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Work Plan

Building 360 Closure
Seneca Army Depot
Romulus, New York

Contract No. DACW45-94-D-0054
Delivery Order No. 02

Prepared for:
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Omaha District
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RESPONSIVE TO THE NEEDS OF ENVIRONMENTAL MANAGEMENT

FINAL
WORK PLAN
SENECA ARMY DEPOT
ROMULUS, NEW YORK

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DECEMBER 1994

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1.0 INTRODUCTION

This 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. DACW45-94-D-0054, Delivery Order No. 2, based upon the USACE's Scope of Service dated September 14, 1994. This Work Plan has been prepared under this delivery order.

The WP addresses the closing of the Steam Jenny Pit located at Building 360 within the Seneca Army Depot. An investigation of the B.360 Steam Jenny area will be performed under this scope of work. Soil, groundwater, and concrete samples will be collected to assess potential contamination resulting from past operations and practices. Preliminary closure activities will also be conducted.

The primary project field activities are as follows:

- Waste removal, transportation and disposal
- Metal grating removal/decontamination
- Concrete sawing/removal/media sampling (concrete, soil, and groundwater)
- Closure sampling
- Surveying and Drilling
- Groundwater monitoring well installation
- Post-Closure sampling (well sampling)

Systematic sampling, testing and quality control procedures will be implemented to assure proper decontamination and possible abandonment of the system. 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. All work performed under this delivery order will follow the scope of services outlined in this Work Plan and Addenda.

The Seneca Army Depot Activity (SEDA) B360 Closure Plan is included in Appendix E. In the event that discrepancies between the procedures in the SEDA B360 Closure Plan and this Work Plan are encountered during project activities, requirements outlined in the SEDA B360 Closure Plan will have precedence.

1.1 Objectives

The objective of closing the Steam Jenny Pit at Building 360 at the Seneca Army Depot is that the existing hazardous collection pit does not conform to current hazardous waste tank regulations and because it was indeterminate, based on inspections, to ensure that the pit did not leak. The objective is also to identify the extent of possible contamination and to use this information as a guide to decontaminate or remove hazardous substances in the future. Systematic sampling, testing and quality control procedures will be implemented to assure proper decontamination and possible abandonment of the system. This objective does not include the remediation of contaminated ground water. If necessary, this will be done in the future as part of remedial work accomplished through either Seneca's Interagency Agreement (IAG) with the New York State Department of Environmental Conservation (NYSDEC) and the Environmental Protection Agency (EPA), or a post-closure permit to be issued by NYSDEC.

1.2 Site History and Location

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. Building 360 at the Seneca Army Depot is a building where old equipment is refurbished and reconstructed. Lathes, presses, metal working machines are degreased with steam, high pressure water, and detergents in the cleaning area. Heavy metals, PCB's and greases are possible substances generated from cleaning activities. After steam cleaning the equipment is moved to other portions of Building 360 for rehabilitation.

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. Figure 1 shows the location of Building 360.

1.3 Project Overview

Implementation of the project tasks will include systematic sampling, testing and quality control procedures to assure proper decontamination and possible abandonment of the system.

The primary project field activities are as follows:

- Waste removal, transportation and disposal
- Metal grating removal/decontamination
- Concrete sawing/removal and sampling (concrete, soil, and groundwater)
- Closure sampling (soil and groundwater)
- Surveying and drilling
- Groundwater monitoring well installation
- Post-Closure sampling (well and sump sampling)

1.3.1 Waste Removal

The existing volume of liquid waste/sludge will be removed from the pit area by means of a vacuum truck and then transported to a facility which is approved to accept waste generated from CERCLA response actions.

1.3.2 Sampling

The existing metal grating will be removed by means of non-sparking (intrinsically safe) tools. Additionally, appropriate measures will be taken to assure adequate ventilation inside of Building 360 during the removal of the grating. Refer to Appendices A (SSHP) for additional details of measures to be taken during the removal of the grating.
After the grating has been removed, concrete chip, soil and groundwater samples will be taken at three locations (see Figure 1, locations C-1, C-2 and C-3). The concrete will be saw-cut and jackhammered at each sample location.

One undisturbed soil sample from the soil/gravel strata below the concrete will be taken with an auger and thin wall tube sampler at each sample location and sent to the laboratory for analysis. The auger will then be used to advance the boring to a depth two feet below the

groundwater surface. One sample of groundwater will be taken, with a weighted bottle, from each sample location and sent to an off-site laboratory for analysis. The sample locations will be backfilled with new crushed gravel and non-shrink grout.

In the event the soil surrounding Building 360 is determined to reveal extensive contamination, additional soil sampling and testing will be required. Additional samples will be taken on the "C" grid line, every sixteen feet from the end of the building to a distance of 48 feet.

1.3.3 Monitoring Well Installation and Groundwater Sampling

Two monitoring wells will be installed in the vicinity of Building 360. One monitoring well will be placed upgradient of Building 360 and one monitoring well will be placed downgradient of Building 360. An existing sump pump adjacent to the cleaning area in Building 360 will also be used as a monitoring well location.

1.3.4 Laboratory Analyses of Samples

Concrete chip, soil and water samples will be analyzed using EPA SW-846 methods for testing criteria of the steam jenny closure. Specific New York State Department of Environmental Conservation (NYSDEC) criteria will be used to determine acceptability of the containment action levels.

1.4 Plan Preparation

The following plans have been developed in accordance with the USACE Scope of Services dated September 14, 1994, and discussions with Seneca Army Depot, USACE-Omaha, and subcontractor personnel.

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

- Appendix A Site Safety and Health Plan (SSHP)
- Appendix B Chemical Sampling and Analysis Plan (CSAP)
- Appendix C Resumes of Key Personnel

- Appendix D Quality Assurance Project Plan (QAPP)

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

In addition, Appendix E contains the Seneca Army Depot Activity (SEDA) B360 Closure Plan, as submitted to New York State. The SEDA Closure Plan and the procedures outlined in it will supersede this Work Plan.

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 mobilized from the IT office in Rochester, New York. Trade labor will be borrowed from the ongoing project at the Ash Landfill. The IT office in Rochester, New York will provide air monitoring, QA/QC, sampling, health and safety, schedule control and technical management personnel. The Building 360 site is approximately 60 miles from Rochester, New York.

The time allotted for mobilization/demobilization of the crew is one hour from Rochester, New York (automobile transportation).

Crew vehicles will be mobilized from the Rochester, New York IT office to provide support facilities for all on-site activities.

The schedule for the arrival of all crew vehicles will be coordinated with both the USACE on-site and the Depot's designated representative.

2.2 Decon Facilities

The drilling subcontractor will erect a temporary decontamination area adjacent to the work area in the vicinity of Building 360.

2.3 Site Preparation

While project activities are ongoing in Building 360 an exclusion zone will be designated surrounding the building by installing a four (4) foot high orange construction fence a minimum distance of 20 feet outside the building. Similarly, during performance of monitoring well installation an exclusion zone shall be delineated by installing a similar fence a minimum distance of 20 feet outside the immediate vicinity of the drilling rig. The fence will be supported by stakes driven into the ground and spaced at ten foot intervals along the fence. The only entrance/exit to the exclusion zone shall be at the Decon Area where all exiting equipment and personnel shall be subject to decontamination measures as specified in the Site Safety and Health Plan (Appendix A).

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 will also contact the local municipal utility hotlines. Any taps, hook-ups and splices into utility lines shall also be coordinated with both the Depot's designated contact and local utilities and work will be done by the Army Depot and/or a local registered electrician.

2.5 Mobilization of Equipment

An inventory of the equipment to be used during decontamination and sampling procedures may include, but not be limited to, the following:

- Personnel protective equipment;
- Augers, thin-wall tube samplers;
- Weighted bottles;
- Detergents;
- Muriatic acid (if necessary);
- Brooms, buckets, brushes, scrapers;
- Hose and nozzles;
- Wrenches for removal of grating;
- Clean plastic sealable bags for placing concrete and soil samples;

- Labels;
- Wet-vacuum, HEPA vacuum;
- Six mil plastic over sandbags sealed with duct tape for contaminant dike at doorway openings;
- Backhoe (for removal of extensive contamination if necessary);
- 55 gallon DOT-approved drums for disposal of equipment, concrete, and soils;
- Jackhammer; and,
- Concrete saws.

2.6 Mobilization of Drilling Subcontractor

One (1) subcontractor, the drilling subcontractor, will be required to support IT in this project. The subcontractor will mobilize the following material and equipment:

- CME 75 Drilling rig or equivalent
- misc. drilling equipment

The drilling subcontractor shall mobilize one driller and one driller's helper required to perform normal and customary tasks associated with this activity.

2.7 Site Teardown

At the conclusion of the project 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 solely associated with the Building 360 project 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; and any temporary fencing will be removed.

3.0 FIELD SAMPLING

Samples will be required in order to show that decontamination of the steam jenny pit has been properly executed and also to determine the possible extent of contamination in groundwater. Additional details on field sampling activities are included in Appendix C, Sampling Work Plan and Resumes of Key Personnel.

In order to obtain concrete and soil samples, the existing metal grating will be removed with wrenches or other non-sparking tools. The grating will then be scrubbed with detergent and water and stored for reuse. The rinsate will be wet vacuumed, placed in 55-gallon DOT-approved drums and transported to Building 307. IT will coordinate the transportation and disposal of only the drummed rinsate and the liquid hazardous material removed from the Steam Jenny Pit. Non-liquid hazardous waste (PPE, concrete, etc.) will be drummed and transported to Building 307 for disposition by SEDA. Samples will be taken at three locations along the center of the trench (see Figure 1). The concrete flooring of the accumulation pit will be saw-cut and jackhammered for the thickness of the concrete.

Sampling activities will generally follow the following protocols:

- Three samples will be taken on the centerline of the center trench. The samples will be taken 8 ft. apart. Samples will be taken at location C-1, C-2 and C-3 (See Figure 1).

- The concrete will be saw-cut and jackhammered at each sample location. Concrete chip samples from the upper layer, middle layer and lower layer will be placed in a "ziploc" bag, labeled and sent to the laboratory for analysis. One undisturbed sample from the soil/gravel strata below the concrete will be taken at each sample location using a truck-mounted hollow stem auger drill rig equipped with a auger and thin wall tube sampler.

- Advance the auger bit and periodically remove accumulated soils, to a depth of 12 inches below the bottom of the concrete.

- Remove the auger carefully to ensure that soil does not fall back into auger hole.

- Remove the auger tip from the drill rod and replace with a decontaminated thin wall tube sampler.

- Install the proper cutting tip and carefully lower sampler into borehole.

- Gradually force sampler into soil. (Care should be taken to avoid scraping borehole sides. Hammering the drill rods to facilitate coring should be avoided as the vibrations may cause the boring walls to collapse.)

- Remove corer and unscrew drill rods.

- Remove cutting tip and remove core from device.
- Discard top of core (approximately 1 inch), which represents any material collected by the corer before penetration of the layer in question.
- Place remaining core into sample container.

The auger shall then be used to remove soil/gravel to a depth of two feet below the groundwater surface. The groundwater shall be pumped out to preclude the possibility of contamination from upper soil layers and allowed to settle for 24 hours prior to sampling. It is anticipated that groundwater will be encountered within a depth of 4 feet below the accumulation pit. One sample of groundwater will be taken, with a weighted bottle, from each sample location and sent to a laboratory for analysis. When sampling is complete the sample locations will be backfilled with new crushed gravel and non-shrink cement grout.

An IT sample coordinator will be present during all active sample processing times. The coordinator will obtain, properly package and ship all samples off-site to a USACE approved laboratory, and track laboratory handling and reporting times in accordance with the requirements of the CSAP. Refer to the CSAP (Appendix B) for specific media sampling, handling, reporting and data requirements.

4.0 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

Two monitoring wells will be installed in the vicinity of Building 360. One monitoring well will be placed hydraulically upgradient of Building 360 and one monitoring well will be placed downgradient of Building 360.

The hydrogeologist will visually inspect the soil in each split-barrel sampler during the augering of the boreholes for the monitoring wells for the following primary purposes:

1) to characterize geologic and hydrogeologic conditions upgradient and downgradient from Building 360; and,

2) to assess the possible presence and the nature and extent of VOCs in soil in order to characterize potential groundwater contamination.

4.1 Regulatory Requirements

All borings associated with well installation will be drilled in accordance with all federal, state, and local requirements as determined by IT. The Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document (Office of Solid Waste and Emergency Response [OSWER] 9950.1, September 1986) will be used as guidance for construction of the proposed monitoring wells. If the specifications as set forth in this Work Plan do not meet state or local requirements, the USACE Technical Manager (USACE-TM) will be contacted for resolution of differences.

4.2 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 well location 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.

4.3 Boring and Well Installation

Each boring will be emplaced either to a maximum depth of 15 feet or to auger refusal if less than 15 feet. The monitoring wells will be constructed of 4-inch O.D. polyvinyl chloride (PVC). Stainless steel screens will be slotted with a slot size of 0.02 inches.

Specific details of monitoring well installation are as follows:

- Hollow-stem augers will be used to auger into soil to a depth of either a maximum of 15 feet below grade or to auger refusal, at both well locations. Auger diameters will have a minimum inside diameter (ID) of 6.0 inches. Subsurface soil samples

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) to detect the presence of volatile organic compounds (VOCs).

- The end of the monitoring well screen will be capped with a threaded end cap or plug. The monitoring well screen and riser will be inserted into the borehole through the hollow-stem augers. All joints will be hand tightened. The well screen will be lowered to the base of the borehole and the screen length will be sufficient to encompass the height of the water column within the well. When the monitoring well screen has been lowered to the correct depth, sufficient monitoring well riser will remain in the monitoring well string to provide a 2-1/2-foot "stick-up" above ground surface.

- A removable cap will be placed over the top of the monitoring well riser prior to filling the annular space around the monitoring well. This will prevent foreign materials from entering the monitoring well during monitoring well construction activities.

- A filter pack will be installed within the annular space around the monitoring well screen to form the monitoring well sensing zone. The filter pack will consist of clean and washed bagged silica sand, graded accordingly for the monitoring well screen slot size. If necessary, the filter pack will be installed by maintaining a head of water in the boring, using the downward flow of water to prevent bridging. Only potable water will be used. If water is added during monitoring well installation, the volume of water used for the construction of each monitoring well will be documented and the appropriate volume of water will be removed during monitoring well development.

- One to 2 feet of the sand filter pack will be placed in the annular space at a time and the augers will be retracted a corresponding distance to expose the sand pack to the formation before placing the next 1 to 2 feet of sand. The sand filter pack will extend approximately 2 feet above the top of the monitoring well screen.

- At a minimum, 2-foot of bentonite pellets will be installed above the sand filter pack. The bentonite pellets will be carefully placed in the borehole to prevent bridging within the augers.

- The annular space around the riser will be tremie grouted from the bentonite seal to within 1 foot from the borehole surface with a cement/bentonite grout.

- All depths to, and thickness of, materials will be recorded. A weighted measuring tape, tremie pipe, or drill rods of known and accurate length will be used to determine the appropriate depth measurements.

- A locking steel protective casing will be cemented 2 feet into the borehole with the top of the protective casing positioned 1 to 3 inches above the top of the monitoring well riser. In specified areas, a water-tight, flush-mounted protective casing may be installed.

- From below the frost line, the annular space will be filled with concrete blending into a 4-inch thick apron extending 3 feet from the outer edge of the borehole. The concrete will be sloping away from the protective casing.

- Monitoring wells will be surveyed for horizontal and vertical coordinates by a licensed surveyor.

4.3.1 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.

4.3.2 Split-Barrel 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 a field assessment (using the PID) 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.

4.3.2.1 Soil Sampling

Sampling will be performed using a split-spoon sampler, using the techniques given in ASTM D 1586-86. 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 15 feet below grade).

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 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. 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 hydrogeologist, 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 a 55-gallon drum staged by the well location.

4.4 Well Development

Upon completion of new monitoring well installations each monitoring well will be developed to remove fines from the well to provide as particulate-free discharge as possible and to restore the natural hydraulic conductivity of the formation. Well development will occur at least 24 hours after the construction of each monitoring well. Wells will be developed through a combination of pumping, gentle surging, or bailing. In this manner, flow reversals within the well may be created, thereby eliminating the possibility of bridging of particles against the well screen. Each well will be developed until turbidity measurements are at or below 50 Nephelometric Turbidity Units (NTU); three consecutive measurements of pH, temperature, and conductivity are the same; or until a minimum of three well columns of water have been removed. After each well is developed, the pH, temperature, turbidity, and specific conductivity of the well water will be measured and recorded to evaluate the initial performance of the well. Water generated during development will be drummed, analyzed, and disposed of appropriately.

The following set-up will be followed when preparing to develop a monitoring well:

- Obtain and begin to complete a Field Activity Daily Log (FADL), Daily Job Log, or logbook
- Check equipment and record the results in the Field Activity Daily Log
- Obtain a sufficient number of the appropriate data collection forms (i.e., Well Development Logs, Water Sampling Logs, etc.)
- Record the most recent calibration date for the water level measuring device in the logbook.

4.4.1 Equipment Preparation

- Decontaminate all pumping equipment before developing each well as defined in Section 5.7 and, if dedicated bailers are not meant to be reused at each well location, use clean disposable bailers.
- Locate and set up the appropriate decontamination area. Check decontamination zone and barricades to public access.

- Assemble containers for the temporary storage of water produced during well development. The containers must be structurally sound, compatible with anticipated contaminants, and field manageable.

4.4.2 Field Procedures

Development of the wells will be performed when parameters such as pH, temperature, etc. have stabilized and no sooner than 24 hours after grouting is completed. No dispersing agents, acids, or disinfectants will be used to enhance the development of the well. Water will not be added to aid development except under the special conditions defined below. If problems or unusual conditions are encountered, the site manager will be notified as soon as possible. Development procedures are as follows:

- Assemble the required equipment on a plastic sheet outside of the splash range.
- Record pertinent information in the Daily Job Log or logbook and on the Well Development Logs or Well Completion form.
- Open the monitoring well and take the air monitoring reading at the top of the casing and in the breathing zone of the well developer.
- Measure depth-to-water and the total depth of the monitoring well.
- Develop the well until the well is free of sediment and/or the appropriate volumes of water have been removed. Sediment-free is loosely defined as 0.01 mL of sediment in a 1000-mL Imhoff cone. If the well is not free of sediment after the appropriate volumes of water have been removed, continue until twice the appropriate volume of water has been removed.
- Document the initial color, clarity, and odor of the water.
- Measure and record the initial pH, temperature, turbidity, and specific conductance of the water
- Containerize all water produced by development. Clearly label each container with the location identification. The determination of the appropriate disposal method will be based on the analytical results from each well.
- For those wells where the boring was made without the use of drilling fluid (mud or water), remove three times the standing water volume in the well (well

screen and casing plus saturated annulus). Should recharge be so slow that three volumes could not be removed in 1 day or the water is not sediment free after this three volume removal, the hydrogeologist will select an appropriate alternative procedure for verifying that the well is properly developed.

- Do not add water to the well to assist development without prior approval by the hydrogeologist. If a well cannot be cleared of mud because the aquifer yields insufficient water, a small amount of potable water may be used to clean up this poorly yielding well. This may be accomplished by pouring water in the well. When most of the fines are out, continue development with formation water only. It is essential that at least five times the amount of water injected must be produced back from the well in order to assure that all injected water is removed from the formation.

- For those wells where the boring was made or enlarged with the use of drilling fluid (mud or water), remove five times the measured amount of total fluids lost while drilling plus five times the standing water volumes as defined above. Use the same procedure (of adding more water) for cases of slow recharge, discolored water, or water that is not sediment free.

- Document the final color, clarity, and odor of the water.

- Measure and record the final pH, temperature, turbidity, and specific conductance of the water.

- Complete the appropriate data entry requirements on the Well Completion form or Well Development Logs.

4.5 Water-Level Measurement

Water levels will be measured in all wells before and after development, before and after sampling, and before and after slug and pump testing. Wells will be allowed to equilibrate for at least 24 hours prior to sampling, and to stabilize the static water level before pump testing. Water levels will be measured to the nearest 0.01 foot using an electric well sounder relative to the top of the well riser. All water levels will be referenced to NGVD.

4.6 Collection of Groundwater Samples

Groundwater samples will be obtained from the newly installed monitoring wells. Prior to sampling, all wells will be purged using a teflon bailer until pH, conductivity, and temperature stabilize within 10 percent between any two well volumes. In addition, a minimum of three times the initial volume of water within the well will be evacuated prior to sampling. The purged water will be collected in 55-gallon drums, tested, and transported to Building 370 which serves as the Seneca Army Depot's 90-day hazardous waste storage area.

If the well becomes devoid of recoverable quantities of water before three well volumes have been removed, an interval of up to 24 hours will be allowed to elapse for the well to recharge before testing for pH stabilization. In either case, the pH of formation water will be measured until three consecutive readings have demonstrated that the pH of the discharge water has stabilized.

Field sampling parameters (temperature, pH, and conductivity) will be measured prior to well sampling. The prime contractor will determine which type of field parameter measurement equipment will be utilized.

4.6.1 Field Preparation

The following procedures will be followed when purging new or existing monitoring wells. Field preparation requires organizing sample bottles, sample labels, and documentation in an orderly, systematic manner that promotes consistency and traceability of all data. Appropriate items should be completed before purging begins.

- Record all pertinent information (i.e., date, site, identification number, and location) in the Daily Job Log. Note field conditions, unusual circumstances, and weather conditions.

- Complete initial information required on sample collection forms and Analysis Request and Chain of Custody forms.

- Locate the monitoring wells to be sampled and the appropriate decontamination area. Locate the staging area and areas for managing purged water and expendable sampling materials.

Prior to purging a well, the required volume of water to be purged will be calculated using the following procedure:

- Measure the water level in the well and determine the total well depth and height of the water column from the well construction diagram.
- Record all calculations and field measurements.
- Calculate the amount of water in the well (casing and/or bore volume) with the formula shown below.

$$\frac{\pi \times (d^2) \times (h_1 - h_2 \times 7.48)}{4} = \textit{gallons per bore volume}$$

where:

π	=3.1416
d	=Inner diameter of well bore (feet)
h_1	=Depth of well from top of well casing (feet)
h_2	=Depth to water from top of casing (determined in field) (feet)
bore volume	=Volume of water equivalent to the standing water in a well.

4.6.2 Purging With a Bailer

Water is removed from the bore by a bottom-filling bailing vessel of known volume. The vessel fills with water and the bailer unit is retrieved with a line or rope.

For purging with a bailer, proceed as described below:

- Using clean equipment, determine the total depth of the well and water level with an electric sounder. Calculate the fluid volume in the casing, using volume or the bore volume, as required.

- Lower the bailer into the well and begin water removal. Collect or dispose of purged water in containers of the type specified.

- Monitor the air above the wellhead to determine the potential for explosion, fire, and any toxic effect on workers.

- Record the amount of water purged from the well.

- Purge a minimum of three casing or borehole volumes and continue purging until the discharge parameters (pH, temperature, and specific conductance) stabilize.

- After bailing, monitor the water level recovery. The recovery rate may be useful in determining the sample rate.

- Decontaminate or dispose of the bailer.

4.7 Groundwater Sampling

The following procedures will be followed when sampling the monitoring wells:

- Each well location will be identified. Well locations and well numbers will be recorded on a Sample Collection Log or similar document.

- Polyethylene sheeting will be placed around the well casing to guard against possible contamination of the ground surface surrounding the well.

- The field personnel will don latex inner gloves and nitrile outer gloves.

- The wellhead cover lock will be removed and the cap will be removed. Readings of VOC levels in both the well casing and the surrounding ambient air will be obtained. These readings will be recorded in the Field Activity Daily Log.

- Depth to water measurements will be obtained with a electronic water level indicator or similar device. The indicator will be decontaminated after each use with an alconox detergent/deionized water solution wash and then rinsed with deionized water.

- Prior to any sampling or purging, the volume of water in each well will be calculated by measuring the vertical extent of water in the well casing. The calculated volume of water present in each well will be recorded in the Well Development Log. Observations (odors and/or discoloration, visual observations on turbidity, etc.) of water quality will also be recorded in the log.

- Well purging and sampling will be accomplished by the use of new teflon® disposable bailers. One bailer will be dedicated to each well for the duration of the project. New polypropylene rope will be used to lower the bailer into each well. Each well will be purged, until three well volumes have been removed or the well ceases to produce water prior to sampling. During the purging process, samples of the purge water (a minimum of three separate samples from each well) will be field screened for pH, temperature, and conductivity levels and the results of this screening will be recorded in the Sample Collection Log. This process is necessary to verify that these parameters have stabilized and that a representative sample of groundwater will be obtained. Prior to actual sampling, and after purging, an attempt will be made to allow each well to recover to within 90 percent of its original volume. For the purposes of this project, it is assumed that several of the existing monitoring wells will require extensive purging to redevelop them. All water generated during purging will be collected in 55-gallon drums and left on site for later disposal.

- 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 sampling time.

- A sample of the groundwater from each well will be obtained, prior to and after the well has been sampled for laboratory analytical parameters, for determining pH, temperature, and conductivity levels. These field parameters will be recorded in the log. Should the pH of the sample require adjustment in the field to attain the required reading (pH of 2), a pH adjustment kit (to be supplied by the laboratory) will be used to adjust the pH of the sample. Adjustment will be accomplished by adding the supplied acid a drop at a time to the sample with an eye dropper. Litmus paper or a pH measurement device will be used to determine the pH of the sample after adjustment.

- Groundwater 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 loss of volatile contaminants. Samples collected for analysis of volatile constituents will be collected first. Large volume samples for extractable organic compounds, total metals, etc., will be collected last.

- 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 well has been sampled, the well cap will be replaced and the wellhead lock will be replaced and locked.

- 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, bailer, rope, and plastic sheeting will be collected and containerized.

4.8 Monitoring Well Location Survey

All monitoring well locations will be surveyed in the X, Y and Z coordinates. 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 well location. The coordinates will be to the closest 1 foot and referenced to the available benchmarks. 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 well 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.

After the wells have been installed and developed, the survey subcontractor will survey the well riser pipe elevations.

5.0 DECONTAMINATION

In the event that it is determined that contamination is limited to the concrete surfaces, the following decontamination procedures will apply:

- All contaminated areas including walls and floors will be scrubbed with industrial detergent and water, then rinsed;
- Water will be collected with a wet-vacuum;
- Additional samples of the surface concrete will be taken by core drilling the concrete to a depth of one inch and then chipping the concrete loose. Additional samples will be taken at random locations within a distance of one foot of the corresponding original sample locations. Concrete samples will be placed in plastic sealable bags for transport to a laboratory for testing. Concrete core holes will be filled with non-shrink grout; and,
- If testing reveals the need for further decontamination, then muriatic acid will be used to decontaminate and resampling will be performed.

Rinsate from decontamination operations will be contained using sandbag diking and 6-mil plastic sheets connected with duct tape. Plastic sheeting will be used to facilitate collection of wastewater which will be collected using a "wet-vac" type vacuum. The wastewater, or rinsate, will be vacuumed either from the plastic or directly from concrete surfaces.

6.0 INVESTIGATION DERIVED WASTES (IDW)

The following wastestreams may require off-site disposal from the Building 360 closure project. These wastestreams are broken into the following groups:

- Wastewater (including rinsate from equipment decontamination), and purged groundwater from sampling activities; and,
- Contaminated soil, concrete and PPE.

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 Service, 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.

Drill cuttings, excess sample materials, and water removed from a boring will be drummed, appropriately labeled, and staged on site in Building 307 for removal 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 Building 307, at the completion of each boring, or daily. Drums will be secured on wooden pallets.

6.1 Disposal of Wastes

Wastewater, rinsate, concrete, soil, protective equipment, tools, plastic, etc. will be placed in 55-gallon DOT-approved drums and transported to Building #307. IT will coordinate the transportation and disposal of only the drummed rinsate and the liquid hazardous material removed from the Steam Jenny Pit. Transportation and disposal of non-liquid hazardous waste (PPE, concrete, etc.) will be coordinated by SEDA.

The accumulated hazardous waste will be disposed of by competitive bid. Land disposal rules will apply. Some soils may require treatment prior to disposal.

6.2 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.

7.0 DOCUMENTATION / RECORDKEEPING

The following field documentation will be maintained during field activities conducted during the performance of the s. 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 s 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.

8.0 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;
- 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 concrete, soil, and groundwater samples, for off-site chemical analysis.

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 μg/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.

9.0 HEALTH AND SAFETY

All project activities will be performed under the direct supervision of the site health and safety professional and will be performed in accordance with specifications set for in the SSHP (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 plan preparation. This is regarded as a dynamic document which may be amended based on ongoing project results.

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

10.0 CERTIFICATION

Certification by an independent New York State registered professional engineer will commence once activities listed in this work plan are complete. An accurate calculation of the amount of contaminated soil and concrete will be made for disposal purposes. Confirmatory samples and tests required by the NYSDEC will be taken at that time.

Within 60 days of final completion of closure, a certification documenting the closure activities will be made by a qualified independent engineer registered in New York State. The certification will state that closure was executed in accordance with the approved closure plan.

11.0 SITE RESTORATION

If soil samples reveal extensive contamination, then the steam jenny building will be closed as a landfill. If the concrete is to be removed, then new concrete will be placed to achieve the existing trench functions. Any areas 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.

12.0 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.

12.1 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 the closure of Building 360.

12.2 Project Organization

The project organization chart presented in 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.

12.3 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.

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.

One H&S officer will be responsible for executing the SSHP. 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.

Mr. Paul Micciche will serve as the Hydrogeologist and will be responsible for overseeing the sampling technicians and the drilling subcontractors during monitoring well installation, and oversight of the sampling technician during groundwater sampling.

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

12.4 Scope of Work

The overall Scope of Work for this project includes sampling of concrete, soil and groundwater. Depending on the analytical results for the initial samples of the three media, the scope may include the following additional activities:

- further sampling and analysis of concrete and soil if contaminant concentrations are determined to be present at greater than RCRA limits; and,

- if soil samples reveal extensive contamination, then the Steam Jenny Building will be closed as a landfill. If the concrete is to be removed, then new concrete will be placed to achieve the existing trench functions.

12.5 Material and Equipment

Material and equipment will be provided in sufficient quantities as required for all closure 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.

12.6 Site Facilities

IT will utilize the temporary site facilities which have been emplaced as part of the ongoing Ash Landfill remediation project. These facilities include 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.

Two office trailers have been provided for IT, USACE, and subcontractor personnel. Drinking water facilities, adequate lighting, commercial telephone service (one line), air conditioning/heating equipment, and portable toilets have been furnished and these will be maintained by IT. The office will be furnished as requested by USACE. Entrance doors will be equipped with a substantial lock. Photocopy and fax machines will be made available for government use and are located in IT's office trailer.

12.7 Project Schedule

The schedule for the Building 360 site has been developed primarily as a sequencing tool and is included in Figure 3. Durations on the included schedule have been established based on quantities provided by the USACE.

12.8 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.

12.9 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.

12.10 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. 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.

12.11 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 Manager 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.

12.12 Final Report

12.12.1 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.

12.12.2 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.

12.12.3 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.

12.13 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.

12.14 Subcontractor Selection Control and Management

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.

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.

12.15 Contractor's Quality Control Program

12.15.1 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.

12.15.2 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.

12.15.3 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.

12.15.4 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.

12.15.5 Safety Inspections

IT will perform daily weekly 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.

12.15.6 Reporting

All inspections and test results will be recorded daily. The sample "Quality Control Rapid Daily Report (QCRDR)" form included in the USACE scope of service, 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.

12.15.7 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.

12.15.8 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.

12.15.9 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 BUILDING 360
USACE CONTRACT NO. DACW45-94-D-0054
DELIVERY ORDER NO.
IT CORPORATION PROJECT NO. 519204

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) 221-7764	Jeff Hubbard
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	(404) 639-2888	relay messages to the EPA,
(24 Hour)		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 Site Supervisor	(607) 869-1681	Robert
Rushing		
IT Corporation Subcontractors		
Quanterra	(412) 731-8806	Carrie Smith Gambler

BUILDING 360 WORK PLAN ADDENDA

The following addendum to the October 1994, Draft Work Plan, Building 360 Closure at the Seneca Army Depot, Romulus, New York, have been generated by IT Corporation (IT) in response to comments received from the New York State Department of Environmental Conservation (NYSDEC) and the United States Army Corps of Engineers (USACE), Omaha District, after their review of the Building 360 Closure Plan, July 1, 1994, and the October 1994, Draft Work Plan.

The comments are reiterated below, followed by IT's responses (in italics).

USACE Comment 1. Section 4.1.1: It should be clarified that the sample taken from below the concrete should be taken of the native soils and the depth may have to be adjusted depending on the amount of fill encountered.

Response *The soil sample will be acquired from the native soil horizon which lies beneath any fill material underlying the concrete floor.*

USACE Comment 2. Section 7: (My copy did not have a table 7-1 and this may be a moot issue) The analytical methodologies should be specified in this section.

Response *Table 7-1 (in final Work Plan) specifies the analytical methodologies for all matrices.*

NYSDEC Comment 1. (Comment on the Building 360 Closure Plan) In Table 1 on page 6, the method for semivolatiles analysis should be changed to 8270 (from 8260). The preparation method for semivolatiles should be 5310 / 3520, the same as for PCBs.

Response *Semivolatiles analysis will be accomplished by Method 8270. The preparation method for semivolatiles will be 3510 / 3520.*

NYSDEC Comment 2. (Comment on Building 360 Closure Plan) On page 1-2 of the Quality Assurance Project Plan, the instrument detection limits are reversed for lead. The detection limit should be 5 ppm while the soil action level is site background.

Response. *Agreed, the values should be switched.*

NYSDEC Comment 3. (Comment on Building 360 Closure Plan) Table 2 on page 1-20 of the Quality Assurance Project Plan is confusing for metals. The metals being analyzed are cadmium, chromium, and lead. Their methods of preparation and analysis are given in the table below. Please change Table 2 accordingly.

Parameter	Matrix	Preparation	Analysis
Cadmium	water	3010	6010
	soil	3050	6010
Chromium	water	3010	6010
	soil	3050	6010
Lead	water	3020	7421
	soil	3050	6010

Response. *Agreed. Table 2 shall correspond to the above values.*

NYSDEC Comment 4. (Comment on the Building 360 Closure Plan) On page 1-21 of the Quality Assurance Plan, the final report submitted to the Department should contain at a minimum a narrative by the data validator, the sample results, chain of custody forms, and all the QC data such as spike recoveres, surrogate recoveries, duplicates, and blank results. NYSDEC may request the entire raw data package, if necessary.

Response. *The final report submitted to the Department will contain a narrative by the data validator, the sample results, chain of custody forms, and all QC data mentioned in the comment. All raw data will be made available to the NYSDEC upon request.*

IT agrees that if any discrepancies exist between the Building 360 Closure Plan, July 1, 1994, and the October, 1994, Work Plan, the Closure Plan will supersede this Work Plan.

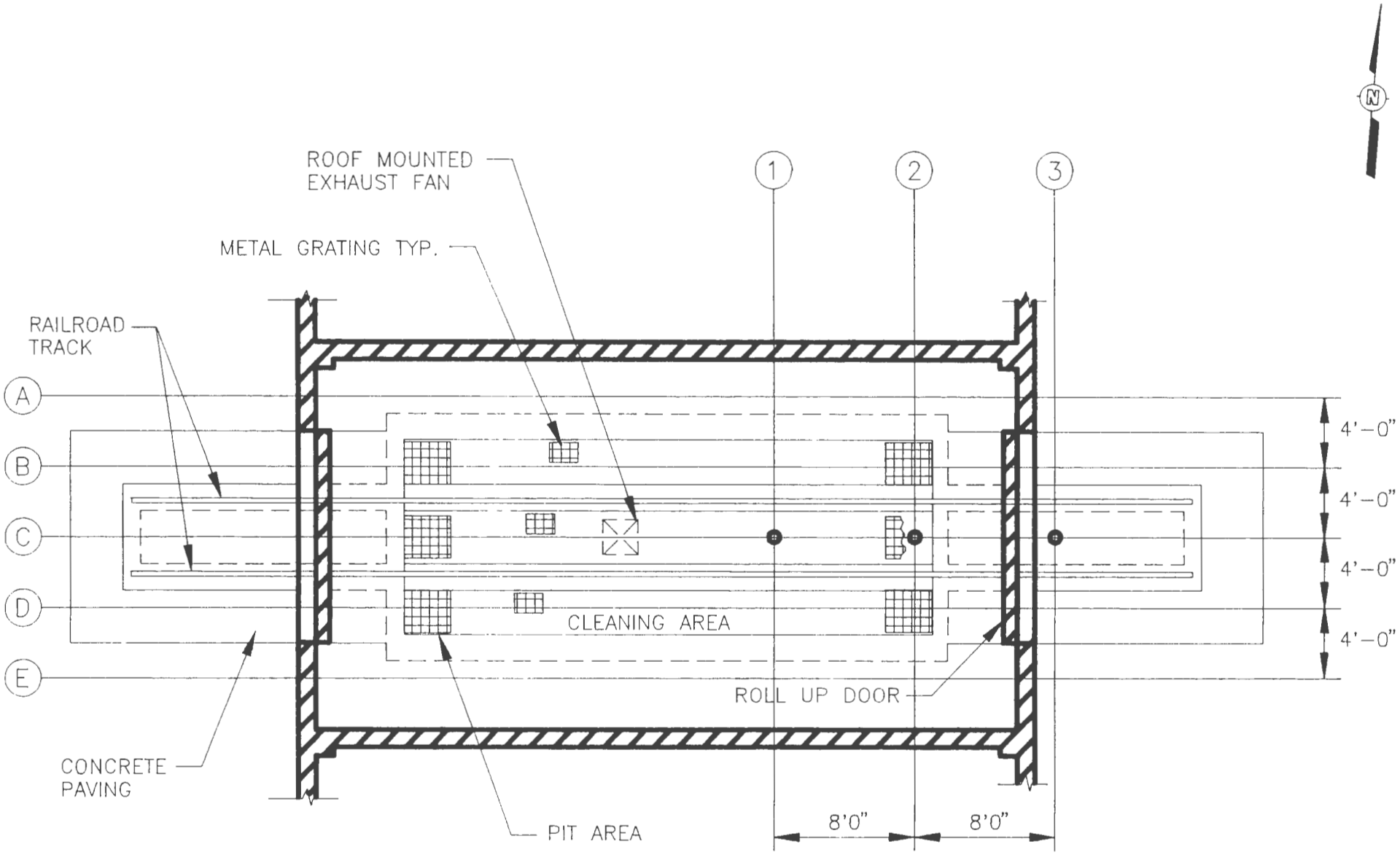

FIGURE 1

BUILDING 360 CLOSURE
SAMPLING LOCATION PLAN

PREPARED FOR

SENECA ARMY DEPOT
ROMULUS, NEW YORK

INTERNATIONAL
TECHNOLOGY
CORPORATION

SCALE: 1/8"=1'-0"

DRAWING NUMBER 519204-A1

CHECKED BY

APPROVED BY

SDP 10-9-94

DRAWN BY

132298

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List of Acronyms

Acronym	Description
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
CIH	Certified Industrial Hygienist
CRZ	Contamination Reduction Zone
dBA	A-weighted decibel(s)
DOL	U.S. Department of Labor
EPA	U.S. Environmental Protection Agency
eV	electron volt
EZ	Exclusion Zone
°F	degree(s) Fahrenheit
GFCI	ground fault circuit interrupter
gpm	gallon(s) per minute
H&S	Health and Safety
HEPA	high-efficiency particulate air
IAG	Interagency Agreement
IDLH	immediately dangerous to life or health
IT	IT Corporation
LEL	lower explosive limit
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PPE	personal protective equipment

List of Acronyms *(Continued)*

Acronym	Description
SCBA	self-contained breathing apparatus
SEDA	Seneca Army Depot Activity
SMAC	Sequential Multiple Analyzer Computer
SSHC	Site Safety and Health Coordinator
SSHP	Site Safety and Health Plan
SZ	Support Zone
TLV	threshold limit value
TWA	time-weighted average
$\mu g/m^3$	microgram(s) per cubic meter
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound
WBGT	Wet Bulb Globe Temperature

Site Safety and Health Plan
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

Review and Approvals

Doug Wehner, Project Manager IT Corporation	Date
Warren Houseman, CIH Warren Houseman, CIH, Health and Safety (H&S) Manager IT Corporation	10/17/94 Date

Site Safety and Health Plan Acknowledgment Form

I have been informed of, and will abide by, the procedures set forth in this Site Safety and Health Plan for the Building 360 Closure Plan, Steam Jenny Pit activities at the Seneca Army Depot in Romulus, New York.

Printed Name	Signature	Company	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 Corporation (IT) personnel and subcontractors during the removal of hazardous substances and decontamination of the Steam Jenny Pit in Building 360 and related soil, groundwater, and concrete sampling.

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, and IT Corporate regulations and procedures; Occupational Safety and Health Administration (OSHA) requirements; and all U.S. Army Corps of Engineers (USACE) requirements. All IT employees and IT subcontractors must comply with the requirements set forth in this plan.

This SSHP prescribes the procedures that must be followed by all site personnel. Operational changes that 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 Health and Safety (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 amendment(s) to this SSHP when changes occur and when additional site-specific information is available. SSHP amendments will be added to Appendix A. No changes to this SSHP will be implemented without prior approval of the H&S Manager or his authorized representative.

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.

Building 360 at the Seneca Army Depot is a building where old equipment is refurbished and reconstructed. Lathes, presses, and metal working machines are degreased with steam, high pressure water, and detergents in the cleaning area. Heavy metals, polychlorinated biphenyls (PCB), and greases are possible hazardous substances generated from the equipment. After steam cleaning, the equipment was moved to other portions of Building 360 for rehabilitation.

The existing cleaning area (20 feet, 6 inches wide by 38 feet, 6 inches long) is a portion of Building 260 separated from the rest of Building 360 by a high bay cinder block wall. Track-mounted carts carrying the equipment to be refurbished were rolled into the cleaning area, through a roll-up door, on a permanently installed rail system. Metal grating had been placed adjacent to, and in the middle of, the rail system. The floor slopes to the metal grating.

Under the metal grating is a trench system that slopes from a depth of 2 feet on the west end to a depth of 2 feet, 10 inches toward the east end. Water and grease flowed through the trench system to an accumulation pit at the east end. This pit is constructed with openings through both rail foundation walls. The pit is 3 feet deep under the metal grating, 6 inches wide, and 3 feet long. The waste from the accumulation pit was pumped into approved waste removal vehicles and disposed of as hazardous waste at an approved storage facility.

Since cleaning operations ceased on January 2, 1990, Seneca Army Depot has periodically monitored the depth of water in the accumulation pit to determine if water levels in the pit are affected by varying groundwater levels. Seneca Army Depot has also periodically rinsed the pit and disposed of the rinsate as hazardous waste but has never had the pit tested, after rinsing, for contamination. In the past, the waste was pumped from the accumulation pit into an approved tank truck and transported to an approved hazardous waste disposal facility. Currently, the cleaning area is not being used.

1.3 References

This SSHP complies with applicable OSHA and U.S. Environmental Protection Agency (EPA) regulations. This SSHP follows the guidelines established in the following documents:

- ***Standard Operating Safety Guides***, 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 (CFR) Part 1910, General Industry Standards
- 29 CFR Part 1926, Construction Industry Standards
- 29 CFR §1926.65, U.S. Department of Labor (DOL)/OSHA
- ***Safety and Health Requirements Manual***, EM 385-1-1, USACE, revised October 1992
- ***Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices***, American Conference of Governmental Industrial Hygienists (ACGIH), 1993-1994.

The contents of this SSHP are consistent with the IT Health and Safety Policies and Procedures as listed in Appendix B. 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 Project Personnel Responsibilities

2.1 All Personnel

All personnel are responsible for continuous adherence to these health and safety 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 SSHP.

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 SSHP, 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 health and safety 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 (H&S) Manager

The H&S Manager is responsible for developing and coordinating the site-specific SSHP and amendments as required. The H&S Manager will be a Certified Industrial Hygienist (CIH) with experience in hazardous waste site operations and shall be responsible for the

development, implementation, and oversight of the health and safety program. Additional H&S Manager responsibilities include:

- General health and safety 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
- Serving as the contact for regulatory agencies on matters of health and safety.

2.5 Site Safety and Health Coordinator (SSHC)

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 SSHC will brief visitors on the contents of this plan and provide a copy if desired.

3.0 Job Hazard/Risk Analysis (Accident Prevention Plan)

This Job Hazard/Risk Analysis (Accident Prevent Plan) addresses the health and safety protocols associated with the Building 360 Closure Plan activities at Seneca Army Depot in Romulus, New York. The implementation of the following guidelines is necessary to ensure the health and safety of field personnel, the general public, and the environment. Although elimination of all risks is impossible, strict adherence to the established guidelines by all on-site personnel will help to minimize incidents and accidents by promoting proper safety measures.

3.1 Statement of IT Safety Policy

IT's policy is to provide a safe and healthful work place for all employees, subcontractors, and consultants in compliance with established regulatory standards and requirements. Site-specific safety requirements established by clients shall take precedence provided that these requirements meet or exceed those of IT and applicable regulatory agencies.

IT adheres to two fundamental principles of safety: (1) all accidents, injuries, and occupational illnesses are preventable; and (2) if an operation cannot be done safely, IT will not do it. To comply with these principles, every worker will receive the appropriate training, equipment, and other resources necessary to complete assigned tasks in a safe and efficient manner.

Safety, industrial hygiene, and loss prevention are the direct responsibility of all members of management, who must create an environment in which everyone shares a concern for their own safety and the safety of their associates. Safety shall take precedence over expediency or shortcuts. It is a condition of employment that all employees work safely and follow established safety rules and procedures. No individual(s) may pose a direct threat to the health and safety of other individuals in the work place.

The implementation of effective safety and health practices is a key measure of managerial performance. Management, with the assistance of the health and safety professional staff, will conduct site safety audits to assess the effectiveness of the safety program(s) in place and to identify areas for improvement. All noted deficiencies shall be promptly corrected.

All injuries, occupational illnesses, vehicle accidents, and incidents with potential for injury or loss will be investigated by the SSHC and Site Superintendent. Appropriate corrective

measures will be taken to prevent recurrence and to continually improve the safety of our work place. The contents of this section of the SSHP will serve as the Accident Prevention Plan.

3.2 Scope of Work

The objective of closing the Steam Jenny Pit at Building 360 at the Seneca Army Depot—since the existing hazardous collection pit does not conform to current hazardous waste tank regulations and because it was indeterminate, based on inspections—is to ensure that the pit does not leak. The objective is also to identify the extent of possible contamination and to use this information as a guide to decontaminate or remove hazardous substances in the future.

Systematic sampling, testing, and quality control procedures will be implemented to assure proper decontamination and possible abandonment of the system. This objective does not include the remediation of contaminated groundwater. If necessary, this will be done in the future as part of remedial work accomplished through either Seneca's Interagency Agreement (IAG) with the New York State Department of Environmental Conservation (NYSDEC) and the EPA, or a postclosure permit to be issued by NYSDEC.

IT will perform the removal and/or decontamination of hazardous material from the Steam Jenny Pit and the subsequent sampling of concrete, soil, and groundwater. This will include the following tasks:

- Site preparation and mobilization
- Waste removal, transportation, and disposal
- Metal grating removal/decontamination
- Concrete sawing and sample collection
- Groundwater monitoring well installation (surveying and drilling)
- Demobilization.

An Activity Hazard Analysis (AHA) for each of these major tasks can be found in Table 3-1.

The AHA is an ongoing process from initiation of the SSHP to implementation and completion of fieldwork. Unanticipated hazards not addressed in these AHAs will be added in the field by the SSHC. These modifications will be submitted to the H&S Manager for approval.

3.3 Chemical Hazards

This section discusses the chemical hazards associated with the steam cleaning, wastewater, and sludge materials removal based on previous field investigations and analytical results. The significant chemical hazards that have been identified include PCBs, lead, chromium, and cadmium. Although all routes of exposure may present potential risk to field personnel, it is anticipated that dermal contact with contaminated sludges and liquids and inhalation of vapors pose the greatest hazard.

Cadmium. A silver-white, odorless metal compound. Cadmium is a human poison by inhalation of dusts and causes an excess of protein in the urine.

Chromium. A blue-white to steel-gray, hard, brittle metal compound. Chromium is a human poison by ingestion causing gastrointestinal disturbances.

Lead. 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 wrists.

PCBs. A mixture of many compounds that vary from mobile, oily liquids to white, crystalline solids and hard, noncrystalline resins. PCBs were commonly used as heat transfer fluid, lubricants, and hydraulic fluids. PCBs vary in technical composition and also chlorination. PCBs are suspected human carcinogens. The higher the chlorine content, the more toxic it is expected to be. Symptoms of exposure may include nausea, vomiting, abdominal pain, and loss of weight.

A chemical hazard assessment for the various contaminants likely to be encountered during project activities can be found in Table 3-2.

Table 3-1
Activity Hazard Analysis
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

Site Preparation and Mobilization Activities	Potential Hazards	Recommended Controls
Principal steps: • Set up work zones, decontamination area, and support equipment Equipment that may be used: • Forklift, pickup trucks Inspection requirements: • Daily Training requirements: • OSHA 40-hour and refresher • Site-specific training • Read and sign off on SSHP • Daily Tailgate Safety Meetings • Qualified equipment operators	Slip, trip, and fall	• Utilize good housekeeping practices.
	Manual lifting	• Use proper lifting techniques. Get assistance when manually lifting loads greater than 60 pounds. Use mechanical equipment whenever possible.
	Noise	• Hearing protection shall be provided to and worn by personnel in areas where noise levels exceed 85 decibels. • Whenever possible, stage noisy equipment in a remote area.
	Heavy equipment	• Use qualified and trained equipment operators. • Moving heavy equipment must have properly functioning backup alarms. • Operators shall inspect their equipment prior to and during each use to ensure that it is functioning properly. • Spotters on the ground will provide guidance to operators. • Machinery or equipment shall not run unattended.
	Falling objects, debris, dust	• Hard hats, safety glasses, and steel-toe/shank boots are required outside the office trailers.
	Pinch points	• Keep hands and feet clear of moving/suspended materials and equipment.
	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.
	Biological hazards (snakes, insects, spiders)	• Inspect work areas carefully and avoid placing hands and/or feet into concealed areas.

Table 3-1

(Continued)

Waste Removal, Transportation, and Disposal	Potential Hazards	Recommended Controls
Principal steps: • Pump out liquids/sludges from pits Equipment that may be used: • Vacuum truck • Pump • Hand shovels • Air monitoring equipment Inspection requirements: • Prior to each use Training requirements:	Slip, trip, fall	• Free-standing liquid and pumpable sludges shall be removed prior to workers entering pits. • Metal grates will also be removed prior to workers entering pits.
	Back strain	• Lift with legs, not back. • Get assistance when necessary. • Size up the job before proceeding.
	Chemical splash/exposure	• Wear PPE as required in this SSHP. • Tape up PPE seams. • Identify location of emergency eyewash/shower station. • Conduct air monitoring during work activities. • Workers shall shower after exiting EZ.
	Explosion	• Properly ground liquid/sludge transfer operations so as to prevent static buildup. • Only qualified operators shall operate vacuum trucks and/or pumps. • Monitor LEL concentrations. • Notify Seneca Army Depot Fire Department of location of work activities.
	Noise	• Hearing protection shall be provided to and worn by workers when noise levels meet or exceed 85 dBA.
	Worker down	• Use the buddy system. • Set up means of communication among confined space team prior to initiation of operations. • Assigned rescue personnel must have rescue training. • Any moving parts or machinery shall be locked/tagged out.

Table 3-1

(Continued)

Metal Grating Removal/Decontamination	Potential Hazards	Recommended Controls
Principal steps: • Disassemble and remove sections of metal grating Equipment that may be used: • Nonsparking tools • Air monitoring equipment • Ventilation equipment • Scrub brushes • Detergent • Wet vac Inspection requirements: • Prior to each use	Chemical exposure	• Use nonsparking tools to disassemble metal grating. • Do not use torch-cutting or other hot work methods. • Steam clean grating prior to disassembly to minimize contact with potentially contaminated grating. • Workers shall not sit or kneel directly on grating. • Workers shall wear required PPE as listed in this SSHP. • Conduct air monitoring. • Assume adequate ventilation inside Building 360.
	Slip, trip, fall	• Set up stable work or floor platform to remove grating. • Evaluate the weight of metal grating sections to be removed prior to handling. • Designate staging area for placement of metal grating.

Table 3-1
(Continued)

Concrete Sawing and Sample Collection	Potential Hazards	Recommended Controls
Principal steps: • Steam clean pit bottom • Pump out liquid • Jackhammer concrete • Drill through pit floor Equipment that may be used: • Backhoe • Jackhammer • Truck-mounted drill rig • Pickup truck • Orange vests • Concrete saw • Drums Inspection requirements: • Prior to each use • Prior to operation of motor vehicle Training requirements: • Hazard communications • Safe Driver Training	Thermal burns	• Use heavy duty outer gloves when steam cleaning. • Avoid contact with uninsulated components. • Do not direct spray wand in the direction of persons, their hands, or their feet.
	Splashes	• Wear PPE as outlined in this SSHP.
	Noise	• Hearing protection shall be provided to and worn by personnel in areas where noise levels meet or exceed 85 dBA.
	Heat stress	• Physiological monitoring will be required for all site workers on break when ambient temperatures exceed 78°F. • Work/rest periods will be established.
	Improper use of chemicals	• Obtain Material Safety Data Sheets for materials that may be used in decontamination, and review with workers.
	Repetitive vibration injury	• Have workers rotate operating jackhammer.
	Poor ventilation	• Use a blower to circulate or introduce air into confined space.
	Asphyxiation	• Work only in areas that contain 20 to 23.5 percent oxygen (regardless of level of protection).
	Worker down	• Use the buddy system. • Set up means of communication among confined space team prior to initiation of operations. • Assigned rescue personnel must have rescue training. • Any moving parts or machinery shall be locked/tagged out.
	Vehicle accidents	• Assign flag person(s) to direct transport of truck-mounted drill rig. • Wear seat belts when vehicle is in motion. • Plan placement of truck-mounted drill rig before driving into pit.
	Dust	• Spray down work area as jackhammer operations are ongoing to minimize dust generation.

Table 3-1

(Continued)

Groundwater Monitoring Well Installation (Surveying and Drilling)	Potential Hazards	Recommended Controls
Principal steps: • Locate utility lines • Set up and drill wells Equipment that may be used: • Drill rig • Water truck • Pickup truck • Bailers • Survey equipment Inspection requirements: • Daily Training requirements: • Daily Tailgate Safety Meetings • Read and sign off on SSHP • Site-specific training	Personal injury, property damage, or equipment damage from heavy equipment operations	• Only authorized personnel shall operate heavy equipment. • Use qualified and trained equipment operators. • Moving heavy equipment must have property functioning back-up alarms. • Spotters on the ground will assist operators in manipulating vehicles and equipment into tight or confined spaces. • Operators shall maintain a constant awareness of personnel and equipment in the work areas. • Machinery or equipment shall not run unattended. • No overhead work shall be performed when, as a result of that work, the possibility of a falling object striking any person exists. • Cranes, derricks, drill rigs, booms or similar equipment shall have a minimum 20 feet clearance from overhead electrical power lines. • When any machinery or equipment is found to be unsafe as a deficiency is noted, the equipment shall immediately be taken out of service and its use prohibited until unsafe conditions have been corrected. • Machinery or equipment shall not be operated in a manner that will endanger persons or property nor shall the safe operating speeds or loads be exceeded. • Getting off or on any equipment while it is in motion is prohibited. • Equipment operated on the highway shall be equipped with headlights, taillights, brake lights, back-up lights, and turn signals visible from the front and rear. • All mobile equipment and the areas in which they are operated shall be adequately illuminated. • Mechanized equipment shall be shut down prior to and during fueling operations. • Whenever equipment is parked, the parking brake shall be set. • No guard, safety appliance, or device shall be tampered with. • Heavy equipment operators shall inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgment. • When conditions are such that lightning is occurring, all equipment operations shall cease. • Personnel are not allowed to work off of machinery or to use them as ladders. • Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge. • Heavy equipment shall be equipped with a fire extinguisher. • Site workers shall establish hand signals when verbal communication becomes difficult. • The operator will ensure that the equipment is on solid ground or foundation with outriggers extended before starting. • Use hearing protection when noise levels exceed 85 dBA in the work area. • Drill rig shall only be moved with the derrick lowered.

Table 3-1
(Continued)

Groundwater Monitoring Well Installation (Surveying and Drilling) (Continued)	Potential Hazards	Recommended Controls
Principal steps: • Locate utility lines • Set up, drill, and install groundwater monitoring wells Equipment that may be used: • Drill rig • Water truck • Pickup truck Inspection requirements: • Daily Training requirements: • Daily Tailgate Safety Meetings • Read and sign off on SSHP • Site-specific training	Pinch points	• Keep hands and feet clear of moving/suspended materials and equipment. • Restrain loose-fitting clothing or PPE.
	Falling objects	• Hard hats, safety glasses, and steel-toe boots are required during drilling activities.
	Slip, trip, fall	• Utilize good housekeeping practices. • At least two persons on site shall be trained in first and CPR.
	Manual lifting	• Use proper lifting techniques. • Get assistance when lifting awkwardly sized loads or those over 60 pounds. • Use mechanical equipment whenever possible.
	Electrocution explosion	• Identify work area to be cleared. • Before beginning intrusive activities, the Site Superintendent shall ensure that underground utilities (i.e., electrical, phone, gas, water lines) are located. • Review blueprints and as-built drawings of facility layout. • When underground utilities are exposed, they shall be protected to avoid damage. • All uncovered lines shall be identified before work proceeds. • Personnel on the ground will assist in probing the soils to find the exact location of the lines and will use hand shovels to carefully remove the soil adjacent to the lines.
	Drum spillage	• Use a drum dolly or forklift to move full drums. • Label all drums as to their contents.

Table 3-1

(Continued)

Demobilization	Potential Hazards	Recommended Controls
Principal steps: • Disassembly of all support equipment • Decontamination of equipment Equipment that may be used: • Forklift Inspection requirements: • None Training requirements: • Forklift training.	Slip, trip, and fall	• Utilize good housekeeping practices. • Hard hats, safety glasses, steel-toe/shank boots are required outside the office trailers.
	Manual lifting	• Use proper lifting techniques. • Get assistance when manually lifting loads greater than 60 pounds. • Use mechanical equipment whenever possible.
	Noise	• Hearing protection shall be provided to and worn by personnel in areas where noise levels exceed 85 decibels. • Whenever possible, stage noisy equipment in a remote area.
	Heavy equipment	• Use qualified and trained equipment operators. • Moving heavy equipment must have properly functioning backup alarms. • Operators shall inspect their equipment prior to and during each use to ensure that it is functioning properly. • Spotters on the ground will provide guidance to operators. • Machinery or equipment shall not run unattended.

Table 3-2
Chemical Hazard Assessment
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

Contaminant (Synonyms) (Abbreviation) CAS No.	PEL (OSHA)/ TLV (ACGIH)	IDLH	Physical/Chemical Characteristics	Routes of Exposure	First Aid	Exposure Symptoms
Cadmium (Cadmium dust) 7440-43-9	0.01 mg/m^3 0.005 mg/m^3	Carcinogen 50 mg/m^3	Metal: silver-white, blue-tinged, odorless solid.	Inhalation Ingestion	Artificial respiration; seek medical attention.	Muscle aches, nausea, vomiting, diarrhea, coughing, chest tightness.
Chromium (Chrome) 7440-47-3	0.5 mg/m^3 0.5 mg/m^3		Metal: blue-white to steel-gray, lustrous, brittle, hard solid.	Inhalation Ingestion	Artificial respiration; seek medical attention.	Fibrosis of lungs.
Lead 7439-92-1	0.05 mg/m^3 0.15 mg/m^3	700 mg/m^3	Metal: A heavy, soft gray ductile solid.	Inhalation Ingestion Contact	Irrigate and wash affected area immediately; artificial respiration; seek medical attention.	Weakness; insomnia; malnutrition; abdominal pain; tremors.
Polychlorinated biphenyl (Chlorodipheynl 42% chlorine) (PCB) Aroclor 1242 53469-21-9	1.0 mg/m^3 1.0 mg/m^3	Carcinogen (10 mg/m^3)	Colorless to light colored viscous liquid; mild hydrocarbon odor. VP: 0.001 mm	Inhalation Absorption Ingestion Contact	Irrigate and wash affected area immediately; artificial respiration; seek medical attention.	Eye irritation; chloracne; liver damage.
Polychlorinated biphenyl (Chlorodiphenyl 54% chlorine) (PCB) Aroclor 1254 11097-69-1	0.5 mg/m^3 0.5 mg/m^3	Carcinogen (5 mg/m^3)	Colorless to pale yellow viscous liquid; mild hydrocarbon odor. VP: 0.00006 mm Hg	Inhalation Absorption Ingestion Contact	Irrigate and wash affected area immediately; artificial respiration; seek medical attention.	Eye and skin irritation; acne-form dermatitis.

Refer to notes at end of table.

Table 3-2

(Continued)

KEY:

ACGIH	-	American Conference of Governmental Industrial Hygienists
CAS No.	-	Chemical Abstract Service Registry Number
IDLH	-	Immediately dangerous to life and health: Maximum concentration from which one could escape within 30 minutes without experiencing any irreversible health effects.
mg/m^3	-	Milligram(s) per cubic meter
OSHA	-	Occupational Safety and Health Administration
PEL	-	Permissible exposure limits: Concentrations that nearly all workers may be repeatedly exposed to, day after day, without adverse effects. (Based on an 8-hour workday and 40-hour workweek.)
TLV	-	Threshold limit value: Concentrations that nearly all workers may be repeatedly exposed to, day after day, without adverse effect. (Based on an 8-hour workday and 40-hour workweek.)
VP	-	Vapor pressure at 68°F in millimeters (mm) mercury (Hg), unless otherwise noted.
	-	Blanks indicate information not available.

REFERENCES:

Title 29 of the Code of Federal Regulations (CFR) Part 1910, July 1993.

American Conference of Governmental Industrial Hygienists (ACGIH), *Threshold Limit Values and Biological Exposure Indices for 1993-1994.*

American Conference of Governmental Industrial Hygienists (ACGIH), *Documentation of the Threshold Limit Values*, 4th Edition, Cincinnati, Ohio, 1980.

National Institute of Occupational Safety and Health (NIOSH), *Pocket Guide to Chemical Hazards*, June 1990.

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

4.1 General Practices

All site personnel are responsible to avoid injury to themselves and others by observing site operations and the condition of equipment and tools. Following are general safety protocols for implementation by project personnel:

- 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 an EZ shall be by prior notification and authorization of the Site Superintendent. All required personal protective equipment (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 an 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 an 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.

- Wearing of contact lenses is not allowed in a CRZ or an 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 eyewash units locally available capable of delivering at least 0.4 gallons per minute (gpm) 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-footcandle 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, explosionproof 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 fieldwork alone. Maintain visual, voice, or radio communication at all times.

4.3 Hot Work

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 designated or approved for such operations. Only approved apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, will 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.

4.3.1 Fire Prevention Precautions

- Cutting, welding, or other hot work shall be permitted only in areas that are, or have been made, fire safe.

- 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 that has previously contained such materials.

  - In any area where combustible gas indicator (CGI) readings are in excess of 10 percent of the lower explosive limit (LEL).

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

4.3.2 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 flameproof 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 (TLV), 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 as 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 tests have been performed by the SSHC.

  - No erasures or changes of dates on hot work permits is 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. 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.

4.4.1 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.

4.4.2 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.

- 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 hosedown 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 or Site Superintendent 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 Bulb Globe Temperature (WBGT) Monitoring

The WBGT Index 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 after each work period a minimum of four times per day when ambient air temperatures exceed 78°F and personnel are wearing PPE, including Tyvek coveralls. WBGT readings will be compared to the TLVs 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 78°F, physiological monitoring will be conducted by the SSHC in order to make any necessary adjustments to the regimen.

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 78°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 110 beats per minute at the beginning of the rest period, 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, 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 regimens.

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 A-weighted decibels (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-required confined space provided the SSHC approves the reclassification and the space meets the criteria outlined in HS 300 (Appendix C - Confined Spaces).

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 that 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 of face and hands, and sanitation purposes. The number of toilets provided will be as follows:

Number of Employees	Minimum Number of Facilities
≤20	One
>20 and <200	One toilet seat and one urinal per 40 workers
≥200	One toilet seat and one urinal per 50 workers

One chemical toilet is anticipated for use during this project for 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 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.

4.9.1 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 (needs to be on the rig and stocked).

4.9.2 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 1-foot radius of the opening of the boring. Drilling may continue as long as vapor readings are within the 0-to-10-percent 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. The minimum clearance from energized overhead electrical lines is listed in Table 4-1.

- 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.

4.9.3 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.

4.9.4 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 safely 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 in direct 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.

4.9.5 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.

4.9.6 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 that 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.

4.9.7 Pipe Handling

- Pipe should be loaded and unloaded, layer by layer, with the bottom layer pinned or blocked securely on 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.

4.9.8 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.

4.9.9 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.

4.10 Excavation Safety

All excavating 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 4 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. The minimum clearance from energized, overhead electrical lines is listed in Table 4-1.

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.

4.11 Biological Hazards

Biological hazards are included since they present a hazard on field projects. Their hazard is expected to be minimal since work activities will be performed inside a building.

Ticks. Ticks are vectors of many different diseases including: Rocky Mountain spotted fever, tularemia, 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 procedures 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. Insects may be found outdoors or in old, abandoned buildings. Symptoms of an insect sting/bite are itching, swelling, and redness at the sting/bite area. Any worker who experiences allergic reactions shall seek medical attention. Avoid insect nesting areas and be aware of their presence in your work areas.

Table 4-1
Minimum Clearance from Energized Overhead Electric Lines
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

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/Warmup Regimen[a]
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

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 warmup breaks, in a warm location, of 10 minutes. For light to moderate work, use the table entry that is one temperature range warmer than the actual temperature range.

5.0 Personnel Protective Equipment (PPE)

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 HS 601 further defines the respiratory protection program that 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 PPE that 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 PPE 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 PPE requires authorization from IT Corporate Health and Safety staff.

5.2.2 Level B Protection

Level B protection shall be 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 (less than 20.0 percent) atmospheres 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 hood 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 PPE 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 around ankle, wrist, and hood openings.

5.2.4 Level D Protection

Level D protection 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-palmed gloves when handling materials.

Modified Level D 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.

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:

Activity	Initial Level of PPE
Mobilization	D
Waste removal, transportation, and disposal	B
Metal grating removal/decontamination	B
Concrete sawing/removal/media sampling	B
Closure sampling	C
Survey/drilling	D/Modified D
Groundwater monitoring well installation	Modified D
Postclosure sampling/well sampling	Modified D

As site activities progress, levels of PPE are subject to change or 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 H&S Manager and Army Technical Representative (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 an 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 and equipment, leaving inner gloves on. All disposable clothing should be placed in plastic bags, and labeled "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 purposes for contamination control zones are 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 (SZ), Contamination Reduction Zones (CRZ), and Exclusion Zones (EZ). 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 (SZ)

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 (CRZ)

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 (EZ)

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. EZs 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 that 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 (Appendix D) once initial site setup is complete. During an emergency, the evacuation routes noted on the site map (Appendix D) 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)
- Hazard briefing that 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. Material Safety Data Sheets (MSDS) will be reviewed with project personnel prior to use of materials for decontamination solutions.

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 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 H&S Manager 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 volatile organic compounds (VOC) will be conducted in the work area by using an HNU photoionization analyzer with an 11.7-electron volt (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.

Action levels for the various instruments are specified in Table 8-1. The frequency and location of air monitoring activities can be found in Table 8-2.

Personnel air sampling for lead will be conducted for 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 in which 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 H&S Manager 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, and 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.

Table 8-1
Instrument Action Levels
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

When in Level B PPE:

Analyte	Action Level	Required Action
Unknown VOCs	≥1,000 ppm above background in breathing zone	Stop work[a]
0_2	≥23% or ≤20%	Stop work[a]
LEL	≥10% of LEL	Stop work[a]
Miniram	≥5 mg/m^3	Stop work[a]

When in Level C Modified/C PPE:

Analyte	Action Level	Required Action
Unknown VOCs	≥125 ppm above background in breathing zone	Level B PPE
0_2	≥23% or ≤20%	Stop work[a]
LEL	≥10% of LEL	Stop work[a]
Miniram	≥1.0 mg/m^3	Initiate dust suppression

When in Level D Modified/D PPE:

Analyte	Action Level	Required Action
Unknown VOCs	≥5 ppm above background in breathing zone	Level C PPE
O_2	≥23% or ≤20%	Stop work[a]
LEL	≥10% of LEL	Stop work[a]

When in SZ:

Analyte	Action Level	Required Action
Unknown VOCs	≥1 ppm above background in breathing zone	Evacuate SZ and re-establish perimeter of EZ.

[a] Contact with the H&S Manager must be made prior to continuance of work. The H&S Manager 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 H&S Manager.

Table 8-2
Air Monitoring Activity Frequency and Locations
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

Work Activity	Instrument	Frequency	Location
Site preparation and mobilization	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A
Waste removal, transportation, and disposal	O_2/LEL HNu Miniram	Continuously Continuously N/A	Breathing zone; work area Breathing zone; work area N/A
Metal grating removal/decontamination	O_2/LEL HNu Miniram	Periodically Continuously N/A	Work area Breathing zone N/A
Concrete sawing/ sample collection	O_2/LEL HNu Miniram	Periodically Periodically Continuously	Work area Breathing zone Breathing zone
Groundwater monitoring well installation (surveying and drilling)	O_2/LEL HNu Miniram	Periodically Continuously Periodically	Work area Breathing zone Work area
Demobilization	O_2/LEL HNu Miniram	N/A N/A N/A	N/A N/A N/A

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 and all visitors of the contents of this SSHP and ensuring that each person signs the SSHP Acknowledgment 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 Site Superintendent, 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 that 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 contaminant 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 that might indicate overexposure 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 8 additional hours of specialized training on program supervision. The following topics are discussed:

- Overall safety and health program
- PPE 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 of 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 Section 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 observation 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 H&S Manager and Project Manager. 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 within 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:

- Content of the standard and appendices

- Specific nature of the operations that could result in exposure to lead above the action level

- Purpose and description of the medical surveillance program.

9.6 Hazard Communication

All personnel performing field activities shall receive hazard communication training. IT personnel have received basic hazard communication training that involves a review of the IT written hazard communication program, MSDSs, container labeling, and chemical health hazards. Personnel shall be trained on the hazards of chemicals on site by reviewing Section 3.3.

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 is required annually for CPR and every 3 years for first aid. These two employees will meet both the training and vaccination requirements 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 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 HS 100, all personnel on site working within a CRZ or an 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 that 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-microgram-per-cubic-meter ($\mu g/m^3$) action level for lead for more than 30 days in any consecutive 12-month period participate in this biological monitoring. At a minimum, pre- and postproject 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 that 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 E). The physical examinations will meet the requirements of 29 CFR §§1926.65 and 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 Site Superintendent, the SSHC, and the H&S Manager. The terms of the restriction will be discussed with the employee and the Site Superintendent. 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 Superintendent/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 Site Superintendent 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 Project Manager, 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 Project Manager 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 Site Superintendent will direct all emergency response activities conducted or managed by IT. In addition to his responsibilities as Emergency Coordinator, the Site Superintendent is responsible for field implementation and enforcement of health and safety policies and procedures as contained in this SSHP. The Site Superintendent 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 (SSHC). 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 Project Manager will provide support to emergency responders and dedicate appropriate project resources to the response effort. If required, the Project Manager will mobilize additional personnel and equipment to the site. The Project Manager will notify and provide the ATR with recommendations concerning any additional action(s) to be taken.

Army Technical Representative (ATR). 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 Project Manager 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
- Estimated 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 (Appendix D) 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 that 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 Site Superintendent and the SSHC will investigate the cause of the spill or discharge to prevent its recurrence. 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 that are self-evident or readily deduced. Contributing factors usually become apparent by questioning why the apparent causal factor was allowed to exist.

Table 11-1
Emergency Telephone Numbers
Building 360 Closure Plan
Steam Jenny Pit
Seneca Army Depot
Romulus, New York

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 H&S Manager - Warren Houseman • Days • Evenings	 (412) 372-7701 (412) 744-3489

On-Site Emergency Telephone Numbers

Ambulance	117
Fire Department	1-316
Police	1-366
HazMat Team	117
Geneva General Hospital	9-797-4000
Electric Company	Business hours - 1-470 After hours - 1-500
Water Company	Business hours - 1-470 After hours - 1-500
Gas Company	Business hours - 1-470 After hours - 1-500

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 Site Superintendent 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 Appendix F.

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 health and safety personnel to ensure that corrective actions or measures have been implemented.

The Site Superintendent or Project Manager 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 Supervisor's Employee Injury Report
- IT Vehicle Accident Report
- IT General Liability, Property Damage, and Loss Report.

Copies of these forms are in Appendix F 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 Site Superintendent, Project Manager, and SSHC will investigate the

conditions that 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 H&S Manager. 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 H&S Manager and SSHC and will be submitted to the ATR.

Appendix A

SSHP Amendments

Appendix B

IT Health and Safety Policies and Procedures
Table of Contents

Appendix B

IT Health and Safety Policies and Procedures Table of Contents

Procedure Number	Procedure Name
HS 001	Safety Policy
HS 010	Employee Safety and Health Work Rules
HS 011	Contractor Safety and Health Rules
HS 013	Health and Safety Procedure Variances
HS 019	Injury and Illness Prevention Program
HS 020	Accident Prevention Program: Reporting, Investigation, and Review
HS 021	Accident Prevention Program: Management Safety Audits and Inspections
HS 022	Accident Prevention Program: Review of New Proposals, Projects, Operation, and Construction
HS 040	Stop-Work Authority
HS 041	Embryo/Fetus Protection Program
HS 050	Training Requirements
HS 051	Tailgate Safety Meetings
HS 052	Health and Safety Plans
HS 060	Hazard Communication Program
HS 080	Insurance Claims
HS 090	OSHA Regulatory Inspections
HS 091	Serious Injury and Fatality Reporting Requirements
HS 092	Occupational Injury and Illness Reoccurred
HS 100	Medical Policies and Procedures
HS 101	Drug and Alcohol Testing
HS 102	Access to Employee Exposure and Medical Records
HS 104	Employee Notification of Industrial Hygiene Monitoring Results
HS 105	Occupational Injuries/Illnesses Procedures
HS 106	First Aid Kits

Procedure Number	Procedure Name
HS 300	Confined Spaces, Industrial
HS 304	Compressed Gases
HS 306	Handling Known Compressed Gas Cylinders
HS 307	Excavation and Trenching
HS 310	Hazardous Waste Operations at Uncontrolled Waste Sites
HS 314	Hot Work in Hazardous Locations
HS 400	Working in Hot Environments
HS 401	Cold Stress
HS 402	Hearing Conservation Program
HS 505	Handling of Inorganic Lead, Inorganic Lead Compounds, and Organic Lead Soaps
HS 512	Handling of Blood or Other Potentially Infectious Materials
HS 513	Handling Radioactive Materials
HS 600	Personal Protective Equipment
HS 601	Respiratory Protective Program
HS 602	Eye Protection - Prescription Safety Glasses
HS 603	Maintenance of Survey Equipment
HS 604	Use and Maintenance of Portable Electrical Equipment
HS 606	Soil Density Gauges
HS 800	Motor Vehicle Operation: General Requirements
HS 810	Commercial Motor Vehicle Operation and Maintenance

Appendix C

IT Policy HS 300
Confined Spaces

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

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6.0 Exception Provisions
7.0 Cross References
8.0 Attachments

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 n 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.

4.16 **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.

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.

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).

- 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 no less often than hourly.);

  - 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.

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.

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

- 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.

- 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

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.

- 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.

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:

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		

- 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

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 LIN 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.

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.

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.

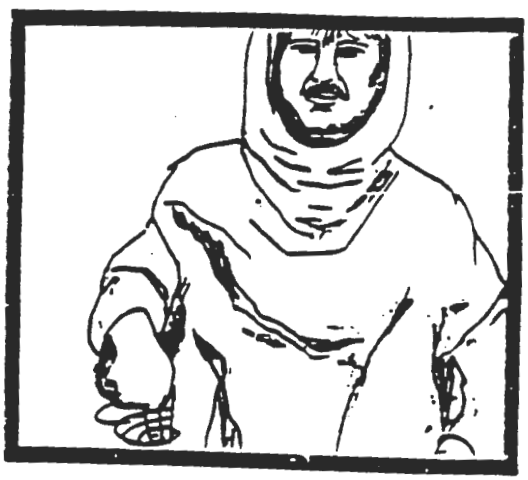
HAND SIGNALS (con't)

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

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

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

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) Combustilbe 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 3

ENTRY PERMIT
PERMIT-REQUIRED CONFINED SPACE (PRCS)

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

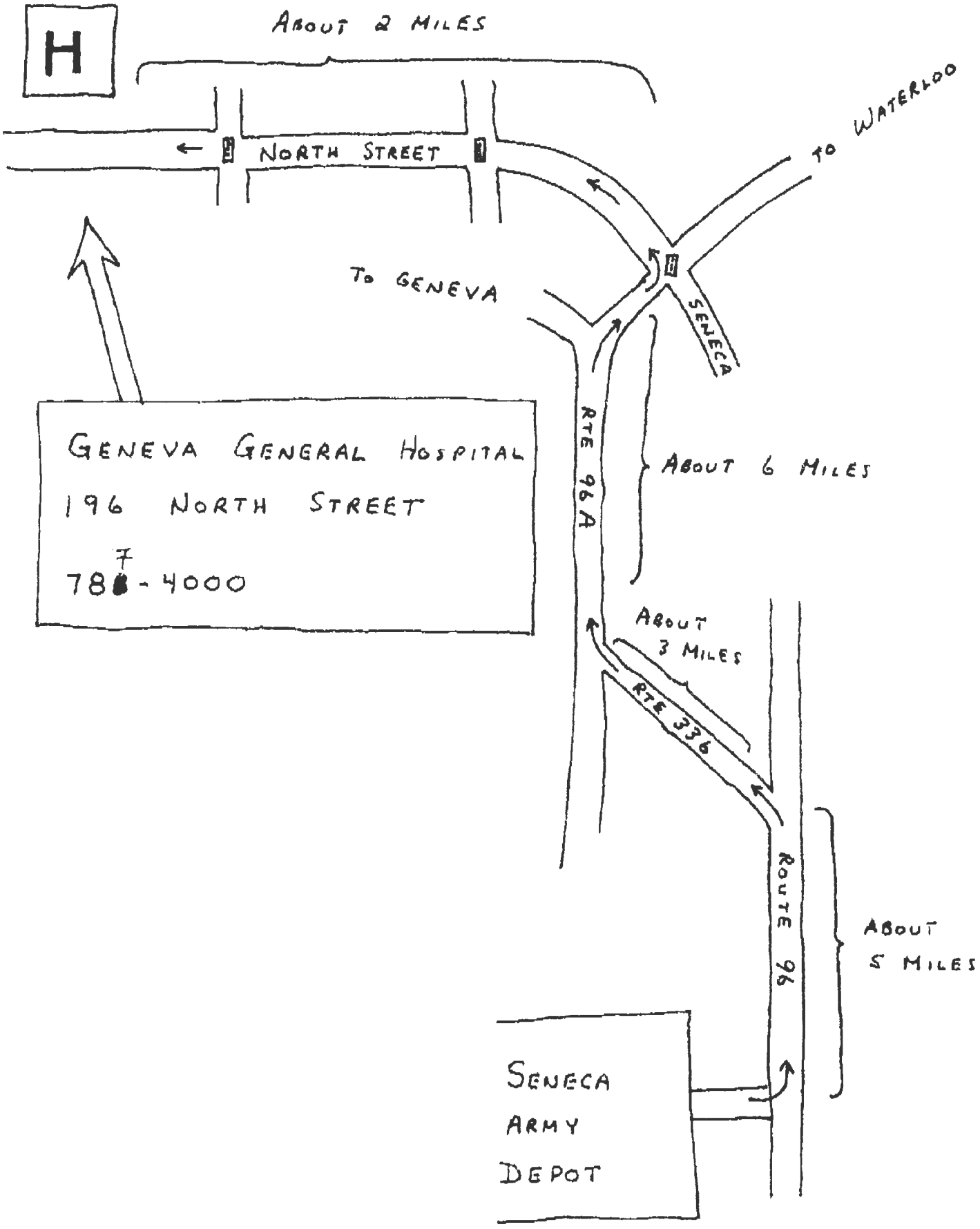
COMMUNICATION
Lifeline "Tug" Signals (See HASP)
Air Powered Horn Signals (See HASP)
Other_____

OTHER PERMITS ISSUED FOR WORK IN PRCS: _____

OTHER HAZARD CONTROL PROCEDURES OR INSTRUCTIONS: _____

Appendix D

Hospital Location Map


H
ABOUT 2 MILES
NORTH STREET
TO WATERLOO
TO GENEVA
SENECA
RTE 96A
ABOUT 6 MILES
GENEVA GENERAL HOSPITAL
196 NORTH STREET
787-4000
ABOUT 3 MILES
RTE 336
ROUTE 96
ABOUT 5 MILES
SENECA ARMY DEPOT

Appendix E

Subcontractor Certification

Appendix E

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 F

Site Forms

INTERNATIONAL TECHNOLOGY CORPORATION

TAILGATE SAFETY MEETING

Division/Subsidiary: _____ Facility: _____

): _____ Time: _____ Job No.: _____

Customer: _____ Address: _____

Specific Location: _____

Type of Work: _____

Chemicals Used: _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

Hospital/Clinic: _____ Phone: ( )_____ Paramedic Phone: ( )_____

Hospital Address: _____

Special Equipment: _____

Other: _____

ATTENDEES

Name Printed	Signature

Meeting conducted by:

_____ _____

Name Printed Signature

_____ _____

Supervisor Manager

DN/101394/EES/SENaaa.SHP

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG				
	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

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:

Industrial Hygiene Monitoring Results

Sample No.	Date	Employee	Social Security #	Contaminant Monitored	Analytical Results	
					mg/m^3	ppm

INTERNATIONAL TECHNOLOGY CORPORATION

COMBUSTIBLE GAS/OXYGEN METER CALIBRATION LOG

Project Name _____ Project No. _____

Date _____ Calibrated by _____

Instrument: Mfg/Model/Serial No. _____

Time	Battery Charged (Y/N)	Audible Alarm Check (Y/N)		Zero Checked (Y/N)		Calibration Standard	Calibration Standard (%)		Actual Meter Reading (%)		Ambient Air Rezero Check	
		LEL	O_2	LEL (0%)	O_2 (20.8%)		LEL	O_2	LEL	O_2	LEL (0%)	O_2 (20.8%)

Comments _____

_____

_____

_____

_____

INTERNATIONAL TECHNOLOGY CORPORATION

Photoionization Detector Calibration Log

Project Name _____ Project No. _____

Date _____ Calibrated by _____

Instrument: Mfg/Model/Serial No. _____

Time	Probe Type (eV)	Battery Charged (Y/N)	Calibration Standard	Calibration Standard Concentration (ppm)	Span Setting	Meter Scale Setting	Zeroed (Y/N)	Expected Meter Reading (ppm)	Actual Meter Reading (ppm)

Comments _____

_____

_____

INTERNATIONAL TECHNOLOGY CORPORATION

Real Time Aerosol Monitoring Log

Project Name _____ Project No. _____

Date _____

Sampled By	Instrument Type (Mfg/Model/ Serial No.)	Battery Charged (Y/N)	Zeroed (Y/N)	Sample Time		Sample Readings (mg/m^3)			Comments
				Start	Finish	TWA	Shift Average	Direct	

General Weather Conditions _____

INTERNATIONAL TECHNOLOGY CORPORATION

INTEGRATED AIR SAMPLING LOG

Project Name _____ Project Number _____

Date _____ Sampled by _____ Sample Method _____

Target Compounds _____

Sample No.	Employee/ Area Sampled	Job Title/Employee No./ Social Security No.	Pump Type/No.	Pre-Sample Flow Rate	Start Time	Stop Time	Total Time (Min)	Post Sample Flow Rate	Avg. Sample Flow Rate	Total Volume (Units)

Weather Conditions _____

Level of PPE (Specify) _____

Comments _____

INTERNATIONAL TECHNOLOGY CORPORATION

COLORMETRIC DETECTOR TUBE LOG

Project Name _____ Project No. _____

Date _____ Sampled by _____

Pump Type, Mfg/Model/Serial No. _____

Time	Detector Tube Type/ (Expiration Date)	Measurable Range	Pump Leak Test (Y/N)	Pump Strokes	Measured Concentration	Comments

Site Safety and Health Plan Amendments

Project Name:_____

Prepared by:_____ Date:_____

For Task Activity(ies):_____

Recommended SSHP Amendment:_____

Reviewer Comments:_____

Approved by:_____ Date:_____

INTERNATIONAL TECHNOLOGY CORPORATION

C&R SAFETY INSPECTION REPORT

DATE: _____ TIME FROM: _____ TO: _____

PROJECT NAME: _____ PROJECT NUMBER: _____

PROGRAM MANAGER: _____ PROJECT MANAGER: _____

GENERAL PROJECT DESCRIPTION: _____

SITE ACTIVITIES AT TIME OF INSPECTION: _____

_____

INTERVIEWED EMPLOYEE: _____

SAFETY ISSUE: _____

_____

CORRECTIVE ACTION: _____

_____

ASSIGNED TO: _____ FOLLOW-UP DATE: _____

CORRECTION VERIFIED: _____ DATE: _____

INTERVIEWED EMPLOYEE: _____

SAFETY ISSUE: _____

_____

CORRECTIVE ACTION: _____

_____

ASSIGNED TO: _____ FOLLOW-UP DATE: _____

CORRECTION VERIFIED: _____ DATE: _____

INSPECTION COMPLETED BY: _____ DATE: _____

HEALTH AND SAFETY REVIEW BY: _____ DATE: _____

INTERNATIONAL TECHNOLOGY CORPORATION

SAFETY INSPECTION CHECKLIST

	Not Applicable	Not* Acceptable	Acceptable		Not Applicable	Not* Acceptable	Acceptable
HEALTH AND SAFETY DOCUMENTATION				**SITE CONTROL**			
Tailgate Safety Meeting				Security Maintained			
Hot Work Permit				Clearly Marked Exclusion Zone			
Confined Space Entry Permit				Clearly Marked Contamination Reduction Zone			
Hospital Route Map				Clearly Marked Support Zone			
OSHA 200 Log				Sign In/Out Log			
MSDSs				Decontamination Procedures			
Air Monitoring Logs				Client Specific Passes			
Equipment Calibration Logs				**PERSONAL PROTECTIVE EQUIPMENT**			
Personnel Training Records				Hard Hats			
Personnel Medical Records				Safety Glasses			
Accident Forms				Steel-Toed Boots			
.mergency Phone Numbers				Gloves			
OSHA Job Protection Posters				Hearing Protection			
IT's H&S Policies and Procedures				Traffic Vests			
Client Specific Documentation				Faceshields			
H&S Plan Acknowledgement				Chemical Resistant Coveralls			
				Chemical Resistant Boots/Gloves			
EMERGENCY EQUIPMENT				Respiratory Protection			
Fire Extinguishers				Back Support Devices			
Shower/Eyewash				Chaps			
Alarm System				Lifelines/Harness			
Transport Vehicle				Welder's Hood w/ Hard Hat			
Communication System				Welder's Sleeves/Leathers			
First-Aid/CPR Provider				Personal Flotation Device			

INTERNATIONAL TECHNOLOGY CORPORATION

SAFETY INSPECTION CHECKLIST continued

	Not Applicable	Not* Acceptable	Acceptable		Not Applicable	Not* Acceptable	Acceptable
HOUSEKEEPING AND SANITATION				**ELECTRICAL**			
Adequate Illumination				GFCIs in Place			
Drinking Water/Disposable cups				Lockout/Tagout Procedures			
Sanitary Facilities				Equipment UL Listed or FM Approved			
Break Area				Adequate Clearance from Overhead Lines			
General Housekeeping				Grounding and Bonding			
Walkways Clear				Qualified Electricians			
				Uncompromised Insulation			
				Utility Markouts Completed			
VEHICLE/EQUIPMENT OPERATIONS				**HAND TOOLS**			
Record of Regular Inspection and Maintenance				Correct Tool Being Used for Job			
Safe Driver Training				Damaged Tools Repaired or Replaced			
Back-up Alarms				All Guards in Place			
Qualified Operators				Neat Storage, Safe Carrying			
Proof of Insurance				Grounded 3-Prong Plugs			
Wheels Chocked				**LADDERS**			
Brake Lights, Warning Devices Operative				Regular Inspections			
Weight Limits and Load Sizes Controlled				Secured at Top and Bottom			
DOT Requirements Met				Side Rails Extended 3 Feet Above Top of Landing			
Fire Extinguisher				Ladders Not Painted			
All Glass in Good Condition				Step Ladders Fully Opened When in Use			
SITE MONITORING				Safety Feet in Use			
Volatile Organics				Rungs not Over 1 Foot on Center			
Dust				Ladder Training			
Noise				Top of Step Ladder Not Used as Step			
Radiation							
Illumination							
Semi Volatile Organics							
Inorganic							

*Any "Not Acceptable" response must be documented on the corrective action form.

INTERNATIONAL TECHNOLOGY CORPORATION

SAFETY INSPECTION CHECKLIST CORRECTIVE ACTIONS

NOT ACCEPTABLE FINDINGS	CORRECTIVE ACTION	ASSIGNED TO	DATE ASSIGNED	DATE COMPLETED	VERIFIED BY

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 ☐ Ye

Doctor/Hospital name _____ Address_____

Witness name(s) _____ Statements attached? ☐ No ☐ Ye

Nature of injury _____ Exact body part_____

Medical attention: ☐ None ☐ First aid on site ☐ Doctor's office ☐ Hospital ER ☐ Hospitalize

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

MANAGER

Comments on incident and corrective action_____

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

HEALTH AND SAFETY

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

INTERNATIONAL TECHNOLOGY CORPORATION

VEHICLE ACCIDENT REPORT

FOR ADMINISTRATION USE ONLY

Date Claim Submitted _____

Agent _____

VEHICLE OPERATOR _____ Drivers License No. _____

Phone No. _____ S.S. No. ___ — ___ — ____

Address _____ City _____

Employer _____ Facility _____

DESCRIBE VEHICLE DAMAGE: _____

_____

Vehicle No. _____ Year _____ Make _____ Model _____ Plate No. _____

OTHER PARTIES' NAME: _____

Address _____ City _____

Phone No. _____ Drivers License No. _____ S.S. No. ___ — ___ — ____

OWNER'S NAME: (Check if same as driver ☐) _____

Address _____ City _____

Phone No. _____

OWNER'S INSURANCE CARRIER: _____ Policy No. _____

Address _____ City _____

DESCRIBE VEHICLE DAMAGE: _____

_____

Plate No. _____ Year _____ Make _____ Model _____

INJURED PARTIES (Complete also a Supervisors Employee Injury Report if an IT Employee):

1. Name _____ Phone No. _____

   Address _____ City _____

   Employer's Name & Address _____

2. Name _____ Phone No. _____

   Address _____ City _____

   Employer's Name & Address _____

WITNESSES:

1. Name _____ Phone No. _____

   Address _____ City _____

   Employer's Name & Address _____

2. Name _____ Phone No. _____

   Address _____ City _____

   Employer's Name & Address _____

DESCRIPTION OF ACCIDENT: **DATE:** / / **TIME:** _____

_____

_____

_____

_____ (continue on reverse side)

LOCATION OF ACCIDENT: _____

_____ City _____

POLICE OFFICER'S NAME: _____ DEPT: _____

Report Prepared By _____ _____ Date / /

Name Printed Signature

Manager _____

INTERNATIONAL TECHNOLOGY CORPORATION

GENERAL LIABILITY, PROPERTY DAMAGE, AND LOSS REPORT

FOR ADMINISTRATION USE ONLY

Date Claim Submitted

Agent

DIVISION/SUBSIDIARY _____ **DATE** / /

ADDRESS _____

HOW DID DAMAGE OR LOSS OCCUR: _____

DESCRIPTION OF DAMAGE OR LOSS: _____

IDENTIFICATION OF DAMAGED OR LOST PROPERTY: _____

LOCATION OF DAMAGED OR LOST PROPERTY (Before Loss): _____

DATE AND TIME OF DAMAGE OR LOSS: Date / / Time _____ AM PM

OWNER OF DAMAGED OR LOST PROPERTY:

Name _____ Phone No. _____

Address _____ City _____

Employer _____

INJURED PARTIES (Complete also a Supervisors Employee Injury Report if an IT Employee):

1. Name _____ Phone No. _____
   Address _____ City _____
   Employer's Name & Address _____
   Nature Of Injury _____
2. Name _____ Phone No. _____
   Address _____ City _____
   Employer's Name & Address _____
   Nature Of Injury _____

WITNESSES:

1. Name _____ Phone No. _____
   Address _____ City _____
   Employer's Name & Address _____
2. Name _____ Phone No. _____
   Address _____ City _____
   Employer's Name & Address _____

WERE PICTURES TAKEN ☐ YES ☐ NO

WERE POLICE NOTIFIED ☐ YES ☐ NO DEPT. _____

COMPLETED BY: _____ _____ Date / /
Name Printed Signature

Manager _____ Date / /
Signature

ITC FORM 9300.1-3 (May 1984) USE BACK SIDE IF NECESSARY

112-10-85

(For Safety Staff only)	REPORT NO	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT *(For Use of this Form See Attached Instructions and USACE Suppl to AR 385-40)*	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1 ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2 PERSONAL DATA

a. NAME *(Last,First,MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)*

3 GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(Military time))*	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME. (2) SUBCONTRACTOR
/ /			

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)*	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)*	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4 CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see instructions)*

a. CONSTRUCTION ACTIVITY	(CODE)	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE)

INJURY / ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see instructions)*

a. SEVERITY OF ILLNESS / INJURY	(CODE)	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE)	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE)
PRIMARY		TYPE	
SECONDARY			
f. NATURE OF ILLNESS / INJURY	(CODE)	SOURCE	(CODE)

6 PUBLIC FATALITY *(Fill in line and corresponding code number in box - see instructions)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE)	b. PERSONAL FLOATATION DEVICE USED?
		☐ YES ☐ NO ☐ N/A

7 MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)*	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)*	(1) FRONT SEAT			
		(2) REAR SEAT			

8 PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	b. OWNERSHIP	c. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9 VESSEL / FLOATING PLANT ACCIDENT *(Fill in line and corresponding code number in box from list - see instructions)*

a. TYPE OF VESSEL/FLOATING PLANT	(CODE)	b. TYPE OF COLLISON/MISHAP	(CODE)

10 ACCIDENT DESCRIPTION *(Use additional paper , if necessary)*

11 **CAUSAL FACTOR(S)** *(Read Instruction Before Completing)*

a. *(Explain YES answers in item 13)*	YES	NO
DESIGN: Was design of facility,workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE. Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES. Were operating procedures a factor?	☐	☐
JOB PRACTICES. Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc.,contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust,fumes,mists,vapors or physical agents, such as, noise,radiation,etc.,contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture,carrying,stooping,etc.,contribute to the accident?	☐	☐
SUPPORT FACTORS. Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT. Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion,was drugs or alcohol a factor to the accident?	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12 **TRAINING**

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	/ / *(Month) (Day) (Year)*

13. **FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES** *(See instruction for definition of direct and indirect causes) (Use additional paper, if necessary)*

a DIRECT CAUSE

b INDIRECT CAUSE(S)

14 **ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).**

DESCRIBE FULLY:

DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.

a. BEGINNING *(Month/Day/Year)* / /	b. ANTICIPATED COMPLETION *(Month/Day/Year)* / /

c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL
CORPS _____	___ / ___ / ___		
CONTRACTOR _____	___ / ___ / ___		

16. **MANAGEMENT REVIEW *(1st).***

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17 **MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)***

a. ☐ CONCUR b ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18 **SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW**

a ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS:

SIGNATURE	TITLE	DATE

19 **COMMAND APPROVAL**

COMMENTS

COMMANDER SIGNATURE	DATE

☆ U.S.G.P.O.: 1989- 626-113

GENERAL. Complete a separate report for each person who was *injured, caused,* or *contributed* to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the descretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16. and 17.

INSTRUCTIONS FOR SECTION 1— ACCIDENT CLASSIFICATION. *(Mark All Boxes That Are Applicable.)*

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.
   (1) INJURY/ILLNESS/FATALITY—Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.
   (2) PROPERTY DAMAGE—Mark the appropriate box if accident resulted in any damage of $1000 or more to government property (including motor vehicles).
   (3) VEHICLE INVOLVED—Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
   (4) DIVING ACTIVITY—Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.
   (1) INJURY/ILLNESS/FATALITY—Mark if accident resulted in any contractor lost-time injury/illness or fatality.
   (2) PROPERTY DAMAGE—Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property (including motor vehicles).
   (3) VEHICLE INVOLVED—Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
   (4) DIVING ACTIVITY—Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.
   (1) INJURY/ILLNESS/FATALITY—Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).
   (2) VOID SPACE—Make no entry.
   (3) VEHICLE INVOLVED—Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" is marked.
   (4) VOID SPACE—Make no entry.

INSTRUCTIONS FOR SECTION 2—PERSONAL DATA

a. NAME—(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.

b. AGE—Enter age.

c. SEX—Mark appropriate box.

d. SOCIAL SECURITY NUMBER—(FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).

e. GRADE—(FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE—For *government civilian employees* enter the pay plan, full series number, and job title, e.g. GS-0810/Civil Engineer. For *military personnel* enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For *contractor employees* enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc.,

g. DUTY STATUS—Mark the appropriate box.
   (1) ON DUTY—Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.
   (2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.
   (3) OFF DUTY - Person was not on official business at time of accident

h. EMPLOYMENT STATUS—(FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3—GENERAL INFORMATION

a. DATE OF ACCIDENT—Enter the month, day, and year of accident.

b. TIME OF ACCIDENT—Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).

c. EXACT LOCATION OF ACCIDENT—Enter facts needed to locate the accident scene. (installation/project name, building number, street, direction and distance from closest landmark, etc.,).

d. CONTRACTOR NAME
   (1) PRIME—Enter the exact name (title of firm) of the prime contractor.
   (2) SUBCONTRACTOR—Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER—Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT—Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW)—Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4—CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY—Select the *most appropriate* construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EQUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING IRRIGATION
25. INSULATION
26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT — Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE (ON VESSEL/BARGE)
4. CRANE (TRACKED)
5. CRANE (RUBBER TIRE)
6. CRANE (VEHICLE MOUNTED)
7. CRANE (TOWER)
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK (CONCRETE)
11. TRUCK (CONCRETE/TRANSIT MIXER)
12. DUMP TRUCK (HIGHWAY)
13. DUMP TRUCK (OFF HIGHWAY)
14. TRUCK (OTHER)
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR (UTILITY)
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 — INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY / ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

NOI NO INJURY
FAT FATALITY
PTL PERMANENT TOTAL DISABILITY
PPR PERMANENT PARTIAL DISABILITY
LWD LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA RECORDABLE FIRST AID CASE
NRI NON-RECORDABLE INJURY

b. ESTIMATED DAYS LOST — Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED — Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY — Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED — Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS/HIPS/ ANKLES/BUTTOCKS
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM (BREAST BONE)
	RV	VERTEBRAE (SPINE; DISC)
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury / illness from the list below. This nature of injury / illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury / illness name on the line and place the corresponding CODE letters in the box provided.

* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN.
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER; STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY — OTHER (EXCEPT DISEASE, ILLNESS)

**A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which doses not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	R9	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC—OTHER
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN
	DC	CEREBRAL VASCULAR CONDITION; STROKE
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)
	DE	EFFECT OF ENVIRONMENTAL CONDITION
	DH	HEARING LOSS
	DK	HEART CONDITION
	DM	MENTAL DISORDER, EMOTIONAL STRESS NERVOUS CONDITION
	DR	RADIATION
	DS	STRAIN, MULTIPLE
	DU	ULCER
	DV	OTHER VASCULAR CONDITIONS
	D9	DISABILITY, OTHER
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and So Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples.

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface)

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/ oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle..
TYPE: 800 (traveling in) SOURCE: 0421 (government-ow vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0510	CONTACTED WITH (INJURED PERSON MOVING)
0520	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0610	LIFTED, STRAINED BY (SINGLE ACTION)
0620	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN

CODE	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0150	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY

CODE	SOURCE OF INJURY NAME
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL—CORROSIVE
0712	DRY CHEMICAL—TOXIC
0713	DRY CHEMICAL—EXPLOSIVE
0714	DRY CHEMICAL—FLAMMABLE
0721	LIQUID CHEMICAL—CORROSIVE
0722	LIQUID CHEMICAL—TOXIC
0723	LIQUID CHEMICAL—EXPLOSIVE
0724	LIQUID CHEMICAL—FLAMMABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INANIMATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE	SOURCE OF INJURY NAME
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 — PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT—Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the *most* appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating—powered
3. Boating—unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities (skin diving, scuba, etc.)
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing (general)
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer (baseball, football, etc.)
24. Sports/winter (skiing, sledding, snowmobiling etc.)
25. Cycling (bicycle, motorcycle, scooter)
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts (fights, riots, vandalism, etc.)
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED—If fatality was water-related was the victim weanng a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7—MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE—Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION—Mark appropriate box.

c. SEAT BELT—Mark appropriate box.

INSTRUCTIONS FOR SECTION 8—PROPERTY/ MATERIAL INVOLVED

a. NAME OF ITEM—Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

b. OWNERSHIP—Enter ownership for each item listed. (Enter one of the following: *USACE; OTHER GOVERNMENT; CONTRACTOR: PRIVATE)*

c. $ AMOUNT OF DAMAGE—Enter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9—VESSEL/ FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT—Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/ floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP—Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN ON DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10—ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT—Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11—CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN—Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE—Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION—Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES—Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES—Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS—Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS—Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS—Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.,), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) OFFICE FACTORS—Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS—Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc?

(11) PERSONAL PROTECTIVE EQUIPMENT—Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL—Is there any reason to believe the person's mental or physical capabilities, judgement, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS—Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. *If one was performed, attach a copy of the analysis to the report.*

INSTRUCTIONS FOR SECTION 12—TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?—For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING—Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.

c. DATE OF MOST RECENT TRAINING—Enter the month, day, and year of the last *formal* training completed that covered the activity-task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13—CAUSES

a. DIRECT CAUSES—The direct cause is that single factor which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES—Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14—ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION—Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15—DATES FOR ACTION

a. BEGIN DATE—Enter the date when the corrective action(s) identified in Section 14 will begin.

b. COMPLETE DATE—Enter the date when the corrective action(s) identified in Section 14 will be completed.

c. TITLE AND SIGNATURE—Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE Supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.

d. DATE SIGNED—Enter the month, day, and year that the report was signed by the responsible supervisor.

e. ORGANIZATION NAME—For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

f. OFFICE SYMBOL—Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16—MANAGEMENT REVIEW (1st)

1ST REVIEW—Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17—MANAGEMENT REVIEW (2nd)

2ND REVIEW—The FOA Staff Chief (i.e., FOA Chief of Constructic Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sig date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18—SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW—The FOA Safety and Occupational Health Office sh review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc, are rectified by the responsib supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for revie comment, and signature.

INSTRUCTION FOR SECTION 19—COMMAND APPROVAL

4TH REVIEW—The FOA Commander shall (to include the person designated Acting Commander in his absence) review the complete report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority sha not be delegated.

FINAL
CHEMICAL SAMPLING AND ANALYSIS PLAN
SENECA ARMY DEPOT
ROMULUS, NEW YORK

CONTRACT NO. DACW45-94-D-0054
DELIVERY ORDER NO. 02
IT PROJECT NO. 519024

PREPARED BY:

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List of Acronyms

AA	Atomic Absorption Spectrophotometry
AIHA	American Industrial Hygiene Association
ARAR	Applicable or Relevant and Appropriate Requirements
AS	Semi-Automated Spectrophotometric Analysis (for cyanide)
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)
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)

1.0 Introduction/Project Description

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, Seneca Army Depot, Building 360 Steam Jenny Pit Closure, Seneca Army Depot, 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. 02, under Rapid Response contract number DACW45-94-D-0054. 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) Building 360 Steam Jenny Pit Closure 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) and applicable addenda.

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 Building 360 Steam Jenny Pit can be found in the Scope of Services document prepared by the USACE, Omaha District in September, 1994. Figure 1-1 presents a map of the Seneca Army Depot facility and surrounding areas.

Building 360 at the Seneca Army Depot is a building where old equipment is refurbished and reconstructed. Lathes, presses, and metal working machines are degreased with steam, high pressure water, and detergents in the cleaning area. Heavy metals, polychlorinated biphenyls (PCBs) and greases are some of the possible hazardous substances generated from cleaning

activities. After steam cleaning, the equipment is moved to other portions of Building 360 for rehabilitation.

1.3 Project Description

The Steam Jenny Pit at Building 360 of the Seneca Army Depot is subject to closure because the existing collection pit does not conform to current hazardous waste tank regulations and because it was indeterminate, based on inspections, to ensure that the pit did not leak. This project is designed to identify the extent of contamination within the steam jenny pit concrete floor and underlying soil and groundwater. Systematic concrete, soil and groundwater sampling and analyses will be implemented to assure proper decontamination and possible clean closure of the system.

In addition, the potential for groundwater contamination will be evaluated by the installation of two monitoring wells outside of Building 360. Groundwater samples from an existing nearby sump pump will also be collected and analyzed for contamination in order to assure protection to public health and the environment.

1.4 Project Objectives

The primary objectives of this project are to:

- Removal of wastewater from the accumulation pit under the decontamination pad and subsequent disposal at an approved hazardous waste disposal facility.
- Decontamination of metal grating on the surface of the concrete floor and place in storage at the project site for future reuse.
- Determine extent of contamination within the concrete floor and underlying soil and groundwater.
- Determine extent of surrounding groundwater contamination by installing two monitoring wells within the perimeter of Building 360 and subsequent collection of groundwater samples.
- Collection of groundwater samples from within the sump pump adjacent to the steam jenny pit cleaning area.

2.0 Project Organization and 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, 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 will be tasked with performing required sample 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 Project Data Quality Objectives

The generation of valid data required for closure of the steam jenny pit at Building 360 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, and to qualitatively evaluate the potential hazard to human health and the environment.

The intended uses of project chemical data include the following:

- Determine the extent of contamination within the concrete floor and underlying soil and groundwater.
- Determine the extent of groundwater contamination collected from the newly installed monitoring wells.
- Determine the extent of groundwater contamination collected from within the steam jenny pit cleaning area sump pump.

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 clean closure of the site and/or closing of the site as a landfill. 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 analyses of concrete, soil, and groundwater based on sample objectives, analytical methods, historical data, and published guidelines for EPA SW846 Protocol. Data Quality Objectives for sample media, as they relate to this project, are summarized on Table 3-1. Table 3-2 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.

4.0 Field Sampling Procedures

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 is outlined as follows:

- Collection of concrete, soil, and groundwater samples from the three test boring locations within the steam jenny pit area.
- Collection of groundwater samples from newly installed monitoring wells.
- Collection of groundwater samples from within the sump pump adjacent to the steam jenny pit cleaning area.

The field-sampling team will collect samples according to protocols defined in 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 concrete, soil, and groundwater 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 required sample containers, preservation and holding times are given in Table 4-2. A site map and the test boring sampling locations are shown in Figure 4-1. Monitoring well locations will be determined prior to field activities.

4.1 Field Activities

4.1.1 Test Boring Sampling

Three test borings and attendant concrete, soil, and groundwater sampling will be accomplished within the Building 360 steam jenny pit area. IT will first remove the existing surface metal grating with the appropriate equipment. The grating will be scrubbed with detergent and water and stored for reuse. The washing rinseate will be collected and disposed of as a hazardous waste.

The test boring sample collection protocol is as follows:

- Three concrete floor samples will be collected from each test boring location by usage of a circular saw and jackhammer. Concrete chip samples from the upper layer, middle layer, and lower layer will be placed in separate "ziploc" bags or glass jars with teflon-lined lids, labeled, and placed in a sample cooler.

- One soil sample, underneath the concrete floor, will be collected from each test boring location utilizing an auger and thin wall tube sampler in the following manner:

  - Using the auger bit, begin drilling and periodically remove accumulated soils to a depth of 12 inches below the bottom of the concrete.

  - Slowly and carefully remove the auger so that soil does not fall back into auger hole.

  - Remove the auger tip from the drill rod and replace with a decontaminated thin wall tube sampler.

  - Install proper cutting tip.

  - Carefully lower sampler into borehole.

  - Gradually force sampler into soil.
    (Care should be taken to avoid scraping borehole sides. Hammering the drill rods to facilitate coring should be avoided as the vibrations may cause the boring walls to collapse.)

  - Remove corer and unscrew drill rods.

  - Remove cutting tip and remove core from device.

  - Discard top of core (approximately 1 inch), which represents any material collected by the corer before penetration of the layer in question.

  - Place remaining core into soil sample containers and then into a sample cooler.

- One groundwater sample will be collected from each test boring location in the following manner:

- The auger shall then be used to remove soil/gravel to a depth of two feet below the groundwater surface. (It is anticipated that groundwater will be encountered within a depth of 4 feet below the accumulation pit.)

- The groundwater shall be pumped out to preclude the possibility of contamination from upper soil layers and allowed to settle for 24 hours prior to sampling.

- One sample of groundwater will be taken, with a weighted bottle, from each sample location. The samples should then be placed in a sample cooler.

4.1.2 Monitoring Well Installation and Sampling

In addition to the three test boings, two monitoring wells will be installed. One monitoring well will be placed upgradient of Building 360 and one downgradient. Once installation is complete, water samples will be collected from each well, placed in the appropriate containers, and placed in the sample cooler. In addition, groundwater samples from the two monitoring wells will be collected and sent for analysis once a month for the two months following well installation.

4.1.3 Sump Pump Sampling

One groundwater sample will be collected from an existing sump pump adjacent to the steam jenny pit cleaning area. The sample will be placed into appropriate containers and sent for analysis once a month for three months. The first sample of the three month period will be collected at the same time the monitoring well groundwater samples are collected.

4.2 Decontamination Procedures

Decontamination procedures for equipment used during drilling and sampling events are provided in the following sections.

4.2.1 Drilling Equipment Decontamination Procedures

The drilling rig and associated tools will be decontaminated before entering the project site. All drilling equipment will be decontaminated between boreholes to prevent cross contamination. The drill rig should be cleaned as described below:

- The engine and power head should be cleaned with a power washer or steam jenny, or hand washed with a brush and detergent (does not have to be laboratory detergent but

should not be a degreaser) to remove oil, grease, and hydraulic fluid from the exterior of the unit. These units should be rinsed thoroughly with tap water.

- All auger flights, auger bits, drilling rods, drill bits, hollow-stem augers, or other parts of the drilling equipment will be cleaned with a power washer or steam jenny or cleaned as outlined below:

  - Wash equipment thoroughly with Alconox or equivalent laboratory grade detergent and hot water using a brush to remove any particulate matter or surface film

  - Rinse equipment thoroughly with tap water

The drill rig will also be inspected for any leakage of hydraulic fluid, oil, transmission fluid or other organic compound which could possibly contaminate the soils. The rig will be filled with gasoline or diesel fuel before being brought to the drilling site. Once the drill rig is brought to the site, it will be assumed that the surface soils are contaminated and no equipment will be set down on the ground where it could be contaminated. Clean plastic sheeting, or cardboard will be placed on the ground to provide a work surface for each hole. Sampling equipment will be wrapped in aluminum foil until use and be re-wrapped in aluminum foil after decontamination prior to the next use.

The materials that will enter the boreholes (augers, rods, etc.) will be carefully cleaned as outlined above. Any split spoons used for sample collection and/or visual soil classification will be decontaminated after each sampling drive using the Alconox, tap water, distilled water procedure with the addition of a final deionized water rinse.

Drilling personnel will wear appropriate protective clothing as required by the Health and Safety Plan. These measures will not only protect the driller, but will also protect the hole from cross contamination. All protective equipment (gloves, boots, etc.) will be decontaminated before reuse or disposal, using the procedure outlined earlier.

The drill rig, tools, and other drilling equipment will be cleaned and decontaminated before leaving the site.

A decontamination area will be established for the preparation and breakdown of sampling equipment. A dedicated decontamination pad will be constructed to accommodate drill rig

decontamination and to collect decontamination water for subsequent pumping into 55 gallon drums or a tank for disposal. The pad will be of sufficient size as to allow the drill rig to be driven onto the pad and be steam cleaned along with the associated drilling equipment.

A small decontamination area will also be set up at each sampling site. Tubs will be set up in the decontamination area to decontaminate smaller pieces of equipment such as stainless steel spoons and trays. This area does not have to be a self contained area with a pump system but all water that has been used for decontamination at this location will be drummed and held on-site.

4.2.2 Decontamination of Sampling Equipment

Sampling equipment, including split-spoons, hand-trowels, stainless steel bowls, shovels, and associated equipment, will be decontaminated between sample intervals either directly at the sample location or at the primary decontamination area. The decontamination procedure for equipment used in collection of samples for chemical analyses will be as follows:

- Wash with Alconox or equivalent laboratory grade detergent
- Rinse in potable water
- Rinse with distilled water
- Rinse with deionized water
- Air dry

After decontamination, the sampling devices will be wrapped in aluminum foil to prevent contamination during handling.

4.3 Sample Packaging and Shipment

Volatile Organic Analysis (VOA) sample vials (two or three vials per sample, depending on the type of analysis) will be packed together in bubble wrap and secured with a rubber band or tape. Bubble-wrapped VOA vial pairs or triplicates will be placed in one "ziplock" bag. Sealed samples in glass containers will be placed in individual "ziplock" bags. Concrete samples in "ziplock" bags or glass jars with teflon-lined lids will be placed in an additional "ziploc" bag.

Samples will be packed inside the ice cooler with bubblewrap to prevent breakage of the glass containers. Vermiculite will also be used as an absorbing material in the event of sample

container breakage. Ice cubes or blue ice, double-sealed in ziplock bags (blue ice will not be used unless double-sealed in a ziplock bag), will be added to the top of the cooler. A chain-of-custody form will be completed, sealed in a ziplock bag, and taped to the inside of the cooler lid. The cooler will be taped shut with strapping or duct tape in two locations, and two custody seals will be taped across the cooler lid, one in the front and one in the back. The samples will then be shipped or hand delivered to the analytical laboratory.

Samples will be delivered to the laboratory within 24 hours after the samples are collected. Samples that cannot be shipped the same day will be properly preserved (on-ice) and custody will be maintained in a locked area or vehicle.

If samples are shipped via commercial carrier, the following additional packaging procedures will be followed:

- Determine the maximum weight allowed per package by shipper (if applicable);
- Complete the shipping form for the courier and retain it as part of permanent documentation;
- Place the laboratory address on top of cooler;
- Place "This Side Up" labels on all four sides and "Fragile" labels on at least two sides and,
- Custody seals will be placed over the lid of each sample cooler.

Sample shipments that would be received on a Saturday must be cleared with the laboratory in advance to make sure that the samples can be received and that holding times will not be exceeded.

The analytical laboratory for Building 360 Steam Jenny Pit, Seneca Army Depot is to be chosen pending the project start date. The two laboratories of choice are listed as follows:

- Quanterra Laboratories
  5103 Old William Penn Highway
  Export, PA 15632

Point of Contact: Carrie Gambler-Smith
Phone: (412) 731-8806

- Eastman Kodak - Chemicals Quality Services
  Kodak Park, Building 34
  Rochester, New York 14652-3708
  Point of Contact: Mr. Richard Schumacher
  Phone: (716) 722-3295

5.0 Sample and Document Custody Procedures

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.

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 an example of 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.

Laboratory personnel will comply with all internal laboratory chain-of-custody procedures as outlined in the laboratory's standard practices manual.

Samples and extracts are to be retained by the laboratory for six (6) months following data submission. The laboratory will provide disposal of the samples after the designated retention period has expired.

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.

6.0 Calibration Procedures and Frequencies

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, dust/aerosol monitor, OVAs and LEL/oxygen meters, 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 EPA SW846 analytical methodology 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.

7.0 Analytical Procedures

Laboratory analytical procedures used for this project will be selected from those listed in Table 7-1. 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 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 Concrete, Soil and Water Samples

The consistency of analytical measurements over the period of project performance is critical. The analytical protocol to be utilized for this project is EPA SW-846. Laboratory analytical methods and quality control procedures are referenced in EPA SW846 requirements. All laboratory analytical methods will strictly follow SW846 procedures. The analytes and detection limits required for this project will conform to the EPA SW846 methodology. 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.

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.

Analytical data deliverables are to be received within ten business days from the time of sample receipt in the Laboratory. Analytical data reportables are to be received within twenty-one business days from the time of sample receipt in the Laboratory.

8.0 Data Reduction, Validation, and Reporting

The following sections describe the protocols to be used in data reduction, verification, analysis and management for the B360 steam jenny closure project.

8.1 Data Reduction

The data reduction procedures given by USEPA, 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 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 EPA 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.

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 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 applicable EPA validation guidance documents will be used to validate the analytical data.

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 USEPA reporting forms 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.

9.0 Internal Quality Control and Frequency

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.

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. Blank and field duplicate analyses must meet criteria as specified in SW846 protocol.

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 SW846 protocol.

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 specified in SW846 protocol. Criteria that initial calibrations and calibration checks must meet are detailed in the methodologies. All laboratory QC checks will follow strict methodologies for all analyses. For non-CLP 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 specified in SW846 protocol.

Analytical blanks (ICB and CCB) are required by inorganic 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." SW846 protocol defines accuracy criteria for organic constituents in the MS and 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. SW846 protocol defines 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. SW846 protocol 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 target organic compounds will have surrogate compounds added to it before analysis on extraction, if applicable. The recovery of these samples aids the analyst in determining matrix effects on recovery of compounds in each sample. SW846 protocol defines 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. SW846 protocol defines LCS acceptance criteria for inorganic 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 methods; and 4) tuning of GC/MS systems every 12 hours to meet '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.

10.0 Performance and System Audits

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. 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.

12.0 Data Assessment Procedures

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, 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 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:

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

where:

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.

$$RPD = \frac{D_1 - D_2}{\left(\frac{D_1 + D_2}{2}\right)} \times 100\%$$

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. 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 USEPA QC Criteria

Approved USEPA 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 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 defined in SW846 protocol.

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 standard mixes and recovery limits to be used for matrix spike analysis. These

criteria are detailed in SW846 protocol. Matrix spike analysis will be performed at a frequency of one per group of twenty or fewer investigative samples or SDG per matrix.

13.0 Corrective Action

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.

14.0 Quality Assurance Reports to Management

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.

15.0 References

ANSI/ASME. NQA-1, Quality Assurance Program Requirements for Nuclear Facilities.

Code of Federal Regulations. Title 10 Part 50, Appendix B.

IT Corporation. IT Corporation Engineering Operations QA Manual, Revision 2, July 1, 1994.

USACE. 1990. Chemical Data Quality Management for Hazardous Waste Remedial Activities, ER-1110-1-263, October 1990.

USACE. 1994. Draft Scope of Services,Rapid Response, Ash Landfill Removal Action - Phase 1. USACE, Omaha District, August, 1994.

USEPA. 1983b. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans." EPA/QAMS -005/08.

USEPA. 1987. "Data Quality Objectives for Remedial Response Activities," USEPA/540/G-87-003.

USEPA. 1990a. "USEPA Contract Laboratory Program Statement of Work for Organic Analysis." March 1990 and subsequent revisions.

USEPA. 1990b. "USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis." March 1990 and subsequent revisions.

USEPA. 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Rev. #8. U.S. EPA Region II. January, 1992.

USEPA. 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Rev. XI, USEPA Region II. January, 1992.

Tables

TABLE 3-1
DATA QUALITY OBJECTIVES

DQO Parameter	Objective
Precision	Per method requirements as specified in SW846
Accuracy	Per method requirements as specified in SW846
Sensitivity	See section 9 of the CSAP
Representativeness	Volatile Organic Compounds < 50% RPD (water), < 50% RPD (soil)
	Semivolatile Organic Compounds < 50% RPD (water), < 50% RPD (soil)
	PCBs < 50% 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
DATA QUALITY OBJECTIVE LEVELS FOR ANALYSES AND MEASUREMENTS

DATA USE	TECHNIQUE	SAMPLE MATRIX	APPROPRIATENESS	DQO LEVEL[1]
Health & Safety Field Personnel Protection	OVA / LEL / Miniram Screening	Air	Surface concrete, soil, groundwater and cuttings from borings.	Level I
Characterization of all groundwater	Volatile Organic Analysis	Water	Groundwater	Level III
Characterization of all groundwater	Semivolatile Organic Analysis	Water	Groundwater	Level III
Characterization of all groundwater	PCBs	Water	Groundwater	Level III
Characterization of all groundwater	Metals	Water	Groundwater	Level III
Characterization of test boring soil	Volatile Organic Analysis	Soil	Soil from test borings	Level III
Characterization of test boring soil	PCBs	Soil	Soil from test borings	Level III
Characterization of test boring soil	Metals	Soil	Soil from test borings	Level III
Characterization of test boring concrete	PCBs	Concrete	Concrete from test borings	Level III
Characterization of test boring concrete	Metals - TCLP	Concrete	Concrete from test borings	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 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.

TABLE 4-1
SUMMARY OF ANALYTICAL CHEMISTRY PROGRAM

Matrix	Number of Samples	Parameters	FD	FB	TB	RB
Concrete	9	PCBs	0	NA	NA	1
		TCLP - Metals (Cd, Cr, Pb Only)	0	NA	NA	0
Soil	3	Volatile organics	1	1	A	1
		PCBs	1	NA	NA	1
		Metals (Cd, Cr, Pb Only)	1	NA	NA	1
Water	12	Volatile organics	3	3	A	3
		Semivolatile organics	3	NA	NA	3
		Metals (Cd, Cr, Pb, Only)	3	NA	NA	3
		PCBs	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.

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	2 x 40 ml glass VOA vials; teflon-lined septum	HCL	14 d to analysis
	Soil	2 x 4 oz. glass jars; teflon lined cap	Cool 4°C	14 d to analysis
Semivolatiles	Water	2 x 500 ml. amber glass bottle; teflon-lined cap	Cool 4°C	14 d to extraction/40 d to analysis
PCBs	Concrete	4 oz. glass jar; teflon-lined cap or "ziplock" bag	Cool 4°C	14 d to extraction/40 d to analysis
	Water	2 x 500 ml. amber glass bottle; teflon-lined cap	Cool 4°C	7 d to extraction/40 d to analysis
	Soil	4 oz. amber glass jar; teflon-lined cap	Cool 4°C	14 d to extraction/40 d to analysis
Inorganics				
Metals	Water	1000 ml polyethylene bottle; poly or teflon-lined cap	HNO^3 to pH<2, Cool 4°C	180 d to analysis
	Concrete	1 x 4 oz. glass jars; teflon-lined cap or "ziplock" bag	Cool 4°C	180 d to analysis
	Soil	1 x 4 oz. glass jars; teflon-lined cap	Cool 4°C	180 d to analysis
Other				
TCLP Metals	Concrete	1 x 4 oz. glass jars; teflon-lined cap	Cool 4°C	180 d to analysis

Notes:
1. Holding times are from verified time of sample receipt (VTSR) and the same for concrete, water and soil.

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 - SW846	Extraction Method	Method
Concrete	PCBs	3540/3550	8080
	TCLP Metals (Cd, Cr, Pb Only)	1311	6010/7000 series
Soil	Volatile Organic Analysis	NA	8240
	PCBs	3540/3550	8080
	Metals (Cd, Cr, Pb Only)	3050/3040	6010/7000 series
Water	Volatile Organic Analysis	NA	8240
	Semivolatile Organic Analysis	3510/3520	8270
	PCBs	3510/3520	8080
	Metals (Cd, Cr, Pb Only)	3005/3010/3020	6010/7000 series

NA - Not Applicable

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			CRQL	
	Water (µg/L)	Soil (µg/kg)		Water (µg/L)	Soil (ug/kg)
Phenol	10	330	N-nitrosodiphenylamine	10	330
bis(2-Chloroethyl)ether	10	330	4-Bromophenyl-phenylether	10	330
2-Chlorophenol	10	330	Hexachlorobenzene	10	330
1,3-Dichlorobenzene	10	330	Pentachlorophenol	25	800
1,4-Dichlorobenzene	10	330	Phenanthrene	10	330
1,2-Dichlorobenzene	10	330	Anthracene	10	330
2-Methylphenol	10	330	Carbazole	10	330
2,2'-oxybis(1-Chloropropane)*	10	330	Di-n-butylphthalate	10	330
4-Methylphenol	10	330	Fluoranthene	10	330
N-Nitroso-di-n-dipropylamine	10	330	Pyrene	10	330
Hexachlorethane	10	330	Butylbenzylphthalate	10	330
Nitrobenzene	10	330	3,3'-Dichlorobenzidine	10	330
Isophorone	10	330	Benzo(a)anthracene	10	330
2-Nitrophenol	10	330	Chrysene	10	330
2,4-Dimethylphenol	10	330	bis(2-Ethylhexyl)phthalate	10	330
bis(2-Chloroethoxy)methane	10	330	Di-n-octylphthalate	10	330
2,4-Dichlorophenol	10	330	Benzo(b)fluoranthene	10	330
1,2,4-Trichlorobenzene	10	330	Benzo(k)fluoranthene	10	330
Naphthalene	10	330	Benzo(a)pyrene	10	330
4-Chloroaniline	10	330	Indeno(1,2,3-cd)pyrene	10	330
Hexachlorobutadiene	10	330	Dibenz(a,h)anthracene	10	330
4-Chloro-3-methylphenol	10	330	Benzo(g,h,i)perylene	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			

* 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)

PCBs

	CRQL Water (µg/L)	CRQL Soil (µg/kg)
Aroclor-1016	0.1	33.0
Aroclor-1221	0.1	67.0
Aroclor-1232	0.1	33.0
Aroclor-1242	0.1	33.0
Aroclor-1248	0.1	33.0
Aroclor-1254	0.1	33.0
Aroclor-1260	0.1	33.0

INORGANIC ANALYTES

	CRDL Water (µg/L)	CRDL Soil (mg/kg)
Aluminum	200	40
Antimony	60	12
Arsenic	10	2
Barium	200	40
Beryllium	5	1
Cadmium	5	1
Calcium	5000	1000
Chromium	10	2
Cobalt	50	10
Copper	25	5
Iron	100	20
Lead	3	0.6
Magnesium	5000	1000
Manganese	15	3
Mercury	0.2	0.1
Nickel	40	8
Potassium	5000	1000
Selenium	5	1
Silver	10	2
Sodium	5000	1000
Thallium	10	2
Vanadium	50	10
Zinc	20	4
Cyanide	10	5

Notes:

CRDL = Contract Required Detection Limits
CRQL = Contract Required Quantitation Limits
RL = Laboratory Specific Reporting Limit

Figures

Attachment A-1

Attachment A-2

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.

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 29CFR1910.120, 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 - 1988 - *Project Hydrogeologist, O.H. Materials Corporation, Findlay, Ohio/Sacramento, 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 - 1985 - *Well Site Geologist, Hywell Inc., Belpre, Ohio.* Provided technical supervision for 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

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

Sandra S. Tersegno

Professional Qualifications

Ms. Tersegno has experience in the environmental consulting and environmental analytical fields. Her area of expertise includes environmental site assessments, federal and state regulations, waste management and disposal, and environmental analytical chemistry. Ms. Tersegno expertise has been supplemented with formal training in the following fields: Hazardous Waste Management - RCRA Compliance Standards, RCRA Land Disposal Restrictions, Hazardous Waste Transport, Hazardous Waste Supervisory Training, and OSHA 40-hour training.

Education

B.S., Zoology, University of Georgia, Athens, Georgia; 1987

Experience and Background

1990 - Present ***Environmental Engineer/Scientist, IT Corporation, Rochester, New York.*** Responsible for the management of excavated material at an inactive hazardous waste site in western New York and the participation in various engineering/remedial projects. Accomplishments include:

- Material Management Program - Work with clients to ensure compliance with state and federal regulations. Develop site specific sampling schemes and work plans. Perform environmental site assessments on excavation sites to determine material classification for proper disposal. Assist in the management of solid and hazardous waste disposal. Administer quality assurance duties including technical editing of work plans and reviewing soil/debris waste profiles prior to final disposal. Assist in development of Corrective Action Material Management Plan. Assist in field sampling activities.

- Perform data validation on analytical data packages for a remediation and remedial investigation projects.

- Assist in development and preparation of remediation project work plans including site specific sampling QA/QC plans.

- Negotiate contracts with environmental laboratories regarding environmental analytical services.

- Assist in proposal writing and client presentations.

1989 - 1990 ***Environmental Organic/Inorganic Chemist, General Testing Corporation, Rochester, New York.*** Analyzed soil and water samples for volatile organic and inorganic parameters following EPA methodology. Calculated parameter levels for

incorporation into a final report.

1987 - 1989 ***Environmental Inorganic Chemist, Law Environmental National Laboratories, Atlanta, Georgia.*** Analyzed soil and water samples for various inorganic parameters following EPA methodology. Functioned as a Sample Control Coordinator. Assisted in field sampling activities.

Professional Affiliations

American Chemical Society

Michael J. Capacci

Professional Qualifications

Mr. Capacci is an experienced analytical chemist with particular expertise in field sampling and analytical methodologies. He is also experienced in database design and development. Mr. Capacci has been involved in several extremely large RI/FS projects and has been responsible for sampling plan development, testing, program development, and field analytical/screening activities.

Education

M.S., Analytical Chemistry, University of Tennessee, Knoxville, Tennessee; 1986
B.S., Biochemistry, Niagara University, Niagara Falls, New York; 1982

Experience and Background

1991 - Present — ***Analytical Project Manager, IT Corporation, Rochester, New York.*** Provides technical and administrative guidance for field sampling specialists. Responsible for the development of sampling and analysis strategies to assure compliance with applicable state and federal regulations. Ensures compliance with Company Safety and Quality Assistance Programs. In his current capacity as a field analytical sampling QA/QC coordinator for a large film processing development company, his responsibilities include:

- Developing and reviewing all analytical testing programs for the on-site soil management team.
- Preparing/reviewing all disposition reports, regulatory review for hazardous waste determination, and comparison of health-based soil classification criteria.

1987 - 1991 — ***Field Analytical Chemist, Field Analytical Services, IT Corporation, Knoxville, Tennessee.*** Responsible for development and implementation of sampling and field analytical projects. Assignments and key experience include:

- Developing and implementing computerized sample tracking system for large RI/FS in Fernald, Ohio.
- Developing sampling work plans.
- Sampling and analysis of soil-gas with portable GC screening devices.

1985 - 1987 — ***Research Associate, Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee.*** Conducted field measurements of priority pollutants in indoor environments.

Supervised field technicians. Helped coordinate hazardous waste screening project using GC analysis for VOCs/PCBs. Assisted with the development of new groundwater/soil measurements techniques.

1982 - 1985 ***Graduate Teaching/Research Assistant, University of Tennessee, Knoxville.*** Served as undergraduate instructor for general and analytical chemistry.

Publications

Capacci, M.J. and M.J. Sepaniak, 1986, "Biological Sample Injection for Open Tubular Liquid Chromatography, "*Journal of Liquid Chromatography*, Vol. 9.

Capacci, M.J., December 1986, "Microscale Biosampling for Open Capillary Liquid Chromatography," Masters Thesis, University of Tennessee at Knoxville.

Balchunas, A.T., M.J. Capacci, et al., 1985, "Dynamically Modified Capillary Columns for Liquid Chromatographic Separations of Biological Compounds, "*Journal of Chromatographic Science*, Vol. 23.

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

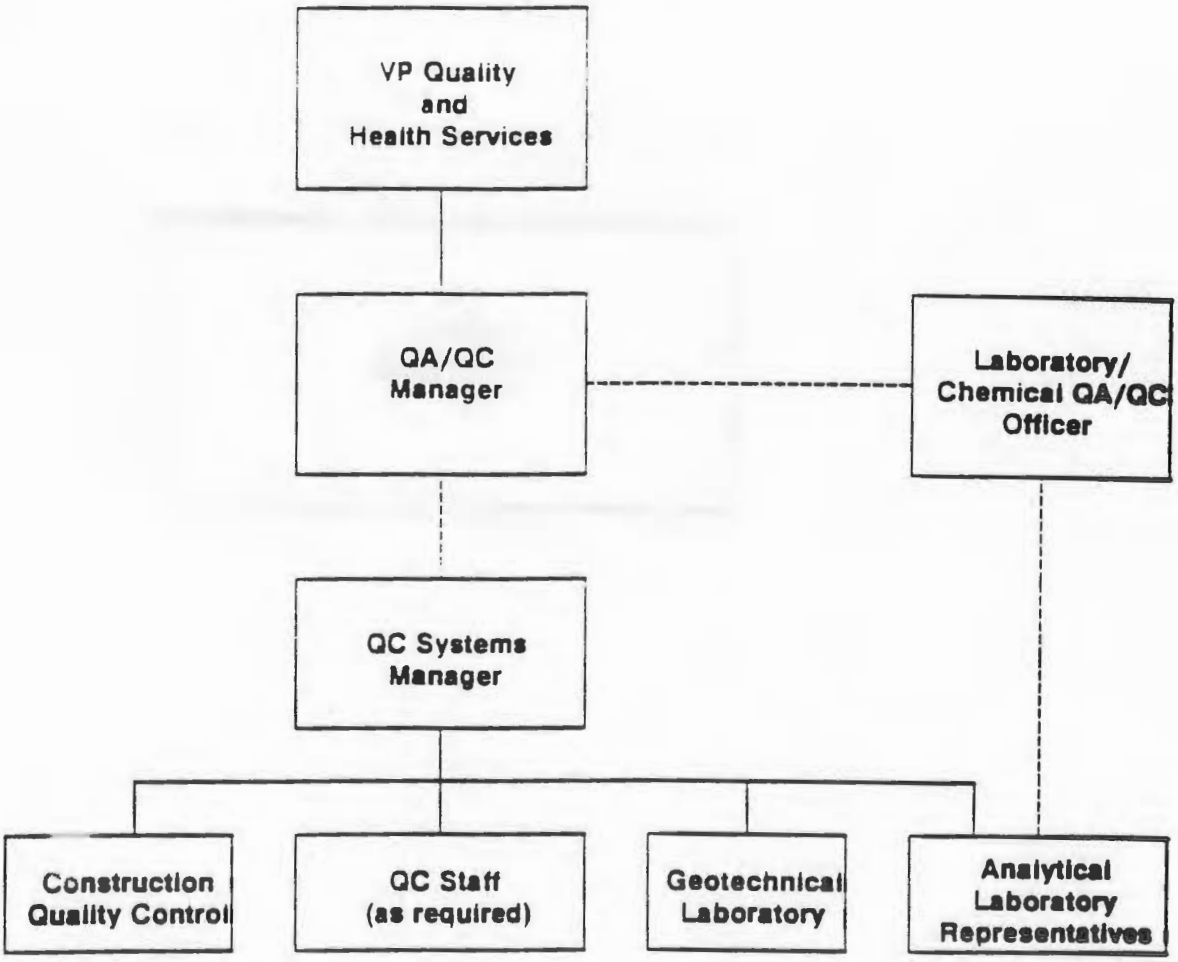


Figure 3.3-1

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 _____ DATE: _____
Quality Control Representative

8 CORRECTIVE ACTION VERIFICATION:

IMPLEMENTED BY: _____ DATE: _____

VERIFIED _____ 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
			Req	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
	3.1	Diversion	x		x		x	include all stormwater management
	3.2	Contamination control	x		x		x	activities.
	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:

_____

_____

_____

_____

_____

_____ _____

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:

_____

_____

_____

_____

_____

_____ _____

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			

BUILDING 360 CLOSURE PLAN

SENECA ARMY DEPOT ACTIVITY
ROMULUS
N.Y.

July 1, 1994

TABLE OF CONTENTS

I. FACILITY CONDITIONS

A. General Information
B. Equipment
C. Schedule of Closure

II. WASTE REMOVAL

III. SAMPLING

IV. TESTING

V. QUALITY ASSURANCE/QUALITY CONTROL

VI. DECONTAMINATION PROCEDURES FOR FINAL CLOSURE

A. General
B. Decontamination
C. Equipment
D. Run-off, Run-on

VII. HAZARDOUS WASTE DISPOSAL

VIII. ABANDONMENT/CONSTRUCTION

IX. CERTIFICATION

APPENDIX 1 - QUALITY ASSURANCE PROJECT PLAN

APPENDIX 2 - LAB ANALYSIS RESULTS AND FLUID LEVEL RECORDS

SENECA ARMY DEPOT
BUILDING 360 CLOSURE PLAN
STEAM JENNY PIT

I. FACILITY CONDITIONS

A. General Information

The objective of closing the Steam Jenny Pit at Building 360 at the Seneca Army Depot is that the existing hazardous collection pit does not conform to current hazardous waste tank regulations and because it was indeterminate, based on inspections, to ensure that the pit did not leak. The objective is also to identify the extent of possible contaminations and to use this plan as a guide to decontaminate or remove hazardous substances. Systematic sampling, testing and quality control procedures will be implemented to assure proper decontamination and possible abandonment of the system. This objective does not include the remediation of contaminated ground water. If necessary, this will be done in the future as part of remedial work accomplished through either Seneca's Interagency Agreement (IAG) with the New York State Department of Environmental Conservation (DEC) and the Environmental Protection Agency (EPA), or a post-closure permit to be issued by DEC.

Building 360 at the Seneca Army Depot is a building where old equipment is refurbished and reconstructed. Lathes, presses, metal working machines are degreased with steam, high pressure water and detergents in the cleaning area. Heavy metals, PCB's and greases are possible hazardous substances generated from the equipment. After steam cleaning the equipment is moved to other portions of Building 360 for rehabilitation.

The existing cleaning area is a 20'- 6" wide by 38'- 6" long portion of Building 360 separated from the rest of Building 360 by a high bay cinder block wall. Track mounted carts carrying the equipment to be refurbished, are rolled into the cleaning area, through a roll-up-door, on a permanently-installed rail system. Metal grating has been placed adjacent to and in the middle of the rail system. The floor slopes to the metal grating.
(Refer to the attached sketch titled "Building 360 Partial Plan".)

Under the metal grating is a trench system which slopes from a depth of 2'- 0" on the west end to a depth of 2'- 10" toward the east end. (Refer to the attached sketch titled

"Section B".) Water and grease flow through the trench system to an accumulation pit at the east end. This pit is constructed with openings through both rail foundation walls. The pit depth is 3'- 4~ under the metal grating. The width of the pit is 0'- 6". The pit length is 3'- 0". (See attached sketches titled "Section A" and "Section B".) The accumulation pit is emptied into approved waste removal vehicles and disposed of as hazardous waste at an approved storage facility.

Since cleaning operations ceased on January 2, 1990, Seneca has periodically monitored the depth of water in the accumulation pit to determine if water levels in the pit are affected by varying groundwater levels. Seneca has also periodically rinsed the pit and disposed of the rinseate as hazardous waste but has never had the pit tested after rinsing for contamination. A manifest detailing information on the removal and disposal of the final volume of waste is included at the end of this report. An analysis of sludge from the bottom of the pit and water in the pit was completed in 1987. A copy of the results of this laboratory analysis is included in APPENDIX 2.

B. Equipment

The equipment used in the cleaning process is a track-mounted cart. Also, equipment to be cleaned can either be hand-carried or transported via dollies into the cleaning area. There is no available inventory of equipment which has been cleaned in Building 360.

C. Schedule of Closure

The cleaning of equipment in Building 360 cleaning area ceased prior to January 2, 1990. According to 6NYCRR Part 373-3.7(d)(2), all closure activities must be completed within 180 days after approval of the closure plan. A schedule of closure activities including a timetable is provided at the end of this report. Note that groundwater remediations are NOT included in this schedule.

II. WASTE REMOVAL

The volume of waste which can accumulate in the tank up to the two-foot freeboard marker is 1200 gallons. If the accumulate pit is filled to floor level, waste volume is approximately 5,000 gallons. In the past, the waste was pumped from the accumulation pit into an approved tank truck and transported to an approved hazardous waste disposal facility. Currently, the cleaning area is not being used.

The wastewater contains oil, water, detergent, grease, dirt, traces of "stoddard" solvent, paint thinner, paint chips, metal fillings and PCB's.

The quantities and dates of removal are indicated as follows:

June 16, 1983	5,000 Gal.
June 23, 1983	5,000 Gal.
March 9, 1984	5,000 Gal.
June 22, 1984	5,000 Gal.
August 12, 1985	5,000 Gal.
July 9, 1986	5,000 Gal.
September 30, 1986	4,500 Gal.
January 26, 1988	4,107 Gal.
January 27, 1988	4,107 Gal.
June 17, 1988	3,700 Gal.
October 26, 1988	3,700 Gal.
October 27, 1988	1,420 Gal.
December 21, 1988	4,775 Gal.
January 2, 1990	2,000 Gal.

A copy of the manifest detailing information on the removal and disposal of the final volume of waste is included at the end of this report. An analysis of sludge in the bottom of the pit and water in the pit was completed in 1987. A copy of the laboratory analysis results and fluid level records is included in Appendix 2 of this plan.

III. SAMPLING

Existing metal grating will be removed with wrenches and torches. The grating will be scrubbed with detergent and water and stored for reuse. The rinseate will be wet-vacuumed and disposed of as a hazardous waste.

Samples will be taken at locations shown on the attached sketches. The concrete flooring of the accumulation pit will be saw-cut and jackhammered for the thickness of the concrete.

Sampling Scheme: The middle of each of the three trenches are approximately 4 ft. on-center. Three samples will be taken on the centerline of the center trench. The samples will be taken 8 ft. apart. (See the attached sketch titled "Building 360 Sampling Plan".)

The Building 360 Sampling Plan sketch has been divided into a 4 ft. x 8 ft. grid. The 4 ft. (east-west) grid lines have been labeled A, B, C, D, and E. The 8 ft. (north-south) grid lines have been labeled 1, 2, and 3. Samples will be taken taken at location C-1, C-2 and C-3.

Sampling procedures are outlined on the following page. The concrete will be saw-cut and jackhammered at each sample location. Concrete chip samples from the upper layer, middle layer and lower layer will be placed in a "ziploc" bag, labeled and sent to the laboratory for analysis. Undisturbed samples from the soil/gravel strata below the concrete will be taken with an auger and thin wall tube sampler.

1. Using the auger bit, begin drilling and periodically remove accumulated soils to a depth of 12 inches below the bottom of the concrete.
2. Slowly and carefully remove the auger so that soil does not fall back into auger hole.
3. Remove the auger tip from the drill rod and replace with a decontaminated thin wall tube sampler.
4. Install proper cutting tip.
5. Carefully lower sampler into borehole.
6. Gradually force sampler into soil. (Care should be taken to avoid scraping borehole sides. Hammering the drill rods to facilitate coring should be avoided as the vibrations may cause the boring walls to collapse.)
7. Remove corer and unscrew drill rods.
8. Remove cutting tip and remove core from device.
9. Discard top of core (approximately 1 inch), which represents any material collected by the corer before penetration of the layer in question.
10. Place remaining core into sample container.

The auger shall then be used to remove soil/gravel to depth two feet below the groundwater surface. The groundwater shall be pumped out to to preclude the possibility of contamination from upper soil layers and allowed to settle for 24 hours prior to sampling. It is anticipated that groundwater will be encountered within a depth of 4 feet below the accumulation pit. One sample of groundwater will be taken, with a weighted bottle, from each sample location and sent to a laboratory for analysis. Field samples will be screened using a photo-ionization detector. The sample locations will be backfilled with new crushed gravel and non-shrink grout.

Monitoring wells will be installed, if groundwater testing or soil sampling indicate concentrations of hazardous materials' in excess of the allowable limits stated in the testing section of the closure plan. Two fifteen foot deep monitoring wells will be installed. One monitoring well will be placed upgrade of Building 360, and one monitoring well is to be placed downgrade of Building 360.

An existing sump pump adjacent to the cleaning area in Building 360 is used to relieve groundwater levels. This pump will be used as a monitoring location. Groundwater will be sampled and tested once a month for three months.

The remediation plan, in the event of extensive soil or groundwater contamination will be accomplished through the RCRA program should the IAG clean-up not be done in a timely manner as determined by DEC.

In the event the soil surrounding Building 360 is determined to reveal extensive contamination, levels in excess of the allowable limits stated in the testing section of the closure plan, additional soil sampling and testing will be required. Additional samples will be taken on the "C" grid line, every sixteen feet from the end of the building for a distance of 48 feet. The time allowed for further sampling is indicated on the Closure Schedule.

In accordance with 6NYCRR Part 373-3.10 (h)(2), if it cannot be demonstrated that all contaminated soils can be practicably removed or decontaminated, then the tank system must be closed as a landfill and 6NYCRR Part 373-3.14 (d) would apply. All the requirements for landfills specified in 6NYCRR Part 373-3.7 and 373-3.8 would have to be met.

IV. TESTING

TABLE 1, on the following page, shows the media, constituent, preparatory method and EPA SW-846 method that will be utilized for testing criteria of the Steam Jenny Closure.

TABLE 1

Steam Jenny Pit Closure
Test Method Scheme

MEDIA	CONSTITUENT	PREPARATORY METHOD	EPA SW-846 METHOD
CONCRETE	PCB's	3540/3550	3540/3550/8080
	Cd	1311 (TCLP)	3010/3020/6010
	Cr	1311 (TCLP)	3010/3020/6010
	Pb	1311 (TCLP)	3010/3020/6010
SOIL	Volatiles	-----	8240
	PCB's	3540/3550	3540/3550/8080
	Cd	3050	3050/6010
	Cr	3050	3050/6010
	Pb	3050	3050/6010
WATER	Volatiles	-----	8240
	Semi-Volatiles	-----	8240
	PCB's	3510/3520	3510/3520/8080
	Cd	3010	3010/6010
	Cr	3010	3010/6010
	Pb	3020	7421

NOTE: The methods indicated above are from EPA SW-846, "Test Methods for Evaluating Solid Waste".

The specific criteria that will be used to determine that the containment action levels are acceptable are listed below in TABLE 2.

TABLE 2

New State Department of Environmental Conservation

ACTION LEVELS

CONSTITUENT	GROUNDWATER/ ACTION LEVEL	SOIL SEDIMENT ACTION LEVEL *
Cadmium	5 ug/L	1 mg/Kg
Chromium	50 ug/L	10 mg/Kg
Lead	15 ug/L	Site Bkgnd.
PCB's	0.1 ug/L	1 PPM

* Action levels for the concrete sample will fall into the soil/sediment action level.

V. QUALITY ASSURANCE/QUALITY CONTROL

The purpose of this section is to state the minimum requirements of a quality assurance project plan for field sample collection and laboratory testing. The regulating standards can be found in the "RCRA Quality Assurance Project Plan Guidance" dated March 28, 1991 of the New York State Department of Environmental Conservation's Division of Hazardous Substances' Regulation.

APPENDIX 1 describes in detail the requirements for the quality assurance project plan for the Building 360 Closure Plan.

Vl. DECONTAMINATION PROCEDURES FOR FINAL CLOSURE

A. General

If all contaminated oils cannot practicably be removed or decontaminated, then system must be closed and treated as a landfill.

If the concrete cores are contaminated above RCRA limits, then the concrete, (except for foundations and footings) will be removed and disposed as a hazardous waste. Background core samples will be taken. New concrete will then be placed in kind. Underpinning and shoring of foundation walls will be required.

If soil and/or groundwater samples reveal extensive contamination, the site will be investigated/remediated under Seneca's Interagency Agreement with DEC and EPA. Should the IAG clean-up not be performed in a timely manner as determined by the Department, a plan to remediate the area will be accomplished through the RCRA program.

B. Decontamination

If contaminant is limited to the surfaces of the concrete, then the following decontamination procedures will apply:

1. All contaminated areas including walls and floors will be scrubbed with industrial detergent and water, then rinsed;
2. Water will be collected with a wet-vacuum;
3. Additional samples of the surface concrete will be taken by core drilling the concrete for a depth of one inch and chipping the concrete loose. Samples will be taken randomly but within one foot of the original samples. Concrete samples will be placed in plastic sealable bags for transport to a laboratory for testing. Concrete core holes will be filled with non-shrink grout; and
4. If testing reveals the need for further decontamination, then muriatic acid will be used to decontaminate and resampling will be performed as noted in Item 3.

C. Equipment

An inventory of the equipment to be used during decontamination and sampling procedures may include but NOT be limited to the following:

1. Personnel protective equipment;
2. Augers, thin-wall tube samplers;
3. Weighted bottles;
4. Detergents and solvents (if necessary);
5. Muriatic acid;
6. Brooms, buckets, brushes, scrapers;
7. Hose and nozzles;
8. Wrenches, cutting torches (for removal of grating);
9. Clean plastic sealable bags for placing concrete and soil samples;
10. Labels;
11. Wet-vacuum, HEPA vacuum;
12. Six mil plastic over sandbags sealed with duct tape for contaminant dike at doorway openings;

13. Backhoe (for removal of extensive contamination if necessary);
14. 55 gallon DOT-approved drums for disposal of equipment, concrete, and soils;
15. Jackhammer; and
16. Concrete saws.

A list of personnel protective equipment may include but not be limited to the following:

1. "TYVEK" brand coveralls with hoods;
2. Safety goggles;
3. Steel toed shoes;
4. Butyl or viton gloves;
5. Duct tape;
6. Half face or full face respirators with HEPA filters; and
7. Emergency eyewash.

D. Run-on/Runoff Control

Rinseate from decontamination operations will be contained using sandbag diking and 6-mil plastic sheets connected with duct tape. The plastic will be used to facilitate collection of wastewater. Wastewater will be collected using a "wet-vac" type vacuum. The wastewater, or rinseate, will be vacuumed from the plastic or directly from concrete surfaces. Since the facility is above grade, run-on is not a concern.

VII. HAZARDOUS WASTE DISPOSAL

Wastewater, rinseate, concrete, soil, protective equipment, tools, plastic, etc. will be placed in 55-gallon DOT-approved drums. Drums can be placed at Seneca's hazardous waste conforming storage, Building #307. A sketch is included at the end of this closure plan.

The accumulated hazardous waste will be disposed of by competitive bid. Land disposal rules will apply. Some soils will be treated prior to disposal. The operations at Frontier Chemicals in Niagara Falls, New York is a typical off-site hazardous waste management facility which may be used for disposal, depending on bids.

VIII. ABANDONMENT/CONSTRUCTION

If soil samples reveal extensive contamination, then the Steam Jenny Building will be closed as a landfill. If the concrete is to be removed, then new concrete will be placed to achieve the existing trench functions. The new steam cleaning operation will utilize a high pressure, high temperature water system. The rinseate water will be recycled and reused. The recycled water will be filtered to remove grease, oils and metals. The recycled water will be re-heated and re-used.

IX. CERTIFICATION

Certification by an independent New York State registered professional engineer can begin once activities listed in this closure plan are complete. The amount of contaminated soil and concrete will then be known for disposal purposes. Samples and tests required by the State Department of Environmental Conservation will be taken at that time.

Within 60 days of final completion of closure, a certification documenting the closure activities must be made by a qualified independent engineer registered in New York State. The certification must state that closure was executed in accordance with the approved closure plan.

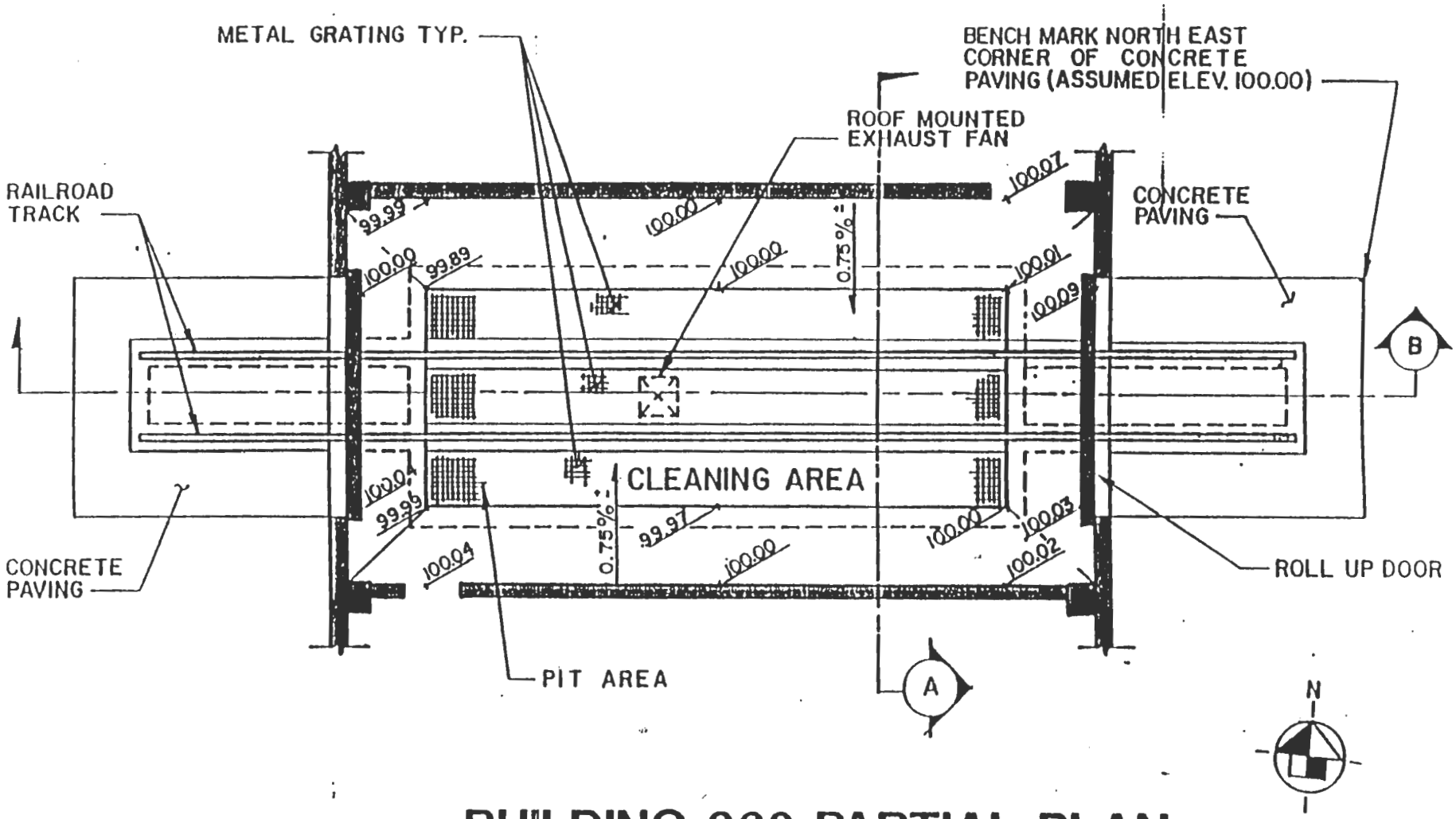
CHAIN OF CUSTODY RECORD

DUE DATE: ____________

CLIENT:			PROJECT NAME:		NO. OF CONTAINERS									
SAMPLE PRES.	DATE	TIME	GRAB	STATION LOCATION										

SAMPLED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	REMARKS:	

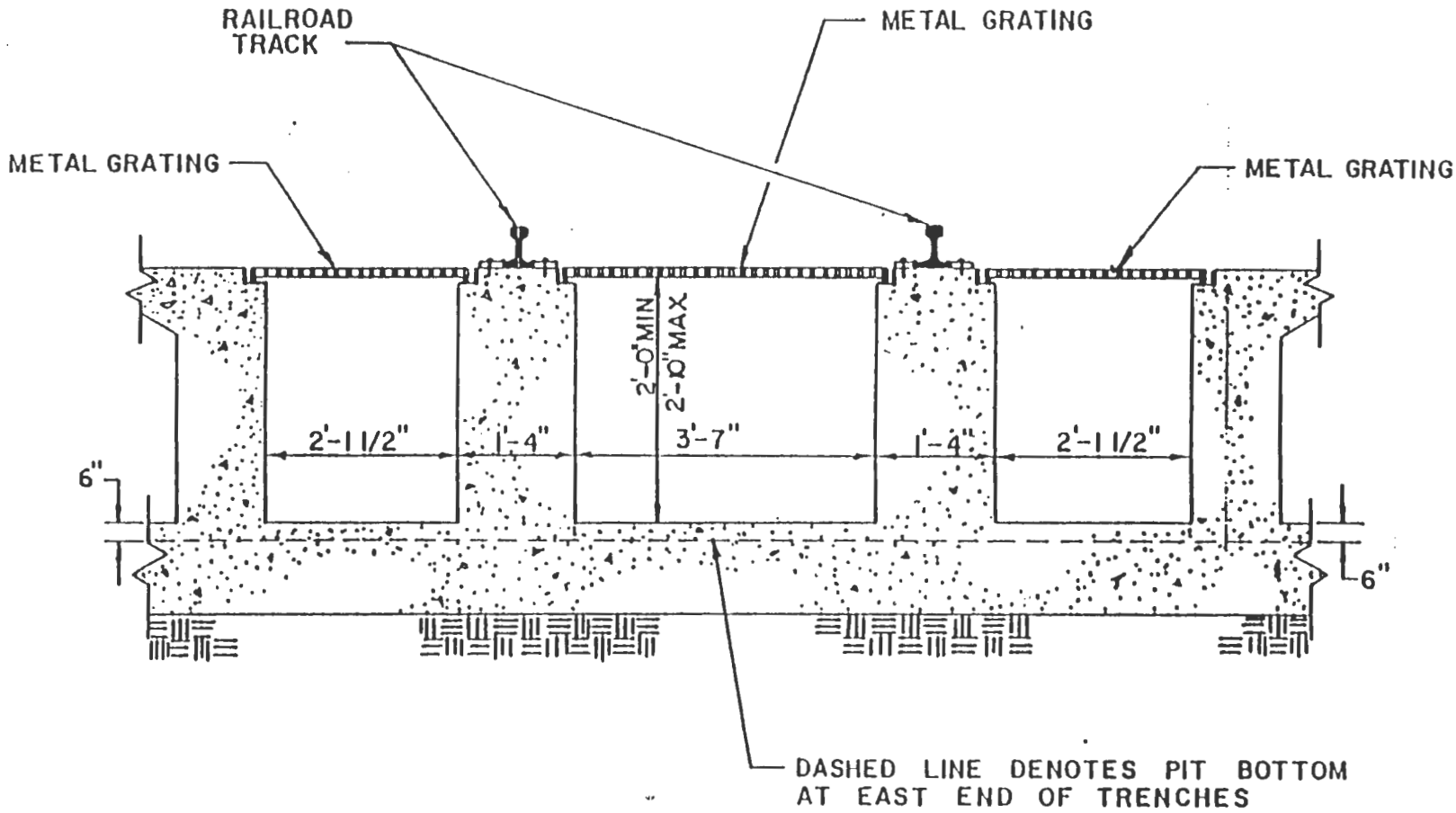
WITNESS: ______________________ DATE: __________ WEATHER CONDITIONS: ______________



BUILDING 360 PARTIAL PLAN

SCALE: 1/8" = 1'-0"

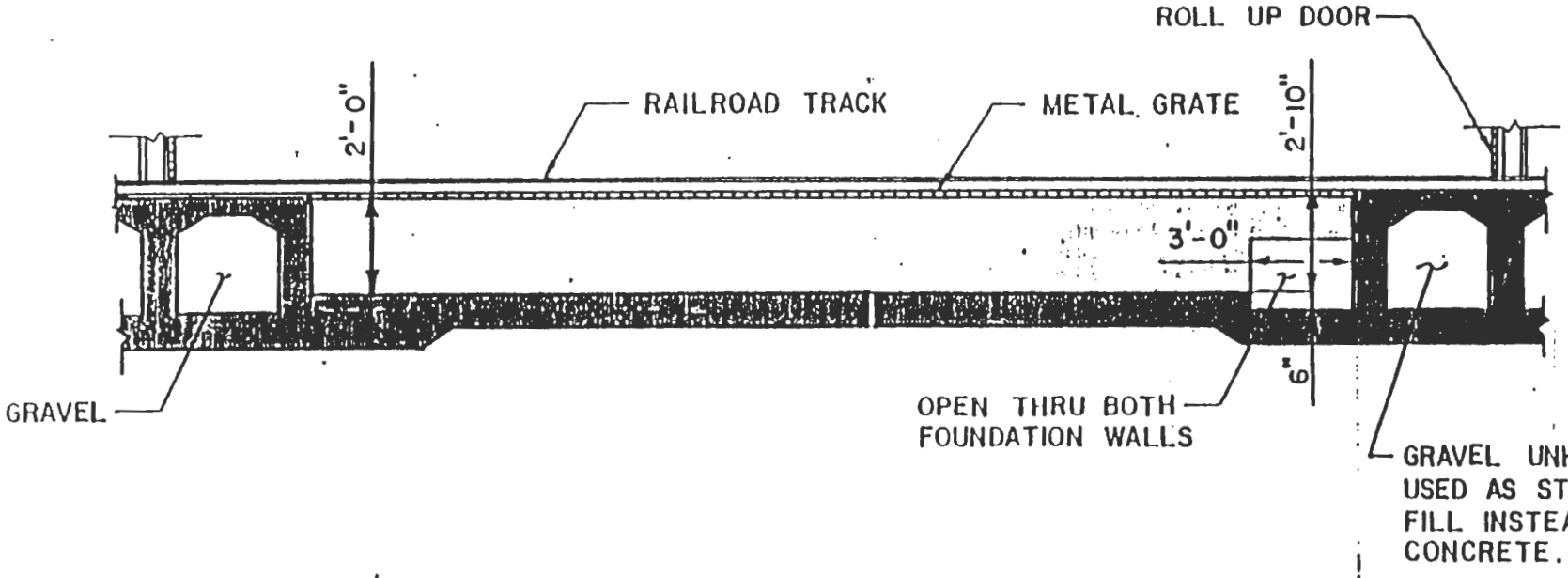
Campbell Design Group
Engineers
201 E. Main St. Horseheads, New York 14845 607/739-3331



SECTION 'A'

SCALE: 1/2" = 1'-0"

Campbell Design Group
Engineers
301 S. Main St. Horseheads, New York 14845 607/739-0321
St. Louis, MO Horseheads, NY Kansas City, MO Poplar Village, KS Akron, IL
Bermuda, PAQ Campbell, NY Baton Rouge, LA Middletown, PA Butler, IL



SECTION 'B'

SCALE: 3/16" = 1'-0"

Campbell Design Group
Architects Engineers Planners
301 S. Main St. Horseheads, New York 14845 607/739-8331

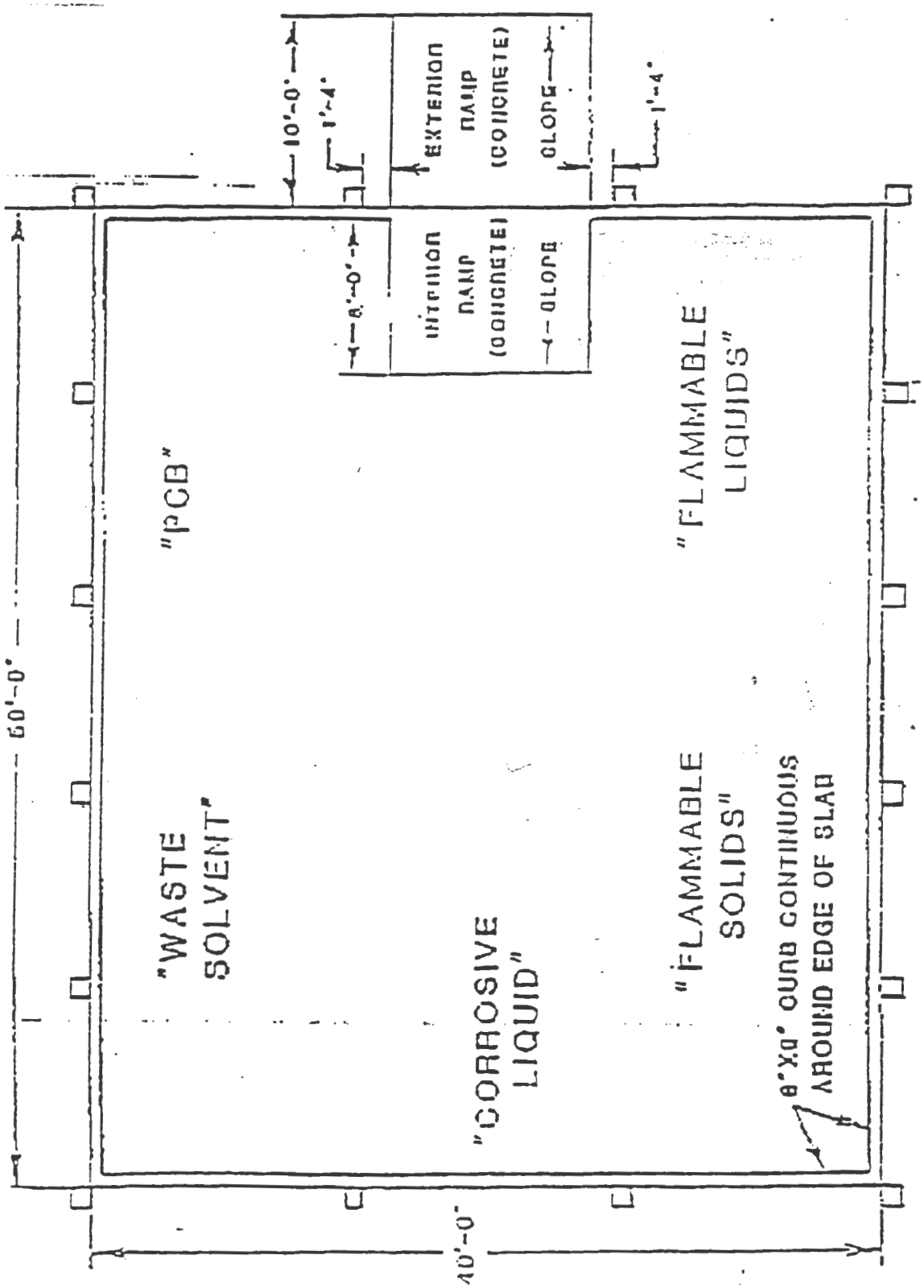


FIGURE D-1 PLAN VIEW - BUILDING 307

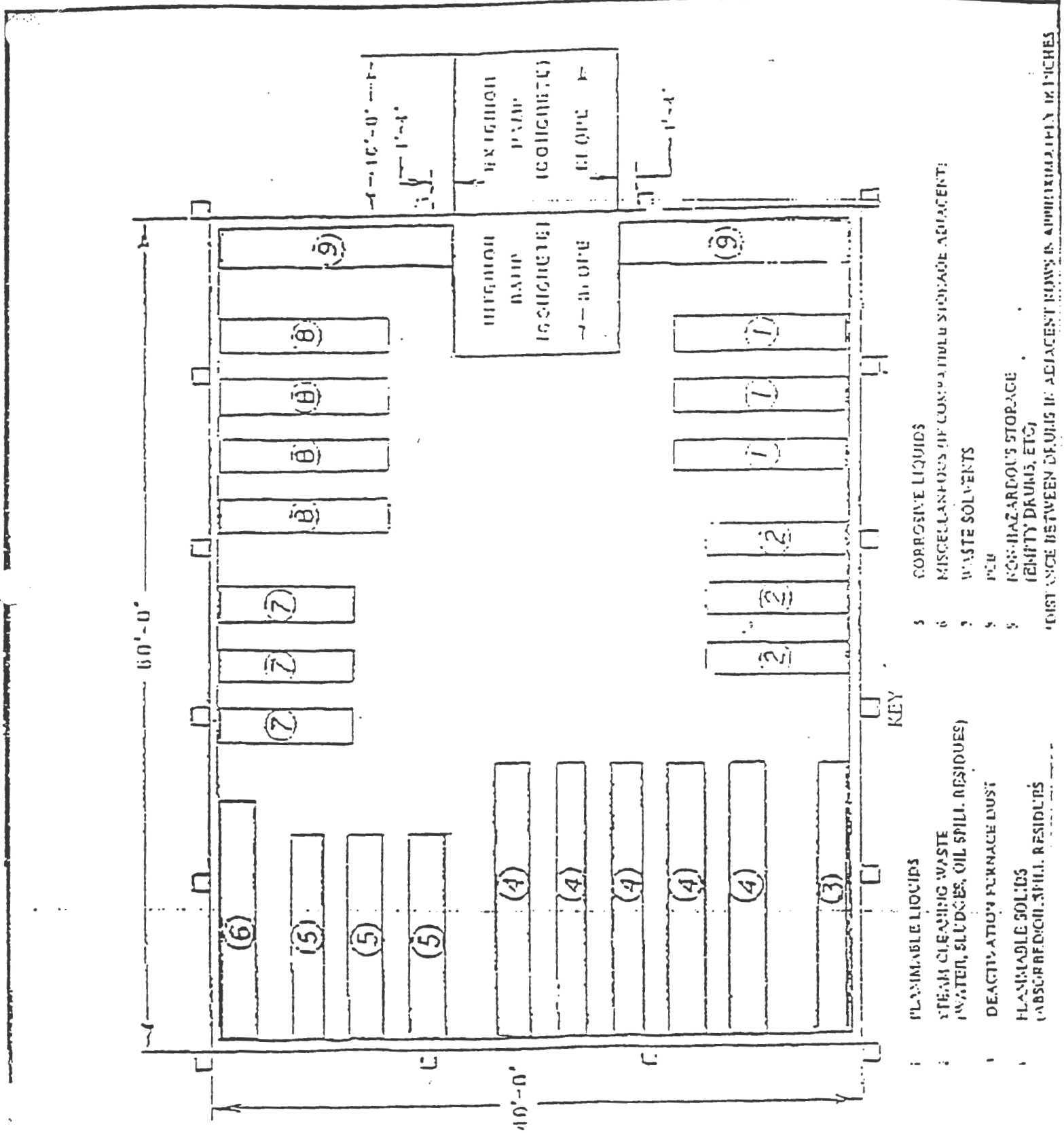


FIGURE D-2 ROW ARRANGEMENT OF HAZARDOUS WASTE - BUILDING 307

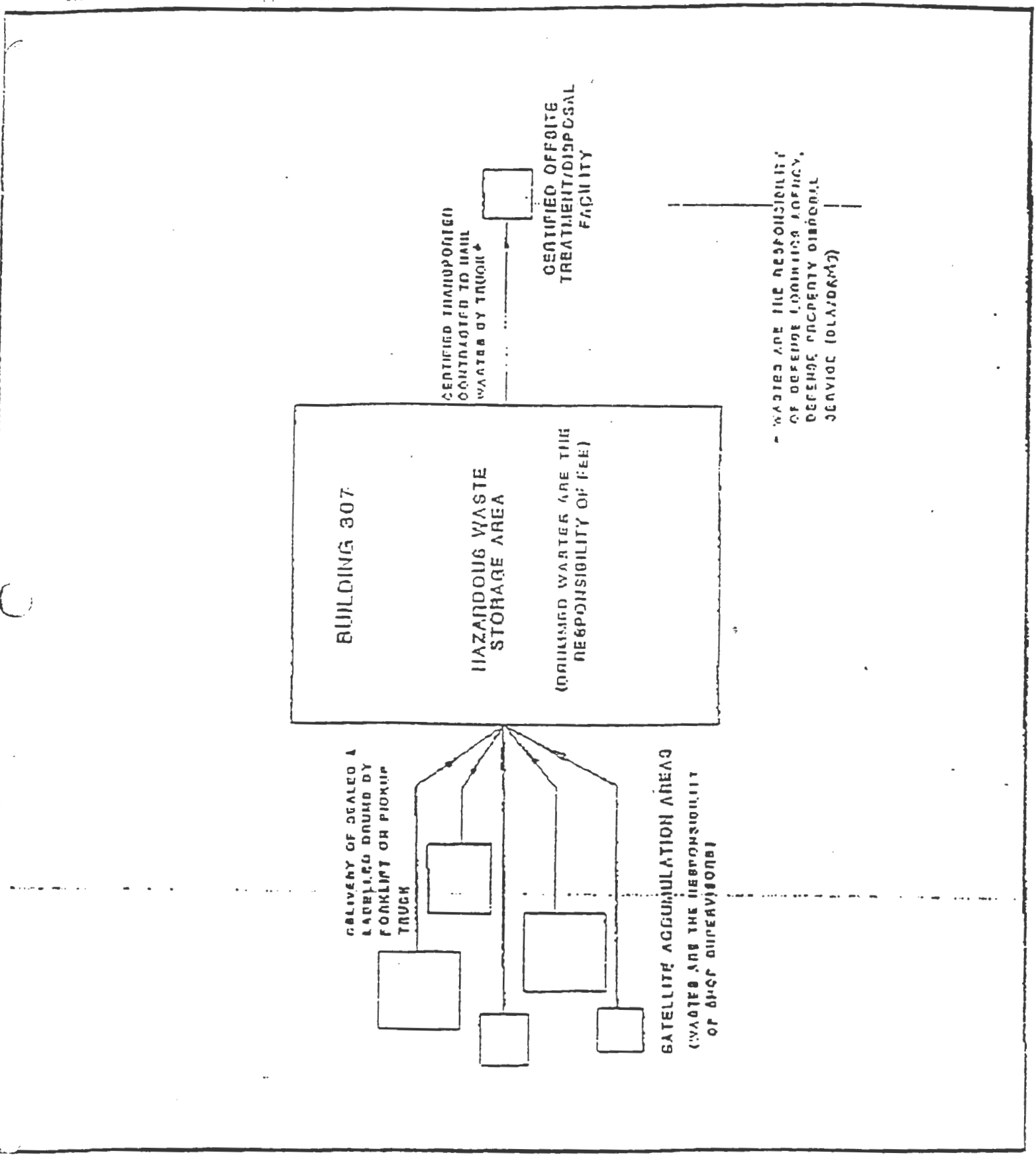


FIGURE D-3 SCHEMATIC DIAGRAM OF HAZARDOUS WASTE MANAGEMENT PRACTICES

48-141 (5/87)—71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Type or print. 31123

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NY 0 21 1 31 81 21 0 81 31 0 — Manifest Document No. 10191901
2. Page 1 of 1
Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address
Seneca Army Depot
Route 96, Romulus, NY 14541-5001
4. Generator's Phone (607 869-1450

A. State Manifest Document No. NY A843904 8
B. Generator's ID SAME

5. Transporter 1 (Company Name) (MRT) — 6. US EPA ID Number — C. State Transporter's ID — D. Transporter's Phone

7. Transporter 2 (Company Name) FRANK'S Vacuum Truck SERVICE, INC — 8. US EPA ID Number NY 0 19 8 12 7 9 12 8 1 1 4 — E. State Transporter's ID 54424DNF — F. Transporter's Phone (716 284-2132

9. Designated Facility Name and Site Address
Frontier Chemical Waste Process, Inc.
4626 Royal Avenue
Niagara Falls, NY 14303
10. US EPA ID Number NY D 0 4 3 8 1 5 7 0 3
G. State Facility's ID
H. Facility's Phone (716) 285-8208/2581

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	
a. Hazardous Waste Liquid, NOS (Steam Cleaning Waste Water) ORM-E, NA 9189 D008	01	TT	EST (MRT) 000	G	D008
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
K. Handling Codes for Wastes Listed Above
a T c
b d

15. Special Handling Instructions and Additional Information
Contains oil, water, detergent, grease, dirt, traces of "Stoddard" solvent, paint thinner, paint chips, metal filings generated from steam washing of large equipment.--
Waste Code 751-64 W/O # 31123

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DAVID C. ADAM D/OA/TPE/SOAD — Signature: David C Adam — Mo. 10 Day 29 Year 90

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: James L. Lambert — Signature: James L Lambert — Mo. 10 Day 29 Year 90

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
Situation Ex Hamilton, Ont. Shipped As B (MC)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Mo. Day Year

APPENDIX 1

QUALITY ASSURANCE PROJECT PLAN

FOR

BUILDING 360 CLOSURE PLAN

SENECA ARMY DEPOT ACTIVITY
ROMULUS
N.Y.

July 1, 1994

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A. Project Description

This Quality Assurance Project Plan is being submitted for the Building 360 Closure Plan at the Seneca Army Depot. The objective of the closure plan is to identify the extent of possible contamination and as a guide to decontaminate and/or remove hazardous substances. (Refer to the Building 360 Closure Plan for further descriptions of the facility and plan objectives.)

When the tank is dewatered, the liquid is disposed of as hazardous waste under D008 lead. From the latest hazardous waste manifest, the wastewater contains, oil, water, detergent, grease, dirt, traces of "stoddard" solvent, paint thinner, paint chips, metal filings and PCB's. (See the Waste Removal section of the Building 360 Closure Plan.)

The following TABLES quantify the goals of the data quality objective process:

ACTION LEVELS

Constituent	Groundwater	Soil/Sediment
Cadmium	5 ug/L	1 mg/kg
Chromium	50 ug/L	10 mg/kg
Lead	15 ug/L	5 ppm
PCB's	0.1 ug/L	0.1 ug/L

INSTRUMENT DETECTION LEVELS

Constituent	Groundwater	Soil/Sediment
Cadmium	4 ug/L	1 mg/kg
Chromium	7 ug/L	1 mg/kg
Lead (by GFAA)	3 ug/L	Soil Bkgnd.
PCB 1242 *	.065 ug/L	80 ug/kg

* From SW846-"8080"

AVERAGE BACKGROUND CONCENTRATIONS
FOR ROCKS, SOILS, AND SEDIMENTS
(IN PPM)

	SHALE	SANDSTONE	LIMESTONE	SOILS	SEDIMENT
Cadmium	0.2	<0.1	0.1	1	2.5
Chromium	100	35	10	50	75
Lead	40	7	8	20	55

Source: Preliminary Site Characterization at the Ash Landfill
Seneca Army Depot
U.S. Army Engineer Division, Huntsville, Alabama

Subsource: Levinson, 1980

Target levels for clean closure will be those of the action level unless background level concentrations are higher than action levels. If determined that the target level cannot be achieved after decontamination or cannot be practically removed, then the tank system will be closed and treated as a landfill.

The closure plan for Building 360 identifies a schedule that is to be employed to assess and adjust the projects activities to achieve the project goals. The closure plan also identifies equipment to be used during sampling and decontamination to protect the health and safety of workers. Clean closure and/or closing as a landfill will assist in assuring protection to public health and the environment.

Laboratory analysis to determine levels and extent of contamination will provide a basis of laboratory analysis for testing after attempts have been made at decontaminating the tank system. First of all, testing of samples prior to decontamination attempts will determine the degree of contamination, if any. Subsequent testing of samples after decontamination will determine if clean closure is achievable.

B. Project Organization and Responsibility:

Because the Seneca Army Depot is operated by the Federal Government, contracts for sampling, testing and decontamination can only be procured through competitive bid. Organizations soliciting to perform this task must submit, with their bids, identification of key individuals responsible for:

1. Sampling Operations;
2. Sampling Quality Control;

3. Laboratory Analysis;
4. Laboratory Quality Control;
5. Data Processing Activities;
6. Data Processing Quality Control;
7. Data Quality Review;
8. Performance Auditing;
9. Systems Auditing (On-Site Evaluations);
10. Overall Quality Assurance; and
11. Overall Project Coordination.

For each key individual named, a brief sentence or two explaining that individual's responsibility, title and authority should be included. Telephone numbers and addresses should be listed with the key individuals. Where several different sampling, testing, and monitoring institutions or subcontractors involved, complete addresses should be provided.

Quality Assurance Officer: The responsibility for data review shall be assigned to a QA Officer or QA Manager. This individual shall have broad authority to approve or disapprove project plans, specific analyses and final reports. The QA Officer is independent from the data-generating activities. In general, the QA Officer shall be responsible for reviewing and advising on all aspects of QA/QC.

C. Quality Assurance Objectives for Data Management:

1. Precision

Precision is a measure of agreement among measurements performed using the same test procedure. Precision will be assessed for applicable parameters by calculating the RPD of two duplicate spike samples as follows:

$$RPD = \frac{R_1 - R_2}{(R_1 + R_2)/2} \times 100$$

Where R1 and R2 = concentration of Replicate Spikes 1 and 2, respectively.

a. Analyzing Precision: Analytical precision will be determined through the use of matrix spikes and matrix spikes duplicates for the analytical work performed. The laboratory will select one sample in 20 and split the sample into three aliquot. The aliquot will be analyzed routinely for the parameters of interest, while the other two aliquot will be spiked with known quantities of the parameters of interest prior to

analysis. The relative percent difference between the two results will be calculated and used as an indication of the precision of the analyses performed.

b. Sample Collection Precision: Sampling precision shall be determined by collecting and analyzing collocated and field replicate samples and then creating and analyzing laboratory replicates for one or more of the field samples. Precision will be reported as the relative percent difference for 2 measurements and as standard deviation for 3 or more measurements. Analysis results from the laboratory replicates provide data on analytical precision. Subtracting the analytical precision from the measurement precision defines the sampling precision.

2. Accuracy

Accuracy is the degree of agreement between a sample's target value (known concentration) and the actual measured value. Accuracy for this project is measured by calculating the percent recovery (R) of known levels of spike compounds into appropriate sample matrices. Percent recovery is calculated as follows:

$$R = 100 \times \frac{[(\text{Spike Sample Conc.}) \times (\text{Sample} + \text{Spike Vol.}) - (\text{Sample Vol.}) \times (\text{Sample Conc.})]}{(\text{Spike Conc.}) \times (\text{Spike Volume})}$$

a. Analytical Accuracy: Analytical accuracy is the percent recovery of an analyte which has been added to the environmental sample at a known concentration before analysis. Analytical accuracy is assessed through the analysis of quality control samples specified in the analytical method (matrix spike, surrogate spike).

b. Sample Collection Accuracy: Sampling accuracy is assessed by evaluating the results of field, trip, and equipment blanks. Trip blanks, equipment blanks, and field blanks are used to assess any cross-contamination that may have occurred. A high level of accuracy can be maintained by frequent and thorough review of field procedures.

3. Representativeness:

Representativeness is addressed by describing sampling techniques and the rationale used to select sampling locations including:

a. Environmental conditions at the time of sampling;
b. Fit of the modeling or other estimation techniques to the event;
c. Appropriateness of site file information versus release conditions;
d. Appropriateness of sampling and analytical methodologies;
e. Number of sampling points;
f. Distribution of the sampling points;
g. Representativeness of selected media; and
h. Representativeness of selected analytical parameters.

4. Completeness

Completeness is the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions (EPA, 1980). A completeness of at least 90 percent for each parameter is the objective for this project. Following completion of the analytical testing, percent completeness will be calculated as follows:

$$\text{Complete (\%)} = \frac{\text{\# of valid concentrations values reported}}{\text{\# of samples collected for analysis of true conc.}} \times 100$$

If completeness is less than 80 percent for ANY parameter, the principal engineer will be notified immediately. The principal engineer is responsible for determining if resampling will be necessary to meet project objectives and will inform the QA supervisor and analytical task manager of the decision.

As stated in "Data Quality Objectives for Remedial Response Activities" (EPA, March 1987), almost no historical data on completeness achieved by individual methods exist. This document states that Level III analytical techniques should generate analytical data which is approximately 80% complete.

5. Comparability

Comparability is the confidence with which one data set can be evaluated against another. Only the specific methods and protocols specified will be used to collect and analyze samples. Comparability shall be applied to the following:

a. Data generated by the investigator over a specific time period;
b. Data generated by an outside laboratory over a specific time period;
c. Data generated by an outside laboratory versus data generated by the investigator; and
d. Data generated by more than one outside laboratory.

The values for quality assurance objectives for precision and accuracy can be found in the EPA publication "Data Quality Objectives for Remedial Response Activities - Development Process". The SW-846 method number, range of recovery, precision and method detection limit values for Level III analytical techniques can be found in this publication.

D. Field Sampling Plan:

The sampling section in the Building 360 Closure Plan discusses the sampling scheme (grid), the media to be sampled and a sampling scheme in case of extensive contamination. This section of this quality assurance project plan will discuss in more detail the sampling techniques, frequency of samples and sampling equipment.

Sampling Scheme

The middle of each of the three trenches are approximately 4 ft. on-center. Three samples will be taken on the centerline of the center trench. The samples will be taken 8 ft. apart. (See the attached sketch titled "Building 360 Sampling Plan".)

The Building 360 Sampling Plan sketch has been divided into a 4 ft. x 8 ft. grid. The 4 ft. (east-west) grid lines have been labeled A, B, C, D, and E. The 8 ft. (north-south) grid lines have been labeled 1, 2, and 3. Samples will be taken at locations C-1, C-2, and C-3.

At each sample location, samples of the concrete core, underlying soil and the groundwater are to be tested for PCB's, cadmium, chromium and lead. One grab sample for each of the media to be tested will be taken at EACH sample location. (The Steam Cleaning Area at Building 360 is heated by two fans which blow air across steam coils. Sampling should be avoided if the unit heaters are "ON" because the moving air may contaminate the samples.)

Concrete Media

The concrete will be sawcut and jackhammered loose at each sample location. Care should be taken to minimize the amount of concrete must created. Care should be taken not to contaminate other open sample holes. Personnel protective equipment shall be worn at all times. Pieces of concrete from the upper layer, middle layer and lower layer from each sample location shall be placed in individual "ziploc" sample bags, labeled and shipped to the laboratory for testing.

Procedures that must be followed to decontaminate concrete saws and jackhammer bits before reuse and between sample locations are outlined in TABLE 1 on page 1-9 of this APPENDIX.

Soil Media

Samples of the underlying soil will be taken with an auger and thin wall tube sampler. One sample will be taken at each sampling location. The auger and thin wall tube sampler shall be decontaminated per TABLE 1 prior to sampling at each sample location.

Field samples of the soil will be screened using a photo-ionization detector. The soil sample must be homogenized prior to being placed into sampling containers. The sample should be removed from the split spoon, placed in a stainless steel pan and thoroughly mixed using a stainless steel spoon. The sampled media in the pan should be scraped from the sides, corners and bottom of the pan, rolled to the middle of the pan, and initially mixed. The sample should then be quartered and moved to the four corners of the pan. Each quarter of the sample should be mixed individually, and then rolled to the center of the container and the entire sample mixed again.

Containers for samples to be tested for METALS shall be of borosilicate glass bottles, 125 ml minimum for solids, with PFTE-lined screw caps. They shall be precleaned as follows:

1. Detergent (non-phosphate) washed with hot water;
2. Tap water rinsed, 3 times with hot water;
3. Acid washed with 1:1 nitric (ultrapure);
4. Rinsed three (3) times with deionized water (demonstrated analyte-free water);
5. Air dried; and
6. Capped when dry.

TABLE 1

EQUIPMENT DECONTAMINATION PROCEDURES

All non-dedicated sampling equipment MUST be cleaned prior to being reused. The following is the accepted procedure for decontaminating sampling equipment:

1. scrub with tap water * and non-phosphate detergent;
2. rinse with tap water; *
3. rinse with 10% HNO_3, ultrapure; **
4. rinse with tap water; *
5. rinse with methanol; ***
6. rinse with acetone; ***
7. rinse with methanol; ***
8. rinse with deionized water **** (demonstrated analyte-free water);
9. air dry; and
10. wrap in aluminum foil

* Tap water may be used from any municipal water treatment system. The use of untreated potable water supply is not an acceptable substitute unless the aquifer is known not to be contaminated.

** Omit this step if metals are not being analyzed. For carbon steel, perform a split spoon sample using a 1% rather than 10% HNO_3 rinse.

*** The solvent rinse can be omitted if organics are not being analyzed. If acetone is a "constituent of concern", the series isopropanol, hexane, isopropanol may be substituted for procedures 5, 6, and 7.

**** Demonstrated analyte-free water is water that will be used for the preparation of blanks, for decontaminating sampling equipment and containers, and for carrying out analytical tests must be ASTM II deionized water demonstrated to be analyte free. The criteria for analyte-free water are the Method Detection Limits (MDL's) for the analytes as stipulated in SW-846, third edition, for the most sensitive analytical method to use to detect the analyte. However, for the common laboratory contaminants listed below, the allowable limits are set at three (3) times their respective MDL's as determined by the most sensitive analytical method:

1. Methylene Chloride
2. Acetone
3. Toluene
4. 2-Butanone
5. Phthalates.

ANY deviation from the above-mentioned criteria MUST receive approval from the NYSDEC prior to implementation.

Containers for samples to be tested for PCB's and VOLATILE ORGANICS shall be new amber glass bottles (125 ml minimum for solids) with PFTE-lined screw caps. They shall be precleaned as follows:

1. Detergent (non-phosphate) washed with hot water;
2. Tap water rinsed three (3) times with hot water;
3. Rinsed with acetone or methanol followed by hexane rinse; *
4. Rinsed three (3) times with deionized water (demonstrated analyte- free water);
5. Oven dry containers for one hour at 105 degrees Centigrade;
6. Air dry caps; and
7. Cap bottles when dry.

Groundwater Media: Grab samples of the groundwater will be taken with weighted bottles and or stainless steel ladles. The weighted bottles and stainless steel ladles shall be decontaminated per TABLE 1 prior to taking consecutive samples. The sample will then be carefully poured from the sampling equipment into the sample container. Use procedures that minimize sample agitation, cross-contamination and reduce/eliminate contact with the atmosphere during sample transfer.

The sample container shall be filled to the point of overflow (convex meniscus). When sealing, be sure the lid is in contact with the sample. After sealing, inspect for air bubbles in the sample container by inverting the container. While samples testing gathered to determine the presence of either PCB's or metals can have some headspace, no air bubbles can be present when testing for volatile organics. If testing requires the absence of air bubbles, remove the cap and add more sample. Reseal the container and inspect for air bubbles by inverting the container. Repeat steps as necessary to assure no air bubbles remain.

Containers for samples of groundwater to be tested for METALS shall be new borosilicate glass bottles, one liter minimum, with PFTE-lined screw caps. They shall be precleaned as follows:

1. Detergent (non-phosphate) washed with hot water;
2. Tap water rinsed, 3 times with hot water;
3. Acid washed with 1:1 nitric (ultrapure);
4. Rinsed 3 times with deionized water (demonstrated analyte-free water);
5. Air dried; and
6. Capped when dry.

* Solvents must be pesticide-grade or better.

Containers for samples of groundwater to be tested for PCB's shall be new amber glass bottles, one liter minimum, with PFTE-lined screw caps. They shall be precleaned as follows:

1. Detergent (non-phosphate) washed with hot water;
2. Tap water rinsed 3 times with hot water;
3. Rinsed with acetone or methanol followed by hexane rinse (Solvents must be pesticide grade or better);
4. Rinsed 3 times with deionized water (demonstrated analyte-free water);
5. Oven dry containers for one hour at 105 degrees Centigrade;
6. Air dry caps; and
7. Cap bottles when dry.

Containers for samples to be tested for VOLATILE ORGANICS shall be 2-40 ml amber glass bottles with teflon-lined septum caps. Containers for samples to be tested for semi-volatile organics shall be one liter amber glass with PFTE-lined screw caps.

Field Screening

After the concrete has been removed at each sample location, the opening in the floor shall be field-screened for volatile organic and semi-volatile organic gases. using a gas chromatograph with a photoionization detector shall be utilized. The results of these field screening techniques shall be documented and appropriate continual sampling procedures implemented in case of potential hazardous situations.

Quality Assurance/Quality Control

Sample containers used during an investigation must be subject to quality assurance/quality control procedures that include tracking, quality control inspections, recording shipments to designees, handling, cleaning and inspecting sample containers.

The following is a description of quality control check points:

1. Incoming Materials Inspection:

   The supplier of containers to the field shall inspect a representative item from each case/carton of containers and component materials received from a vendor, to check for conformance with specifications. Any deviation shall be considered unacceptable, and materials immediately returned to the vendor for replacement. The supplier

shall maintain a log of incoming shipments, in which cases/cartons shall be identified by material type, vendor purchase order number and delivery date. The supplier shall indicate on this log the date of incoming inspection and acceptance or rejection of the material.

2. Quality Control Inspection of Cleaned Containers:

Following container cleaning and labeling, the supplier of containers to the field shall randomly select two containers from each container lot to be used for quality control purposes. A notice shall be placed in each case from which QC containers have been removed. The two categories of QC containers are: Analysis QC and Storage QC.

a. Analysis QC Containers

One selected QC container per lot shall be designated as the Analysis QC Container. The Analysis QC Container(s) shall be analyzed by the supplier to check for contamination, prior to releasing the container lot for shipment. The QC analyses procedures the supplier must use to determine extractable organics, pesticides, volatiles, metals, and cyanide are specified further on in this section. This series of analyses shall constitute the QC check for containers.

b. Storage QC Containers

One selected QC container per lot shall be designated as the Storage QC Container. The Storage QC Container shall be separated from the lot after cleaning and labeling and stored by the supplier in a designated contaminant-free storage area, which shall be continuously monitored for volatile contaminants. The date the storage container is placed in the storage area shall be entered into the Storage QC Container logbook.

Upon request, the supplier of containers to the field shall remove the Storage QC container from the storage area and analyze the container using the QC analysis procedures specified for that container type. Such analysis shall be completed and data reported to within ten (10) days following the analysis request. Analysis of the Storage QC Container will be indicated if contamination to the particular container lot comes into question at any time pursuant to supplier shipment. Upon removal, containers shall be logged out of the storage area.

The designated storage area for the Storage QC Containers shall be monitored continuously. A pre-cleaned, QC cleaned 40 mL vial filled with demonstrated organic-free deionized water shall be placed in the storage area. These vials shall be changed at one-week intervals. The removed vial shall be subjected to the volatile organics QC check procedure described further on in this Section. Any peaks shall indicate contamination.

3. Quality Control Procedures for Cleaned Containers:

The type(s) of QC tests applied correlates with the type of container being tested and its future use in sample collection. The required QC tests determine extractable organics, pesticides, volatile organics, metals, and cyanide. Quality control tests shall be run according to the container type and related sample type utilizing the specified Method(s), as described in the following:

a. Determination of Extractable Organics/Pesticides

(1) Sample preparation should follow the NYSDEC CLP statement of work for processing extracts:

(a) Rinse the container three (3) times with sixty (60) mL of pesticide-grade methylene chloride and shake each rinse for two minutes;
(b) Transfer the extracts from (1) to a KudernaDanish (KD) apparatus equipped with a threeball Snyder column. Concentrate to less than 10 mL on a water bath. Bring the extract up to 10 mL with pesticide-grade methylene chloride;
(c) Transfer 1.0 mL of the extract to a separate concentrator tube for pesticide/herbicide/ PCB analysis;
(d) Concentrate the remaining 9 mL to 1.0 mL for the Base Neutral Acid Assay;
(e) Add 9 Ml of pesticide-grade hexane to the methylene chloride extract and mix. Concentrate to less than 1.0 mL using a micro KD apparatus. Bring volume up to 1.0 mL with pesticide-grade hexane and assay for pesticide/herbicide/PCB.
(f) Concentrate the solvent blank by following the preceding steps, except skip the container rinse in step (a) and add 180 mL pesticide-grade methylene chloride directly to the KD apparatus.

(2) Extractable Organics QC Check

(a) Inject 3 mL of solvent into a gas chromatograph mass spectrometer (GC/MS);
(b) Analyze for extractable organics by EPA method SW-846 "8250" or "8270";
(c) Any peaks found in the container solvent that are not found in the solvent blank or with peak heights or areas not within ± 50% of the blank peak height or area shall be cause for rejection;
(d) Perform tentative identification and tentative quantification of any contaminant(s) that cause rejection of a container Lot;
(e) Appropriate calibration standards must be run as specified by the method to ensure that the required sensitivities will be achieved; and
(f) A blank shall be run with each analysis.

(3) Pesticide/Herbicide QC Check

(a) Inject 1 mL of solvent into a gas chromatograph (GC) equipped with the detector specified by the analytical method;
(b) Analyze for the pesticides by EPA Methods SW-846 "8080", "8140", and "8150" as appropriate;
(c) Any peaks found in the container solvent that are not found in the solvent blank or with peak heights or areas not within ± 50% of the blank peak height or area shall be cause for rejection;
(d) Perform tentative identification and tentative quantification of any contaminant(s) that cause rejection of a container Lot;
(e) A standard mixture made-up of all pesticide/herbicide organic compounds identifiable by Method "8140","8150", and "8080" and at concentrations expected must be analyzed to ensure that the required sensitivities will be achieved; and
(f) A blank shall be run with each analysis.

b. Determination of Volatile Organics

(1) Fill the container with deionized demonstrated organic-free water;
(2) Analyze for volatile organics by EPA Method SW846 "8240" using Gas Chromatograph/Mass Spectrometer (GC/MS) with the operating conditions specified in that method;

(3) Any peaks not found in the blank, or with peak heights or areas not within ± 50% of the blank peak height or area shall be cause for rejection;
(4) Perform tentative identification and tentative quantification of any contaminant(s) that cause rejection of a container Lot;
(5) Appropriate calibration standards must be run as specified by the method to ensure that the required sensitivities will be achieved; and
(6) A blank shall be run with each analysis.

c. Determination of Metals

(1) Add 50 ml deionized water to the container and acidify with 0.5 ml metals-grade HNO3. Cap and shake well;
(2) Treat the sample as a dissolved metals sample. Analyze the undigested water for all metals specified in SW-846 by applying the most sensitive EPA Method in SW-846 specified for the analysis of total metals (i.e. SW-846 "7000" series or SW-856 "6010");
(3) Concentration at or above the detection limit specified for the method for each parameter will be cause for rejection of the lot of containers; and
(4) A set of standards in the expected working range and a blank must be analyzed with each analytical run. The acid matrix of the standards and blank must match that of the samples.

d. Determination of Cyanide

(1) Cyanide is to be determined by EPA Method SW-846 "9010" by placing 250 ml of deionized water in the container. Add 1.25 ml of 6N NaOH. Cap the container and shake vigorously for two minutes. Analyze an aliquot by the EPA method selected;
(2) A blank must be run by analyzing an aliquot of the deionized water used above;
(3) A set of standards in the expected working range must be analyzed with each run along with the blank; and
(4) The detection of contaminants of 20 ppb total cyanide will be cause for rejection of the lot of containers.

4. Sample Preservation and Storage:

The containers with samples to be tested for PCB's shall be stored in an ice chest at 4 degrees Centigrade. Their holding times are 7 days to extraction and 40 days to analysis. The containers to be tested for metals shall be preserved with concentrated HNO3 to a pH <2, cooled to 4 degrees Centigrade and their holding times are 6 months. Soil samples to be tested for volatile organics shall be cooled to 4 degrees Centigrade and their holding times are 7 days. Groundwater to be tested for volatile organics shall be preserved by acidifying samples with 4 drops of concentrated hydrochloric acid; if residual chlorine is present, add sodium thiosulfate and their holding times are 14 days. Groundwater samples to be tested for semi-volatile organics shall be cooled to 4 degrees Centigrade and their holding times are 7 days to extract and 40 days to analyze.

5. Collated and Replicate Samples:

One out of 20 investigative samples shall be collated for groundwater and shall be replicated or collated for soil samples. Replicated samples can be substituted for groundwater. These samples shall be spread out over the sampling event, preferably one per each day of sampling.

6. Trip and Equipment Blanks:

Trip blanks shall be taken for groundwater samples only. Trip blanks shall be comprised of 40 ml VOA vials filled with demonstrated analyte-free deionized water. Trip blanks shall be taken in a 1:20 ratio for each PCB sample and metals sample, one per each days sampling and one per each cooler if more than one cooler per day. The trip blanks shall be the first container placed into the cooler. Equipment blanks shall be performed once per day per each type of sampling equipment used. Equipment blanks are collected by passing demonstrated analyte-free deionized water through and over cleaned sampling equipment.

7. Matrix Spikes:

Spikes shall be performed by laboratory personnel only. Extra analytical samples for both PCB's and for metals must be collected in the field so the laboratory can perform a matrix spike/matrix spike duplicate (MS/MSD). (Blank spikes may be performed in the laboratory as described in the NYSDEC ASP but this would be in addition to the MS/MSD.) The volume of the container for the field

blank sample to be laboratory spiked for metals shall be one liter. The exact amount of spiking material shall be recorded for future use. The spike materials shall be laboratory prepared solutions made from pure compounds.

E. Documentation and Chain-of-Custody

1. Field Log Book:

All information pertinent to field sampling activity must be entered in a bound book with consecutively-numbered pages. Entries in the log book must include at least the following:

a. Date and time of site entry.
b. Purpose of sampling.
c. Name and address of field investigator and sample collector.
d. Name of facility.
e. Type of process that produced contamination.
f. Date and time of sample collection and sample I.D. number.
g. Weather conditions.
h. Contaminant components and concentrations, if known.
i. Description and location of sampling point.
j. Air monitoring device readings and the significance of the readings; i.e. presence of volatile non-aqueous phase, need for respiratory protection, etc.
k. Condition of monitoring wells and other environmental media sampling equipment (rusty, bent casing, etc.).
l. Field measurements such as pH, temperature, conductivity, flammability, explosiveness, etc.
m. Water level measurements and depths to bottom in monitoring wells prior to evacuation.
n. Immiscible layer detection in monitoring wells and equipment used for interface detection and sampling the layers prior to evacuation.
o. Monitoring well purging equipment, volume of water purged, and the time required to recharge the well.
p. Soil, Sediment, sludge/groundwater, and surface water sample preparation methods and sampling equipment utilized.
q. Where and when sampling equipment refusal occurred and the corrective action taken.
r. Sampling equipment decontamination procedures and when equipment was decontaminated.
s. Number and size of samples taken.

t. Physical properties observed of samples taken; i.e. color, odor, turbidity, non-aqueous phase, stratification, etc.
u. Purge water and other sampled media disposal practices.
v. When samples were shipped to lab.
w. Any other relevant field observations.

2. Sample Labels:

Sample labels are necessary to prevent misidentification of samples. Gummed paper labels or tags are adequate and should include at least the following information:

a. Sample number.
b. Name of collector.
c. Date and time of collection.
d. Place of collection.

Labels should be affixed to sample containers prior to or at the time of sampling. The labels should be filled out at the time of collection.

3. Sample Seals:

Sample seals are used to detect unauthorized tampering of samples following sample collection up to the time of analysis. Gummed paper seals may be used for this purpose. The paper seal includes, at least, the following information:

a. Sample number (MUST be identical to the number on the sample label.)
b. Collector's name.
c. Date and time of sampling.

The seal must be attached in such away that it is necessary to break it in order to open the sample container. Seals must be affixed to containers before the-samples leave the custody of personnel.

4. Field Records:

Field records shall be completed at the time the sampling is collected and shall be signed. Field records shall contain the following information:

a. Unique sampling or log number.
b. Date and time.

c. Source of sample (including name, location, and sample type).
d. Preservative used (if any).
e. Analysis required.
f. Name of collector.
g. Any pertinent field data (PID screening results, etc.).
h. Serial numbers on seals and transportation cases.

One member of the sampling team shall be appointed Field Custodian. The Field Custodian documents transactions from the sampling team and the sample remains in the custodians custody until shipping to the laboratory. The sample container shall be placed in a transportation case along with chain-of-custody records, pertinent field records, and analysis request forms. The transportation case is then sealed or locked.

5. Shipping:

Samples taken shall be shipped as hazardous substances and transported according to the following requirements:

a. If the substance in the sample is known or can be identified, package, mark, label and ship according to the specific instructions for the material (if it is listed) in the DOT Hazardous Materials Table, 49 CFR 172.101.
b. For samples of hazardous materials of unknown content, Part 172.402 (h) of CFR allows the designation of hazard class based on the shipper's knowledge of the material and selection of the appropriate hazard class from Part 1763.2.

6. Chain-of-Custody Record:

The chain-of-custody record must contain the following:

a. Site name and address.
b. Sample number.
c. Sample type (composite or grab) and matrix.
d. Date and time of collection.
e. Number of containers.
f. Parameters for which analysis are required.
g. Signature of collector.
i. Signatures of persons involved in chain of possession.
j. Inclusive times and dates of possession.
k. Condition of sample upon arrival at laboratory.
l. Temperature of the cooler upon receipt by the laboratory.

7. Laboratory Operations:

The laboratory shall identify a responsible party to act as sample custodian. The custodian shall sign for incoming field samples, obtain documents of shipments and verify the data entered into the sample custody records.

The Lab Custodian shall prepare a sample custody log consisting of serially-numbered standard lab-tracking report sheets. The lab custodian shall also prepare procedures for sample handling, storage and disbursement for analysis.

F. Calibration Procedures

Analytical instrumentation shall be calibrated in accordance with requirements which are specific to the instrumentation and procedures employed. Introductory methods "7000" and "8000" in Test Methods for Evaluating Solid Wastes (EPA SW-846) and the procedures specified in the individual methods shall be consulted for criteria for initial and continuing calibration.

G. Sample Preparation and Analytical Procedures

For each measurement, TABLE 2 below illustrates the sample preparation and analytical procedure to be used in support of the investigation program.

TABLE 2

Parameter	Matrix	Preparation	Analysis
PCB's	Water	SW846- 3510/3520 3510/3520/8080	SW-846
	Solids	SW846- 3540/3550	SW-846 3540/3550/8080
TRACE METALS	Water	SW846-3005 (GFAA) for Cadmium & Chromium	SW-846 3010/6010
		SW846-3010 (FLAA or ICP)	SW846-7421 for Lead
		SW-846-3020 (GFAA) SW846-7060 (GFAA)	

TABLE 2 (continued)

Parameter	Matrix	Preparation	Analysis
TRACE METALS (cont)		SW846-7740 (GFAA)	
	Solids	SW846-3050 (FLAA,GFAA,or ICP)	SW846-3050/6010
	Oily Water	SW846-3040 (FLAA,GFAA,or ICP)	SW846-6010 SW846-7000 Series or 200 Series Equiv.
SEMI-VOLATILE ORGANICS	Water	3510/3520	SW846-8270
	Solids	3540/3550	SW846-8270
VOLATILE ORGANICS	Water	----	SW846-8240
	Solids	----	SW846-8240

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Section A discusses the anticipated detection limits of the selected analytical method. Detection limits will be determined in accordance with the procedure published in 40 CFR Part 136.

H. Data Reduction, Validation and Reporting

The principal criteria that will be used to validate the integrity of the data during collection and reporting should be modeled from Functional Guidelines for Evaluating Organics Analysis, EPA, February 1, 1988 and Functional Guidelines for Evaluating Inorganics Analysis, EPA, July 1, 1988, or their updated versions.

1. Field Data Validation

Validation of field data shall be performed on two levels. First, all data shall be validated at the time of collection by following standard procedures and QC checks. Second, data shall be validated by supervisory personnel who will review the data to ensure that the correct codes and units have been included. The supervisory personnel are responsible for ensuring that justifiable data is obtained by conforming to the following field objectives:

a. Adherence to the approved sampling plan;
b. Equipment and instruments are properly calibrated and in working order;
c. Samples are collected according to written standard operating procedures;
d. Sufficient sample volume is collected to maintain sample integrity and conduct all required analysis;
e. Samples are properly preserved;
f. All applicable field QC samples are provided with each sample set;
g. Complete chain-of-custody documentation is maintained throughout the duration of the field effort, and copies are included with each sample shipment; and
h. Field samples will arrive at the laboratory in good condition.

Random checks of sampling and field conditions should be made by the supervisory personnel, who should check recorded data at that time to confirm the observations. Whenever possible, peer review should also be incorporated into the data validation process, in order to maximize data consistency between field personnel.

i. Checklist will be used to oversee and monitor the QA/QC.

2. Laboratory Data Validation

Data validation will be performed by the specific analytical task leader, the Laboratory QC Officer, and the Laboratory QA Manager. Validation will be accomplished through routine audits of the data collection and flow procedures and monitoring GC sample results. Data collection and flow audits include:

a. Review of sample documents for completeness by the analyst(s) at each step of the analysis scheme;
b. Daily review of instrument logs, performance test results, and analyst performance by the analytical task manager;
c. Unannounced audits of report forms, notebooks, and other data sheets by the Laboratory QA Manager;
d. Daily review of performance indicators such as blanks, surrogate recoveries, duplicate analyses, matrix spike analysis, etc., by the analytical task manager;
e. Checks on a random selection of calculations by the Laboratory QA Manager;

f. Review by the Laboratory QA Manager of all reports prior to, and subsequent to, computerized data entry; and
g. Review and approval of final report by the Laboratory QA Manager.

Results from the analysis of project and blind audit QC samples will be calculated and evaluated as reported. If these results indicate data quality problems, immediate corrective action will be taken, and all data collected since previous QC audits will be carefully reviewed for validity.

As discussed in Section B, Project Organization and Responsibility, the key individuals soliciting to perform sampling, testing, and decontamination procedures must provide a brief statement explaining individual's responsibility, title and authority for handling and validating data in the reporting scheme. Also, individuals soliciting for this work must identify an independent validator, and must provide a statement of how the individual is independent from the project.

The last page of this APPENDIX shows an example of a Chain-of-Custody Form. The laboratory will supply reports for Quality Control results and checklists that will be used to oversee and monitor the Quality Assurance/Quality Control.

I. Internal Quality Control Checks

Standard analytical methods are given in the pertinent SW846 analytical method. The standards, blanks, duplicates and spiked samples are used for calibration and identification of potential matrix interferences. The laboratory shall use adequate statistical procedures to monitor and document performance and implement an effective program to resolve testing problems. Data from QC samples shall not be used to alter or correct analytical data.

The quality control data and records obtained in the following components of analytical quality control shall be submitted to the data validator and to the regulatory agency with the sample results. These procedures shall be performed at least once with each analytical batch with a minimum of once per twenty samples.

1. Matrix Spike and Matrix Spike Duplicate Samples

A matrix spike and matrix spike duplicate shall be analyzed and must be carried through all stages of the sample preparation and measurement steps. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements must be spiked into the sample at known concentrations.

The objective of spiking is to determine the extent of matrix bias or interference on analyte recovery and sample-to-sample precision. For soil/sediment samples, spiking is performed at approximately 3 ppm and, therefore, compounds in excess of this concentration in the sample may cause interference for the determination of spiked analytes.

Sample blank matrix spikes must also be run periodically to assure that matrix spike results which are out-of-range are due to matrix effects and not to problems with the spike solution.

2. Reagent Blank Sample

Each batch shall be accomplished by a reagent blank. The reagent blank shall be carried through the entire analytical procedure.

3. Surrogate Spike Sample

The analyst shall monitor both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by spiking every blank, standard, and environmental sample (including matrix spike/matrix duplicate samples) with surrogate compounds prior to purging or extraction. Surrogates shall be spiked into samples according to the appropriate analytical methods.

Surrogate spike recoveries shall fall within the control limits set by the laboratory (in accordance with procedures specified in the method or within $\pm$ 20%) for samples falling within the quantification limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates below the quantification limit; evaluation of analytical quality will rely on the quality control embodied in the check, spiked and duplicate spiked samples.

4. Check Sample

Each analytical batch shall contain a check sample. The analytes employed shall be a representative subset of the analytes to be determined. The concentrations of these analytes shall approach the estimated quantification limit in the matrix of the check sample. In particular, check samples for metallic analytes shall be matched to field samples in phase and in general matrix composition.

5. Instrument Adjustments and Calibration

Instrument adjustment and calibration shall be in accordance with requirements which are specific to the instrumentation and procedures employed. Criteria for initial conditions, calibration and continuing confirmation are found in the appropriate SW-846 analytical method.

6. Standards

Standard curves derived from data consisting of one reagent blank and four concentrations shall be prepared for each analyte. The response for each prepared standard shall be based upon the average of three replicate readings of each standard. The standard curve shall be used with each subsequent analysis provided that the standard curve is verified by using at least one reagent blank and one standard at a level normally encountered or expected in such samples.

The response for each standard shall be based upon the average of three replicate readings of the standard. If the results of the verification are not within $\pm$ 10% of the original curve, a new standard shall be prepared and analyzed. If the results of the second verification are not within $\pm$ 10% of the original standard curve, a reference standard should be employed to determine if the discrepancy is with the standard or with the instrument. New standards should also be prepared on a quarterly basis at a minimum. All data used in drawing or describing the curve shall be so indicated on the curve or its description. A record shall be made of the verification.

Standard deviations and relative standard deviations shall be calculated for the percent recovery of analytes from the spiked sample duplicates and from the check samples. These values shall be established for the twenty most recent determinations in each category.

7. Detection Limit Determination

Laboratory analytical quality control to determine detection limits can be found in 40CFR Part 136. Field quality control can be found in the following:

a. Documentation

All field activities must be properly documented including:

(1) Specific environmental sampling procedures;
(2) Procedures and justifications for any field actions taken contrary to this quality assurance project plan;
(3) Pre-field activities such as equipment check-out using standardized checklists;
(4) Post-field activities including equipment and personnel decontamination; and
(5) Chain-of-custody procedures for all samples collected in the field.

b. Blank, Field Matrix-Spiked, Collocated, and Replicate Samples

Field quality control procedures for blanks, field matrix-spiked, collocated and replicate samples can be found in Section D - Field Sampling Plan.

J. Performance and System Audits

System audits consist of the qualitative evaluation of the components of the measurement systems to determine their proper selection and use. These audits include a careful evaluation of both field and laboratory quality control procedures and shall be performed on a regular schedule during the life of the project. System audits shall be conducted by an individual who is technically knowledgeable about the operation and who is independent of any other aspect of the investigation. The primary objective of the systems audit is to ensure that the Quality Assurance/ Quality Control procedures are being followed.

Performance audits are conducted periodically to determine accuracy of the total measurement system and are quantitative evaluations of the measurement systems. This requires testing the measurement systems with samples of known composition or behavior to evaluate precision and accuracy.

Performance AND System Audits will be performed weekly basis during both the sampling and the testing life of the project.

The following are recommended audit procedures:

1. Field Performance Audits

Field performance audits shall be conducted during the project as field data are generated, reduced and analyzed. All numerical manipulations shall be legible and sufficiently complete to permit reconstruction by others. Analyses of blank samples is an audit of the effectiveness of measures taken in the field to ensure sample integrity. The results of field replicates are an audit of the ability of field teams to collect representative sample portions of each matrix type.

2. Field Systems' Audits

Systems audits of site activities will be accomplished by an inspection of all field site activities. During this audit, the auditor(s) will compare current field practices with standard procedures. The following elements should be evaluated during a field systems' audit:

a. Overall level of organization and professionalism;
b. All activities conducted in accordance with the Work Plan;
c. All procedures and analyses conducted according to procedures outlined in this Quality Assurance Project Plan:
d. Level of activity and sample documentation;
e. Level of QA conducted per each field team;
f. Contingency plans in case of equipment failure or other event preventing the planned activity from proceeding;
g. Decontamination procedures;
h. Level of efficiency with which each team conducts planned activities at one site and proceeds to the next; and
i. Sample packaging and shipment.

After completing the audit, any deficiencies should be discussed with the field staff, and corrections identified. If any of these efficiencies could affect the integrity of the samples being collected, the auditor(s) will inform the field staff immediately, so that corrections can be implemented immediately.

3. Laboratory Performance Audits

Laboratory performance audits shall be conducted on a routine basis and include items such as:

a. Verification of written procedures and analyst(s) understanding;
b. Verification and documentation of procedures and documents;
c. Periodic unannounced inspection of the sample handling group;
d. Periodic unannounced inspection of the analytical process record keeping; and
e. Review of a portion of all analytical data and calculations.

Corrective action will be taken for any deficiencies noted during the audit.

4. Laboratory System Audits

Laboratory system audits are qualitative audits of the measurement systems, ensuring that they are properly maintained and used. In the event that a major defect is discovered as a result of one of these audits, a follow-up inspection shall be conducted after sufficient time has passed for correction of the deficiency, or evidence of correction of the deficiency may be presented by the laboratory.

a. Scheduled Audit

These audits will be performed on a regularly scheduled basis, and include review of:

(1) Analytical and support instrumentation maintenance logs;
(2) Analytical and support instrumentation calibration logs;
(3) Refrigerator and freezer temperature records;
(4) Distilled/de-ionized water supply records;
(5) Sample tracking system;
(6) Standard tracking system; and
(7) Reagent chemical log-in, tracking, and disposal.

b. On-site Audit

During this audit, performed by the project Quality Assurance Officer (QAO), laboratory records and procedures will be inspected for completeness, accuracy, precision, and adherence to prescribed methods. This inspection will include:

(1) Following the sample chain-of-custody from time of sample receipt, through all analysis steps, to data reduction, validation, and report generation;
(2) Examination of maintenance and calibration logbooks, to ensure that maintenance and calibration are performed on a scheduled basis;
(3) Examination of procedures and records for data calculation, transfer and validation;
(4) Spot-check of calibration, QC, and sample data from selected instruments for selected days, to ensure acceptable precision, accuracy, and completeness;
(5) Inspection of storage areas, glassware preparation areas, and distilled/de-ionized water system records and procedures;
(6) Examination of QA procedures and records (standard and spike solution logbooks and storage areas, control charts, QA manuals).

K. Preventive Maintenance

Preventive maintenance of field and laboratory equipment shall be performed on a regular basis in accordance with written standard operating procedures or maintenance manuals for each equipment item used for this project.

L. Data Assessment Procedures (From 40 CFR 136)

The following describes the equations used to assess precision, accuracy and completeness of the measurement data, and to determine the measurement systems detection limits.

1. Precision

$$RPD = \frac{R_1 - R_2}{(R_1 - R_2/2} \times 100$$

Where: R_1 and R_2 represent the concentration of replicate spikes 1 and 2.

2. Accuracy

$$R = \frac{[(\text{Spiked Sample Conc.}) \times (\text{Sample} + \text{Spike Vol.}) - (\text{Sample Vol.}) \times (\text{Sample Conc.})]}{(\text{Spike Conc.}) \times (\text{Spike Volume})} \times 100$$

Where R = percent recovery.

3. Completeness

$$\text{Complete} = \frac{\text{\# of valid true concentrations reported}}{\text{\# of samples collected for anal. of true conc.}} \times 100$$

4. Method Detection Limits

$$MDL = t(n-a,\ 1-a = 0.99) X\ S$$

Where MDL = Method Detection Limit
S = Standard deviation of the replicate analysis
t(n-1, 1-a = 0.99) = Students' t-value appropriate to a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom.

M. Corrective Actions

If the results of the analysis are not within the anticipated limits, there are corrective actions that should be initiated by the analyst. There are, however, other checks within the measurement system that only the person assigned QA/QC responsibilities would be in a suitable position to evaluate and take action upon if required. A "blind" sample inserted in the normal sample flow would be an example of such a check.

The need for corrective action may be identified by either system audits, performance audits or standard QC procedures. Essential steps in the corrective action system are:

1. Identify and define the problem;
2. Assign responsibility for investigating the problem;
3. Investigate and determine the cause of the problem;
4. Determine a corrective action to eliminate the problem;
5. Assign and accept responsibility for implementing the corrective action;
6. Implement the corrective action and evaluate its effectiveness; and
7. Verify that the corrective action has eliminated the problem.

It is the responsibilty of the QAO to ensure that these steps are taken and that the problem necessitating the corrective action has been resolved.

N. Quality Assurance Reports to Management

Reports to management shall include:

1. Periodic assessment of the accuracy, precision and completeness of the measurement data;
2. Results of performance audits;
3. Results of system audits;
4. Significant QA/QC problems along with recommended solutions; and
5. Resolutions of previously-stated problems.

The individual(s) responsible for preparing the periodic reports should be identified. These reports and the final project report should include a separate QA/QC section that summarizes data quality information contained in the periodic reports.

Field Quality Assurance Report

Status reports should be submitted periodically to describe the progress of the project. These should include daily field progress reports, compiled field data sets, and corrective action documentation at appropriate intervals. Situations requiring immediate corrective action measures will be brought to the attention of the Project Manager.

Laboratory Quality Assurance Reports

A project QA report that summarizes all QA activities and QC data for the project will be issued to the project QAO whenever analysis data are reported to the Project Manager. In addition, the Laboratory Director will provide QA update memoranda for each sampling episode to the Project Manager upon evaluation of the analytical work for that episode. The Project Manager will be notified immediately of laboratory QA situations requiring immediate corrective action.

Special Notifications

All situations that indicate an imminent health risk will be brought to the immediate attention of the Project Manager and the regulatory agency. Written notification with supporting data will be forwarded within 3 days.

Final Report

The final report submitted to the regulatory agency must include a separate quality assurance section that summarizes the data quality information contained in the periodic reports.

APPENDIX 2

LAB ANALYSIS RESULTS AND FLUID LEVEL RECORDS

FOR

BUILDING 360 CLOSURE PLAN

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

PREPARED BY:

CAMPBELL DESIGN GROUP, P.C.
CIVIL, ELECTRICAL, AND MECHANICAL ENGINEERS
301 SOUTH MAIN STREET
HORSEHEADS, NEW YORK 14845

CDG FILE NO. 60-9422

OCTOBER 28, 1992

Galson
Technical Services, Inc.
6601 Kirkville Road
Post Office Box 548
E. Syracuse, N.Y. 13057
Tel: (315) 432-0506

LABORATORY ANALYSIS REPORT

Client: SENECA ARMY DEPOT
Task Number: 87041020
Location: SEE BELOW

Job Number: G7189
Date Sampled: 9-APR-1987

PO Number: DAAC-712-86M-A324

Lab ID: E8598, E8599, E9601
Sample ID: SLUDGE BARREL

			SAMPLE DESCRIPTION
PCB	MG/KG	<4	OILY, BLACK SOIL WITH WATER & OIL MIXTURE ON TOP. ONLY SLUDGE WAS ANALYZED
	TYPE	NA	
*LEAD	MG/KG	2700	
*CADMIUM	MG/KG	41	
*CHROMIUM	MG/KG	93	
FLASH POINT	°F	115	
TOTAL ORGANIC HALOGENS (AS LINDANE)	%	<0.0001	

Method(s): EPA 600/4-79-020, EPA SW846, EPA 608
Footnotes: SPIKED RECOVERY 110%
*RESULTS ON DRY WEIGHT BASIS
Submitted by: DWF, AC, JS
Approved by:
Date: 27-APR-1987

(<) - Less Than
(>) - Greater Than
NA - Not Applicable
ND - Not detectable
NS - Not specified
MG - Milligrams
L - Liters
M³ - Cubic Meter
MG/M³ - Milligrams Per Cubic Meter
PPM - Parts Per Million
UG - Micrograms
NG - Nanograms

Galson
Technical Services, Inc.
6601 Kirkville Road
Post Office Box 546
E. Syracuse, N.Y. 13057
Tel (315) 432-0506

LABORATORY ANALYSIS REPORT

Client: SENECA ARMY DEPOT
Task Number: 87041020
Location: SEE BELOW

Job Number: G7189
Date Sampled: 9-APR-1987

PO Number: DAAC-712-86M-A324

		Lab ID: E8566, E8567	
		Client ID: STEAM CLEANING PIT	SAMPLE DESCRIPTION
Total Lead	MG/L	26	MOSTLY WATER WITH THIN, BLACK OIL LAYER.
Total Cadmium	MG/L	1.0	ONLY WATER LAYER ANALYZED
Total Chromium	MG/L	1.5	
Total Organic Halogen (as Lindane)	MG/L	<0.0001	

Method(s): EPA 600/4-79-020

(<) - Less Than
(>) - Greater Than
NA - Not Applicable
ND - Not detectable
NS - Not specified
MG - Milligrams
L - Liters
M^3 - Cubic Meter
MG/M^3 - Milligrams Per Cubic Meter
PPM - Parts Per Million
UG - Micrograms
NG - Nanograms

Footnotes:

Submitted by: JS
Approved by:
Date: 27-APR-1987

43-14-1 (5/87)—7I

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. 31123

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA No. NY0213820830 / Manifest Document No. 01190	2. Page 1 of 1	Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address
Seneca Army Depot
Route 96, Romulus, NY 14541-5001
4. Generator's Phone (607 869-1450

A. State Manifest Document No. NY A843904 8
B. Generator's ID SAME

5. Transporter 1 (Company Name) ~~Frontier Chemical Waste Process,~~ (MRP)
6. US EPA ID Number
C. State Transporter's ID
D. Transporter's Phone ~~716 285 8208~~

7. Transporter 2 (Company Name) Frank's Vacuum Truck Service, Inc
8. US EPA ID Number NY D 9 8 2 7 9 2 8 1 4
E. State Transporter's ID 54424DNY
F. Transporter's Phone (716) 28421[illegible]

9. Designated Facility Name and Site Address
Frontier Chemical Waste Process, Inc.
4626 Royal Avenue
Niagara Falls, NY 14303
10. US EPA ID Number N Y D 0 4 3 8 1 5 7 0 3
G. State Facility's ID
H. Facility's Phone (716) 285-8208/2581

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous Waste Liquid, NOS (Steam Cleaning Waste Water) ORM-E, NA 9189 D008	01	TT	EST 2000 (MRP) ~~[illegible]~~	G	D008
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a c
b d

K. Handling Codes for Wastes Listed Above
a T c
b d

15. Special Handling Instructions and Additional Information
Contains oil, water, detergent, grease, dirt, traces of "Stoddard" solvent, paint thinner, paint chips, metal filings generated from steam washing of large equipment.--
Waste Code 751-64 W/O # 31123

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DAVID G. ADAM D/OA/TPE/SOAD — Signature: David G Adam — Mo. Day Year: 01 02 90

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: James L. Lambert — Signature: James L Lambert — Mo. Day Year: 01 02 90

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
Section K-a Handling code should be B (MC)

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Mike McCormick — Signature: Mike McCormick — Mo. Day Year: 01 03 90

In case of emergency or spill immediately call the National Response Center 1-800-424-8802 and the N.Y. Department of Transportation (518) 457-7362.

STEAM JENNY PIT 188
FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

E	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
			10-6	14 1/2"	
			10-7	"	
			10-10	"	
			10-11	15"	"
			10-12	15 1/2"	"
			10-13	16 1/2"	
			10-14	16 1/2"	
			10-17	17 1/4"	
			10-18	18"	"
			10-19	18 3/4"	
			10-20	20"	
			10-21	21 1/4"	
			10-24	22"	
			10-25	[illegible]	
			10-26	2" [illegible]	
			10-27	"	
			10-28	"	
			10-31	"	
			11-1	"	
10-3	14"		11-2	"	
10-4	"		11-3	"	
10-5	14 1/2"		11-4	"	

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT

FLUID LEVEL RECORD

188

**NOTIFY SUPERVISOR IMMEDIATELY

IF LEVEL CHANGES OVERNIGHT.

DATE	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
11-7	3 1/2"	P. Attman	12-9	3 1/2"	A. T[illegible]
11-8	〃	P. Attman	12-12	〃	A. T[illegible]
11-9	〃	P. A.	12-13	〃	A. T[illegible]
11-10	〃	P. A.	12-14	〃	H. E[illegible]
11-11	〃	P. A.	12-15	〃	H. W. E.
11-14	〃	H. E[illegible]	12-16	〃	H. W. E.
11-15	〃	H. W. E.	12-19	〃	〃
11-16	〃	H. W. E.	12-20	〃	〃
11-17	〃	H. W. E.	12-21	〃	〃
11-18	〃	H. E[illegible]	12-22	〃	H. E[illegible]
11-21	〃	〃	12-23	〃	H. E[illegible]
11-22	〃	〃	12-27	〃	P. Attman
[illegible]-23	〃	〃	12-28	〃	P. Attman
11-28	〃	〃	12-29	〃	H. W. E.
11-29	〃	〃	12-30	〃	H. W. E.
11-30	〃	〃	1-3	〃	H. W. E.
12-1	〃	P. Attman	1-4	〃	〃
12-2	〃	P. Attman	1-5	〃	〃
12-5	3 1/2"	P. A.	1-6	〃	〃
12-6	〃	P. A.	1-9	〃	〃
12-7	〃	[illegible]	1-10	〃	〃
12-8	〃	H. E.	1-11	〃	H. E[illegible]

RECORD IS TO COMPLETED EVERY DAY.

SEE ER Form 16 1 Jul 75 GENERAL PURPOSE FORM

STEAM JENNY PIT

FLUID LEVEL RECORD

189

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

D	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
1-12	2 1/2"	H. E. Armey	2-14		H. E. Armey
1-13		H. W. E.	2-15		H. W. E.
1-17		H. W. E.	2-16		"
1-18		P. Atterway	2-17		"
1-19		P. A.	2-21		"
1-20		A. Tinsley	2-22		"
1-23		A. Tinsley	2-23		"
1-24		A. Tinsley	2-24		H. E. Armey
1-25		H. W. E.	2-27		H. E. Armey
1-26		"	2-28		H. E. Armey
1-27		"	3-1		H. E. Armey
1-30		"	3-2		H. W. E.
1-31		"	3-3		H. W. E.
2-1		"	3-6		"
2-2		"	3-7		P. H. Atterway
2-3		"	3-9		P. H. Atterway
2-6		"	3-9		P. H.
2-7		"	3-10		P. H.
2-8		"	3-13		H. E. Armey
2-9		"	3-14		H. W. E.
2-10		H. E. Armey	3-15		H. W. E.
2-13		H. W. E.	2-16	3 1/2"	H. W. E.

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT 1 89

FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

DATE	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
3-17	3½"	H. Eichman	4-21	11	[illegible]
3-21	3½"	H. Eichman	4-24	12	[illegible]
3-22	3½"	H. Eichman	4-25	12½"	PA
3-23	3½"	H. Eichman	4-26	12½"	PA
3-24	3½"	H. Eichman	4-27	13	[illegible]
3-28	3½"	H. Eichman	4-27	14	[illegible]
3-30		H. E.	5-1	15	PA
3-31		H. E.	5-2		RF
4-1		H. E.	5-3		RF
4-4		H. E.	5-4		RF
4-5		H. E.	5-5	15"	PA
[illegible]	4"	RW	5-8	15"	PA
[illegible]	5"	RW	5-9	15½	PA
4-10	5¼"	[illegible]	5-10	16"	PA
4-11	5¾"	[illegible]	5-11	16½	RF
4-12	6½"	[illegible]	5-12	17"	RF
4-13	7"	[illegible]	5-15	18	[illegible]
4-14	7¼"	PA	5-16	19½"	[illegible]
4-17	7¼"	PA	5-17	20	[illegible]
4-18	8"	RF	5-18	21	[illegible]
4-19	10"	RF	5-19	[illegible]	[illegible]
4-20	11"	RF	5-22	[illegible]	[illegible]

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT '89

FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

Checked pit weekly after stopped using

D	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
5-23	22"	RF	6-25	4"	[signature]
5-24	/	RF	6-28	4"	[signature]
5-25	(	PA	7-5	4"	[signature]
5-26	)	PA	7-12	4"	[signature]
5-29	/	PA	7-19	4"	[signature]
5-30	/	RF	7-26	4"	[signature]
5-31	\	RF	8-2	4"	[signature]
6-1	)	[signature]	8-9	4"	[signature]
6-2	?	[signature]	8-16	4"	[signature]
6-5	(	RF	8-23	4"	[signature]
6-6	|	PA	8-30	4"	[signature]
6-7	\	PA	9-5	4"	PA
6-8	/	PA	9-13	4"	[signature]
6-9	(	RF	9-18	4"	[signature]
6-12	/	RF			
6-13	/	RF			
6-14		[signature]			
6-15		[signature] Pump out			
[illegible]	4"	[illegible]	[illegible]		
		STOPPED USING			
		IT TO START			
		PCB JOB			

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT

FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATEL

IF LEVEL CHANGES OVERNIGHT.

DATE	LEVEL	SIGNATURE	DATE	LEVEL	SIGNATURE
11-5 0715 AM	13 7/16"	G. Tolan	11-9 AM	21 7/16"	H. Eichmeyer
11-5 1615 PM	13 7/16	G. Tolan			
11-6 0715 AM	13 7/16"	G Tolan			
11-6 PM	13 15/16"	G. Tolan			
11-9 AM	13 15/16	H. Eichmeyer			
11-9 PM	15 1/8"	H. Eichmeyer			
11-10 AM	15 1/8"	H. Eichmeyer			
11-10 PM	15 7/16"	B. Barb			
11-12 AM	15 7/16	H. Eichmeyer			
11-12 PM	18"	H. Eichmeyer			
11-13 AM	18"	H. Eichmeyer			
11 13	18"	H. Eichmeyer			
16 AM	18"	H. Eichmeyer			
11-16 PM	18"	B Barb			
11-17 AM	18"	B. Barb			
11-17 PM	19"	H. Eichmeyer			
11-18 AM	19"	H. Eichmeyer			
11-18 PM	21"	H. Eichmeyer			
11-19 AM	21"	H. Eichmeyer			
11-19 PM	21 3/16	B Barb			
11-20 AM	21 3/16	B. Barb			
11-20 PM	21 3/16	B Barb			

RECORD IS TO COMPLETED EVERY DAY.

SEE EP Form 16 1 Jul 75

GENERAL PURPOSE FORM

STEAM JENNY PIT Pumped Dry 2 Jan 90
Sludge removed 5 Jan 90
FLUID LEVEL RECORD Pit floor covered w/ Speedy Dry 5 Jan 90

**NOTIFY SUPERVISOR IMMEDIATEL
IF LEVEL CHANGES OVERNIGHT.

1990 DATE	Liquid LEVEL	SIGNATURE & Time	1990 DATE	Liquid LEVEL	SIGNATURE & Time
6 Jan 90	0"	J Hinman 0700	12 Feb 90	0"	James E. Hinman 0715
9 Jan 90	0"	J Hinman 0800	13 Feb 90	0"	J Hinman 0710
10 Jan 90	0"	J Hinman 0700	14 Feb 90	0"	J Hinman 0720
11 Jan 90	0"	J Hinman 0730	15 Feb	0"	J Hinman 0725
12 Jan 90	0"	J Hinman 0730	16 Feb	0"	J Hinman 0715
16 Jan 90	0"	J Hinman 0730	20 Feb	1 3/4"	J Hinman 0720
17 Jan 90	0"	J Hinman 0700	21 Feb	1 3/4"	J Hinman 0715
18 Jan 90	0"	J Hinman 0700	22 Feb	1 3/4"	J Hinman 0715
22 Jan 90	0"	J Hinman 0730	23 Feb	1 3/4"	J Hinman 0730
23 Jan 90	0"	J Hinman 0700	26 Feb	1 3/4"	J Hinman 0730
24 Jan 90	0"	J Hinman 0730	27 Feb	1 3/4"	J Hinman 0715
25 Jan 90	0"	J Hinman 0715	28 Feb	1 3/4"	J Hinman 0725
29 Jan 90	0"	J Hinman 0700	1 Mar	1 1/2"	J Hinman 0715
29 Jan 90	0"	J Hinman 0730	5 Mar	1 1/2"	J Hinman 0710
30 Jan 90	0"	J Hinman 0800	6 Mar	1 1/2"	J Hinman 0707
31 Jan 90	0"	J Hinman 0715	7 Mar	1 1/2"	J Hinman 0725
1 Feb 90	0"	J Hinman 0715	8 Mar	1 1/2"	J Hinman 0715
5 Feb 90	0"	J Hinman 0720	9 Mar	1 1/4"	J. Hillett 0730
6 Feb 90	0"	J Hinman 0730	12 Mar	1"	J. Hillett 0800
7 Feb 90	0"	J Hinman 0710	13 Mar	1"	J Hinman 0720
8 Feb 90	0"	J Hinman 0700	14 Mar	1"	J Hinman 0740
9 Feb 90	0"	J Hinman 0800	15 Mar	1"	J Hinman 0720

RECORD IS TO COMPLETED EVERY DAY.

SEE AF Form 16 1 Jul 75 GENERAL PURPOSE FORM

STEAM JENNY PIT

FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

1990 DATE	Liquid LEVEL	SIGNATURE & Time	1990 DATE	Liquid LEVEL	SIGNATURE & Time
19 Mar	1"	JHinman 0715	20 April	3/8"	JHinman 0712
20 Mar	1"	JHinman 0720	23 April	1/4"	JHinman 0708
21 Mar	1"	JHinman 0715	24 April	1/4"	JHinman 0727
22 Mar	1"	JHinman 0707	25 April	1/4"	JHinman 0715
23 Mar	1"	JHinman 0720	26 April	1/4"	JHinman 0713
26 Mar	1"	JHinman 0720	30 April	1/4	K Hilliott 0815
27 Mar	1"	JHinman 0710	1 MAY	1/4"	JHinman 0702
28 Mar	1"	JHinman 0711	2 May	1/4"	JHinman 0712
29 Mar	1"	JHinman 0711	3 May	1/4"	JHinman 0709
2 April	1"	JHinman 0710	4 May	1/4"	JHinman 0713
3 April	1"	JHinman 0711	7 May	1/4"	JHinman 0708
4 April	1"	JHinman 0705	8 May	1/4"	JHinman 0713
5 April	1"	JHinman 0715	9 May	1/4"	JHinman 0704
6 April	1"	JHinman 0900	10 May	1/4"	JHinman 0705
9 April	3/4"	JHinman 0715	11 May	1/4"	JHinman 0710
10 April	3/4"	JHinman 0700	12 May	1/4"	JHinman 0605
11 April	3/4"	JHinman 0711	14 May	1/4"	JHinman 0710
12 April	3/4"	JHinman 0719	15 May	1/4"	JHinman 0730
16 April	1/2"	JHinman 0720	16 May	1/4"	JHinman 0709
17 April	3/8"	JHinman 0715	17 May	1/4"	JHinman 0717
18 April	1/8"	K Hilliott 0715	18 May	1/2"	JHinman 0701 – 2 Days of Rain
19 April	1/8"	K Hilliott 0720	19 May	1/2"	JHinman 0605

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT
FLUID LEVEL RECORD

**NOTIFY SUPERVISOR IMMEDIATELY IF LEVEL CHANGES OVERNIGHT.

1990 DATE	LEVEL	SIGNATURE	1990 DATE	LEVEL	SIGNATURE
21 May	1"	Hinman 0707	16 June	2"	Hinman 0605
22 May	1"	Hinman 0708	18 June	2"	Hinman 0712
23 May	1"	Hinman 0715	19 June	2"	Hinman 0715
24 May	1"	Hinman 0716	20 June	2"	Hinman 0714
25 May	1"	Hinman 0711	21 June	2"	Hinman 0709
26 May	1"	Hinman 0605	22 June	2"	Hinman 0712
29 May	1"	Hinman 0715	23 June	2"	Hinman 0604
30 May	1"	Hinman 0716	25 June	2"	Hinman 0703
31 May	1"	Hinman 0712	26 June	2"	Hinman 0705
1 June	1"	Hinman 0711	27 June	1 3/4"	Hinman 0727
2 June	1"	Hinman 0602	28 June	1 3/4"	Hinman 0707
4 June	1"	Hinman 0703	29 June	1 3/4"	Hinman 0710
5 June	1"	Hinman 0718	30 June	1 3/4"	Hinman 0602
6 June	1"	Hinman 0709	2 July	1 3/4"	Hinman 0710
7 June	1"	Hinman 0720	3 July	1 3/4"	Hinman 0708
8 June	1"	Hinman 0715	5 July	1 3/4"	Hinman 0704
9 June	1"	Hinman 0605	6 July	1 3/4"	Hinman 0707
11 June	2"	Hinman 0715	7 July	1 3/4"	Hinman 0604
12 June	2"	Hinman 0720	9 July	1 3/4"	Hinman 0717
13 June	2"	Hinman 0716	10 July	1 3/4"	Hinman 0703
14 June	2"	Hinman 0708	11 July	1 3/4"	Hinman 0707
15 June	2"	Hinman 0710	12 July	1 3/4"	Hinman 0712

Sink installed in North End of 36 - Drains into Pit.

RECORD IS TO COMPLETED EVERY DAY.

STEAM JENNY PIT
FLUID LEVEL RECORD

NOTIFY SUPERVISOR IMMEDIATELY
LEVEL CHANGES OVERNIGHT

1990 DATE	LEVEL	SIGNATURE	TIME	1990 DATE	LEVEL	SIGNATURE	TIME
13 July	1"	JHinman	0714	15 Aug	1/4"	JHinman	0707
14 July	1"	JHinman	0604	16 Aug	1/4"	JHinman	0717
16 July	1"	JHinman	0710	20 Aug	1/8"	JHinman	0712
17 July	1"	JHinman	0706	21 Aug	1/8"	JHinman	0720
18 July	1/2"	JHinman	0720	22 Aug	1/8"	J. Hillotte	0730
19 July	1/2"	JHinman	0710	23 Aug	1/8"	J. Hillotte	0715
23 July	1/2"	JHinman	0707	24 Aug	1/8"	J. Hillotte	0715
24 July	1/2"	JHinman	0720	28 Aug	1/8"	J. Hillotte	0720
25 July	1/4"	JHinman	0708	28 Aug	1/8"	JHinman	0708
26 July	1/4"	JHinman	0711	29 Aug	1/8"	JHinman	0715
27 July	1/4"	J. Hillotte	0710	30 Aug	1/8"	JHinman	0714
30 July	1/4	J. Hillotte	0715	4 Sept	1/8"	JHinman	0730
31 July	1/4"	JHinman	0707	5 Sept	1/8"	JHinman	0712
1 Aug	1/4"	JHinman	0710	6 Sept	1/8"	JHinman	0711
2 Aug	1/4"	JHinman	0805	7 Sept	1/8"	JHinman	0705
6 Aug	1/4"	JHinman	0710	8 Sept	1/16"	JHinman	0618
7 Aug	1/4"	JHinman	0718	10 Sept	1/16"	JHinman	0715
8 Aug	1/4"	JHinman	0708	11 Sept	1/16"	JHinman	0726
9 Aug	1/4"	JHinman	0720	12 Sept	1/16"	JHinman	0707
10 Aug	1/4"	JHinman	0713	13 Sept	1/16"	J. Hillotte	0712
13 Aug	1/4"	J. Hillotte	0715	17 Sept	1/16"	JHinman	0730
14 Aug	1/4	J. Hillotte	0715	18 Sept	0"	JHinman	0720

STEAM JENNY PIT
F ID LEVEL RECORD

NOTIFY SUPERVISOR IMMEDIATELY
LEVEL CHANGES OVERNIGHT

1990 DE	LEVEL	SIGNATURE	TIME	DATE	LEVEL	SIGNATURE	TIME
19 Sept	0"	J Hinman	0720	24 Oct	1/2"	J Hinman	0718
20 Sept	0"	J Hinman	0717	25 Oct	1/2"	J Hinman	0705
21 Sept	0"	J Hinman	0731	29 Oct	1/2"	J Hinman	0706
24 Sept	0"	J Hinman	0719	30 Oct	1/2"	J Hinman	1546
25 Sept	0"	J Hinman	0729				
26 Sept	0"	J Hinman	0713				
27 Sept	0"	J Hinman	0716				
1 Oct	0"	J Hinman	0716				
2 Oct	0"	J Hinman	0720				
3 Oct	0"	L. Hillitt	0720				
4 Oct	0"	J Hinman	0721				
5 Oct	0"	J Hinman	0741				
9 Oct	0"	J Hinman	0708				
10 Oct	0"	J Hinman	0707				
11 Oct	1/8"	J Hinman	0707				
15 Oct	1/2"	J Hinman	0712				
16 Oct	1/2"	J Hinman	0713				
17 Oct	1/2"	J Hinman	0709				
18 Oct	1/2"	L Hillitt	0710				
19 Oct	1/2"	L Hillitt	0715				
22 Oct	1/2"	J Hinman	0723				
23 Oct	1/2"	J Hinman	0715				

STEAM JENNY PIT
FLUID LEVEL RECORD

NOTIFY SUPERVISOR IMMEDIATELY I
LEVEL CHANGES OVERNIGHT

DATE	LEVEL	SIGNATURE	TIME	DATE	LEVEL	SIGNATURE	TIME
19 Sept	0"	J Hinman	0720	24 Oct	½"	J Hinman	0718
20 Sept	0"	J Hinman	0717	25 Oct	½"	J Hinman	0705
21 Sept	0"	J Hinman	0731	29 Oct	½"	J Hinman	0706
24 Sept	0"	J Hinman	0719	30 Oct	½"	J Hinman	1546
25 Sept	0"	J Hinman	0729				
26 Sept	0"	J Hinman	0713				
27 Sept	0"	J Hinman	0716				
1 Oct	0"	J Hinman	0716				
2 Oct	0"	J Hinman	0720				
3 Oct	0"	L. Hillotte	0720				
4 Oct	0"	J Hinman	0721				
5 Oct	0"	J Hinman	0741				
7 Oct	0"	J Hinman	0708				
10 Oct	0"	J Hinman	0707				
11 Oct	⅛"	J Hinman	0707				
15 Oct	½"	J Hinman	0712				
16 Oct	½"	J Hinman	0713				
17 Oct	½"	J Hinman	0709				
18 Oct	½"	L Hillotte	0710				
19 Oct	½"	L Hillotte	0715				
22 Oct	½"	J Hinman	0723				
23 Oct	½"	J Hinman	0715				

SSE EQ Form 16 1 Jul 75

GENERAL PURPOSE FORM

APPENDIX B

NEW YORK STATE SALE AND USE TAX

CEMRO-OC/Viles/3820 7 July 1994

MEMORANDUM FOR CEMRO-ED-ER (ATTN: Andrew Winslow)

SUBJECT: Rapid Response, New York State Sales and Use Tax

1. Please refer to your memo dated 24 June 1994 regarding a Rapid Response Project at Seneca Army Depot, New York.

2. According to the New York Statutes, New York collects a state sales and use tax at the rate of four percent (4%). Seneca County imposes a three percent (3%) tax, making the total tax for a project at the Seneca Army Depot, seven percent (7%).

3. There are no provisions exempting Federally-funded environmental projects from payment of the New York state sales and use tax, and there are no provisions for returning such taxes to the Federal Government.

ANN L. WRIGHT
Senior Assistant District Counsel

APPENDIX C

RAPID RESPONSE DAILY WORK ORDER, QUALITY CONTROL DAILY REPORT, AND WEEKLY REPORT

RAPID RESPONSE WEEKLY REPORT

Project Name _____ For Week Ending __/__/__

Project Location _____ Report No. _____

Name _____ Title _____

Company Name & Address _____

Telephone No. ( ) _____-_____ Telefax No. ( ) _____-_____

Reporting Period: _____/_____/_____ to _____/_____/_____

Percent Field Work Completed _____% Percent Project Completed _____%

Summary of Work Completed On-Site: _____

Summary of Work Completed Off-Site: _____

RAPID RESPONSE WEEKLY REPORT CONT'D

Project Name & Location _____

For Week Ending ___/___/___

Explanation of Deviation from WorkPlan (Including Modifications and Schedule Slippages): _____

Problems Encountered: _____

Recommendations: _____

Key Personnel Changes: _____

RAPID RESPONSE WEEKLY REPORT CONT'D

Project Name & Location _____

For Week Ending ___/___/___

Work Anticipated to be Performed the Following Week: _____

Unit Price Quantities Reached to Date:

Unit Priced Item	Unit	Quantity To Date	Quantity Anticipated

Other Remarks: _____

Signature:

RAPID RESPONSE DAILY WORK ORDER

_____

(PRIMARY CONTRACTOR'S NAME)

_____

(CONTRACT NUMBER)

_____

(SITE NAME AND LOCATION)

REPORT NO.____ DELIVERY ORDER NO._____ DATE_____

SUBCONTRACTOR(S):

_____

_____

_____

GOVERNMENT AGENCIES ON-SCENE:

_____

_____

_____

INSTRUCTIONS: THE CONTRACTOR SHALL BE ATTACHED TO THE RAPID RESPONSE QUALITY CONTROL DAILY REPORT AND SHALL BE SUBMITTED DAILY AT THE CLOSE OF BUSINESS TO THE ON-SITE CORPS REPRESENTATIVE. CONCURRENTLY, THE CONTRACTOR SHALL PROVIDE ELECTRONIC ACCESS TO THE COMPLETED FORMS TO THE CORPS DISTRICT OFFICE AND THE AREA OFFICE.

1. DESCRIPTION OF WORK TO BE PERFORMED BY CONTRACTOR(S), WITH AN ESTIMATE OF THE PERCENTAGE TO BE COMPLETED:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. NUMBER OF PERSONNEL AUTHORIZED TO PERFORM WORK ON-SITE AND OFF-SITE.

SUPERVISORS	_____	FOREMAN	_____
ENGINEERS	_____	CHEMIST	_____
GEOLOGIST	_____	SAFETY	_____
EMT	_____	TECHS	_____
LABORERS	_____	OPERATORS	_____

OTHERS (SPECIFY):

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. EQUIPMENT AND EXPENDABLE MATERIALS AUTHORIZED:

ITEM	QUANTITY	DURATION	ITEM	QUANTITY	DURATION

4. TEST AND/OR INSPECTIONS TO BE PERFORMED (INDICATE TYPE AND LOCATION): _____

5. ADDITIONAL COMMENTS/REMARKS: _____

6. CERTIFICATION: I CERTIFY THAT THE ABOVE WORK IS ORDERED AND AUTHORIZED BY THE ON-SITE CORPS REPRESENTATIVE IN THE PERFORMANCE OF THE ABOVE CITED CONTRACT.

_____
ON-SITE CORPS REPRESENTATIVE

7. I ACKNOWLEDGE RECEIPT OF THIS WORK ORDER AND UNDERSTAND THAT ANY MODIFICATION TO THE WORK ORDER MUST BE IN WRITING AND APPROVED BY THE PROJECT MANAGER.

_____
CONTRACTOR'S REPRESENTATIVE

8. WORK ORDER AMENDMENTS AND MODIFICATIONS (INCLUDE TIME, DESCRIPTION, AND AUTHORIZING PERSON): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ON-SITE CORPS REPRESENTATIVE

CONTRACTOR'S REPRESENTATIVE

RAPID RESPONSE QUALITY CONTROL DAILY REPORT

_____
(CONTRACTOR'S NAME)

_____
(CONTRACT NUMBER)

_____
(SITE NAME AND LOCATION)

REPORT NO.____ DELIVERY ORDER NO._____ DATE_____
WEATHER_____ RAINFALL_____INCHES TEMP: MIN._____ MAX._____

INSTRUCTIONS: THE CONTRACTOR SHALL SUBMIT THIS FORM DAILY AT THE CLOSE OF BUSINESS TO THE ON-SITE CORPS REPRESENTATIVE. CONCURRENTLY, THE CONTRACTOR SHALL PROVIDE ELECTRONIC ACCESS TO THE COMPLETED FORMS TO THE CORPS DISTRICT OFFICE AND THE AREA OFFICE.

1. WORK PERFORMED TODAY BY PRIMARY CONTRACTOR ON-SITE AND/OR OFF-SITE (INCLUDING A COMPLETE DESCRIPTION):_____

2. WORK PERFORMED BY SUBCONTRACTORS ON-SITE AND/OR OFF-SITE (INCLUDE A COMPLETE DESCRIPTION):_____

3. COMPLETE AND ATTACH THE DAILY PERSONNEL COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 1.

THE DAILY PERSONNEL COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, EMPLOYEE NAME AND CLASSIFICATION, HOURLY LABOR RATES (REGULAR, OVERTIME OR OTHER), TOTAL HOURS (REGULAR, OVERTIME OR OTHER) AND PER DIEM. LABOR COSTS SHALL BE SUMMED FOR: EACH EMPLOYEE, THE ENTIRE DAILY REPORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF LABOR.

4. ON-SITE CONDITIONS WHICH RESULTED IN DELAYED PROGRESS:_____

5. TYPE AND RESULTS ON INSPECTIONS: (INDICATE WHETHER: P-PREPARATORY, I-INITIAL, OR F-FOLLOWUP AND INCLUDE SATISFACTORY WORK COMPLETED OR DEFICIENCIES WITH ACTION TO BE TAKEN):_____

6. LIST TYPE AND LOCATION OF TESTS PERFORMED AND RESULTS:_____

7. LIST VERBAL INSTRUCTIONS RECEIVED FROM GOVERNMENT PERSONNEL ON ANY DEFICIENCIES OR RETESTING REQUIRED:_____

8. COMPLETE AND ATTACH THE DAILY EQUIPMENT COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 2. THE DAILY EQUIPMENT COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, EQUIPMENT TYPE AND IDENTIFICATION NUMBER, HOURS IN SERVICE, HOURS STANDBY, HOURS IDLE TIME, COST RATE, AND DAYS IN SERVICE. EQUIPMENT COSTS SHALL BE SUMMED FOR: EACH TYPE, THE ENTIRE DAILY EFFORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF EQUIPMENT.

9. LIST THE TOTAL NUMBER OF SAMPLES COLLECTED AND TESTED FOR THE DAY:
COLLECTED:_____ TESTED:_____ AMPLIFYING INFO._____
_____
_____
_____
_____
_____

10. LIST THE TOTAL QUANTITY OF WASTEWATER TREATED: _____ GALLON(S)

11. LIST THE TOTAL NUMBER OF DRUMS OVERPACKED:

QUANTITY	LOCATION	HAZ-CAT
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

12. LIST THE TOTAL AMOUNT OF WASTE(S) REMOVED FROM THE SITE:

LIQUID: _____BBL/GAL SOLIDS: _____YDS/TONS

AMPLIFYING INFO:_____
_____
_____
_____

13. LIST THE FOLLOWING TRANSPORTATION AND/OR DISPOSAL INFORMATION:

QUANTITY	I.D. NO.	MATERIAL	MANIFEST NO.	DISPOSAL LOCATION

14. COMPLETE AND ATTACH THE DAILY MATERIAL COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 3. THE DAILY MATERIAL COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, MATERIAL PURCHASED, QUANTITY AND UNITS, LOCATION OF MATERIAL, AND VENDOR. MATERIAL COSTS SHALL BE SUMMED FOR: EACH PURCHASE, THE ENTIRE DAILY EFFORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF MATERIALS.

15. LIST ALL SAFETY VIOLATIONS OBSERVED AND CORRECTIVE ACTIONS:_____

16. LIST ANY CREDITS AND/OR ADJUSTMENTS DUE TO THE GOVERNMENT (REFERENCE INVOICE NUMBER, CONVERSATIONS, ETC.)._____

17. COMPLETE AND ATTACH THE RAPID RESPONSE DAILY WORK ORDER AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 4. THE DAILY WORK ORDER IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND/OR OFF-SITE INCLUDING SUBCONTRACTORS. THIS DOCUMENT DETAILS THE CONTRACTORS NEXT DAY WORK EFFORT WHICH SHALL HAVE ADVANCE APPROVAL BY THE ON-SITE CORPS REPRESENTATIVE BEFORE THE CONTRACTOR IS ENTITLED TO COST REIMBURSEMENT.

18. ADDITIONAL COMMENTS/REMARKS:_____

19. 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 PRIMARY CONTRACTOR AND EACH SUBCONTRACTOR AND HAVE DETERMINED THAT ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP ARE IN STRICT COMPLIANCE WITH THE PLANS AND SPECIFICATIONS, EXCEPT AS NOTED ABOVE.

_____
CONTRACTORS DESIGNATED
QUALITY CONTROL REPRESENTATIVE

APPENDIX D

HEALTH AND SAFETY INSTRUCTIONS

Appendix D - Health and Safety Scope of Work
Closure of Building 360, Steam Jenny Pit, Seneca Army Depot, NY

1. General. The Rapid Response Contractor responsible for the tasks defined by this scope of work shall review all information provided and develop the necessary documents which contain the health and safety criteria, procedures, and practices sufficient to protect on-site personnel, the environment, and potential off-site receptors from the chemical and physical hazards particular to this site. The Contractor shall utilize the services of a Certified Industrial Hygienist (CIH) experienced in hazardous waste site operations to oversee the development and implementation of the health and safety documents required by this section. If the information made available is insufficient to allow the Contractor to develop these documents, a description of all additional information required shall be prepared and submitted to the Contracting Officer (CO).

2. Regulatory Requirements. All site investigation activities and health and safety documents required by this scope of work shall comply with and reflect the following regulations and appropriate guidance publications, as a minimum:

2.1 Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

2.2 U.S. Army Corps of Engineers (USACE), Safety and Health Requirements Manual, EM 385-1-1 (October 1992).

2.3 Occupational Safety and Health Administration (OSHA) Construction Industry Standards, 29 CFR 1926, and General Industry Standards, 29 CFR 1910; especially 29 CFR 1926.65 - "Hazardous Waste Operations and Emergency Response", 29 CFR 1910.1000 - "Air Contaminants", and 29 CFR 1926.62 - "Lead in Construction".

2.4 NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", October 1985.

2.5 Environmental Protection Agency 40 CFR Part 761, especially Subpart G, "PCB Spill Cleanup Policy".

2.6 Other applicable Federal, State, and local safety and health requirements.

3. Documents. The following health and safety documents are required to be developed under this scope of work. Avoid providing material of a general nature, not specifically related to this project or site. Information readily available in standard texts should be repeated only to the extent necessary to meet the requirements of this scope. The Safety and Health Program will contain general information required by the referenced OSHA standards and EM 385-1-1 which is applicable to all hazardous waste activity efforts performed by the contractor. The Site Safety and Health Plan should be a brief document addressing only site-specific safety and health requirements and procedures based

upon site-specific conditions. Duplication of the general information contained in the Safety and Health Program is unwanted.

3.1 Safety and Health Program. All contractors and their subcontractors performing on-site activities at hazardous waste sites are required by regulation to develop and maintain a written Safety and Health Program in compliance with OSHA standard 29 CFR 1926.65(b)(1) through (b)(4). Written certification that such a program has been prepared and implemented shall be submitted to the CO as a preface to the required Site Safety and Health Plan (SSHP). This program ,including updates, shall be made available to the CO in its entirety upon request. Advanced Agreement # 19 under the Rapid Response Contract has fulfilled this requirement.

3.2 Contractor Site Safety and Health Plan (SSHP). The Site Safety and Health Plan required by 29 CFR 1926.65(b)(4) shall be prepared by the Contractor and submitted to the Contracting Officer for review and approval prior to the commencement of any on-site work activity to be performed by the Contractor and/or his subcontractors. This SSHP shall describe the health and safety procedures, practices, and equipment to be implemented and utilized in order to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed. The level of detail provided in the SSHP shall be tailored to the type of work, complexity of operations to be accomplished, and hazards anticipated. It is anticipated that this project will involve the pumping of hazardous waste sludge and steam cleaning of the Steam Jenny Pit, and the boring of the pit for the purpose of taking soil samples. All topics required by OSHA standard 1926.65(b)(4), and those described below, shall be addressed in the SSHP. Where the use of a specific topic is not applicable to the project, provide a negative declaration to establish that adequate consideration was given the topic, and give a brief justification for its omission.

3.2.1 Site Description and Contamination Characterization. Describe the location, topography, and approximate size of each site, the on-site jobs/tasks to be performed, and the duration of planned site activities. Compile a complete list of the contaminants found or known to be present in site areas to be impacted by the work to be performed. Compilation of this listing shall be based on results of previous studies, or if not available, select the likely contaminants based on site history and prior site uses/activities. Include chemical names, concentration ranges, media in which found, applicable regulatory clean-up levels, locations on-site, and estimated quantities/volumes to be impacted by site work, if known.

3.2.2 Hazard/Risk Analysis. Identify the chemical, physical, biological, and safety hazards of concern for each site task and/or operation to be performed. Selection of chemicals as indicators of hazard shall be based on media concentrations, toxicity, volatility or potential for air entrainment at hazardous levels, and frequency of detection. Describe chemical and physical properties of selected contaminants, sources and pathways of employee exposures, anticipated on and off-site exposure level potentials, and regulatory (including

Federal, State, and local) or recommended protective exposure standards. Specify and justify "action levels" based upon airborne exposure hazards and direct skin contact potentials for upgrades/downgrades in levels of personnel protection; for implementation of engineering and/or work practice controls; for emergency evacuation of on-site personnel; and for the prevention and/or minimization of public exposures to hazards created by site activities. Air monitoring/sampling shall be performed in accordance with Paragraph 3.2.8 : "Exposure Monitoring/Air Sampling Program" below, the resulting data compared with established "action levels", and appropriate corrective actions initiated as necessary.

3.2.3 Accident Prevention. The SSHP will serve as the Accident Prevention Plan (APP) and activity hazard analyses (phase plans), required by F.A.R. Clause 52.236-13, and Paragraphs 01.A.07 through 01.A.08 and Table 1-1 (pp. 3-5) of USACE EM 385-1-1 (1992). The APP shall be contained in the SSHP as a separate definable section, titled "Accident Prevention Plan". Therefore a separate APP is not necessary. The activity hazard analysis is an ongoing process from initiation of plan preparation through the implementation and completion of the field work. This is especially true under the Rapid Response Contracts. Therefore, the activity hazard analysis shall consist of two specific phases, the first of which shall be detailed in the SSHP submittal process to meet the intent of 29 CFR 1926.65 and paragraph 3.2, "Contractor Site Safety and Health Plan" of this section. The phase safety plans shall be outlined and developed to the full extent possible prior to SSHP submittal. Phase two of the activity hazard analysis (phase plans) as required by the APP shall be developed on-site by the Contractor's supervisory staff prior to beginning any specific activity and incorporated into the SSHP on an ongoing basis throughout the duration of the field activities. Any additional topics required by EM 385-1-1, but not specifically covered in Paragraph 3.2. of this scope of work, shall be addressed in the Accident Prevention section of the SSHP under the phase safety field development process. Daily safety and health inspections shall be conducted to determine if operations are being performed in accordance with the SSHP, USACE and OSHA regulations, and contract requirements. In the event of an accident/incident, the Contractor shall immediately notify the CO. Within two (2) working days of any reportable accident, the Contractor shall complete and submit to the CO an Accident Report on ENG Form 3394 in accordance with AR 385-40 and USACE Supplements to that regulation.

3.2.4 Staff Organization, Qualifications, and Responsibilities. Discuss the organizational structure, including lines of authority (chain of command), and overall responsibilities of the contractor and all subcontractors for site activities, including supervisor/employee relationships. Summarize the operational and health and safety responsibilities and qualifications of each key person identified. Specifically: (1) A Certified Industrial Hygienist (CIH) with experience in hazardous waste site operations shall be responsible for the development, implementation, and oversight of the Safety and Health Program and SSHP. The SSHP shall be signed and dated by the CIH prior to submittal; (2) A fully trained and experienced Site Safety and Health Officer (SSHO), responsible to the contractor and the CIH, may be delegated to implement and continually enforce the safety and health program and site-specific plan elements

on-site; and (3) At least two persons certified in first aid/CPR by the Red Cross, or equivalent agency, shall be continuously present on-site during site operations.

3.2.5 Training. All personnel performing on-site activities shall have completed applicable training in accordance and compliance with 29 CFR 1926.65(e). In addition, site-specific training covering site hazards, procedures, and all contents of the approved SSHP shall be conducted by the SSHO for on-site employees and visitors prior to commencement of work or entering the site. The type, duration, and dates of all employee training performed shall be listed by employee name and certified in the SSHP.

3.2.6 Personal Protective Equipment (PPE). In accordance with 29 CFR 1926.65(g)(5), a written Personal Protective Equipment (PPE) program which addresses all the elements listed in that regulation, and which complies with respiratory protection program requirements of 29 CFR 1910.134 is to be included in the Safety and Health Program. Therefore, the SSHP shall detail the minimum PPE ensembles (including respirators) and specific materials from which the PPE components are constructed for each site-specific task/operation to be performed, based upon the hazard/risk' analysis performed above. When preparing ppe ensembles for protection against highly toxic or mobile chemicals, list any pertinent material breakthrough times, as provided by the ppe manufacturer. Components of levels of protection (A,B,C,D and modifications) must be relevant to site-specific conditions, including heat stress potential and safety hazards. Include site-specific procedures for on-site fit-testing, cleaning, maintenance, inspection, and storage.

3.2.7 Medical Surveillance. All personnel performing on-site activities shall be participants in an ongoing medical surveillance program, meeting the requirements of 29 CFR 1926.65 and ANSI Z-88.2. A description of the general medical surveillance program is to be included in the Safety and Health Program. All medical surveillance protocols and examination results shall be reviewed by a licensed physician who is certified in Occupational Medicine by the American Board of Preventative Medicine, or who, by necessary training and experience, is Board-eligible. The SSHP shall only describe the content and frequencies of any additional medical tests, examinations, and/or consultations determined necessary by the physician due to probable site-specific conditions, potential occupational exposures, and required protective equipment. Certification of participation in the medical surveillance program, the date of last examination, and name of reviewing occupational physician shall also be included for each affected employee. The written medical opinion from the attending physician required by 29 CFR 1926.65(f)(7) shall be made available upon request to the CO for any site employee.

3.2.8 Exposure Monitoring/Air Sampling Program (Personal and Environmental). Where it has been determined that there may be employee exposures to and/or off-site migration potentials of hazardous airborne

concentrations of hazardous substances, appropriate direct-reading (real-time) air monitoring and integrated (time-weighted average (TWA)) air sampling shall be conducted in accordance with applicable regulations (OSHA, EPA, State). Both air monitoring and air sampling must accurately represent concentrations of air contaminants encountered on and leaving the site. Sampling and analytical methods following NIOSH (for on-site personnel and site perimeter locations) and/or EPA (for site perimeter or off-site locations) criteria shall be appropriately utilized. Personnel samples shall be analyzed only by laboratories successfully participating in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Testing (PAT) or Laboratory Accreditation programs. Meteorological monitoring shall be performed on-site as needed and used as an adjunct in determining perimeter and any off-site monitoring/sampling locations. Where perimeter monitoring/sampling is not deemed necessary, provide a suitable justification for its exclusion. Noise monitoring and radiation monitoring (alpha, beta, gamma) shall be conducted as needed, depending on the site hazard assessment. All monitoring/sampling results shall be compared to "action levels" established pursuant to Paragraph 3.2.2 : "Hazard/Risk Analysis", above, to determine acceptability and need for corrective action.

3.2.9 Heat and Cold Stress Monitoring. Heat and/or cold stress monitoring protocols shall be implemented, as appropriate. Work/rest schedules shall be determined based upon ambient temperature, humidity, wind speed (wind chill), solar radiation intensity, duration and intensity of work, and protective equipment ensembles. Minimum required physiological monitoring protocols which will affect work schedules shall be developed. In cases where impervious clothing is worn (full-body), the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" protocol for prevention of heat stress shall be followed, and heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Where impervious clothing is not worn, the most current published ACGIH heat stress standard (TLV) shall be used. For cold stress monitoring to help prevent frostbite and hypothermia, the most current published ACGIH cold stress standard shall be referenced and followed, as a minimum.

NOTE: If either heat or cold stress is not anticipated due to the season or local climate, provide a negative declaratory statement as mentioned in section 3.2.

3.2.10 Standard Operating Safety Procedures, Engineering Controls and Work Practices. Address the following elements as a minimum: (1) Site rules/prohibitions (buddy system, eat/drink/smoking restrictions, etc.); (2) Material handling procedures (soils, liquids, radioactive materials); (3) Drum/container handling procedures and precautions (opening, sampling, overpacking); (4) Confined space entry procedures; (5) Hot-work, sources of ignition, and electrical safety (ground-fault protection, overhead power line avoidance, etc.); (6) Excavation safety; (7) Machine guarding; (8) Fall protection; (9) Illumination; (10) Sanitation; (11) Engineering controls.

3.2.11 Site Control Measures. Include site map(s) containing work zone delineation and access points. Describe on-site and off-site communications, security (physical and procedural), and general site access.

3.2.12 Personal Hygiene and Decontamination. Specify necessary facilities and their locations. Detail standard operating procedures, frequencies, supplies and materials to accomplish decontamination of site personnel.

3.2.13 Equipment Decontamination. Specify necessary facilities, equipment, and their locations. Detail procedures, frequencies, supplies and materials, and methods to determine adequacy for the decontamination of equipment used on-site.

3.2.14 Emergency Equipment and First Aid Requirements. The following items, as appropriate, shall be immediately av ailable for on-site use:)I(First aid equipment and supplies approved by the consulting MD; (2) Emergency eyewashes/showers (comply with ANSI Z-358.1, 1910.151(c)); (3) Emergency respirators (worst-case appropriate); (4) Spill control materials and equipment; and (5) Fire extinguishers (specify type- i.e., 10 B/C , size, locations).

3.2.15 Emergency Response and Contingency Procedures (On-Site and Off-Site). This section of the SSHP shall contain an Emergency Response Plan in compliance with 29 CFR 1926.65(1), which addresses the following elements, as a minimum: (1) Pre-emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposures, personal injuries, fires/explosions, environmental spills and releases, discovery of radioactive materials; (2) Personnel roles, lines of authority, communications; (3) Posted instructions and a list of emergency contacts: (physician, nearby medical facility, fire and police departments, ambulance service, federal/state/local environmental agencies, CIH, Contracting Officer); (4) Emergency recognition and prevention; (5) Site topography, layout, and prevailing weather conditions; (6) Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control); (7) Specific procedures for decontamination and medical treatment of injured personnel; (8) Route maps to nearest pre-notified medical facility; (9) Criteria for initiating community alert program, contacts, and responsibilities; and (10) Critique of emergency responses and follow-up.

3.3 Logs, Reports and Recordkeeping. The following logs, reports, and records shall be developed, maintained, and submitted to the CO at the conclusion of the site work: (1) Training logs (site-specific, visitor); (2) Daily safety inspection logs (may be part of the Daily QC Reports); (3) Employee/visitor register; (4) Environmental and personal exposure monitoring/sampling results.

4. Document Revisions, Addenda, and Field Modifications. Review comments issued prior to SSHP approval shall be incorporated by revising and reissuing affected pages. If major revisions are necessary, the entire Plan shall be resubmitted for review and approval. Minor changes affecting only a few pages may be made

by addenda sheets and resubmitted. Once on-site, unanticipated field conditions encountered which were not addressed in the approved SSHP shall be immediately reported to the CO. Field activities in such areas shall be halted until the SSHP has been modified to reflect changed conditions and reviewed/approved by the CO.

5. CO-Approved Visitors. The Contractor shall continuously maintain on-site a minimum of four (4) sets of protective equipment (except for air-purifying respirators, prescription safety glasses, and safety shoes) for government visitor usage. These ensembles shall include all PPE specified in the SSHP. If protective clothing is included, at least one set shall be size X-large.

6. Special Considerations. Please be aware that recent Corps policy has declared that the two (minimum) first aid/CPR designated personnel required by EM 385-1-1, 03.A.02, shall be covered by the contractor's Bloodborne Pathogen Standard, 29 CFR 1910.1030. Please address this coverage in the SSHP. Inclusion of the contractor's exposure control plan is not necessary; simply state that the applicable training & offering of HBV vaccine has been completed.

Also note that the governing standard for Hazardous Waste Site Operations, 29 CFR 1910.120, has been transferred to the construction standard, and given the identifier 29 CFR 1926.65. All specific paragraph references retain the same number, thus 1910.120 (b)(1) becomes 1926.65 (b)(1). Reference Federal Register dated June 30, 1993, pg. 35076.

PLEASE MODIFY YOUR SSHP/WORKPLAN SOFTWARE ACCORDINGLY.

PHASE PLAN GUIDELINES

1. Definition of Phase. A phase is an operation involving a type of work which presents hazards not experienced in previous operations or where new subcontractors are performing the work. The three components, phase-hazard-action, are described in the attached sheets. These include:

a. Phase of Construction. This sample contains a list of phases and subphases that may require a separate phase safety plan. Obviously, all the phases listed will not be applicable to each project and some projects may involve phases not identified in this list.

b. Hazards. This sample contains a list of some of the typical hazards that might be encountered. These are examples only, and should not be copied. It is necessary to study the work involved and to identify the specific hazards that will be experienced at this work area, as the hazards will vary significantly between projects. As an example, hazards encountered on underground utilities at one project may differ substantially from the hazards found at another similar project because of differences in soil, depth of excavation, proximity of structures and building, and locations of other utilities.

c. Sample Phase-Hazard-Action Outline. This sample shows a possible format for a phase safety plan that might be submitted on a representative project. This sample incorporates phases of construction, the hazards that may be encountered, and preventive actions that will be taken to overcome these hazards. This example should not be copied as each phase or project should be analyzed on an individual basis.

2. Individuality. Phase plans developed for one project should not be copied for another as the hazards differ substantially. In addition, there may be a number of alternative ways of dealing with a particular hazard. Accordingly, the phase plan for the project at hand must list only the alternative or combination of alternatives that have been chosen after considering the factors involved.

3. Implementation and Instruction. Employees performing the work must be made aware of the plans. For this reason, an important part of any phase plan is a description of the specific instructions and precautions that will be given to the employees who will be performing the work.

SAMPLE NO. 1

EXAMPLES OF MAJOR/SUBCONSTRUCTION PHASES

Earthmoving, Land Clearing and Building Foundations

- Hand operations
- Equipment operations
- Pile-driving
- Basement excavations

Concrete Work

- Footings
- Forming
- Steel reinforcement
- Concrete placement
- Stripping
- Material Storage
- Finishing

General Building Construction

- Carpentry
- Masonry
- Floor, wall, brick cleaning
- Plastering
- Painting
- Floor coverings
- Roofing
- Misc. finishing phases

Electrical and Instrumentation

- Interior
- Aerial
- Underground
- Alarm and intercom

Demolition

Paving

Explosive and Blasting

Marine Operations

- Floating plant
- Dredging/excavations
- Diving
- Rock placement
- Piled-driving

Trenching and Excavations for Utilities

- Water
- Gas
- Sewer
- Communications cables

Steel Erection

- Delivery and storage
- Erection

Mechanical

- Heating, vent/air cond.
- Plumbing
- Sprinkler systems

Landscaping

- Grading
- Sodding/seeding
- Planting
- Rock placement

Quarrying

Tunneling

Cableway Operations

NOTE: This is not to be considered a complete list of phases of construction. Each project will require its own phase considerations.

SAMPLE NO. 2

EXAMPLES OF HAZARDS TO BE CONTROLLED

Falls

- Into excavations
- Into caissons
- From scaffolds
- From roofs
- From steelwork
- From forms
- From elevated floors
- Through floor openings
- Through wall openings

Cave-ins Caused by:

- Water
- Vibration - traffic, rail, road, and equipment
- Excavated material (spoil)
- Freezing/thawing
- Heavy Equipment
- Adjacent building foundations
- Existing utilities
- Gravel veins

Fire Associated with:

- Welding spatter
- Flammable liquids, vapors, and paints
- Flammable gases
- Improper storage of combustibles

Run Over by Equipment

Collisions Between Equipment

Equipment Rolling Over

Crane Overturning

Contact with Energized Powerlines

Drowning

Material Falling

Crushed Under Equipment

Tire Servicing

Improperly Stacked or Stored Materials

- Round poles
- Steel materials
- Irregularly shaped items

Electrocution or Shock

Health Hazards Associated with Chemicals and Caustics such as:

- Epoxies
- Cement dust
- Acids
- Solvents
- Unknowns

Health Hazards Associated with Toxic Vapors and Mists such as:

- Spray painting operations
- Paint thinners and dryers
- Solvents
- Adhesives
- Carbon monoxide
- Unknowns

Health Hazards Associated with Toxic Particles and Dusts such as:

- Sandblasting
- Masonry saws
- Dry wall taping (asbestos)

Health Hazards Associated with Noise such as:

- Jackhammer operations
- Sandblasting
- Masonry saw operations
- Grinding
- Crushers
- Woodworking equipment

Health Hazards Associated with Ionizing Radiation such as:

- Soil testing
- X-ray of welds

NOTE: This is not to be considered a complete list of hazards. Each project and each phase has its own peculiar hazards that must be controlled.

SAMPLE NO. 3

EXAMPLES OF A PHASE SAFETY PLAN FOR MASONRY CONTRACTORS

Contractor Name: James Masonry Contract No. 76-0000

Location: Jonesville Army Reserve Center, NE Date Prepared: 2 May 1977

Equipment to be used: Forklift, mortar mixer, metal tubular scaffold, masonry saw

Phase of Construction	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Ground Level Masonry Activity	Equipment running over employee	(1. Backup alarms. (2. Barricade work areas. (3. Signalmen where required. (4. Brief drivers on proper and safe operations.
	Back injuries due to over-stretching or improper lifting of materials	(1. Stack materials at proper level and height. (2. Set up disposal bins.
	Tripping over materials or stepping on nails, etc.	(1. Clean up materials. (2. Set up disposal bins. (3. brief employees to discard into proper disposal containers.
	Materials being hoisted over employees' heads	(1. Brief crane operator to stay away from area.
Masonry Wall Construction	Employees falling from elevated structures; i.e., scaffold or floor	(1. Deck entire scaffold. (2. Install standard railing and toeboards on all open sides. (3. Install standard ladder and tie off for access. (4. Insure scaffolding is properly assembled. (5. Secure footings for scaffolds.

Sample No. 3 (Cont'd)

EXAMPLES OF A PHASE SAFETY PLAN FOR MASONRY CONTRACTORS

Phase of Construction	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Masonry Wall Construction (Cont'd)	Tripping	(1. Clean up materials. (2. Set up disposal bins. (3. Brief employees to discard into proper disposal containers.
	Back injuries	(1. Stack materials at proper level and height. (2. Brief each employee on how to lift.
Cleanup and Other Masonry Supported Activities	Flying particles from brick saws chipping operations	(1. Safety goggles. (2. Proper guards on saws.
	Electrocution or Shock	(1. Grounded tools.
	Inhaling of toxic materials or handling of caustics or toxic materials	(1. Protective gloves, goggles, chemical masks, aprons, footwear.

NOTE: This is only an example of a phase safety plan and is not to be considered all inclusive. The plan must be developed for each job and each phase.