be organized by various project file categories, and letter designations. Typical categories are shown in the example index in **Table 5.5-1**. Additional categories will be added or deleted as required. Each file folder will be divided into appropriate categories based on content, numbered and filed sequentially within each category. Folder tabs will be marked to indicate folder number and file title as it appears on the project index.

A numbered index (**Figure 5.5-1**) will be prepared and updated as records are added by the designated personnel. The index will list the individual file folders and identify the records therein to facilitate locating the records. The index will be kept in a separate folder at the front of the project file.

The QCSM is responsible for monitoring the control of records and performing scheduled audits or surveillances of the document control system in accordance with Section 8.0 of this plan.

5.4 Submittals

5.4.1 Preparation and Maintenance

The Project Manager, or his designee, is responsible for the preparation and maintenance of the specified submittals for the project. Submittals will be listed in the Project Submittal Register which will be updated as required by the contract.

5.4.2 Submittal Register

The Submittal Register for a project will be a USACE Eng Form 4288 or equivalent form and will be maintained and updated as required for the contract. Submittals returned unapproved or with comments requiring revisions will be so noted on the submittal register and re-entered as a revision. The QCSM will monitor the submittal register to verify submittals are being controlled, scheduled, tracked, and statused in an effective manner.

5.4.3 Submittal Preparation and Transmittal

Submittals will be prepared by the Project Manager or designee. Submittals to IT from subcontractors or vendors will be reviewed and accepted prior to transmitting the submittals to the client. The submittals will be made utilizing the USACE Eng Form 4025 or equivalent form. All appropriate information will be completed prior to transmittal of the submittals. Submittals will be scheduled to coincide with the need dates and adequate time allowed for review and approval in accordance with the contract requirements.

5.4.4 Review and Certification of Submittals

The QCSM is responsible for the review and certification of submittals prior to transmittal to the Client. The submittals will be reviewed for conformance to specified requirements, completeness, and accuracy. Submittals requiring modifications or changes will be returned to the originator, subcontractor, or vendor for corrective actions and resubmittal for review and approval by the QCSM. Submittals approved by the QCSM will be certified as in compliance with all contract requirements. The certification will be indicated by signing and dating the transmittal form in the appropriate signature block.

5.4.5 Resubmittals

Submittals which are not approved by the Client or returned with comments which require resubmittal for approval will be processed in the same manner as the original submittals. The submittal number used for the original submittal will be used for each resubmittal followed by sequential alpha numeric suffix for each resubmittal. The resubmittals will be re-entered on the submittal register with the new resubmittal number.

6.0 Nonconformances and Corrective Actions

6.1 Nonconformance Report

Any work or materials not conforming to the specifications or contract requirements will be identified and documented on a Nonconformance Report (NCR) as indicated on **Figure 6.1-1**, Nonconformance Report. As a minimum, the NCR will detail the nonconforming condition, recommended corrective action(s), and disposition of the corrective action(s). The NCR will remain open until the nonconforming condition has been satisfactorily resolved and verified as acceptable by QC.

6.2 Identification of Nonconforming Items

Items identified as nonconforming will be documented on an NCR which will, at a minimum, include the following:

- Description of nonconforming item or activity
- Detailed description of nonconformance
- Referenced criteria
- Recommended disposition
- Affected organization.

6.3 Control and Segregation

The nonconforming materials or items will be controlled in a manner that will prevent inadvertent use or further processing which would cause the nonconforming condition to be inaccessible for correction. All items statused as nonconforming will be clearly identified and segregated from acceptable items except where size, installation status, and other conditions would make it impractical to segregate from conforming items.

6.4 Disposition

The disposition of NCRs will include the necessary actions required to bring the nonconforming condition to an acceptable condition, and may include reworking, replacing, retesting, or reinspecting. Implementation of the disposition may be in accordance with the original procedural requirements, a specific procedure or a written instruction.

6.5 Documentation

Client notifications of noncompliance and the proposed corrective actions will be documented on an NCR and processed in accordance with this section. Corrective actions will be implemented upon receipt of the notification. The NCR will remain open until the noncompliance is resolved.

6.6 Corrective Actions

In addition to resolving identified nonconforming conditions, corrective actions will also address the cause of adverse conditions contributing to the nonconformance and establish methods and controls to preclude the recurrence of the same or similar types of nonconformances.

The QCSM will track the identified nonconformances and corrective actions to identify any trends in the causes of the nonconforming conditions, and initiate necessary actions to prevent recurrence.

The QCSM will monitor the corrective actions to verify the corrective actions were properly implemented and accepted and that the Nonconformance Report was closed out.

Additional requirements for handling nonconforming conditions and corrective actions during sampling and analytical activities are defined in the Chemical QC Plan.

6.7 Stop Work Notice

Any nonconforming conditions which could threaten safety or cause an environmental threat will be stopped through the use of a Stop Work Notice authorized by the QCSM and Project Manager. Stop Work Notices may also be issued in the event of insufficient corrective actions resulting in recurring nonconforming work. In all cases, Stop Work Notices will require authorization by the QCSM and the Project Manager. When concurrence to a stop work situation cannot be resolved at the project level, the situation will be referred to succeeding upper levels of management for resolution.

7.0 Subcontractor Quality Control

All subcontractors performing work for a project are responsible for compliance to the requirements of their respective subcontract. Subcontractors include organizations supplying quality-related items or services to the project. The overall responsibility for conformance to the quality requirements for the subcontracted items and services is retained by IT.

The requirements for personnel qualifications, technical performance levels, QC procedures, acceptability levels, and documentation will be included as a part of the subcontract documents. The QCSM or designee will review the subcontract procurement documents to verify all of the QC requirements are passed on the subcontractor.

The QCSM is responsible for the implementation of inspections, surveillance, document reviews, audits and other QC activities for monitoring the subcontractor to verify compliance with the contract and subcontract requirements. These activities will be documented on inspection reports, checklists, audit reports, field logs, or other forms appropriate to the function performed.

For field operations, the project QC staff will provide QC checks before, during, and at the completion of the subcontractor's activities to the extent necessary to determine that the subcontractor is in compliance with the QC measures set forth by the contract and the applicable subcontract documents including:

- Meeting quality requirements
- Generating, controlling, and maintaining required documentation
- Performing and documenting required inspections and tests
- Identifying, reporting, and correcting nonconforming conditions
- Turnover to IT.

7.1 Laboratory Services

7.1.1 Geotechnical and Material Testing

Geotechnical and material testing will be performed by an independent materials testing laboratory. The laboratory will be responsible for the performance of sub-site preparation, earthwork, concrete, and other physical testing defined in the applicable work specification. Specific tests and testing requirements are defined in the Construction QC Plan.

The QCSM is responsible for monitoring outside laboratory operations to verify:

- All required tests are made
- Location of tests
- Frequency of tests
- Calibration of test equipment
- Test results/acceptance criteria
- Documentation.

The materials testing laboratory to be utilized for this project is:

To be determined for each contract

7.1.2 Analytical Testing

Chemical analytical testing will be performed using an on- or off-site, full-service laboratory as required by the contract. The chemical analytical testing laboratories, equipment, facilities, QC procedures, required tests, test frequencies, calibration requirements, and related activities are described in the Chemical QC Plan. The laboratory to be utilized for the performance of analytical testing is:

To be determined for each contract

The QCSM will monitor the chemical laboratory activities to verify that, as a minimum, the following activities comply with the contract requirements:

- All required tests are made
- Location of test samples
- Frequency of tests
- Calibration of equipment
- Chain-of-custody
- Test results/acceptance criteria
- Documentation
- Sample processing and holding times.

7.1.3 Sampling

Samples for chemical, analytical, soils, and material testing will be obtained for the performance of specified tests or analysis, in accordance with the requirements of Parts II and III of this SQCMP.

The QCSM is responsible for monitoring the collection, handling, and shipping of the samples and for verifying chain-of-custody, laboratory procedures, calibrations or test equipment, test documentation, and results for compliance to the specified requirements.

8.0 Audits

8.1 Audit System

8.1.1 Performance of Audits

The QA/QCM will establish a system for the performance of audits to evaluate the effectiveness of the implementation of the CSQCMP and referenced plans and procedures. Routine audits will be performed by the QCSM on quality related activities.

Planned and scheduled audits of the Project QC Program will be performed by the QA/QCM or designee. The initial audit will be performed as soon as practical after the start of construction or remediation activities. Additional audits will be performed as determined necessary by the QA/QCM. The frequency of the audits will be based upon the extent of activities being performed and the project schedule. In addition to the initial audit, at a minimum, additional audits will be performed annually.

8.1.2 Documentation

The audits will be performed and documented in accordance with written procedures, checklists, and instructions. These documents will include all required attributes necessary to verify compliance with the contract and regulatory requirements. A specific audit plan will be developed by the QA/QCM prior to the performance of each audit. The plan will detail the elements to be audited on a pre-planned checklist.

8.1.3 Audit Personnel

The audits will be performed by personnel trained and qualified in auditing techniques and reporting. The personnel performing the audits will be familiar with the requirements set forth in the CSQCMP and the specific application to be audited. The personnel performing the audit will be assigned and report to the QA/QCM for the audit activities. Personnel performing the audits will be independent of the organization and activities audited.

8.1.4 *Activities Included*

The auditing system will cover the activities affecting quality during construction, operation, and analytical testing for the project and will encompass both on-site and off-site activities including subcontractors.

8.1.5 *Audit Results*

Upon completion of the audits, the results will be reported to the QA/QCM, Project Manager, audited organization, Project QCSM, and the Client. All nonconforming conditions identified during the audits requiring corrective actions will be re-audited or otherwise evaluated to verify that the corrective actions were properly implemented by the affected organization.

Part I
APPENDIX A

CQC Duties and Qualifications

Part I - APPENDIX A
DUTIES AND QUALIFICATIONS

EXAMPLE ONLY

Duties

Civil/Structural Inspections. QC staff personnel are responsible for monitoring and documenting all pertinent information on general civil and structural features of work including demolition, clearing, grubbing and stripping, subgrade and finish elevations, earthwork in general, backfill, dimensions, plumbness and alignment of structures and members and for conducting the quality control inspections for work related to concrete, steel and general site preparation and closure activities to verify compliance with the technical specifications and applicable standards.

Contaminated Soil and Waste. QC staff personnel are responsible for monitoring and documenting the storage, handling, sampling, testing and disposal of contaminated soils and waste materials.

Thermal Treatment. QC staff personnel are responsible for monitoring and documenting the installation and erection of the thermal treatment equipment, shakedown and pretrial burn operations, trial burn performance testing, operation, sampling, testing and analysis of the treated materials, aqueous waste, and the removal of treated materials.

2.0 Qualifications

Resumes to be included in this Appendix

Part I
APPENDIX B

Sample Forms

APPENDIX B
Sample Forms Index
EXAMPLE ONLY

FORM	DESCRIPTION	STANDARD
A-2	Density of soil in place, sand cone method	ASTM D1556
A-3	Density of soil in place, nuclear method	ASTM D2922
A-3-A	Density of soil in place, nuclear method and field cone penetrometer	ASTM D2923 Army TMS-530
A-5	Laboratory compaction test	ASTM D698 or D1557
A-6	Compaction test	ASTM D698 or D1557
A-7	Moisture content data sheet	ASTM D2216
A-9	Sieve analysis	ASTM D422
A-10	Hydrometer test and sieve analysis hydrometer test (calculation sheet)	ASTM D422
A-12	Amount of material in soils finer than No. 200 sieve	ASTM D1140
A-35	Unconfined compression test	ASTM D2166
A-36	Visual description of soils data sheet (coarse-grained)	
A-37	Visual description of soils data sheet (fine-grained)	
A-40	Concrete placement inspection and testing report	
A-41	Cone penetration	

Part I
TABLES

Table 5.5-1
Example Project File Categories
EXAMPLE ONLY

Category	Letter Designation	Contents
Correspondence	A-1	General In-house Correspondence
	A-2	Outgoing Correspondence
	A-3	Incoming Correspondence
	A-4	Minutes of Meeting Logs
	A-5	Telecopy Files
	A-6	Transmittal Logs
Bids, Contracts, and Specifications	D-1	Client Contract, Including Definition of Scope of Work
	D-2	Drawings
	D-3	Bidders' List/Approved Bidders
	D-4	Individual Subcontractor (Vendor) Records (filed alphabetically), including Requisitions, Purchase Orders, Invoices, Receiving Documents, and Subcontractor Change Orders
Field Data and Data Checkprints	E-1	Field Activity Daily Logs (Daily Site Reports)
	E-2	Sample Collection Logs
	E-3	Sample Chain-of-Custody/Request for Analysis Forms
	E-5	Subsurface Logs
	E-6	Test Data Forms
	E-7	Instrument Installation Data
	E-8	Survey Data
	E-9	Inspection Reports
	E-10	Field Testing Equipment and Calibration Records
IT Reports	H-1	Work Plan
	H-2	Sampling and Analysis Plan
	H-3	QA Project Plan
	H-4	Health and Safety Plan
Photographs	I	Photographs

Table 5.5-1
Page 2 of 3

Category	Letter Designation	Contents
Project Phases	J	
	J-1	Design
	J-2	Procurement
	J-3	Construction
	J-4	Trial Burn
	J-5	Thermal Treatment Operations
	J-6	Site Closure
Laboratory and Laboratory Data	K	
	K-1	Air Sampling/Monitoring Plans
	K-2	Water Sampling
	K-3	Soil Sampling
	K-4	Treated Materials Sampling
	K-5	Laboratory Certifications
	K-6	Meteorological Data
	K-7	Wipe Sample Analysis Plan
Regulatory Submittals and Licensing & Permitting Applications	L	
Reference Material	M	
Site Monitoring Records	N-1	OSHA Records
Drawings and Table Checkprints	O	
Management Records/Job Tracking Data	P-1	Project Administration
	P-2	Project Personnel
	P-3	Job Tracking
	P-4	Scheduling
Quality Records	Q-1	Nonconformance Documentation
	Q-2	Audit Reports and Responses
	Q-3	IT Internal QA/QC Correspondence
	Q-4	IT Internal QA/QC Programs
	Q-5	IT Internal QA/QC Reviews

Table 5.5-1
Page 3 of 3

Category	Letter Designation	Contents
Health and Safety Records	R-1	Tailgate Safety Meeting Notes
	R-2	Site-specific Health and Safety Training Records
	R-3	Real-time Air Monitoring Log
	R-4	Health and Safety Equipment Calibration Logs
	R-5	Accident Reports
	R-6	Daily H&S Reports
	R-7	Miscellaneous H&S Inspections/Tests
	R-8	Contractor/Visitor H&S Orientation
	R-9	Material H&S Data Sheets
	R-10	OSHA Inspections
	R-11	H&S Correspondence
Permits/Applications	S-1	Permits/Applications

Part I
FIGURES

Figure 3.1-1
Typical Quality Control Organization Chart

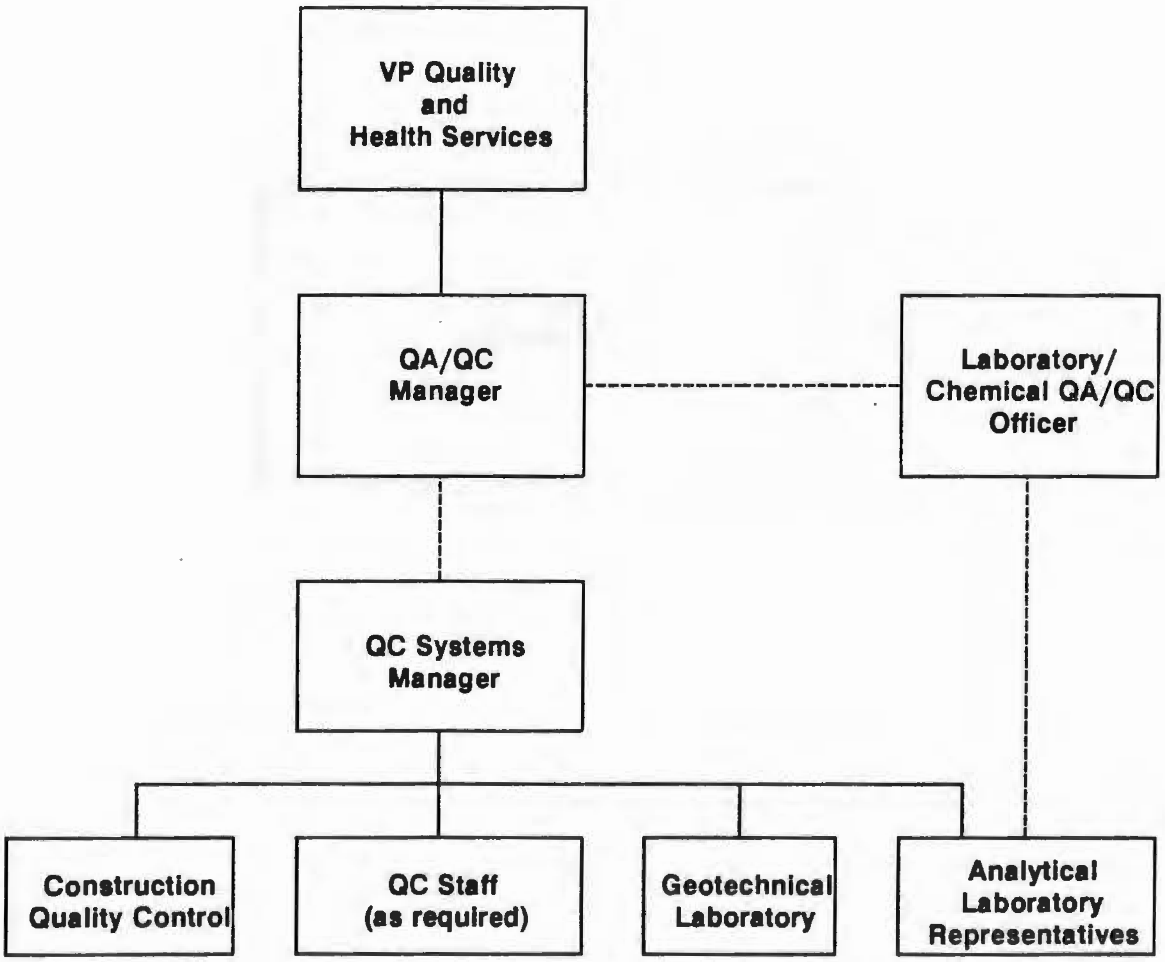

Figure 3.3-1

EXAMPLE

TO: QCSM (name)

DATE:

FROM: Vice President C&R or Principle in Charge

SUBJECT: (Project Name)

This letter describes the responsibilities and authority delegated to you in your capacity as Quality Control Systems Manager (QCSM) for the subject project.

In the position as the Project QCSM, you are responsible for the implementation and enforcement of the Quality Control Management Plan (QCMP) during site preparation, construction, operation, and closure activities to verify that the quality of the materials, workmanship, and operations complies with the specified requirements throughout the duration of the project.

You have the authority to identify and report quality problems, reject nonconforming materials, initiate corrective actions and recommend solutions for nonconforming activities, and to control further processing, delivery, or installation activities until satisfactory disposition and implementation of corrective actions is achieved.

Figure 5.2-1

Construction Quality Control Daily Report

REPORT NO. ______ CONTRACT NO. ____________ DATE __________

LOCATION OF WORK: ____

DESCRIPTION: ____

WEATHER ______________________________, RAINFALL ______ inches,

TEMP: MIN _________, MAX _________

1. Work Performed Today

____

____

____

2. Work Performed Today by Subcontractors

____

____

____

3. Type and Results of Inspection: (include Satisfactory Work Completed or Deficiencies with Action to be taken.)

____

____

____

Figure 5.2-1
Page 2 of 2

4. List Type and Location of Tests Performed and Results of These Tests:

5. Verbal Instructions Received:

6. Corrective Actions Proposed/Taken:

7. Remarks:

8. Safety Violations Observed

9. CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the contractor and each subcontractor and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications, except as may be noted above.

Quality Control System Manager

Figure 6.1-1
Non-Conformance Report

1 PROJECT NAME:		2 JOB NO.
3 LOCATION:	4 DATE:	5 NCR NO.

6 DESCRIPTION OF NON-CONFORMANCES:

PREPARED BY: ______________________ DATE: ______________
Quality Control Representative

REVIEWED BY: ______________________ DATE: ______________
Quality Control System Manager

7 DISPOSITION:

RECOMMENDED BY: ______________________ DATE: ______________

REVIEWED BY: ______________________ DATE: ______________
Quality Control Representative

8 CORRECTIVE ACTION VERIFICATION:

IMPLEMENTED BY: ______________________ DATE: ______________

VERIFIED BY: ______________________ DATE: ______________
Quality Control Representative

9 NCR CLOSEOUT ______________________ DATE: ______________
Quality Control System Manager

Figure 5.5-1
Project Index

Project Number: ____________________

Project Name: ____________________

Category: _______________

Designation	Description

Part II
Construction Quality Control Plan

(PROJECT)

***

PREPARED
by
IT Corporation

Approved by: ______________________________ Date: ______________
IT QA/QC Manager

Approved by: ______________________________ Date: ______________
IT Project Manager

Approved by: ______________________________ Date: ______________
Client Representative

***

Original Issue Date: __________

Last Issue Date __________ Rev. __

Part II - CONSTRUCTION QC PLAN

1.0 General

1.1 Purpose

The purpose of this plan is to establish the procedures and methods to be implemented during construction operations. The plan will be keyed to the construction sequences and includes methods for the following phases of inspections:

- Preparatory inspection
- Initial inspection
- Followup inspection.

1.2 Scope

This plan is applicable to all work, inspections, and testing activities performed during construction operations for the project, including on-site and off-site operations. The plan includes control measures for verifying the quality of equipment and materials and for monitoring construction activities.

In general, the plan will be implemented for the following activities:

- Inspections of
  - Excavation activities
  - Erosion and sediment control
  - Building erection and demolition
  - Material handling
  - Equipment installation and removal
  - Backfill
  - Stormwater management
  - Decontamination of buildings and equipment
- Submittals
- Testing (other than chemical).

2.0 Organization and Responsibilities

Unless otherwise specified, the construction QC organization and responsibilities are included in Part I of the SQCMP.

3.0 Construction Inspection Plan

The Construction Inspection Plan establishes the measures required to verify the quality of work performed and compliance to the specified requirements, including the inspection of materials and workmanship before, during, and after each definable feature of work.

3.1 Preparatory Inspection (where required)

Preparatory inspections will be performed prior to starting the definable features of work listed in **Table 3.1-1**. Where more than one definable feature of work is included in one work activity, one preparatory meeting may cover the separate features of work. The preparatory inspection meeting will be attended by the responsible construction staff personnel, any applicable subcontractor involved with the feature of work and responsible QC staff personnel. The Client will be notified in advance to coordinate participation in the inspection. The preparatory inspection meeting includes, but is not limited to:

- Review of pertinent contract requirements
- Review material and equipment documentation for required tests, submittals, and approvals
- Review required control inspections and test requirements
- Establish that the preliminary work required to begin the feature of work is complete and conforms to approved drawings and submittal data
- Establish that the required materials and equipment for commencement of the work are on hand or available for use on the feature of work and that all equipment is properly calibrated and in proper working condition.

The preparatory inspection meetings will be documented on the Preparatory Inspection Checklist as indicated on **Figure 3.1-1**. Preparatory inspections will be reported on the Construction QC Report (CQCR) and the checklist included as an attachment.

Personnel performing work activities affected by a preparatory inspection will be directed in the acceptable level of the workmanship involved for the feature of work covered by the inspection.

3.2 Initial Inspection (where required)

An initial inspection will be conducted at the beginning of the definable features of work. The inspection will be performed as soon as it is determined by the QCSM that a sufficient portion of the feature of work has been accomplished to evaluate the following criteria:

- Compliance with the specifications, drawings, submittals, and other contract requirements
- Acceptable levels of workmanship
- Use of defective or damaged materials
- Resolution of differences.

The initials inspections will include participation of the responsible personnel, including appropriate subcontractors and the QC personnel involved with the feature of work. The Client will be notified in advance of each initial inspection to coordinate participation in the inspection.

Initial inspections will be documented using the Initial Inspection Checklist as shown on **Figure 3.2-1**. The initial inspections will be reported on the CQCR and the checklist included as an attachment.

3.3 Followup Inspections

Followup inspections will be performed on a continuous basis. The frequency of the followup inspections will be dependent upon the extent of work being performed on each particular feature of work. Followup inspections will be performed on all ongoing work. Followup inspections will also be performed on any completed work phase prior to starting subsequent phases. Deficiencies identified will be corrected in a timely manner or placed on a punchlist. Deficiencies which would be made inaccessible for correction by subsequent work activities will be corrected and accepted prior to starting the new work.

Followup inspections will be documented using the Daily Followup Inspection Form as shown on **Figure 3.3-1**. The followup inspections will be reported on the CQCR and copies of the Followup Inspection Forms attached.

3.4 Completion Inspection

At the completion of all work or increment of work, the work will be inspected for compliance with the contract plans and specifications.

The QCSM is responsible for initiating the completion inspection and verifying development of a punchlist of items which do not conform to the specified requirements including incomplete work items. The punchlist will identify all nonconforming or incomplete work. Upon completion of the punchlist items, a second inspection will be conducted by QC to verify all of the items conform to the requirements.

3.5 Inspection Documentation

The QCSM is responsible for the maintenance of the inspection records. Inspection records will be legible and clearly provide all information necessary to verify the items or activities inspected conform to the specified requirements, or in the case of nonconforming conditions, provide evidence that the conditions were brought into conformance or otherwise accepted by the Client.

4.0 Testing

4.1 Testing Procedures (Other than Chemical Sampling and Analysis)

Testing procedures will be developed and implemented to perform the tests specified for the project. The type, number, and frequency of the tests will be as specified in the contract documents, and will include the requirements of referenced standards or regulatory guidelines. Chemical sampling and analysis are included in the Chemical Quality Control Plan (CQCP) included as Part III of the SQCMP.

4.2 Laboratory Services

Laboratory services for soils, geotechnical, and materials will be utilized to perform on-site or off-site testing during the construction phase of work covered by this plan. The material testing laboratory will be selected and qualified in accordance with the contract requirements.

4.3 Tests

A general list of soils, geotechnical, and material tests to be performed during construction is provided as an example in Part I, **Appendix B**. Specific tests to be performed will be documented on the Quality Control Test Form in **Appendix A** which, as a minimum, includes the following:

- Test name/procedure/frequency
- Specification paragraph number
- Responsible laboratory/personnel.

The QCSM or designee is responsible for monitoring the testing activities to verify conformance to the contract requirements. The monitoring will include project on-site activities and both on-site and off-site laboratories and includes, but is not limited to:

- Sampling methods, locations and frequencies
- Testing procedures
- Test equipment availability and compliance
- Calibrations
- Test documentation and results.

4.4 Documentation

Testing activities and results of the tests and monitoring activities will be included on the CQCR. Test reports, calibration records, and other recording forms used to document test activities will be maintained by the QCSM. Tests performed and the results of the tests will be included in the CQCR. Sample forms for documenting test activities are included in **Appendix B** of Part I of the SQCMP.

5.0 Document Control

The construction document controls will be in accordance with Chapter 5.0 of Part I of the SQCMP.

5.1 Construction QC Report (CQCR) (where required)

A CQCR will be completed daily to document construction activities covered by this plan. In addition to the information required by Section 5.3 of Part I of the SQCMP, the CQCR will include:

- Phases of construction in progress
- Material and/or equipment delivered to the site
- Details of preparatory, initial, and followup inspections
- Tests performed and results.

The CQCR will be signed by the appropriate QC personnel responsible for completion of the activities, including subcontractors, and furnished to the QCSM for review and a copy attached to the CQCDR and processed in accordance with Part I, Section 5.2.1. A sample of the CQCR form is included as **Figure 5.1-1**.

6.0 Submittals

Unless otherwise specified, submittals will be processed in accordance with Section 5.6 of Part I of the SQCMP.

7.0 Nonconformances

Nonconforming activities or items will be identified, reported, and controlled in accordance with Section 6.7 of Part I of the SQCMP.

8.0 Audits

Audits of construction activities to evaluate the effectiveness of the implementation of this plan will be performed in accordance with Section 8.0 of Part I of the SQCMP.

TABLE 3.1-1

Definable Features of Work
EXAMPLE ONLY

Spec Section	Para. No.	Feature of Work	PREP		Initial		Followup	Remarks
			Reg	Date	Req	Date	Req	
01015	Tables 01015-1 01015-2 01015-3	 Waste characteristics Waste characteristics Waste characteristics						 QC to monitor QC to monitor QC to monitor
01050	1.3 3.2 3.3 3.4	Field engineering - QC Inspection Reference points Survey requirements	x					QC verification QC monitor QC monitor QC monitor
01105	1.1	Environmental management and reporting						QC monitor
01300	1.1	Submittals						QC to monitor, review, certify
01420	1.1	Material laboratory services	x		x		x	QC acceptance/monitor
01430	1.1	Chemical quality control	x		x		x	QC monitor chemical QC Plan
01440	1.1	Chemical testing laboratory service						QC monitor
01505	 3.2 3.2.3 3.2.4 3.2.5 3.3 3.3.1 3.3.2 3.3.4 3.3.6	MOBILIZATION/DEMOBILIZATION Mobilization Mobilization TTU AWT system Treated materials handling system Demobilization Building equipment structures, etc. Decontamination Utilities Closure	 x x x x x x x x					QC monitor all features of work in the section NOTE: One preparatory meeting may include all mobilization activities

TABLE 3.1-1
(Page 2 of 2)

Spec Section	Para. No.	Feature of Work	PREP Req	PREP Date	Initial Req	Initial Date	Followup Req	Remarks
01510		SITE UTILITIES						
	3.2	Water supply	x					QC monitor
	3.3	Sanitary waste system	x					QC monitor
	3.4	Telephone service	x					QC monitor
	3.5	Electrical power	x					QC monitor
	3.6	TTU fuel source	x					QC monitor
01770	1.1	Project record documents	x		x		x	
01725	1.1	As-built drawings	x		x		x	
01725	1.1	Project closeout	x		x		x	
	3.3	Post-construction inspection	x		x		x	
02100	1.1	Site preparation	x					
	3.1	Excavation	x		x		x	
	3.2	Dust control	x				x	
	3.3	Disposal	x				x	
02210	1.1	Stormwater management	x					NOTE: One preparatory inspection may include all stormwater management activities.
	3.1	Diversion	x		x		x	
	3.2	Contamination control	x		x		x	
	3.5	Treatment	x		x		x	QC monitor
02220	1.1	Earthwork	x		x		x	
	3.1	Submittals						QC review/certify submittals
	3.2	Excavation	x		x		x	
	3.3	Backfill	x		x		x	
	3.4	Grading	x		x		x	
	3.5	Compaction	x		x		x	
	3.6	Foundation design						

Part II
FIGURES

Figure 3.1-1
Preparatory Inspection Checklist
Page 1 of 2

ITEM:				Date:
Contract Specifications:				
Material	Qty	Condition	Testing	Comment
STORAGE CONDITIONS:				
SUBMITTALS:				

Figure 3.1-1
Page 2 of 2

MATERIAL/EQUIPMENT CERTIFICATIONS:
PREPARATORY SITE CONDITIONS:
CONTRACT VARIANCE:
COMMENTS:

Attendees:

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QC Representative **Date**

QCSM **Date**

Figure 3.2-1
Initial Inspection Checklist
Page 1 of 2

ITEM:				Date:
Contract Specifications:				
Material	**Qty**	**Condition**	**Testing**	**Comment**
STORAGE CONDITIONS:				
MATERIAL/EQUIPMENT CERTIFICATIONS:				

Figure 3.2-1
Page 2 of 2

SITE CONDITIONS:
CONTRACT VARIANCE:
COMMENTS:

Attendees:

____

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____

____

____

____
QC Representative **Date**

____
QCSM **Date**

Figure 3.3-1
Daily Followup Inspection Form
Page _ of _

Feature:	Inspection Date:
Installation Date:	
Description:	
Reference of Applicable Specification or Drawing:	
Remarks:	

QC Representative Date

Figure 5.1-1

CONSTRUCTION QUALITY CONTROL REPORT
Page 1 of 2

Contract No.:	**Date:**
Project Name:	**Report No.:**
Weather:	
Phases of Construction in Progress (give briefly only phase or phases of work in progress) (if CPM is a contract requirement, identify by nodes an description of those CPM activities where work was performed):	
Material and/or Equipment Delivered to Site (including equipment demobilization):	
Inspection Mode (include non-compliance inspections, phase of work inspected and inspections and deficiencies noted):	
Preparatory	
Initial	
Followup	
Tests Performed and Results of Tests (including results of tests taken on previous dates)	

Verbal Instructions Received (list any instructions given by Subcontractor's personnel on construction deficiencies, retesting required, etc., with action to be taken)
Changed Conditions/Delays/Conflicts Encountered
Remarks
Quality Control Inspector SIGNATURE: Date:
Subcontractor's Verification: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specification except as noted above. **Quality Control Systems Manager: Date:**

Part II
TABLES

Part II
APPENDIX A

Quality Control Tests

Part II - APPENDIX A
Quality Control Tests
EXAMPLE ONLY

Spec. Section	Paragraph No.	Test Procedure	Test Name	Test Frequency	Test Responsibility	Remarks
			Tests to be Determined			

APPENDIX J

RESUMES OF KEY PERSONNEL

ALBERT L. MEYERS, JR.

Professional Qualifications

Mr. Meyers has over 20 years of experience in the construction and remediation industries. During this time, he has had increasing degrees of responsibility in most areas of the business. His experience includes emergency response activities with major road carriers and highway facilities, total plant decontamination, groundwater extraction and treatment, chemical handling, categorizing and packing, soil removal, and total site encapsulation.

Mr. Meyers has coordinated, supervised, and managed various underground storage tank (UST) removal and replacement activities across the United States. He has worked closely with client and regulatory agencies to attain compliance for acceptance of many sites. Mr. Meyer's involvement in managing sites with major clients as well as government agencies, his knowledge of construction and remedial operations, as well as his chemical background, have provided him with extensive capability and knowledge of the industry.

Education

B.S., Chemistry, University of Dayton, Dayton, Ohio; 1974
Safety Training (per OSHA 29CFR1910.120)

Experience and Background

1991 - Present: Operations Manager/Program Director Rapid Response Program, IT Corporation, Cincinnati,Ohio. Responsible for management of the Rapid Response contract for IT Corporation, which encompasses extensive interface with the COE and their clients, the development of the project, final price negotiations, and delivery order award. The position also includes the responsibility of initiating a services group for IT in the Cincinnati area.

1989 - 1991: Project Manager/Operations manager, Pittsburgh Remediation Group, IT Corporation, Pittsburgh, Pennsylvania. Promoted to Operations Manager of Pittsburgh Services. Responsible for hiring, training, and assignment of all hourly personnel and Operations Supervisors. Responsibilities also included the oversight of the services facility which supplied protective clothing, equipment, tools, monitoring equipment, and the entire vehicle fleet. Continued project management responsibilities on commercial projects as well as Rapid Response projects with the USACE.

1984 - 1989: Field Supervisor/Project Manager, Remediation Group, IT Corporation, Pittsburgh, Pennsylvania. Develops work plans, schedules, and cost estimates and coordinates job implementation and execution of work. He has managed or supervised on site the following jobs:

- On-site management of a major polychlorinated biphenyl (PCB) decontamination asbestos abatement at a naval power station in Guam. Activities include contract administration and negotiation as well as coordination of all decontamination removal, treatment, and disposal activities with the Navy and their inspectors.

- On-site management of Superfund/potentially responsible party (PRP) site in Indiana involving the cleaning/demolition of vertical and horizontal tanks ranging from 5,000 to 250,000 gallons. This included all interface between client and government, strict documentation, the scheduling of site activities, and all disposal/
treatment.

- Supervised/managed total plant decontamination of PCB in Kentucky. Cleanup involved equipment removal/replacement, slab demolition/replacement, equipment-building decontamination, excavation, and water treatment. This project had a time constraint of two weeks, which necessitated 12-hour shifts, to complete 95 percent of the work.

- Supervised PRP project in Edison, New Jersey that involved eight hundred 55-gallon drums of unknown material, 30 tank trailers full of solvents and PCB oils, and the excavation of approximately 2,000 cubic yards of soil.

- Supervised cleanup of a large state-funded PCB/chemical dump site in New Jersey. Activities included the excavation of soils, laboratory bottles, containers, categorization, and disposal (approximately 80,000 bottles total).

- Supervised/managed the removal of USTs across the United States for a major client as well as other clients. This included attaining all necessary permits, licenses, soil and product analysis, excavation, sampling, replacement of tank when necessary, backfill with approved/clean material, disposal of waste, and compliance with all federal, state, and local regulations.

- Supervised/managed the treatment and disposal of outdated or unknown chemicals and gases at a Pittsburgh university and research facility. Many of the chemicals were unknown and warranted site hazardous categorization or site treatment due to no available disposal.

- Supervised/managed various groundwater intercept and treatment activities for major chemical and petroleum clients across the United States. Activities included treatment system design, setup, and after flow rate stabilization. The systems are self-controlled through automation, needing minor maintenance, using state-of-the-art equipment.

1982 - 1983 Assistant Chemist/Quality Control Inspector, Schaffner Manufacturing Company, Pittsburgh, Pennsylvania. Performed analyses for product development and was responsible for quality control and product development.

1980 - 1982 Field Supervisor/Project Manager, Enviro Haz Mat, Inc., Pittsburgh, Pennsylvania. Assisted in design of basic structure of business; performed job surveys, drafted proposals, and estimated costs; and supervised and coordinated the planning, execution, and cleanup of all projects within the division.

1978 - 1980 Recovery Technician/Team Leader/Supervisor, AMO Pollution Services, Pittsburgh, Pennsylvania. Involved and trained in emergency response team action; assisted in preparing proposals and safety plans; and supervised various remedial projects and emergency response actions.

1972 - 1978 Mosites Construction Company, Pittsburgh, Pennsylvania. Laborer on all types of general construction projects; truck driver and limited equipment operator; material expeditor; and crew leader.

Registrations/Certifications

Certified Tank Installer

DOUGLAS P. WEHNER, PROJECT MANAGER

EDUCATION:
B.B.A., Finance/Accounting, University of Cincinnati, Cincinnati, Ohio; 1984
M.B.A., Accounting, Xavier University, Cincinnati, Ohio; 1992

Mr. Wehner is a project manager with nine years of professional experience. Since 1987, he has served in various management capacities within IT's construction and remediation division, including that of project administrator, operations supervisor, and project manager. He has managed a combined total of over 100 hazardous toxic and radiologic waste (HTRW) and emergency response delivery orders that have required variations of on-site source control, on-site treatment, decontamination, demolition, transportation, and disposal. Since 1991, Mr. Wehner has served as Deputy Program Manager and General Superintendent of the Midwest for IT Corporation's (IT) U.S. Army Corps of Engineers (USACE) Omaha Rapid Response Contract.

SPECIAL QUALIFICATIONS:

- More than five years of experience as Deputy Program Manager and General Superintendent for the USACE Omaha Rapid Response Contract, responsible for the management of 20 delivery orders on a cost-reimbursable basis.

- Seven years of direct experience in remediation and HTRW response, including as-required support in investigation, design, and construction. Managed over 90 emergency response delivery orders as Deputy Program Manager under the U.S. Environmental Protection Agency (EPA) emergency response cleanup services (ERCS) program, a cost-reimbursable contract.

EXPERIENCE RECORD:

1991 - Present **Project Manager, IT Corporation, Cincinnati, Ohio.** Supervises professional and support staff in the implementation of remedial action projects. Responsible for project cost, schedule, quality assurance, and health and safety performance. Most relevant assignments include:

- Deputy Program Manager for the USACE Omaha Rapid Response Contract. Responsible for administering contract modifications, monitoring compliance with contract scope of services and preparing cost proposals, and developing and reviewing work plans. Accomplishments include:

  - Designed on-site cost tracking program for the Rapid Response Contract that could be used as a stand-alone system or a fully integrated system in IT's job accounting system via modem.

  - Developed training sessions for key site management personnel, ensuring that the contract's requirements are being met from the field.

- Developed, negotiated, and implemented an Immediate Response Contract modification to the existing USACE Rapid Response Contract, which provides the USACE with flexibility to require IT to be on site within 72 hours of notification.

- Developed, negotiated and revised IT's newly awarded followon USACE Rapid Response contract which will be implemented in September, 1994, and is worth $50 million over 5 years.

1989 - 1990 **Operations Supervisor, IT Corporation, Cincinnati, Ohio.** Coordinated personnel, equipment, and subcontractors during the execution of remedial action and emergency response work orders. Additionally was responsible for the management of technical, contractual, and financial aspects of services.

- Project Manager over 20 delivery orders for the USACE Omaha Rapid Response Contract, responsible for assisting in the planning and direction of delivery orders, coordinating with the USACE throughout the performance of the delivery orders, coordinating all work plans, financial reporting, and implementing quality assurance and health and safety plans.

- Deputy Program Manager for IT's ERCS contract in the EPA Zone III (Region V). Managed over 90 delivery orders under this contract, coordinating activities between the EPA and a team of 10 subcontractors.

- Project Manager on response actions, including water main installations, underground storage tank (UST) investigation and removal, plating facility decommissioning, spill cleanups, soil fixations, methane extraction, vacuum enhanced pumping, soil vapor extracting, and free product recovery system installations.

1987 - 1989 **Project Administrator, IT Corporation, Cincinnati, Ohio.** Responsible for coordination of in-house and subcontractor resources in the performance of the EPA Region V ERCS contract. Additionally responsible for invoicing, cost summarization, vendor payment, and developing and implementing internal controls and policies with regard to field operations.

1984 - 1987 **Accountant, Gibson Greetings, Cincinnati, Ohio.** Responsible for annual operating and capital budgeting, quarterly financial forecasting, and variance analysis.

RECOMMENDATIONS/CITATIONS:

Served as Project Manager for USACE Omaha District Rapid Response projects at Tidewater Community College and Bird Third Party, for which IT received commendations.

Warren Houseman

Professional Qualifications

Mr. Houseman has over 15 years of diversified industrial hygiene and safety experience in heavy industry and hazardous waste and is responsible for industrial hygiene, occupational safety, training, workers' compensation, and medical surveillance programs for the remediation division of IT. As a principal industrial hygiene investigator, he has experience in recognizing and measuring such occupational hazards as organic vapors, asbestos, lead, silica, ionizing radiation, and noise. He has also provided training programs to IT's technical field staff concerning asbestos, respiratory protection, hearing conservation, radiation survey equipment, gas testing equipment, and hazard communication. Because of his professional achievements, Mr. Houseman has been named an IT Technical Associate.

Education

M.S., Hygiene, University of Pittsburgh, Pittsburgh, Pennsylvania; 1982
B.S., Biology, California University of Pennsylvania, California, Pennsylvania; 1976
Additional Training:
40-Hour Health and Safety Training for Hazardous Waste Site Workers in accordance with 29 CFR1910.120, IT Corporation, 1987
8-Hour Refresher Training, IT Corporation 1988, 1989, 1990, 1991, 1992
Multimedia Standard First Aid, American Red Cross, 1988
Adult Cardiopulmonary Resuscitation, American Red Cross, 1988
Managing Safety: Techniques That Work for Operations Managers, E.I. duPont deNemours & Company, 1990
AHERA Contractor/Supervisor Training for Asbestos Abatement, Asbestos Consulting Testing, Lincoln, Nebraska, 1990
Managing Ionizing Radiation Programs for Industrial Hygienist, AIHA, Salt Lake City, Utah, 1991

Registrations/Certifications

Certified Industrial Hygienist: American Board of Industrial Hygiene

Experience and Background

1990 - Present — ***Health and Safety Manager, IT Corporation, Pittsburgh, Pennsylvania.*** Responsible for industrial hygiene, occupational safety, training, workers' compensation, and medical surveillance programs for the Construction and Remediation Major Projects Division of IT. Duties include:

- Development or approval of health and safety plans (H&S) for all major projects

- Acquisition of H&S staff

- Participation in monthly safety council and audit programs and H&S technical exchange committee

- Review of proposals for H&S cost estimates

- Assignment as temporary on-site H&S officer during employee vacations and excused leaves

- Coordination and technical support of field H&S technicians

1987 - 1990 ***Health and Safety Coordinator, IT Corporation, Pittsburgh, Pennsylvania.*** Responsible for industrial hygiene, occupational safety, training, workers' compensation, and medical surveillance programs for the remediation division of IT. Duties included:

- Administering the industrial hygiene program for recognition, evaluation, and control of workplace health hazards.

- Supervising a comprehensive loss control program, including audits, accident investigations, employee training, and establishment of H&S requirements for projects and facilities.

- Coordinating and technical support of field H&S technicians

- Designing and implementing H&S plans for remedial investigations, decontamination, and remediation projects.

- Coordinating with H&S regulatory agencies at local, state, and federal levels.

1985 - 1987 ***Environmental Health Engineer, USS Division, USX Corporation, Lorain, Ohio.*** Responsible for the implementation and direction of the Lorain Works Industrial Hygiene Program. Experience included:

- Recognizing and measuring occupational hazards, including organic vapors, asbestos, lead, silica, ionizing radiation, and noise

- Instructing training programs concerning asbestos, respiratory protection, hearing conservation, radiation survey equipment, gas testing equipment, and hazard communication

- Achieving compliance with Occupational Safety and Health Administration (OSHA) and U.S. Nuclear Regulatory Commission (NRC) regulations

- Participating in joint union-management safety committee meetings

- Functioning as site Radiation Safety Officer (RSO)

- Supervising gas rescue personnel

- Interacting with the plant safety function.

1984 - 1985 ***Industrial Hygienist, Mon Valley Works, USS Corporation, Dravosburg, Pennsylvania.*** Shared responsibility for the implementation and direction of the Industrial Hygiene Program at five facilities. Experience included:

- Evaluating collected survey data followed by written conclusions and recommendations

- Developing programs, including respiratory protection program for air purifying respirators and guidelines for the handling and removal of asbestos-bearing materials

- Evaluating employee exposure histories for occupational disease claim petitions.

1983 - 1984 ***Environmental Health Technician, Edgar Thomson Works of USS Corporation, Braddock, Pennsylvania.*** Responsible for industrial hygiene at the Edgar Thomson and Duquesne plants. Experience included:

- Participating in gas program, radiation committee, and safety program audit teams
- Collecting, evaluating, and managing Material Safety Data Sheets
- Recognizing and measuring occupational hazards.

1976 - 1983 ***Environmental Health Technician, Clairton Works, USS Corporation, Clairton, Pennsylvania.*** Conducted industrial hygiene surveys and provided written conclusions and recommendations.

Professional Affiliations

American Academy of Industrial Hygiene
American Industrial Hygiene Association (full member)

Publications

Houseman, W. C., 1982, "Development and Evaluation of Experimental Passive Dosimeters for the Collection of Formaldehyde," Master's Thesis, University of Pittsburgh, Pittsburgh, Pennsylvania.

Professional Qualifications

Mr. Coutts has 10 years of experience as a hydrogeologist and project manager in a number of professional positions. His experience has included management, design, and implementation of groundwater related programs at listed hazardous waste sites and hazardous waste treatment, storage and disposal (TSD) facilities.

Education

B.S., Geological Sciences, Ohio University; 1984
College of Business, Akron University; 1977 - 1979

Experience and Background

1992 - Present — ***Project Manager/Senior Hydrogeologist, IT Corporation, Rochester, New York.*** Responsibilities include providing technical oversight on all excavation projects for the Eastman Kodak Company Soils Management Program involving groundwater related issues, performing pre-excavation site characterization studies, generating and implementing soil sampling and analysis work plans, and classifying excavated material for subsequent disposition. Project Manager and technical oversight on three ongoing Superfund Remedial Investigation Feasibility Programs (RI/FS) located in the northeastern United States. Extensively involved in the development and review of numerous RI/FS and RCRA Facility Investigation (RI) workplans. Provided expert witness testimony representing a township located in upstate New York in opposition to a proposed limestone quarry expansion.

1988 - 1991 — ***Project Manager, Chemical Waste Management, Inc., Fremont, California.*** Regional Hydrogeologist/Project Manager for all geologic and groundwater related programs at seven CWMI owned and operated hazardous waste treatment storage and disposal (TSD) facilities located in the Western United States and Mexico. Management, design, and implementation of detailed site characterization studies, hydrogeologic investigations, corrective action programs, and site closures. Development, review and implementation of RCRA Facility Investigation (RFI) and CERCLA Remedial Investigation (RI) workplans. Management and design of groundwater and vadose zone characterization/monitoring programs, remedial action program design, large scale dewatering programs, and water resource evaluation and development. Technical support for Western Region, bid and proposal review, consultant/contractor selection and management, agency interaction and preparation of contractual agreements.

1985 - ***Project Hydrogeologist, O.H. Materials Corporation, Findlay, Ohio/Sacramento,***
1988 ***California.*** Extensively involved in hydrogeological investigations, site haracterization studies, and groundwater remediation programs at numerous superfund sites, manufacturing and industrial facilities, refineries, hazardous waste sites, and emergency response situations. Capabilities include site investigation and remedial action program design. Supervision of the design and installation of groundwater monitoring wells and product, groundwater and vapor phase recovery systems. Application of knowledge and techniques in aquifer pump and slug tests, borehole permeability testing, surface and borehole geophysical methods, groundwater modeling, soil sampling, surface and groundwater sampling, surveying, project management, proposal and report generation.

1984 - ***Well Site Geologist, Hywell Inc., Belpre, Ohio.*** Provided technical supervision for
1985 hydrocarbon exploration operations. Targeted formation tops and estimated thickness through correlation of existing stratigraphic and geophysical logs and triangulation of data. Responsibilities included maintaining a lithologic log, monitoring a gas chromatograph and recording fluorescence properties of drill returns to determine location and potential of pay zones.

1980 - ***Dual Offshore Drilling Company, Lafayette, Louisiana***

Professional Affiliations

Association of Groundwater Scientists and Engineers
California Groundwater Association

John F. Gauthier, P.E.

Professional Qualifications

Mr. Gauthier has 18 years of environmental engineering experience including investigation, design, and construction. He has managed regulatory consulting and auditing projects, ground water remediation projects, waste minimization studies, air monitoring programs and design projects. Mr. Gauthier has significant expertise in the application and interpretation of New York State Superfund regulations (Part 375), RCRA Hazardous Waste tank and UST regulations. Because of his achievements as a project manager, Mr. Gauthier was named an IT Senior Project Management Associate.

Education

Master of Science in Civil Engineering, Wayne State University, Detroit; 1981
Bachelor of Civil Engineering, University of Detroit, Detroit; 1976

Registrations/Certifications

Professional Engineer: New York, Michigan, Wisconsin, and Indiana

Experience and Background

1990-Present — Project Manager, IT Corporation, Rochester, New York. Manages a wide range of projects including environmental regulatory compliance, groundwater remediation, environmental site investigations, ambient air monitoring, hazardous waste management, investigation, design and construction. He has extensive experience negotiating with the NYSDEC and NYSDOH on the issues of NYS superfund site investigations, multimedia investigations, and ambient air. Managed Hazardous Waste Reduction Programs for major industrial facilities. Quality Assurance Manager for the Sarney Farms Superfund Site construction under the ARCs program. Responsible for technical review of numerous SPCC plans for facilities throughout New York State.

1987 - 1990 — Senior Project Engineer/Project Manager, The Sear-Brown Group, Inc. Was senior project engineer on environmental, site development and utility projects. Provided engineering support for permitting, project approvals, and environmental impact studies. Conducted and managed wide range computer modeling activities including hydrology, hydraulics, probabilistic modeling, and water supply.

1976 - 1987 — Project Manager/Senior Hydraulic Engineer, The Detroit District Corps of Engineers. Managed water resource design and regulation studies. Provided hydrologic and hydraulic design engineering for planning and flood control investigations. Project manager for water resources projects, responsible for the managed control of a system of reservoirs and the implementation of an associated

network of hydrometeorological data stations. Conducted hydraulic and hydrologic studies for planning and design level studies. Responsible for the development of Geographic Information System (GIS) data bases for two regional planning studies in southeastern Michigan. Managed the constructibility/biddability portion of the district's support for the EPA Construction Grants Program for the rehabilitation of sanitary sewer systems in Michigan. Was responsible for monitoring progress of several construction projects including a containment facility for contaminated sediments.

Professional Affiliations

American Society of Civil Engineers - Environmental Section
Society of American Military Engineers - Director, Buffalo Post

Professional Qualifications

Mr. Korb is an air quality professional in the Rochester, NY office. His technical expertise in air quality services includes air emissions inventories, compliance assessments, air toxics, air dispersion modeling, and statistical analysis of air quality data. Mr. Korb has managed several projects involving air permitting, a major air toxics study on formaldehyde, and an ambient air monitoring project under consent order.

Mr. Korb also coordinates and manages the health and safety program for the Rochester office. His responsibilities include providing technical assistance and support to project management and field teams in health and safety related matters, designing and performing industrial hygiene projects, and developing project-specific Health and Safety Plans.

Specific project experience within the past year includes:

- Completed numerous compliance permitting activities in New York.
- Designed and completed ambient air monitoring programs for several projects in New York State.
- Performed and managed an industrial ventilation efficiency study at a specialty metallurgical facility in New York.
- Managed a multi-million dollar ambient air monitoring project under consent order in the State of New York. Project activities included ambient air monitoring, on-site meteorological data collection, statistical analysis of data, two separate dispersion modeling tasks, reporting requirements, regulatory agency interface, and project management tasks.
- Conducted a preliminary air emissions inventory and compliance assessment at a chemical coatings facility in New York State.
- Completed several air emissions inventories for a paper and pulp facility, a specialty chemical plant, and a photographic facility. Project add-on work included developing air permits for the emission sources.
- Completed an air toxics study on formaldehyde, researching ambient formaldehyde concentrations from other studies across urban areas in the U.S., provided summary of the potential toxic effects of formaldehyde, and examined atmospheric chemistry of formaldehyde.
- Conducted several industrial hygiene surveys including ones in process decommissioning projects, sewer cleaning and inspection projects, and process

operations projects. These projects have included air monitoring for volatile organic chemicals, airborne vapors, dusts, and particulates.

Education

M.S., Environmental Science and Industrial Hygiene, University of Rochester,
Rochester, New York; 1991
B.S., Biological Sciences: Neuroscience, University of Rochester, Rochester,
New York; 1988

Training

40 hours Hazardous Waste Operations and Emergency Response
8 hours Hazardous Waste Supervisory course
8 hours Qualified Person course
12 hours Monitoring Instruments: Operation and Calibration
Red Cross First Aid/CPR Certificate

Experience and Background

1991-1990 *Project Manager, Environmental Services, IT Corporation, Rochester, NY.* Manages and participates in air quality service projects including, permitting, emission inventories, compliance assessments, dispersion modeling, risk assessments, air toxic studies, and ambient air monitoring activities. Manages Health and Safety Program and Quality Assurance Program for the Rochester office.

1991 *Project Engineer, Radian Corporation, Rochester, NY.* Served on project staff for ambient air monitoring project at large industrial facility in Upstate New York. Performed sample collection and management activities.

1988-1990 *Lab Manager, University of Rochester Medical Center, Department of Biophysics, Rochester, New York.* Designed experiments, conducted tests. and performed analyses in medical research laboratory. Operated, troubleshot complex instrumentation and electronics. Supervised, designed, and assisted in intern research projects.

1987-1988 *Environmental Analyst, RMI Titanium Co., Sodium Plant, Ashtabula, Ohio.* Performed analyses on groundwater, soil, and plant effluent samples. Utilized wet chemical analysis techniques, flame absorption spectrophotometry, infrared spectrophotometry, turbidity tests, BOD analyses, and other sampling in job. Compiled state and federal EPA reports and daily plant analysis results.

Professional Affiliations

Member, Western New York Chapter of American Industrial Hygiene Association
Member, American Industrial Hygiene Association
Associate Member, Air and Waste Management Association

Paul J. Micciche

Professional Qualifications

Mr. Micciche has six years of experience as a hydrogeologist and has managed and participated in projects involving database management, groundwater investigations, soil vapor investigations, and hydrogeologic mapping. He has managed and participated in investigations at photochemical, photocopier imaging, and United States government facilities.

Education

M.S., Geology, Western Michigan University, Kalamazoo, Michigan; (pending)
B.S., Geology, State University of New York, Brockport, New York; 1985
A.A.S., Liberal Arts, Monroe Community College, Rochester, New York; 1983

Experience and Background

1990 - Present *Senior Hydrogeologist, IT Corporation, Rochester, New York.* Responsibilities include project management, client interface, cost and schedule control, technical supervision, regulatory agency interface, and direction of project staff. Experience includes:

- Managed efforts of project personnel engaged in performing database management and reporting of soil analytical data generated during numerous investigations over a decade-long period at a major photochemical manufacturing facility. This task was performed in support of the manufacturer's Phase I RCRA Facility Investigation. The database was comprised of analytical results from soil samples from over 2,600 individual sampling locations. Mr. Micciche also wrote SWMU unit descriptions/histories for past investigations within SWMUs at the facility.

- Performed field oversight for U.S. EPA at a Superfund landfill. Responsible for ensuring that monitoring well installation, field permeability testing, leachate and groundwater sampling and subsurface soil/bedrock sampling were performed in conformance with U.S. EPA-approved plans and specifications.

- Designed monitoring well networks and supervised well installation and groundwater sampling and analysis for a Phase II investigation at an aerospace manufacturing facility.

- Supervised removal of lead contaminated sewer piping and underground storage tanks at an aerospace manufacturing facility.

- Supervised sampling of soils and on-site Energy Dispersive X-ray Fluorescent (EDXRF) analysis of lead concentrations in site soils.

- Conducted an environmental site assessment which included an evaluation of potential impacts of past or present use of oil and hazardous materials on site to soil, surface water, or groundwater.

- Provided project management supervision for the generation of a Remedial Investigation/Feasibility Study (RI/FS) Work Plan, prepared in compliance with Order on Consent terms, at a listed inactive hazardous waste disposal site.

- Providing project management supervision of a soil vapor investigation, performed in compliance with Order on Consent terms, at a listed inactive hazardous disposal waste site.

- Participating in several negotiations with regulatory agencies related to investigation work plans for a major photochemical manufacturing facility.

1988 - 1990 *Assistant Hydrogeologist, H&A of New York.* Participated in a groundwater contamination investigation at a major photochemical manufacturing facility where responsibilities included oversight of soil sampling, rock core sampling and monitoring well installation. Additional on-site tasks included performance of rising head permeability tests using pressure transducers and a data logger/computer. Provided additional support of investigation through performance of permeability test data interpretation and generation of hydrogeologic cross section diagrams.

Assisted in the performance of a soil vapor investigation at a major photochemical manufacturing facility. The survey involved sampling soil vapor at over 200 locations at the facility and analyzing soil vapor samples with a portable gas chromatograph.

Additional responsibilities included, groundwater flow and solute transport modeling, groundwater sampling and performance of numerous environmental site assessments in combination with soil vapor investigations throughout the United States.

Also, designed and implemented soil vapor surveys, providing support for groundwater development and groundwater contamination investigations, and environmental studies.

1985 - 1988 ***Research and Teaching Assistant, Department of Geology, Western Michigan University, Kalamazoo, Michigan.*** Responsibilities included hydrogeologic characterization of groundwater recharge/discharge areas in the glaciated terrain of southwestern Michigan, installation and development of groundwater monitoring wells utilizing an ATV-mounted drill rig, and split-spoon sampling of glacial deposits.

Obtained graduate college research funding for thesis on the effects of meteorologic variations on concentrations of volatile organic compounds in soil vapor present above gasoline-contaminated groundwater. Soil vapor was collected at discrete time intervals and then analyzed at the gas chromatography laboratory to allow for a statistical assessment of possible correlation between atmospheric pressure fluctuations and changes in concentrations of volatile organic compounds present in soil vapor.

Professional Affiliations

Air and Waste Management Association
Buffalo Association of Professional Geologists
National Groundwater Association
Association of Groundwater Scientists and Engineers

Lynne A. Monaco

Professional Qualifications

Ms. Monaco is a specialist in environmental law with 19 years of experience gained through her employment at various law firms as well as the New York State Attorney General's Office. She also served as lead investigator for the DOE's Research and Development Administration where she was responsible for conducting a study on the impacts of energy facility siting in the state of Colorado. She has joined IT as a senior staff consultant in the areas of environmental law and regulatory issues. In this role, Ms. Monaco provides consultation to IT's business unit managers and section managers relating to regulatory issues encountered on our many projects. Her background has included representing clients in negotiations and proceedings before the EPA and numerous state and local agencies, counseling clients on regulatory compliance matters, and representing clients in numerous federal and state Superfund actions.

Ms. Monaco has a diverse regulatory background that has involved direct negotiations with the EPA and other regulatory agencies on behalf of clients. She has also defended and counseled clients in matters arising under various federal, state, and local environmental regulations including CERCLA, RCRA, Clean Air Act (CAA), and Federal Water Pollution Control Act.

She has extensive experience in EPA Region II through her work on behalf of the state of New York in the Love Canal hazardous waste matter. She also provided environmental counsel to Eastman Kodak relating to RCRA compliance and corrective action and to Rochester Gas and Electric at their Lower Falls sites.

Education

J.D., State University of New York Law School, Buffalo, New York; 1982
M.S., City Planning, Massachusetts Institute of Technology; 1977
B.A., History, Canisius College, Buffalo, New York; 1975

Experience and Background

1994 - Present — ***Senior Environmental Consultant, Rochester, New York.*** Provides technical oversight and support relating to regulatory matters encountered on IT's environmental projects. Directs regulatory activities in coordination with managers and staff and provides training and development to younger staff members.

Projects include acting as environmental counsel for Jefferson Smurfit Corporation and conducting CAA permitting work for Dexter Corporation and General Marble Corporation.

1987 - 1994 ***Associate and Partner, Nixon, Hargrave, Devans, and Doyle, Rochester, New York.*** Member of the firm and its environmental practice group. Coordinator of the air pollution regulatory practice team. Member of the technical team task force. Practice involved all aspects of environmental law, with significant regulatory experience in air pollution, hazardous waste (Superfund and RCRA compliance), asbestos, and polychlorinated biphenyl (PCB) matters.

Represented clients in negotiations and proceedings before the U.S. Environmental Protection Agency (EPA) and numerous state and local agencies, relating to enforcement, permitting, consent decrees, rulemaking, regulatory challenges, and agency information requests. Counseled clients on regulatory compliance matters, and assisted industries in developing compliance strategies and plans through in-house training programs, development of compliance manuals, and environmental auditing. Extensive involvement in transactional work performing liability assessments on behalf of sellers, buyers, and lenders to identify and quantify environmental risks.

Examples of projects include development of an air pollution compliance manual and in-house training for a major manufacturing facility; assisted numerous Fortune 500 clients in developing strategies for compliance with Clean Air Act requirements; represented client in major multimillion dollar air pollution litigation alleging consent decree violations related to stack testing and capture efficiency determinations; developed comments for clients on proposed air pollution regulations; represented major utility industry and major manufacturing industry in multimedia inspections and enforcement actions, including participation in settlement negotiations with EPA, NEIC, and state/commonwealth regulatory agencies; provided substantive regulatory counseling to a software company in developing computerized auditing modules; negotiated a voluntary cleanup with EPA resulting in a "No Further Action" CERCLIS designation for a potential Superfund site; and represented clients in numerous federal and state Superfund actions.

Worked extensively with clients in the chemical, coating, imaging, banking, pulp and paper, electronics, metal molding and finishing, food processing, graphic arts, utility, and other industries on a wide variety of regulatory issues.

Speaker at numerous conferences and seminars on the CAA Amendments and other environmental topics. Published articles on environmental issues.

1982 - 1987 ***Associate, Environmental Law Practice Group, Sanders and Dempsey, Cleveland, Ohio.*** Environmental regulatory experience included defending and counseling clients in matters arising under the Comprehensive Environmental Response,

Compensation, and Liability Act (CERCLA), RCRA, CAA, Federal Water Pollution Control Act, and various state and local environmental laws, ordinances, and regulations. Participated in negotiations on permit matters, consent decrees, notices of violation, variances, penalty provisions, and agency information requests. Also participated in regulatory challenges in judicial and administrative proceedings. Selected as lead environmental counsel representing industry in Jacksonville, Florida, in the drafting of a comprehensive municipal environmental control ordinance that included provisions on air, water, noise, odor, and hazardous substances.

1980 - 1980 ***Law Clerk, Environmental Defense Section, New York State Attorney General's Office, Buffalo, New York.*** Worked on behalf of the state of New York in the Love Canal hazardous waste matter.

1977 - 1979 ***Public Policy Consultant, Cogswell, Chilson, Dominick, and Whitelaw, Denver, Colorado.*** Advised municipal and corporate clients on the development of internal environmental policies, practices, and procedures. Assisted attorneys on various environmental matters.

1976 - 1977 ***Lead Investigator, State of Colorado Facility Siting Study, DOE, Research and Development Administration, Cambridge, Massachusetts.*** Was responsible for conducting a study on the impacts of energy facility siting in the state of Colorado (coal, oil, shale, etc.). Work included on-site investigations, consultation with government officials and industry representatives, research, and the preparation of a report that was published by the M.I.T. laboratory of architecture and planning, and distributed to officials in numerous states by ERDA.

1975 - 1976 ***Consultant, Land Use and Coastal Zone Management, Governor's Office, State of Rhode Island, Providence, Rhode Island.*** Advised the governor of the state of Rhode Island on policy options related to land use and coastal zone management issues. Assisted in the drafting of comprehensive land use and growth management legislation that was ultimately adopted by the state.

Professional Affiliations

Air and Waste Management Association
American Bar Association, Natural Resources and Litigation Sections
New York State Bar Association, Natural Resources Section
M.I.T. Alumni Association

Professional Qualifications

Mr. Noonan is a Civil Engineer experienced in air dispersion modeling, air permitting, sewer investigation, landfill design as well as various site investigations. He is currently working on a facility wide air dispersion modeling project which includes an emissions inventory, preliminary screening procedure, downwash and cavity analysis and execution of several models.

Education

B.S., Civil Engineering, Villanova University, Villanova, Pennsylvania; 1992
BEE Training Center, PERMITS, (air dispersion modeling course)

Registration/Certification

Engineer-in-Training: New York
40 hours Hazardous Waste Operations and Emergency Response per 29 CFR 1910.120
8 hours Hazardous Waste Supervisory course per 29 CFR 1910.120

Experience and Background

1992 - Present *Project Engineer, IT Corporation, Rochester, New York.* Participates in a variety of multi-disciplinary projects. Experience includes:

- Developed an air emissions database for an industrial facility with 103 emission points. Database provided air dispersion modeling input data by linking compound characteristics with stack parameters and performed a screening procedure which included a cavity impact analysis based on Air Guide-1 procedures.

- Conducted a preliminary air emission inventory and compliance assessment at a chemical coating facility. Project included a comprehensive inventory of emission points, review of existing permits and interviews of plant personnel to obtain current process information. The compliance assessment incorporated both Federal and State air regulations.

- Performed air dispersion modeling for an industrial site with over 100 emission sources including 75 methanol sources and 35 formaldehyde sources. Many downwash scenarios were evaluated to determine worst case maximum concentration. Cavity analyses were performed according to Air Guide-1 procedures. Results were reported as part of an order on consent signed by State of New York.

- Analyzed a database of soil analytical data generated during numerous investigations over a decade-long period at a major photochemical facility. The database was comprised of 2,646 soil samples with over 150,000 analytical results. The data was managed to provide summary tables as part of a Phase I RCRA Facility Investigation.

- Collected and analyzed critical information pertaining to a complex industrial sewer system for the purpose of prioritizing individual pipe segments according to a hierarchy for future inspection efforts. This prioritization hierarchy was dependent upon materials of construction, pipe diameter, geographic location, groundwater elevations, structure elevation and toxicity of discharges. This effort required constructing a computer database and entering 3100 individual records. The data generated by this project required the use of a geographical information system (GIS) and database software to assess and prepare reports presented to the EPA.

- Quality Assurance/Quality Control (QA/QC) officer for the capping of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) landfill site. Supervised activities specific to the construction of the final cover system that were required to demonstrate that the design had been implemented and performance requirements were met.

- Performed infiltration/exfiltration studies to determine the fate and transport of releases from industrial sewer system under various hydraulic load conditions.

- Participated in various field sampling programs including surface soil, soil vapor and groundwater sampling as well as air monitoring for an industrial facility decommissioning.

- Performed the stack testing of an aluminum separator for efficiency of removal utilizing EPA reference methods.

- Developing work plans for a Hazardous Waste Reduction Plan.

- Trained CAD Operator.

1991 ***Surveyor, Waste Management, Inc., Morrisville, Pennsylvania.*** Worked as a rod/instrument man on a crew of three responsible for layout of the cells, liner system, sump area, and force main for the G.R.O.W.S. and Tullytown landfills.

1990 ***Chamber Associates, Center Square, Pennsylvania.*** Performed quality assurance review on sewer and storm water system designs as well as reviewed surveyor's data.

1989 ***Product Control Tester, Eastman Kodak Company, Rochester, New York.*** Performed quality control tests on manufactured paper which included percent chemical concentration, density, wet and dry tensile tests, and porosity. All data was entered into a database.

Professional Affiliations

Associate Member, American Society of Civil Engineers
Chi Epsilon - National Society of Civil Engineers
Associate Member, Air and Waste Management Association