DEPARTMENT OF THE ARMY
HUNTSVILLE DIVISION, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

451-03

REPLY TO
ATTENTION OF

CEHND-ED-PM (200-1a) 13 July 1989

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Army IRP, Seneca Army Depot, NY, Remedial Investigation/Feasibility Study (RI/FS) at Incinerator Ash Landfill Draft Scope of Work (SOW), Project No. SEAD-002

1. Subject SOW is provided for your review. Request comments be provided by telefax to this Division, ATTN: CEHND-ED-PM, Mr. Walt Perro, NLT 21 July 1989. Our telefax number is commercial 205-895-3089.

2. Our contracting strategy is to award this SOW as a delivery order to an Indefinite Delivery Order-type contract to assure award during FY89.

3. Point of contact is Mr. Walt Perro, AUTOVON 788-5142 or commercial 205-895-5142.

FOR THE COMMANDER:

for H. O. EVERITT
Chief, Engineering Division

Encl

DISTRIBUTION:
Commander
Seneca Army Depot, ATTN: SDSSE-AD (Randy Battaglia), Romulus, NY 14541
U.S. Army Materiel Command, ATTN: AMCEN-A, 5001 Eisenhower Ave, Alexandria, VA 22333
U.S. Army AMC Installation & Services Activity, ATTN: AMXEN-IC, Rock Island, IL 61299-7190
U.S. Army Depot System Command, ATTN: AMSDS-EN-FS (Toplisek), Chambersburg, PA 17201
U.S. Army Engineer Division, Missouri River, ATTN: CEMRD-ED-EA (Plack), PO Box 103 Downtown Station, Omaha, NE 68101
U.S. Army Engineer Division, Missouri River, ATTN: CEMRD-ED-GL, PO Box 103 Downtown Station, Omaha, NE 68101
U.S. Army Engineer Toxic and Hazardous Materials Agency, ATTN: CETHA-IR-D (Gibson), Aberdeen Proving Ground, MD 21010-5401
U.S. Army Environmental Hygiene Agency, ATTN: HSHB-ES-G (Fox), Bldg. 1677, Aberdeen Proving Ground, MD 21010-5422

FACSIMILE TRANSMITTAL HEADER SHEET

COMMAND	NAME OFFICE SYMBOL	TELEPHONE NUMBER	AUTHORIZED RELEASER'S SIGNATURE
FROM: Commander Seneca Army Depot Romulus, NY 14541-5001	SDSSE-HE (Gottaglia)	~~AV 489-5532~~ Comm 607-869-1458	Stephen M Sholem
TO: Cdr. USACE Huntsville Div. P.O. Box 1600 Huntsville, AL 35807	CEHND-ED-PM (Healy)	~~AV~~ Comm 205-895-~~3089~~ 3421	DATE-TIME: 10117002 / MONTH: Jun / YEAR: 1989

CLASSIFICATION	NO. PGS.	PRECEDENCE	REMARKS:
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DA FORM 3918 R

7 Jul 89

ANNEX G

REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES
AT THE
INCINERATOR ASH LANDFILL
SENECA ARMY DEPOT ROMULUS, NEW YORK

1.0 GENERAL STATEMENT OF SERVICES

1.1 Background. As part of its continuing program of evaluating its hazardous waste management practices, the Army is performing Remedial Investigations/Feasibility Studies (RI/FS) at Seneca Army Depot (SEAD). A recently completed site investigation of the abandoned ash landfill area (Solid Waste Management Unit (SWMU) Designations SEAD-3, SEAD-6, SEAD-14 and SEAD-15) has documented the existence of a narrow plume of groundwater contamination which is believed to extend to, and possibly beyond, the Depot's western boundary. The contaminants of concern are chlorinated volatile organic compounds (VOC's); trans-1,2-dichloroethene, trichloroethene and, to a lesser extent, 1,2-dichloroethane, vinyl chloride and chloroform. Additionally, some heavy metals were found at concentrations above background. The RI/FS investigations are to be conducted to determine the magnitude of environmental contamination and appropriate remedial actions. The US Army Corps of Engineers, Huntsville Division, on behalf of SEAD, is contracting for the required work.

1.2 Location. Seneca Army Depot is a US Army facility located in Seneca County, New York. SEAD occupies approximately 10,600 acres. It is bounded on the west by State Route 96A and on the east by State Route 96. The cities of Geneva and Rochester are located to the northwest (14 and 50 miles, respectively); Syracuse is 53 miles to the northeast and Ithaca is 31 miles to the south. The surrounding area is generally used for farming.

1.3 Regulatory Status. The Incinerator Ash landfill area of Seneca Army Depot is presently being considered for inclusion on the Federal Facilities National Priorities List. Actual proposal is expected in July of 1989. Consequently, all work to be performed under this contract shall be performed ac-

cording to CERCLA guidance as put forth in the Draft "Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA", dated March 1988 (Reference 11.21).

1.4 Previous Investigations. Previous investigations have been performed at various SEAD units. An "Installation Assessment and Update" (USATHAMA Reports No. 157 (1980) and 157(U) (1987), respectively) were conducted by the U.S. Army Toxic and Hazardous Materials Agency. The purpose of the assessments was to identify potentially contaminated areas at the Depot. The U.S. Army Environmental Hygiene Agency's Groundwater Contamination Survey No. 38-26-0868-88, "Evaluation of Solid Waste Management Units, Seneca Army Depot" identifies and describes all solid waste management units (SWMU's) at SEAD. In addition, a confirmation study has been performed and closure plans are being developed for the burning pads (SEAD-23). USATHAMA also conducted a "Site Investigation Report" in March 1989 for the Burning Pit/Landfill. A complete list of previous investigations is presented as References in Section 11.0.

1.5 Units to be Investigated Under this Contract. The RI/FS investigations will be focused on the incinerator ash landfill area, which is comprised of the following designated SWMU's.

1.5.1 Incinerator Cooling Water Pond, SWMU No. SEAD-3

1.5.2 Incinerator Ash landfill, SWMU No. SEAD-6

1.5.3 Refuse Burning Pits SWMU No. SEAD-14

1.5.4 Abandoned Incinerator (Building 2207), SWMU No. SEAD-15

1.6 Security Requirements. Compliance with SEAD security requirements is mandated. These requirements are presented in Section 9.0.

2.0 OBJECTIVE

The objective of this Scope of Work is to perform a complete RI/FS at the incinerator ash landfill area as defined by Office of Solid Waste and Emergency Response Directive 9355, beginning with the RI/FS scoping process and ending with a signed Record of Decision, at the identified site.

3.0 DETAILED DESCRIPTION OF SERVICES

3.1 General Requirements. All work performed by the AE shall, so far as possible, be designed and implemented in a manner which compliments earlier investigations and shall conform to this Statement of Work (SOW). The AE,

through Work Plans and RI/FS Reports, shall present a complete description of the RI/FS process as applied to the facility. All work shall be performed under the general supervision of both a Professional Engineer registered in the State of New York and a Certified Professional Geologist.

3.2 RI/FS Work Plan Preparation. The AE shall prepare three documents; a RI/FS Project Scoping Document, a RI/FS Work Plan Document, and a Community Relations Plan Document; which are intended to do the following: (1) to provide a consolidated report on site history, current site activities, and resulting environmental impacts; (2) to familiarize the AE's personnel who are working on the project with site conditions; and (3) to provide project plans and proposed tasks by which the AE's personnel shall conduct RI/FS activities. It is intended that only one set of documents, addressing all of the site components listed in paragraph 1.5, be prepared. Each of the components of the site shall be separately addressed within the set of documents. No field work, with the exception of the initial site visit may be performed until the plans are reviewed and accepted by the Contracting Officer. All work must be performed according to the plans. The documents shall be prepared as follows:

3.2.1 (Task G-1)-Site Visit and Review Existing Data. The AE shall perform a visual inspection of the site, review the records, reports and other data provided by the Contracting Officer and the facility, or made available to the AE from sources such as public records, the USEPA, the State Regulators, the State Geological Survey, or from interviews with local residents and officials who have knowledge of past site activities.

3.2.2 (Task G-2)-RI/FS Project Scoping Document. This Task corresponds to a portion of EPA Task 1 in Appendix B of the RI/FS Guidance Manual. The AE shall prepare a RI/FS Project Scoping Document which provides a summary of site conditions, gives an overview of the RI/FS process and which describes how the process will be implemented at Seneca Army Depot. The RI/FS Project Scoping Process shall contain, as a minimum, the following elements:

3.2.2.1 Physical Characteristics of the Site. The AE shall provide a site description which includes location, ownership, topography, geology, hydrology, land use, waste type, estimates of waste volume, synopsis of findings and results of previous investigations, and other pertinent details. The description shall also include historical events of concern such as chemical

storage and disposal practices, results and findings of previous studies and a "quality assurance" evaluation of the existing data in order to estimate its reliability.

3.2.2.2 Conceptual Site Model. From the analysis of the data reviewed, the AE shall make a preliminary determination of the physical characteristics of the site and prepare a Conceptual Site Model of the known contaminants. The model is to give an overview of site conditions, probable and potential contaminants of concern, severity of contamination, and the potential impacts on the environment. As a minimum the Conceptual Site Model shall include potential routes of migration, potential receptors and anticipated impacts.

3.2.2.3 Develop and Evaluate Preliminary Remedial Action Objectives and Alternatives. The AE shall present an overview of the remedial actions that could be reasonably used to mitigate adverse site conditions. The choice of alternatives shall be based on proven effectiveness of the technology and the anticipated cost of implementation. This is not meant to be a detailed investigation of all potentially available remedial technology.

3.2.2.4 Preliminary Identification of ARAR's and TBC Requirements. The AE shall make a preliminary determination of potential contaminant, location, and action specific ARAR's based upon an evaluation of existing site data.

3.2.2.5 Develop Data Needs and Data Quality Objectives. The AE shall evaluate the existing data and determine the additional data necessary to characterize the site, complete the conceptual site model, better define the ARAR's, and narrow the range of preliminary identified remedial alternatives. The AE shall consider the intended uses of existing data as well as data to be collected under this contract and determine the type, quantity, and quality of additional data needed for each site.

3.2.3. (Task G-3) Soil-Gas Investigations. The AE shall perform the Soil-Gas Sampling and Analysis program during the RI/FS Work Plan preparation phase of this RI/FS. It is specifically intended that the soil-gas investigation be performed during Work Plan preparation so that the data can be utilized to assist in preparing the Field Sampling Plan which selects and justifies subsequent, more detailed site characterization activities.

3.2.3.1 (Subtask G-3.1) Soil-Gas Investigation Work Plan. The AE shall submit a brief work plan which proposes soil-gas sampling locations and which describes the sampling equipment, personnel, and procedures to be used. The plan shall recommend specific numbers of soil-gas samples to be collected at each site investigated and the target analytes for each site investigated. The work plan will also specify safety procedures to be utilized during the soil-gas sampling, using the AE's corporate Safety, Health and Emergency Response Plan, (SHERP). However, the detailed RI/FS SHERP will not be required with this submittal.

3.2.3.2 (Subtask G-3.2) Soil-Gas Sampling and Analysis. The AE shall perform soil-gas sampling and analyses at a minimum of 1000 locations at the facility. The purpose of the soil-gas sampling program shall be to locate sources and migration routes of volatile petroleum hydrocarbons and/or volatile chemicals in the soil and groundwater. The AE shall report the results of the Soil-Gas Sampling as a letter report submitted no later than the submission date of the draft RI/FS Work Plan.

3.2.4 (Task G-4) RI/FS Work Plan. This Task corresponds to a portion of EPA Task 1 in Appendix B of the RI/FS Guidance Manual. The AE shall prepare an RI/FS Work Plan Document. Quality Control/Quality Assurance procedures, Standard Operating Procedures, methods, equipment, and specific personnel along with their qualifications that the AE proposes to utilize to accomplish the RI/FS shall be identified and discussed at appropriate locations within the plan. As a minimum the RI/FS Work Plan shall include the following:

3.2.4.1 (Subtask G-4.1)-Safety, Health and Emergency Response Plan (SHERP). The AE shall prepare and submit a Safety, Health and Emergency Response Plan that the AE's personnel, subcontractors and visitors to the site shall use while the field investigations are being conducted. This portion of the RI/FS Work Plan shall be prepared according to Section 5 of this SOW and the requirements of the SEAD Safety office.

3.2.4.2 (Subtask G-4.2) Quality Assurance Project Plan. The AE shall prepare and submit a Quality Assurance Project Plan (QAPP) according to the requirements of Section 6 of this SOW. This portion of the RI/FS Work Plan shall also describe in detail, the following: 1) Site Background; 2) Quality control and quality assurance procedures to be exercised including organization and responsibilities; 3) QA objectives; 4) Sampling procedures; 5)

Sample custody; 6) Calibration procedures; 7) Analytical procedures; 8) Data reduction, validation and reporting; 9) Internal quality control; 10) Performance and system audits; 11) Preventive maintenance; 12) Data assessment procedures; 13) Corrective actions; and, 14) Quality assurance reports.

3.2.4.3 (Subtask G-4.3) Field Sampling Plan. The AE shall prepare and submit, as part of the RI/FS Work Plan, a Field Sampling Plan (FSP). The FSP shall describe in detail all sampling and analysis activities to be exercised including site background, sampling objectives, sampling locations and frequency, designations, equipment and procedures and handling and analysis requirements to be applied at each site. Section 3.3.1 of this SOW provides for numerous field investigation activities which will be applied to the project. It is intended that the AE, in the Field Sampling Plan, propose and justify how the field investigation activities will be allocated to specific RI/FS sites. In addition to the specific requirements of the RI/FS Guidance Document, the AE shall provide the following subplans as part of the FSP.

3.2.4.3.1 Soil Boring and Monitoring Well Installation Plan. The AE shall prepare and submit a Soil Boring and Monitoring Well Installation Plan according to the requirements of Section 7 of this SOW. This portion of the RI/FS Work Plan shall include proposals for locations of specific wells and borings based upon previous investigations, the AE's own evaluation of the sites, and the results of the Soil-Gas Investigation.

3.2.4.3.2 Geophysical Investigation Plan. The AE shall prepare and submit a Geophysical Investigation Plan which describes specific equipment, methods and personnel which the AE proposes to utilize to accomplish the geophysical investigations. The plan shall propose specific locations for proposed geophysical investigations and shall include justification for the method selected for use at each site in order to meet the objective of the geophysical investigations which is to obtain information on the physical, subsurface conditions at source areas for the site.

3.2.4.3.3 Test Pit Excavation Plan. The AE shall prepare and submit a Test Pit Excavation Plan proposing excavation and logging methods, decontamination procedures, and locations for test pit excavation into known and suspected waste disposal sites. A total of 20 pits will be required at the landfill area. The purpose of the test pits is to obtain information necessary for source characterization. Each pit shall be a minimum of 3 feet deep, to bedrock, or to ground-water, whichever is encountered first. Each

pit shall be approximately four feet wide and ten feet long. Each pit shall be visually and photographically logged from the natural ground surface. No one shall ever actually enter any test pit. At each pit an average of two soil or waste samples shall be collected from the excavator bucket. Each pit shall be backfilled with the material excavated from it within 48 hours of the initial excavation. If an excavation is left unattended, the AE shall mark and barracade it to prevent accidental entry by personnel or livestock. All personnel entering the exclusion area surrounding each test pit excavation shall be suited in Level B protective gear unless is it demonstrated that a lower level of protective gear is appropriate.

3.2.4.3.4 Air Monitoring Plan. The AE shall prepare and submit an Air Monitoring Plan which proposes and justifies air monitoring methods, equipment and personnel to be used during air monitoring. Air monitoring will be required at two sites to develop baseline conditions prior to test pit excavation and then again, during test pit excavations to determine if significant release of contaminants to the air are occurring.

3.2.5 (Task G-5) Community Relations Plan. The AE shall prepare and submit a Community Relations Plan (CRP) according to the requirements of the RI/FS Guidance Manual, Appendix B, Task 2. It shall describe how and when the community will be informed of RI/FS activities and findings. The Plans shall describe how the RI/FS is to be implemented and managed, describe the information expected from each task and how the information will be gathered, interpreted and incorporated into the RI/FS Reports. The Plan will describe the full RI/FS process, through implementation of Remedial Action, (even though this SOW does not carry the RI/FS process to that point) so that the entire process is described. It is intended that the plan and descriptions use non-technical jargon wherever possible in preparing the Community Relations Plan.

3.3 Phase I Remedial Investigation/Feasibility Studies. The objective of Phase I of this SOW is to perform the RI/FS activities corresponding to USEPA's Phase I Remedial Investigation and USEPA Phase I and USEPA Phase II Feasibility Studies. The AE shall perform the RI and FS activities approximately concurrently, and submit the data in combined RI/FS reports. When all the field work and data analyses are complete, the AE shall prepare a Phase I RI/FS Report. The AE shall also present specific recommendations for Phase II Remedial Investigations and Feasibility Studies that may be necessary to complete the RI/FS.

3.3.1 Phase I Remedial Investigations.

3.3.1.1 (Task G-6) Field Investigations. The work required in this Section corresponds to EPA Task 3 in Appendix B of the RI/FS Guidance Manual. The AE shall perform field investigations in order to characterize the site and determine the nature and extent of soil and groundwater contamination. The work shall be performed according to the approved work plan and as follows:

3.3.1.1.1 (Subtask G-6.1) Install Soil Borings. The AE shall install 25 soil borings at locations determined in the approved FSP. The average depth of the borings shall be 15 feet deep, but individual borings may be shallower or deeper. A total of 375 linear feet of drilling is provided for under this subtask. Twenty-five soil samples will be collected as part of this subtask for subsequent chemical analysis under Subtask G-7.1.

3.3.1.1.2 (Subtask G-6.2) Install Shallow Wells. The AE shall install 20 shallow groundwater monitoring wells at locations determined in the approved FSP. The average depth of the wells shall be 12 feet deep, but individual wells may be shallower or deeper. No well installed under this Task will be greater than 15 feet deep. A total of 240 linear feet of drilling is provided for under this subtask. Approximately 2 feet of bedrock will be penetrated in each of these wells.

3.3.1.1.3 (Subtask G-6.3) Install Deep Wells. The AE shall install 5 deep groundwater monitoring wells at locations determined in the approved FSP. The average depth of the wells shall be 25 feet deep, but individual wells may be shallower or deeper. No well installed under this Task will be less than 20 feet deep or greater than 30 feet deep. A total of 125 linear feet of drilling is provided for under this subtask. Approximately 20 feet of bedrock will be penetrated in each of these wells.

3.3.1.1.4 (Subtask G-6.4) Test Pit Excavations. The AE shall excavate 20 test pits at locations determined in the approved FSP. Twenty soil samples will be collected as part of this task for subsequent chemical analyses under subtask G-7.1.

3.3.1.1.5 (Subtask G-6.5) Surface Water Sampling. The AE shall collect one round of surface water samples at locations determined in the approved FSP. Five field samples shall be collected at five locations for analysis under subtask G-7.2.

3.3.1.1.6 (Subtask G-6.6) Geophysical Surveys. The AE shall perform Geophysical Surveying according to the requirements of the approved FSP. The AE shall perform 10,000 linear feet of geophysical survey over 15 acres. The AE shall utilize a method of geophysical investigation capable of detecting buried 55-gallon drums and debris, if existing, to a depth of 15 feet. The purpose of the geophysical surveys is to obtain detailed information necessary for source characterization. The AE shall utilize sufficient location control in the field to ensure that geophysical anomalies located are recoverable to an accuracy of plus or minus one foot. The AE shall perform all associated work and subsequent evaluations and interpretations necessary to incorporate the data into the Phase I RI/FS report.

3.3.1.1.7 (Subtask G-6.7) Air Monitoring. The AE shall conduct Air Monitoring at locations determined in the approved FSP. The purpose of the air monitoring is to obtained detailed information necessary for the Baseline Risk Assessment.

3.3.1.1.8 (Subtask G-6.8) Surveying. Each new soil boring, monitoring well, test pit and surface water sampling point shall be located according to the requirements of Section 8.0 of this Statement of Work.

3.3.1.2 (Task G-7 Chemical Sampling and Analysis. The work required in this Section corresponds to EPA Tasks 4 and 5 in Appendix B of the RI/FS Guidance Manual. The AE shall collect and analyze samples in a manner determined in the approved FSP. The total number of samples to be collected by the AE along with required and approved analysis methods are shown in Tables 1 and 3 The AE shall prepare cost estimates assuming that the entire Table 1 list will be analyzed. During contract negotiations the AE and Contracting Officer will agree on a unit price for each method. If all analyses specified in this SOW are not required, the price shall be reduced according to the agreed unit price. The AE shall submit a Table which provides the results of each round of analytical data as soon as it is received from the laboratory, and not wait for the next scheduled report submission.

3.3.1.2.1 (Subtask G-7.1) Analysis of Soil Samples. The AE shall analyze 45 soil samples previously collected from the 25 soil borings and the 20 test pits. The total number of soil and QA/QC samples and analysis are summarized in Table 2-17. The AE shall submit a Table which provides the results of each round of analytical data as soon as it is received from the laboratory, and not wait for the next scheduled report submission.

3.3.1.2.2 (Subtask G-7.1) Collection and Analysis of Groundwater Samples. The AE shall collect and chemically analyze one groundwater sample from each of the 25 new groundwater monitoring wells installed and each of 10 existing wells. A total of 35 wells will be sampled under this subtask. In addition, the AE shall chemically analyze the five surface water samples collected in Subtask G-6.5. The total number of water and QA/QC samples to be taken and the required analyses are summarized in Table 2-18. The AE shall submit a Table which provides the results of each round of analytical data as soon as it is received from the laboratory, and not wait for the next scheduled report submission.

3.3.1.3 (ask G-8) Baseline Risk Assessment. The work required in this Section corresponds to EPA Task 6 in Appendix B of the RI/FS Guidance Manual. Using the information gathered from the record search, the field work and data analyses, the AE shall prepare a Risk Assessment. The Risk Assessment shall provide an evaluation of the potential threat to human health and the environment in the absence of any remedial action and provide the basis for determining whether or not remedial action is necessary. The Risk Assessment Report shall be prepared using the guidance presented in the RI/FS Guidance Manual and, as a minimum, contain a baseline risk assessment, an exposure assessment, and a standards analysis. The AE shall provide information including, but not necessarily limited to, the following:

3.3.1.3.1 (Subtask G-8.1) Identification of Contaminants of Concern. Using the information gathered from field work, record search, and consultation with appropriate local, State and Federal Officials the AE shall identify the contaminants which are of concern. The AE shall provide a summary of each identified contaminant describing why it was selected, and the effects of its chronic and acute toxicity to humans and the environment.

3.3.1.3.2 (Subtask G-8.2) Exposure Assessment. The AE shall identify actual or potential exposure paths and routes, characterize potentially exposed populations, and estimate expected exposure levels. As part of the Exposure Assessment, the following Task shall also be performed:

3.3.1.3.2.1 (Subtask G-8.2.1) Water Well Survey. The AE shall make a reasonable effort to determine the existence of all operating water wells used for human consumption within one mile of the Installation that may be affected by deteriorated water quality on the Installation. A "house-to-house" survey is not intended. However, whenever possible, the AE

shall include well location, depth, screened interval, water use, and number of people served by the well. This task may be performed through the examination of records available at public sources, backed by occasional field checks. The information shall be provided both in tabular form and on suitable maps.

3.3.1.3.2.2 (Subtask G-8.2.2) Spring Survey. The AE shall make a reasonable effort to determine the existence of all springs used for human consumption within one mile of the Installation that may be affected by deteriorated water quality on the Installation. The information shall be provided both in tabular form and on suitable maps.

3.3.1.3.3 (Subtask G-8.3) Toxicity Assessment. The AE shall make a comparison of acceptable levels of contamination with actual levels identified during the exposure assessment. The comparison shall be based upon available ARARs, TBCs and other toxicological data, where existing.

3.3.1.3.4 (Subtask G-8.4) Risk Characterization. The AE shall, based upon other components of the Risk Assessment, characterize the risk associated with the site. The AE shall consider the carcinogenic risk, noncarcinogenic risk and the environmental risk. The characterization shall include a summary of each projected exposure route for contaminants of concern and the distribution of risk across various sectors of the population. Such factors as weight-of evidence associated with toxicity information, the estimated uncertainity of the component parts, and the assumptions contained within the estimates shall be discussed.

3.3.1.3.5 (Subtask G-8.5) Propose Applicable or Relevant and Appropriate Requirements (ARAR's) and To Be Considered (TBC) Requirements. The AE shall develop and propose contaminant and location specific "Applicable or Relevant and Appropriate Requirements" (ARAR's) and To Be Considered (TBC) Requirements which, after review and possible modification as directed by the Contracting Officer, will be utilized to evaluate subsequent proposed remedial actions. ARAR's and TBC's shall be prepared using guidance presented in the RI/FS Guidance Manual.

3.3.1.4 (Task G-9) Treatability Study Requirements Assessment. The work required in this Section corresponds to EPA Task 7 in Appendix B of the RI/FS Guidance Manual. The AE shall assess existing data on technologies identified as Remedial Action Alternatives to determine data needs required to undertake treatability investigations following completion of alternatives

development. The AE shall recommend if specific Treatability Studies are required or if the existing situation is well enough understood and described in scientific, engineering and other technical literature such that site specific treatability studies do not appear to be necessary. The AE shall develop a Treatability Study Work Plan, and address results applications. Actual implementation of the Treatability Study Work Plan is not part of this SOW.

3.3.2 (Task G-10) Phase I Feasibility Study. The work required in this Section corresponds to EPA Task 9 in Appendix B of the RI/FS Guidance Manual. The primary objective of this phase of the FS is to develop an appropriate range of waste management options that protect human health and the environment.

3.3.2.1 (Subtask G-10.1) Develop Remedial Action Objectives. The AE shall develop remedial action objectives which protect human health and the environment and then describe general response action which will satisty the remedial action objectives.

3.3.2.2 (Subtask G-10.2) Identify Alternative Remedial Actions. The AE shall describe all available technologies that could be reasonably used as remedial actions at SEAD. The AE shall then screen the list to remove any potential Remedial Actions which are clearly illogical, inadequate, unfeasible, or otherwise ill-suited to the site. Remedial actions presented past the initial screening shall consist of only those representing proven technologies adequate to address site conditions. The strengths and weaknesses of each technology shall be addressed. The initial screening shall be based upon effectiveness, implementability and cost. Where appropriate, the AE may combine feasible remedial actions. The "no action" alternative shall be described in detail as part of this task. Additional data needed shall also be described.

3.3.3 (Task G-11) Prepare Phase I RI/FS Report. The work required in this Section corresponds to EPA Tasks 8 and 11 in Appendix B of the RI/FS Guidance Manual. At the completion of the preceding tasks, the AE shall prepare the Remedial Investigation/ Feasibility Study Report, fully documenting all Phase I work performed. The report shall be prepared according to the requirements of this SOW and the referenced guidance documents. The report shall also describe the recommended work to be performed during the Phase II RI/FS and make specific recommendations, and provide the justification, for sampling locations and analytes proposed for Phase II. As part of this report

the AE shall evaluate the need for interim or expedited remedial actions at each of the sites. If the AE recommends that either is appropriate, he shall so propose and justify. The AE shall also propose and justify additional investigations to be undertaken as part of the Phase II Remedial Investigations, if any, for the Contracting Officer's review and approval.

3.4 (Task G-12) Record of Decision. The work required in this Section corresponds to EPA Task 12 in Appendix B of the RI/FS Guidance Manual. The AE shall prepare a document for the signature of the SEAD Commander addressing the decision to implement the approved remedial action alternative.

4.0 SUBMITTALS AND PRESENTATIONS

4.1 Format and Content. The Engineering Reports, consisting of work plans and RI/FS reports, presenting all data, analysis, and recommendations shall be prepared in accordance with the suggested RI/FS Format as presented in the RI/FS Guidance Manual. Each submittal shall be accompanied by an EPA completness checklist (where existing), completed by the AE, which references the specific location within the submitted report, of the required item. All drawings shall be of engineering quality in drafted form with sufficient detail to show interrelations of major features on the installation site map. When drawings are required, data may be combined to reduce the number of drawings. The report shall consist of 8-1/2" x 11" pages with drawings folded, if necessary, to this size. A decimal paragraphing system shall be used, with each section and paragraph of the reports having a unique decimal designation. The report covers shall consist of durable 3-ring binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A report title page shall identify the AE, the Corps of Engineers, Huntsville Division, and the date. The AE identification shall not dominate the title page. Each page of draft and draft-final reports shall be stamped "DRAFT" and "DRAFT-FINAL" respectively. Each report shall identify the members and title of the AE's staff which had significant, specific input into the report's preparation or review. Submittals shall include incorporation of all previous review comments accepted by the AE as well as a section describing the disposition of each comment. Disposition of comments submitted with the final report shall be separate from the report document. All final submittals shall be sealed by both the registered Professional Engineer-In-Charge and the Certified Professional Geologist.

4.2 Presentations. The AE shall make presentations of work performed according to the schedule in paragraph 4.6. The presentation will consist of a summary of the work accomplished and anticipated followed by an open discussion among those present. The AE shall provide a minimum of two persons at the meetings which are expected to last one day each.

4.3 Conference Notes. The AE will be responsible for taking notes and preparing the reports of all conferences, presentations, and review meetings. Conference notes will be prepared in typed form and the original furnished to the Contracting Officer (within five (5) working days after date of conference) for concurrence and distribution to all attendees. This report shall include the following items as a minimum:

a. The date and place the conference was held with a list of attendees. The roster of attendees shall include name, organization, and telephone number.

b. Written comments presented by attendees shall be attached to each report with the conference action noted. Conference action as determined by the Government's Project Manager shall be "A" for an approved comment, "D" for a disapproved comment, "W" for a comment that has been withdrawn, and "E" for a comment that has an exception noted.

c. Comments made during the conference and decisions affecting criteria changes, must be recorded in the basic conference notes. Any augmentation of written comments should be documented by the conference notes.

4.4 Confirmation Notices. The AE will be required to provide a record of all discussions, verbal directions, telephone conversations, etc., participated in by the AE and/or representatives on matters relative to this contract and the work. These records, entitled "Confirmation Notices", will be numbered sequentially and shall fully identify participating personnel, subject discussed, and any conclusions reached. The AE shall forward to the Contracting Officer as soon as possible (not more than five (5) work days), a reproducible copy of said confirmation notices. Distribution of said confirmation notices will be made by the Government.

4.5 Progress Reports and Charts. The AE shall submit progress reports to the Contracting Officer with each request for payment. The progress reports shall indicate work performed, and problems incurred during the payment period. Upon award of this delivery order, the AE shall, within 15 days, prepare a progress chart to show the proposed schedule for completion of the

project. The progress chart shall be prepared in reproducible form and submitted to the Contracting Officer for approval. The actual progress shall be updated and submitted by the 15th of each month and may be included with the request for payment.

4.6 Schedule of Deliverables and Review Meetings. Deliverables shall be submitted according to the following schedule.

Deliverable/Meeting	Days following NTP
Soil-Gas Investigation Work Plan	20
Soil-Gas Sampling Report	40
Draft RI/FS Scoping Document, Work Plan, and Community Relations Plan	40
Review Meeting at Seneca AD	60
Draft-Final RI/FS Scoping Document, Work Plan, and Community Relations Plan	80
Final RI/FS Scoping Document, Work Plan, and Community Relations Plan	110
Draft Phase I RI/FS Report	150
Review Meeting at Seneca AD	180
Draft-Final Phase I RI/FS Report	190
Final Phase I RI/FS Report	220
Draft ROD	250
Review Meeting at Seneca AD	270

Draft-Final ROD	290
Final ROD	320

4.7 Submittals.

4.7.1 General Submittal Requirements.

4.7.1.1 Distribution. The AE is responsible for reproduction and distribution of all documents. The AE shall furnish copies of submittals to each addressee listed in paragraph 4.7.3 in the quantities listed in the document submittal list. Submittals are due at each of the addressees not later than the close of business on the dates shown in paragraph 4.6.

4.7.1.2 Partial Submittals. Partial submittals will not be accepted unless prior approval is given.

4.7.1.3 Cover Letters. A cover letter shall accompany each document and indicate the project, project phase, the date comments are due, to whom comments are submitted, the date and location of the review conference, etc., as appropriate. (Note that, depending on the recipient, not all letters will contain the same information.) The contents of the cover letters should be coordinated with CEHND-ED-PM prior to the submittal date. The cover letter shall not be bound into the document.

4.7.1.4 Supporting Data and Calculations. The tabulation of criteria, data, circulations, and etc., which are performed but not included in detail in the report shall be assembled as appendices. Criteria information provided by CEHND need not be reiterated, although it should be referenced as appropriate. Persons performing and checking calculations are required to place their full names on the first sheet of all supporting calculations, and etc., and initial the following sheets. These may not be the same individual. Each sheet should be dated. A copy of this scope of work shall be included as appendix A in the Draft R/FS report only report.

4.7.1.5 Reproducibles. One camera-ready, unbound copy of each submittal shall be provided to the Contracting Officer in addition to the submittals required in the document and submittal list. All final submittals shall also be provided on floppy disks compatible with the Intel 310/80286 computer in ASCII format and in Word Star 2000 release 2.0 format.

4.7.2 Specific Submittal Requirements.

a. Soil-Gas Investigation Work Plan (Final) (Subtask G-3.1)

b. Soil-Gas Sampling Report (Final) (Subtask G-3.2)

c. RI/FS Work Plan (Draft, Draft-Final, Final) (Tasks G-2, G-4, G-5)

d. RI/FS Report (Draft, Draft-Final, Final) (Task G-11)

4.7.3 Addressees.

Commander
U.S. Army Corps of Engineers
Huntsville Division
ATTN: CEHND-ED-PM (Mr. Walt Perro)
PO Box 1600
Huntsville, AL 35807-4301

Commander
U.S. Army Depot Systems
Command (DESCOM)
ATTN: AMSDS-EN-FD
(Mr. Tim Toplisek)
Chambersburg, PA 17201

Commander
U.S. Army Environmental
Hygiene Agency (USAEHA)
ATTN: HSHB-ME-S
Building 1677
Aberdeen Proving Ground, MD 21010-5422

Commander
U.S. Army Corps of Engineers
Missouri River Division
ATTN: CEMRD-ED-EA (Mr. Doug Plack)
PO Box 103, Downtown Station
Omaha, NE 68101-0103

Commander
U.S. Army Material Command (USAMC)
ATTN: AMCEN-A (Mr. Bob King)
5001 Eisenhower Ave.
Alexandria, VA 22333-0001

Commander
U.S. Army Corps of Engineers
Missouri River Division
ATTN: CEMRD-ED-GL
PO Box 103, Downtown Station
Omaha, NE 68101-0103

Commander
U.S. Army Corps of Engineers
Toxic and Hazardous Materials Agency
ATTN: CETHA-IR-D (Ms. Katherine Gibson)
Aberdeen Proving Ground, MD 21010-5401

Commander
Seneca Army Depot
ATTN: SDSSE-AD (Randy Battaglia)
Romulus, NY 14541

Commander
U.S. Army Corps of Engineers,
North Atlantic Division,
ATTN: CENAD-CO-EP
90 Church Street
New York, NY 10007-9998

Commander
HQUSACE
ATTN: CEEC-EB
20 Massachusettes Ave. NW
Room 2209
Washington, D.C. 20314-1000

4.6.4 Document and Submittal List.

	Soil-Gas Wk. Plns	Soil-Gas Reports	RI/FS Work Plans Draft	Draft-Final	Final	RI/FS Report Draft	Draft-Final	Final
CEHND-ED-PM	6	6	6	6	6	6	6	6
USAMC	1	1	1	1	1	1	1	1
DESCOM	2	2	2	2	2	2	2	2
CETHA-IR-D	2	2	2	2	2	2	2	2
CEMRD-ED-EA	3	3	3	3	3	3	3	3
CEMRD-EA-GL	1	1	1	1	1	1	1	1
SDSSE-AD	10	10	10	10	10	10	10	10
CENAD-CO-EP	1	1	1	1	1	1	1	1
USAEHA	1	1	1	1	1	7	7	7
CEEC-EB	0	0	0	0	0	1	0	1
TOTAL	27	27	27	27	27	34	33	34

5.0 SAFETY REQUIREMENTS.

The AE shall prepare and submit the Safety, Health and Emergency Response Plan (SHERP) to the Contracting Officer (CO) for review and approval prior to commencement of any field work, according to the schedule in Paragraph 4.6. No field work (other than the initial visual inspection and the soil-gas investigation) may be performed until all plans are reviewed and approved by the CO. All work shall be performed according to the approved plan. The SHERP shall be prepared in accordance with the requirements specified in this section.

5.1 General. The SHERP must be administered by a qualified safety and health professional. Qualifications shall consist of training and experience commensurate with the hazards to be encountered for the project. The SHERP shall comply with all federal, state, and local health and safety requirements, e.g., the Occupational safety and Health Administration (OSHA) requirements (29 CFR 1910 and 1926), the U.S. Environmental Protection Agency

(USEPA) hazardous waste requirements (40 CFR 260-270), the U.S. Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1), and the U.S. Army Materiel Command Safety Manual, AMC-R 385-100. The SPP shall include but not limited to:

5.2 Organization/Administration. The AE shall assign responsibilities for safety activities and procedures. A safety officer shall be designated to implement the SHERP for all onsite activities.

5.3 Standard Operating Procedures (SOPs). The AE shall outline standard operating procedures (SOPs) for preventing accidents, and protecting personnel from injury and occupational illness for all operations having a significant accident potential. Approved SOPs will be made available to prime and subcontractor personnel for personnel information guidance and compliance.

5.4 Identification of Hazards. The AE shall review existing records and data to identify potential hazards associated with the designated drilling and sampling sites and to evaluate their impact on field operations. The AE shall develop action levels for controlling worker exposure to the identified hazards in accordance with appropriate requirements.

5.5 Personal Protective Equipment. The AE shall provide appropriate personal protective equipment (PPE) to ensure workers, official visitors and government employees are protected from exposure to recognized physicalhazards and protected from exposure to hazardous chemical concentrations above the action level for each operation stated for each work zone. The level of protection shall be specified in the SOP for each operation. The AE shall provide and maintain all PPE.

5.6 Safety and Health Training. The AE shall, as a minimum provide training to his employees complying with the requirements of 29 CFR 1910.120. The program shall inform employees, official visitors and government employees of the special hazards and procedures (including PPE, its use and inspection) to control these hazards during field operations. Employees shall be trained in emergency procedures, areas of restricted access, methods of decontamination, and general safety. All prime and subcontractor personnel shall complete this program prior to beginning on-site work. The AE shall keep individual training records on all workers associated with the project and submit a copy of these records in the draft SOP.

5.7 Monitoring. The AE shall provide continuous monitoring of the identified hazards associated with the designated drilling sites for controlling worker exposure during field operation. When applicable, National Institute for Occupational Safety and Health (NIOSH) approved sampling and analytical methods must be used.

5.8 Emergency Procedures. The AE shall establish procedures to take emergency action in the event of immediate hazards, i.e.,a chemical agent leak or spill, fire, or personal injury. The AE designated safety officer shall serve as the emergency coordinator. Personnel and facilities providing support in emergency procedures shall be identified.

5.9 Medical Surveillance. Prime and subcontractor personnel shall have medical examinations prior to commencement of work. The medical examination results shall be evaluated to determine if the individual is physically fit for the work to be performed and that no physical condition or disease would be aggravated by exposure to the identified hazards. Medical records shall be available for review by the CO upon request.

5.10 First Aid. The AE shall provide appropriate emergency first aid equipment suitable for treatment of exposure to identified hazards, including chemical agents. A vehicle shall be made available to transport injured workers to medical facilities identified in the SHERP.

5.11 Accident Recording and Recordkeeping. The AE shall immediately notify the CO of any accident/incident. Within two working days of any reportable accident the AE shall complete and submit to the CO an Accident Report on ENG Form 3394 in accordance with AR 385-40 and OCE supplement 1 to that regulation.

5.12 Safety Inspection. The AE shall conduct regular safety inspections to determine if operations are being conducted in accordance with established SOPs.

5.13 Site Layout. The AE will determine three areas; exclusion, contamination reduction and support, for each work site. No person shall be allowed entry into the exclusion and contamination reduction areas unless in compliance with Sections 5.5, 5.6, and 5.9.

5.14 Unexploded Ordnance. The facility is a military installation and has been used for storage, evaluation and disposal of ordnance and/or explosive materials as well as for military training. If explosive contamination or unexploded ordnance is discovered at any time during operations at the

site the AE shall mark the location, immediately stop operations in the affected area, and notify the CO. The Government will make appropriate arrangements for evaluation and proper disposal of the device. It is anticipated that in the unlikely event that such conditions arise, they will be overcome with only slight delays to the AE. It is the express intention of the Government that the AE is not to drill, excavate, or otherwise disturb the subsurface in areas where ordnance or explosives may reasonably be suspected unless specific, detailed plans to do so are prepared and approved.

5.15 SHERP Format. The SHERP shall address the following topics:

RESPONSIBILITIES
Principal Engineer
Corporate Safety and Health Officer
Program Manager
Site Safety and Health Coordinator
Field Personnel
Subcontractor Personnel

HAZARD COMMUNICATION AND TRAINING
Comprehensive Health and Safety Indoctrination
Specialized Training
Pre-Investigation Health and Safety Briefing
Morning Safety Meetings
Post-Investigation Health and Safety Briefing

MEDICAL SURVEILLANCE AND EXPOSURE MONITORING
Medical Surveillance
Environmental Monitoring

HEALTH AND SAFETY EQUIPMENT
Personal Protective Equipment
Environmental Monitoring Equipment
Emergency Equipment
Fire Extinguishers
First Aid Kits

Eye Wash
Emergency Shower
Communications

STANDARD OPERATING PROCEDURES
Health and Safety Site Plan
Responsibilities
Site Description
Hazard Evaluation
Work Zones
Levels of Protection
Environmental Monitoring
Safe Work Practices
Decontamination Procedures
Site Entry Procedures
Emergency Information
Site Security
Activity Hazard Analysis
Site Inspection
Well Installation/Logging
Sampling
Land Survey
Laboratory Analysis

6.0 QUALITY ASSURANCE PROJECT PLAN REQUIREMENTS

The AE shall prepare and submit the Quality Assurance Project Plan (QAPP) according to the requirements of this section and the definitions given in Paragraph 6.9. The site specific field and laboratory QC/QA plan shall be included.

6.1 Approval. The work plan must be approved by the CO prior to performing any field work. In the event corrections or comments are made by the CO on the draft plan, any necessary changes shall be implemented by the AE before final approval.

6.2 AE Responsibility for Chemical Analyses. It is the responsibility of the AE to properly collect, transport, analyze and present the data pertaining to chemical analysis. If the AE or his subcontractor does not follow the

specified criteria and approved work plans and thereby jeopardizes the samples, the Contracting Officer will disapprove the samples and direct the AE to resample, analyze, and present the data at no additional cost to the Government. If directed to do so by the Contracting Officer, the AE shall collect and send representative "split" samples to the US Army Corps of Engineers, Missouri River Division Laboratory (CEMRD-ED-GC, 402-221-7324). The AE will not be responsible for the analysis of the "split" samples or subsequent reporting results. The AE, however, is required to defend his results if there is disagreement between the samples analyzed by the AE and the samples analyzed by the CEMRD laboratory.

6.3 Content and Format. The plan shall address each of the topics in Paragraphs 6.4 through 6.8.4. The following outline shall be used as applicable.

SECTION 1.0 PROJECT ORGANIZATION AND RESPONSIBILITY
SECTION 2.0 SAMPLING
- 2.1 Selection of Sampling Locations
- 2.2 Samples to be Collected
  - 2.1.1 Soil/Sediment Samples
  - 2.1.2 Groundwater Samples
  - 2.1.3 Soil-Gas Samples
  - 2.1.4 QC/QA Samples
- 2.3 Sample Collection Methods
- 2.4 Sample Containers
- 2.5 Sample Preservation
- 2.6 Identification
- 2.7 Transportation and Custody

SECTION 3.0 ANALYSES
- 3.1 Parameters
- 3.2 Analytical Methods
- 3.3 Laboratory QC/QA

SECTION 4.0 DATA ANALYSIS AND REPORTING
SECTION 5.0 PROGRAM CONTROLS

6.4 Project Organization and Responsibility. The project organization for the prime contractor and any subcontractors shall be clearly defined with a discussion of quality control responsibilities. The AE's Quality Control (QC) Officer shall report to a responsible senior officer of the company,

that is, QC management shall be separate from project management. A list of key individuals shall be provided , including those with QC responsibilities. The project-related qualifications of the AE's analytical laboratory shall be addressed in terms of equipment, facilities, and personnel. Names of laboratory supervisors, chemists, technicians and QC officers shall be given with brief resumes chronologically listing education and experience. The project schedule and list of responsible persons shall be stated.

6.5 Sampling.

6.5.1 Selection of Sampling Locations. For sampling sites to be chosen in the field, the plan shall describe the rationale that will govern their selection. The plan shall provide the location of each known sampling point on a site map. The plan shall discuss geological and hydrological influences on sample location, and provisions to insure that samples are representative of the site through the use of appropriate field control samples.

6.5.2 Samples to be Collected. The plan shall list or tabulate the samples to be collected, showing the number of samples, types, locations and analytes. The list shall include field controls. Samples collected and prepared in the field shall include: soil samples, groundwater samples, and field control samples, as described in succeeding paragraphs.

6.5.2.1 Soil Samples. The plan shall list or tabulate samples to be collected from the soil borings for chemical analysis, indicating number, location, depth and analyses required.

6.5.2.2 Groundwater Samples. Each of the groundwater monitoring wells shall be sampled once, by the procedure specified in Paragraph 6.5.3.2. All sampling of existing wells and wells installed under this delivery order shall be accomplished within a period not exceeding five consecutive days. All samples to be analyzed for metals shall be filtered at the time of collection through filter membranes with a nominal pore size of 0.45 microns.

6.5.2.3 Field Control Samples. A minimum of 10% of all groundwater samples collected shall be QC/QA (5% QC, 5% QA). At least two sampling blanks (1 QC, 1 QA) and two duplicates (1 QC, 1 QA) shall be collected. If samples are to be tested for volatiles, at least two travel blanks shall be included (1 QC, 1 QA). A minimum of 10% of all soil samples collected shall be QC/QA (5% QC 5% QA). Soil QC/QA shall be splits/duplicates. At least two duplicates/splits shall be collected (1 QC/1 QA).

6.5.2.4 Summary. The types and numbers of samples required are summarized in "Types and Numbers of Samples Collected", Table 1.

6.5.3 Sample Collection Methods. Specific sampling procedures to be used and appropriate references or descriptions shall be given as needed including sample sizes, sampling equipment, etc. Collection and preservation methods shall be consistent with the specified analytical methods and other standards.

6.5.3.1 Prevention of Cross-Contamination. The plan will describe cleaning of equipment and precautions for preventing contamination of samples during collection.

6.5.3.2 Groundwater Sampling. Before a sample is collected from a well, the water level shall be measured and recorded. Then the well shall be pumped or bailed with clean equipment to remove a quantity of water equal to at least five times the submerged volume of the casing. If the well does not recharge fast enough to permit removing five casing volumes, the well shall be pumped or bailed dry, and allowed to recharge for four hours. If the well has recharged to greater than 50 percent of the static wster level, then two to three well volumes shall be removed. If the well does not recover to 50 percent of the static water level in four hours, then the well shall be pumped dry a second time and sampled as soon as sufficient recharge has occurred. The sample taken from the well for chemical analyses shall be collected from the screened portion of the well and not from the overlying riser section or the underlying sand-sump section of the well. The plan shall describe details of the sample collection procedure.

6.5.3.3 Collection of Soil Samples. The plan shall include complete details of the proposed procedure for collecting soil samples.

6.5.4 Sample Containers. List the composition and volume of containers to be used according to sample type (soil, water, air, etc.) and analyte. Describe cleaning and other preparation of containers.

6.5.5 Sample Preservation. List or tabulate the required preservation methods and maximum holding times, by sample type and analyte.

6.5.6 Identification. Describe the proposed system for identifying, labeling and tracking samples. Include recording of field data in permanently bound notebooks, and the system for relating field data to the proper samples.

6.5.7 Transportation and Custody. Describe packing, shipping or other transportation and custody documentation, in accordance with "Sample Handling Procedures," HND Guideline, September, 1986.

6.6 Analyses.

6.6.1 Parameters. The plan shall tabulate the samples to be collected and analyses to be performed. Tables 1 and 2 lists required analyses and approved methods. Analysis as listed in the Table shall be performed on each field sample as well as on field controls sent to the AE's laboratory or subcontract laboratory. Laboratory controls (internal QC samples) are not listed, but shall be included in the approved Sampling/Analysis-QC/QA plan. Alternate methods and variation in procedures to those in the Tables may be used if approved by the CO and described in the approved plan.

6.6.2 Analytical Methods. Each proposed method must be specified exactly and in detail by one of the following: (1) Reference to an accepted published method, e.g., an EPA, SM, or ASTM method, if the published procedure is followed exactly; or (2) reference to an accepted published method with a description of any deviations from the published procedure, or (3) complete description of the procedure, e.g., copies of laboratory instructions. Descriptions of any pre-treatment or preparation of the sample required before the actual analysis shall be included. Include the required concentration ranges, and data on the sensitivity (detection limits), precision and accuracy, by analyte and sample matrix in the descriptions of methods. Detection limits shall correspond to the Contract Laboratory Program of the USEPA. Indicate how pre-existing data on sensitivity, precision and accuracy were determined, and procedures to be used to validate the methods for the matrices in question.

6.7 Data Analysis and Reporting. For each analytical method and major measurement parameter, the following information shall be provided:

6.7.1. The data analysis scheme including units and equations required to calculate concentrations or the value of the measured parameter.

6.7.2. Plans for treating results that appear unusual or questionable. Describe the feedback systems used to identify problems by means of the results obtained from control samples. Limits of data acceptability shall be included with the corrective action to be taken when these limits are exceeded. Personnel responsible for initiating and carrying out corrective action shall be indicated. Describe how re-establishment of control is

demonstrated. Unacceptable contamination levels in blanks, and the maximum acceptable disagreement between replicate samples and between field duplicate/split samples shall be stated in the Quality Assurance Project Plan. These limits shall correspond to those required by the Contract Laboratory Program of the USEPA. Corrective action to be taken when these limits are exceeded shall be described, and the circumstances that require collection of new samples at no additional cost to the Government shall be specified.

6.7.3. Description of the data management systems, including the collection of raw data, data storage and data quality assurance documentation.

6.7.4. Identification of individuals to be involved in the reporting sequence.

6.7.5. Description or illustration of the proposed data reporting format. Only quantified concentrations of analytes shall be reported.

6.7.6. Procedures to assess the precision, accuracy and completeness of all measurement parameters. The AE shall report precision based on standards and known additions. If statistical procedures are used for data review before reporting, include descriptions.

6.8 Program Controls

6.8.1 Calibration Procedures and Frequency. List field and laboratory instrumentation, specifying manufacturers, models, accessories, etc., with procedures used for calibration and frequency of checks. The instrumentation and calibration should be consistent with the requirements of the contract and the analytical method requirements.

6.8.2 Internal Quality Control Checks. Internal quality control checks are necessary to evaluate performance reliability for each measurement parameter. The numbers and types of internal QC checks and samples proposed (e.g. blanks, duplicates, splits, "spiked" samples and reference standards, as applicable) shall be defined clearly in the work plan and summarized by methods and analytes. The laboratory's established practice for including control samples among the samples tested, and any additional controls required by the present project, shall be described.

6.8.3 Preventive Maintenance. A system for preventive maintenance for facilities and instrumentation shall be described. Preventive maintenance shall be performed by qualified personnel. Records shall be maintained and shall be available for inspection by the CO on request and subsequent repairs, adjustments and calibrations shall be recorded.

6.8.4 External Certification. Prior to any sampling activities under this SOW, the AE's analytical laboratory must be validated by the US Army Corps of Engineers, Missouri River Division (CEMRD-ED-GC, 402-221-7324) or its representative. It is the responsibility of the AE's laboratory to achieve validation from CEMRD independent of CEHND and this delivery order.

6.9 Definitions. The following terms and meanings are given as they are applied here, since usage and terminology in this field are not yet standardized.

6.9.1 Field Blank Sample is a trip blank, rinsate sample, field background soil blank sample submitted with the field samples for QC/QA purposes.

6.9.2 Field Control Samples are field splits, duplicates/replicates and Field Blank Samples submitted with the field samples for QC/QA purposes.

6.9.3 Trip or Travel Blanks are Type II Reagent Grade organic-free deionized water in 2 x 40 mL VOA vials that accompany the sample containers to the field and back to the laboratory. Trip blanks are used only for coolers containing aqueous samples for volatile organic analysis. These blanks, as well as alll other samples being submitted for volatile organic analysis, are to contian no headspace.

6.9.4 Rinsate Blanks are collected rinse water (Type II Reagent Grade) from the final rinses of the sampling equipment. Rinsate blanks are to be used in conjunction with volatile, semi-volatile and in-organic analysis of water samples. Sample preservation and containers shall be appropriate for the analytes of interest.

6.9.5 Soil Blanks (Background) are used to establish background levels of metals and other analytes in soils. These are normally collected from visually clean soil near the site. The field background soil blank sample is uually counted along with the field samples. It is collected in duplicate and submitted to the AE's laboratory and the QA laboratory along with the field samples.

6.9.6 Splits are two or more subsamples of one large sample. These are taken after compositing a large soil sample (after samples for volatile analyses have been removed). Splits are used for both QA and QC purposes for soil samples for all analytes excluding volatiles. It is acceptable to split soil samples into three portions after compositing (field sample, split for QA, and split for QC).

6.9.7 Duplicates or triplicates are separate samples collected at the same location and time as the original sample. Duplicates or triplicates are preferred over splits for volatile organic analyses of soil samples because compositing leads to loss of volatile components. Water samples for QA/QC checking are also duplicate or triplicate samples.

6.9.8 Check/Calibration Standards are used to calibrate field instruments such as the VOA meter and are used to establish control limits for analytical parameters.

6.9.9 Quality Assurance Samples are collected by the sampling team for use by the government's QA laboratory. The purpose of the sample in to assure the government that the data generated by the AE's analytical laboratory are of suitable quality.

6.9.10 Quality control samples are collected by the sampling team for use by the AE's laboratory. The identity of these samples is held blind to the analysts and laboratory personnel until data are in deliverable form. The purpose of the sample is to provide site specific field originated checks that the data generated by the AE's analytical laboratory are of suitable quality.

6.9.11 Internal QC Sample or Laboratory Control. A reference standard, standard addition, replicate sample, blank or other sample are samples in which the analyte concentration is known or can be calculated, which is placed among the samples to be analyzed in order to evaluate or demonstrate validity of the analytical results.

6.9.12 Reference Standard. A sample prepared from pure reagents to contain one or more analytes at known concentrations.

6.9.13 Standard Addition or "Spiked" Sample. A field sample to which known concentrations of one or more analytes have been added.

6.9.14 Laboratory Replicate Samples. Subsamples of a single field sample which are divided at the laboratory and analyzed as separate samples.

6.9.15 Replicate Analyses. Multiple analyses performed on the same sample.

6.9.16 Laboratory Blank. A sample prepared at the laboratory from pure materials containing none of the analyte. Laboratory blanks include method blanks, reagent blanks and others.

TABLE 1
Total Types and Numbers of Samples Collected
SUMMARY OF BASIC CONTRACT REQUIREMENTS

		Quality Assurance and Quality Control					
	Field	Splits/Dups		Rinsates		Trip Blanks	
	Samples	QC(AE)	QA(CE)	QC(AE)	QA(CE)	QC(AE)	QA(CE)
GROUNDWATER:							
Volatiles	35	1	1	1	1	1	1
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals	35	1	1	1	1	NR	NR
Other: TDM	35	1	1	1	1		
SURFACE WATER:							
Volatiles	5	1	1	1	1	1	1
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals	5	1	1	1	1	NR	NR
Other: TDM	5	1	1	1	1		
SURFACE SOILS:							
Volatiles				NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals				NR	NR	NR	NR
Other:				NR	NR	NR	NR
SUBSURFACE SOILS:							
Volatiles	45	5	5	NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals	45	5	5	NR	NR	NR	NR
Other: EP TOX	45	2	2	NR	NR	NR	NR

TABLE 2-17
Types and Numbers of Samples Collected

	Field Samples	Quality Assurance and Quality Control: Splits/Dups QC(AE)	Splits/Dups QA(CE)	Rinsates QC(AE)	Rinsates QA(CE)	Trip Blanks QC(AE)	Trip Blanks QA(CE)
GROUNDWATER:							
Volatiles							
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals						NR	NR
Other:							
SURFACE WATER:							
Volatiles							
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals						NR	NR
Other:							
SURFACE SOILS:							
Volatiles				NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals				NR	NR	NR	NR
Other:				NR	NR	NR	NR
SUBSURFACE SOILS:							
Volatiles	45	5	5	NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals	45	5	5	NR	NR	NR	NR
Other: EP_TOX	45	2	2	NR	NR	NR	NR

TABLE 2-18
Types and Numbers of Samples Collected

		Quality Assurance and Quality Control					
	Field	Splits/Dups		Rinsates		Trip Blanks	
	Samples	QC(AE)	QA(CE)	QC(AE)	QA(CE)	QC(AE)	QA(CE)
GROUNDWATER:							
Volatiles	35	1	1	1	1	1	1
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals	35	1	1	1	1	NR	NR
Other: TDM	35	1	1	1	1		
SURFACE WATER:							
Volatiles	5	1	1	1	1	1	1
B/N/A						NR	NR
Pesticides/PCB's						NR	NR
TRPH						NR	NR
Metals	5	1	1	1	1	NR	NR
Other: TDM	5	1	1	1	1		
SURFACE SOILS:							
Volatiles				NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals				NR	NR	NR	NR
Other:				NR	NR	NR	NR
SUBSURFACE SOILS:							
Volatiles				NR	NR	NR	NR
B/N/A				NR	NR	NR	NR
Pesticides/PCB's				NR	NR	NR	NR
TRPH				NR	NR	NR	NR
Metals				NR	NR	NR	NR
Other:				NR	NR	NR	NR

TABLE 3
METHODS FOR SAMPLE ANALYSIS

Analyte	Technique	Soil	Groundwater	Surface Water(1)
Arsenic (As)	GF	3050/7060	7060	206.2
	H	7061	7061	206.3
Barium (Ba)	DA	3050/7080	3005/7080	208.1
	GF	----	----	208.2
	ICP	3050/6010	3005/6010	200.7
Cadmium (Cd)	DA	3050/7130	3005/7130	213.1
	GF	3050/7131	3020/7131	213.2
	ICP	3050/6010	3005/6010	200.7
Chromium (Cr)	DA	3050/7190	3005/7190	218.1
	GF	3050/7190	3020/7191	218.2
	ICP	3050/6010	3005/6010	200.7
Lead (Pb)	DA	3050/7420	3005/7420	239.1
	GF	3050/7421	3020/7421	239.2
	ICP	3050/6010	3005/6010	200.7
Mercury (Hg)	CV	7471	7470	245.1
Selenium (Se)	GF	3050/7740	7740	270.2
	H	7741	7741	270.3
Silver (Ag)	DA	7760	7760	272.1
	GF	----	----	272.2
	ICP	3050/6010	3005/6010	200.7
EP Toxicity	---	1310	----	----

TABLE 3 (Continued)

Analyte	Technique	Soil	Groundwater	Surface Water
Halogenated Volatile Organics	GC	5030/8010	5030/8010	601
Non-Halogenated Volatile Organics	GC	5030/8015	5030/8015	602
Aromatic Volatile Organics	GC	5030/8020	5030/8020	602
Volatile Organics	GC/MS	8240	8240	624
Explosives(2)	--	SM02	SM01	---
Pesticides & PCB's	GC	3550/8080	3520/8080	608
Thiodiglycol(2)	HPLC			
Dioxins	GC/MS	8280	8280	---

DA=Direct Aspiration
GF=Graphite Furnace
H=Hydride
CV=Cold Vapor
ICP=Inductively Coupled Plasma
GC=Gas Chromatograph
GC/MS=Gas Chromatograph/Mass Spectroscopy

(1) Surface water samples may also be analyzed by the SW-846 methods listed for groundwater.

(2) USATHAMA Methods.

7.0 SOIL BORING AND MONITORING WELL REQUIREMENTS.

The following requirements shall be incorporated into the AE's Soil Boring and Monitoring Well Installation Plan and followed in the field. The plan shall be prepared using the following outline as applicable:

SECTION 1.0 INTRODUCTION AND BACKGROUND

SECTION 2.0 WELL AND BORING LOCATIONS AND DEPTHS

SECTION 3.0 DRILLING EQUIPMENT

SECTION 4.0 DRILLING PROCEDURES

SECTION 5.0 CONTAMINATION PREVENTION AND DECONTAMINATION PROCEDURES

SECTION 6.0 WELL DESIGN AND INSTALLATION

SECTION 7.0 WELL DEVELOPMENT

SECTION 8.0 IN-SITU PERMEABILITY

SECTION 9.0 PROJECT ASSIGNMENTS & PERSONNEL QUALIFICATIONS

7.1. Location. Monitoring well locations shall be proposed by the AE as part of the plan prior to commencement of drilling activities. The AE shall obtain written approval from the facility engineer, to drill at each site to avoid disturbing buried utilities.

7.2. Design of Monitoring Wells. The design and construction of monitoring wells shall follow as closely as practical the design for properly installed, low-yield domestic water supply wells. State and local certification requirements for drillers shall be met. State and local design and installation requirements shall be met. The AE shall be responsible for obtaining any soil boring or well drilling permits required by state or local authorities and for complying with state or local regulations concerning submission of well logs and samples.

7.3. Installation of Monitoring Wells.

7.3.1 General Requirements. The AE shall provide all drilling equipment, materials and personnel required to install the wells, as well as a qualified geologist or geotechnical engineer who shall be on-site for all drilling, installation, development and testing operations. The AE shall submit proposed drilling methods in the Monitoring Well Installation Plan. Any changes to the approved drilling methods must be submitted to the Contracting Officer for prior approval.

7.3.2. Protection of Water Yielding Zones. The use of any liquid, including water, is to be avoided during drilling and will only be permitted by the Contracting Officer in cases where he determines that it is absolutely

necessary for successful installation of the well. If water is required during drilling or well installation, only non-chlorinated potable water will be permitted. Any proposed use of water must be approved by the Contracting Officer beforehand. Grease or oil on drill rod joints will not be permitted. Dispersing agents (such as phosphates) or acids shall not be used. There shall be no attempt made to chemically disinfect the well. The rigs, drill tools, and associated equipment shall be cleaned with steam and washed and rinsed with a decontaminating liquid prior to commencement of drilling at each well and boring location. It is expressly required that toxic and/or contaminating substances shall not be used during any part of the drilling, well installation or well development processes. All drilling activities and methods shall be sufficient to prohibit the introduction of contaminants from one water bearing stratum to another via the well bore or completed well.

7.3.3 Well Design.

7.3.3.1 Boring Diameter. The boring shall be of sufficient diameter to permit at least two (2) inches of annular space between the boring wall and all sides of the centered riser and screen.

7.3.3.2 Well Riser and Screen.

7.3.3.2.1 Riser. Well riser shall consist of new threaded, flush joint, stainless steel pipe with a two (2) inch nominal diameter. Well risers shall, as a minimum, conform to the requirements of ASTM-D 1785 Schedule 40 pipe and shall is clearly identified as the material which is specified.

7.3.3.2.2 Screen. The well screen shall be five (5) feet in length and shall be constructed of stainless steel similar to the well riser. The screen shall be noncontaminating, factory constructed and of "continuous wrap" or "mill-slot" design. Field slotted or cut screen is not permitted. The slot size shall be determined by the AE and designed to be compatible with aquifer and filter pack material. The AE shall provide a sieve analysis of one or more representative samples of the aquifer material in which the screen is placed and which demonstrates that the screen is compatible with the aquifer material. The sieve analysis shall be conducted in accordance with ASTM C 117 and C 136 and results shall be submitted to the Contracting Officer with the field boring logs.

7.3.3.2.3 Screen Location. The AE shall have the responsibility of placing the well screen in the appropriate location in the bore hole so that the completed monitoring well functions satisfactorily.

7.3.3.2.4 Sand-Sump. There shall be a 2-foot minimum length "sand-sump" placed below the base of the screen. The sand-sump shall be a blank section of riser conforming to the requirements of riser as described above. The sand-sump will be installed only if the screen can be placed at the appropriate interval without the sand-sump penetrating any underlying aquitards.

7.3.3.2.5 Joining Screen and Riser. Screen and riser sections shall be joined by threaded, flush-joint couplings, to form watertight unions, that retain 100% of the strength of the screen. Solvent glue shall not be used at any time in construction of the wells. The bottom of the deepest screen or casing section shall be sealed with a threaded cap or plug of inert, non-corroding material similar in composition to the screen itself.

7.3.3.2.6 Well Plumbness and Alignment. All risers and screens shall be set round, plumb, and true to line. Centralizers shall be used to assure plumbness and alignment of the wells. Centralizers shall not be installed on the well screen.

7.3.3.3 Filter Pack. The AE shall select and use clean, inert, siliceous materials to construct a uniform and continuous filter pack designed to prevent migration of fines into the screen. Carbonate or crushed stone material shall not be used. The filter pack shall be placed by tremie pipe from the bottom of the boring to approximately two (2) feet above the top of the well screen. Natuaral development methods may be used when appropriate.

7.3.3.4 Bentonite Seal and Grout. A minimum two (2) foot seal, consisting of tamped bentonite pellets or bentonite slurry shall be placed into the annular space between the riser and boring wall at the top of the filter pack. Non-shrinking cement grout shall then be placed from the top of the bentonite seal to the ground surface. The cement grout shall consist of a mixture of portland cement (ASTM-C 150), and water in the proportion of not more than seven (7) gallons of clean water per bag of cement (One cubic foot or 94 pounds). Additionally, 3% by weight of bentonite powder shall be added if permitted by State regulations.

7.3.4 Soil Sampling for Geotechnical Analysis. During drilling of soil borings and monitoring wells, soil samples shall be collected and geotechnical analysis shall be performed as outlined below.

7.3.4.1 Dry, hollow stem or solid auger methods of drilling shall be used wherever subsurface conditions allow.

7.3.4.2 Soil samples shall be taken continuously for the first 10 feet and at 5-foot intervals thereafter.

7.3.4.3 Sampling shall be done with a split-spoon sampler (ASTM-D 1586-67) or thin wall sampler (ASTM-D 1587-74) using standard sampling techniques.

7.3.4.4 Samples shall be stored in labeled, air-tight plastic or glass containers by the AE until such time as they are needed for testing or the contract is complete.

7.3.4.5 All soil samples shall be visually classified by the Unified Soil Classification System. The AE shall verify the classification by laboratory analyses consisting of the following:

Test Description	# Required/ Well1
a. Grain-size distribution (ASTM-D 421 & 422)	3
b. Atterburg limits (ASTM-D 423 & 424)	3
c. Moisture content (ASTM-D 2216)	3

Specific soil samples to be tested, along with type of test, will be determined by the AE after reviewing the boring logs. Laboratory analyses shall use equipment and methods described in EM-1110-2-1906 or ASTM manuals.

7.3.5 Rock Drilling. Rock drilling is expected during this program. Borings encountering rock may be rock-bitted to the target depth.

7.3.6 Protection of Well. At all times during the progress of the work, precautions shall be used to prevent tampering with the well or the entrance of foreign material into it. Upon completion of the well, a suitable vented cap shall be installed to prevent material from entering the well. The well riser shall be surrounded by a larger diameter steel casing set into a concrete pad and rising 24" to 36" above ground level. The steel casing shall be provided with lock and cap. A minimum three foot square, four inch thick concrete pad, sloped away from the well shall be constructed around the well casing at the final ground level elevation. A survey marker shall be permanently placed in each pad as detailed in Section 8.0 of this SOW. Four, two-inch or larger diameter steel posts shall be equally spaced around the well and embedded in the concrete pad. The ground immediately surrounding the top of the well shall be sloped away from the well. There shall be no openings in the protective casing wall below its top.

7.3.7 Temporary Capping. Any well that is to be temporarily removed from service, or left incomplete due to delay in construction, shall be capped with a watertight cap and equipped with a "vandal proof" cover satisfying applicable state or local regulations or recommendations.

7.3.8 Field Logs. The field geologist or geotechnical engineer shall maintain suitable logs detailing drilling and well construction practices. One copy of each field log including the required color slides, shall be submitted to the Contracting Officer not later than 10 calendar days after each well is completed. The well will not be accepted by the Contracting Officer until the logs are received and approved. Information provided in the logs shall include but not be limited to the following:

7.3.8.1 Reference elevation for all depth measurements.

7.3.8.2 Depth of each change of stratum.

7.3.8.3 Thickness of each stratum.

7.3.8.4 Identification of the material of which each stratum is composed according to the Unified Soil Classification System, or standard rock nomenclature, as necessary.

7.3.8.5 Depth interval from which each formation sample was taken.

7.3.8.6 Depth at which hole diameter (bit sizes) change.

7.3.8.7 Depth at which groundwater is first encountered.

7.3.8.8 Depth to the static water level and changes in static water level with well depth.

7.3.8.9 Total depth of completed well.

7.3.8.10 Depth or location of any loss of drill water circulation, loss of tools or equipment.

7.3.8.11 Location of any fractures, joints, faults, cavities or weathered zones.

7.3.8.12 Depth of any grouting or sealing.

7.3.8.13 Nominal hole diameters.

7.3.8.14 Amount of cement used for grouting or sealing.

7.3.8.15 Depth and type of well casing.

7.3.8.16 Description (to include length, location, diameter, slot sizes, material, and manufacturer) of well screen(s).

7.3.8.17 Any sealing-off of water-bearing strata.

7.3.8.18 Static water level upon completion of the well and after development.

7.3.8.19 Drilling date or dates.

7.3.8.20 Construction details of monitoring well.

7.3.9 Final Logs. The field logs shall be edited and drafted for inclusion into the final report.

7.4. Well Development. After each well has been constructed, but no sooner than 48 hours after grouting is completed, the AE shall direct a program for the development of the well by pumping and/or surging, without the use of acids, dispersing agents or explosives. Development shall continue for a period of 4 hours (minimum), and until groundwater removed from the well is clear and free of sand and drilling fluids and until parameter (pH, temperature, etc.) stabilization has occurred. No water or other liquid may be introduced into the well other than formation water from that well. After final development of the well, the AE shall collect approximately 1 liter of water from the well in a clear glass jar, place the jar in front of a standard color chart, and photograph it with a 35mm color slide. The AE shall shake the jar of well development water immediately prior to photography to ensure that all solids are suspended. The AE shall submit the slide as part of the well log. The photograph shall be a suitably back-lit close up which shows the clarity or turbidity of the water.

7.5. In-Situ Permeabilities. After development of monitoring wells, the AE shall calculate for each, the in-situ permeability of the screened stratum in accordance with "Methods of Determining Permeability, Transmissibility and Drawdown," or other equivalent methods. However, no water or other liquid may be introduced into the well other than formation water from that well.

7.6. AE Responsibility for Monitoring Wells.

7.6.1 It is the responsibility of the AE to properly plan, design, install, develop, and test monitoring wells so that they are suitable to produce groundwater samples representative in quantity and quality of subsurface conditions. The AE shall ensure that the requirements of this scope of work and best construction practices are carried out.

7.6.2 If the AE, due to his inadequate design or construction, installs monitoring wells that are not functional or not in accordance with specifications, the Contracting Officer will disapprove the well and direct the AE to repair or replace it at the Contacting Officer's discretion. This work shall be done at no additional cost to the Government.

7.6.3 If a monitoring well is disapproved by the Contracting Officer, or is abandoned by the AE for any reason, the hole shall be backfilled with neat cement grout from top to bottom by the AE at no additional cost to the Government.

8.0 SURVEY RQUIREMENTS.

8.1 Control Points. Plastic or wooden hubs shall be used for all basic control points. A minimum of three (3) concrete monuments with 3.25-inch domed brass or aluminum alloy survey markers (caps) and witness posts shall be established at the site. The concrete monuments shall be located within the project limits, be set 50 feet from the edge of any existing roads in the interior of the project limits and be a minimum of 1,000 feet apart. Horizontal control (1:10000) and vertical control (1:5000) of third order or better shall be established for the network required for all the monuments. The caps for the new monuments shall be stamped in a consecutively numbered sequence as follows:

SEAD-4-1989	SEAD-5-1989	SEAD-6-1989
USAED-HUNTSVILLE	USAED-HUNTSVILLE	USAED-HUNTSVILLE

The dies for stamping the numbers and letters into these caps shall be of 3/16-inch in size. All coordinates are to be referenced to the State Plane Coordinate System and all elevations are to be referenced to the 1929 North American Vertical Datum.

8.2 Location Surveys. A 3.25-inch diameter domed survey marker (cap) composed of brass, bronze or aluminum alloy shall be permanently set in the concrete pad surrounding each well. Coordinates and elevations shall be established for each boring and monitoring well. The coordinates shall be to the closest 1.0-foot and referenced to the State Plane Coordinate System. Elevations to the closest 0.01-foot shall be provided for the survey marker and for top of the casing at each well. These elevations shall be referenced to the National Geodetic Vertical Datum of 1929.

8.3 The location, identification, coordinates and elevations of all the control points recovered and/or established at the site, and all of the wells, soil borings, test pits, and surface water sampling points shall be plotted on a planimeter map (at a scale of 1"=50 feet) to show their location with

respect to surface features within the project area. A tabulated list of the monuments and the monitoring wells, including their coordinates and elevations, a "Descriptive Card" for each monument established or used for this project and all field books and computations shall be prepared and submitted to the Huntsville Division (CEHND), ATTN: CEHND-ED-CS. The tabulation shall consist of the designated number of the well or monument, the x- and y-coordinates and all the required elevations. The Descriptive Card shall show a sketch of each monument; its location with relative to reference marks, buildings, roads, towers, etc.; a written description telling how to locate the monument from a known point; the monument name or number and the adjusted coordinates and elevations. These items shall be submitted to CEHND no later than the Draft Report Submission.

9.0 SECURITY REQUIREMENTS

9.1 The following requirements must be followed by the AE at Seneca Army Depot to facilitate entry and exit of AE employees and to maintain security.

9.1.1 Personnel Registration:

9.1.1.1 A list of all AE employees, sub-contractors and suppliers indicating firm name and address will be furnished through POC/COR to the Counterintelligence Division, Building 710, 72 hours prior to commencement of work.

9.1.1.2 A confirmation of employment SDSSE-SC Form 268 will be executed by the AE concerning each employee, to include all sub-contractors and their personnel. No forms will be transferred to another file if the AE has other on-going contracts at SEAD. The AE will provide a list of personnel who are authorized to sign Form 268 for the firm. A sample of each signature is required. Counterintelligence Division must be notified, in writing, of any changes to this list. All completed forms will be provided through COR/POC to the Counterintelligence Division 72 hours prior to commencement of work. Failure to complete Form 268 correctly will result in employee's denial of access to Seneca. The Counterintelligence Division must be notified, in writing through POC/COR to Counterintellignece, at least 72 hours prior to requesting any action. The chain of command for all AE actions will be through POC/COR to Counterintelligence Division. There will be no exceptions.

9.1.1.3 Camera permits require written notice from the POC/COR prior to access. Open camera permits will not be issued. The following information is required:

(a) Camera make, model and serial number.

(b) Contract name and name of individual responsible for the camera.

(c) Dates camera will be used.

(d) Where it will be used.

(e) What will be photographed and why.

9.1.1.4 If a rental, leased or privately owned vehicle is required in place of a company vehicle, the following information is needed.

(a) Name of individual driving.

(b) Year, make, model, color and license plate of the vehicle.

(c) Typed letter on company letterhead indicating that the company assumes responsibility for rental, leased or privately owned vehicles.

9.1.1.5 All access media will be destroyed upon expiration date of contract. If an extension is required a list of employee names and new expiration date must be furnished to the Counterintelligence Division. Contract extensions must be made prior to the contract expiration date or new Form 268s will be required for each individual that requires an extension.

9.1.2 Traffic Regulations:

9.1.2.1 Traffic Laws, State of New York, apply with emphasis on the following regulations.

9.1.2.2 Speed Limit:	Controlled Area	- as posted
	Ammo Area	- 50 mph
	Limited/Exclusion Area	- 25 mph

9.1.2.3 All of the above are subject to change with road conditions or as otherwise posted.

9.1.3 Parking: AE vehicles (trucks, rigs, etc.) will be parked in areas designated by the Director of Law Enforcement and Security. Usually parking will be permitted within close proximity to the work site. Do not park within 30 feet of a depot fence, as these are clear zones.

9.1.4 Gates:

9.1.4.1 Post 1, Main Gate - NY Highway 96, Romulus, New York is open for personnel entrance and exit 24 hours daily, 7 days a week.

9.1.4.2 Post 3, entrance to North Depot Troop Area, located at end of access road from Route 96-A is open 7 days a week for personnel and vehicle entrance and exit.

9.1.5 Security Regulations:

9.1.5.1 Prohibited Property:

9.1.5.1.1 Cameras, binoculars, weapons and intoxicating beverages will not be introduced to the installation, except by written permission of the Director/Deputy Director of Law Enforcement and Security.

9.1.5.1.2 Matches or other spark producing devices will not be introduced into the Limited/Exclusion or Ammo Area's except when the processor of such items is covered by a properly validated match or flame producing device permit.

9.1.5.1.3 All vehicles and personal parcels, lunch pails, etc. are subject to routine security inspections at any time while on depot property.

9.1.5.1.4 All building materials, equipment and machinery must be cleared by the Director of Engineering and Housing who will issue a property pass for outgoing equipment and materials.

9.1.6 AE Employee Circulation:

9.1.6.1 AE employees are cleared for entrance to the location of contract work only. Sight-seeing tours or wandering from work site is NOT AUTHORIZED.

9.1.6.2 Written notification will be provided to the Counterintelligence Division (Ext. 30202) at least 72 hours prior to overtime work or prior to working on non-operating days.

9.1.6.3 Security Police (Ext. 30448/30366) will be notified at least two hours in advance of any installation or movement of slow moving heavy equipment that may interfere with normal flow of traffic, parking or security.

9.1.7 Unions: Representatives will be referred to the Depot Industrial Labor Relations Officer (Ext. 41317).

9.1.8 Offenses: (Violations of law or regulations)

9.1.8.1 Minor: Offenses committed by AE personnel which are minor in nature will be reported by the Director of Law Enforcement and Security to the Contracting Officer who in turn will report such incidents to the AE for appropriate disciplinary action.

9.1.8.2 Major: Serious offenses committed while on the installation will be reported to the FBI. Violators may be subject to trial in Federal Court.

9.1.9 Explosive Laden Vehicles:

9.1.9.1 Vehicles such as vans, cargo trucks, etc. carrying explosives will display placards or signs stating "EXPLOSIVES".

9.1.9.2 Explosive ladened vehicles will not be passed.

9.1.9.3 When an explosive laden vehicle is approaching, pull over to the side and stop.

9.1.9.4 When catching up with an explosive laden vehicle, slow down and allow that vehicle to remain at least 100 feet ahead.

9.1.9.5 When approaching an intersection where an explosive laden vehicle is crossing - STOP - do not enter the intersection until such time as the explosive carrier has passed thru, and cleared the intersection.

9.1.9.6 When passing a vehicle that is parked, and displaying "Explosive" signs, slow down to 10 miles per hour, and take every precaution to allow more than ample clearance.

9.1.10 Clearing Post: All AE employees are required to return all identification badges, and passes on the last day of employment on the depot. The AE is responsible for the completion of all turn-ins by his employees, and informing the Counterintelligence Division and the depot organization administering the contract, for termination of any employee's access to the depot.

10.0 PUBLIC AFFAIRS.

The AE shall not publicly disclose any data generated or reviewed under this contract. The AE shall refer all requests for information to CEHND. Reports and data generated under this contract shall become the property of the Department of Defense and distribution to any other source by the AE, unless authorized by the Contracting Officer, is prohibited.

11.0 REFERENCES

11.1 "Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities," USEPA Publ. No. EPA/530/SW-611.

11.2 "Manual of Water Well Construction Practices, " USEPA Publ. NO. EPA/570/9-75-001.

11.3 Methods of Determining Permeability, Transmissibility, and Drawdown," U.S. Geological Survey Water Supply Paper No. 1536-1, 1963.

11.4 "U.S. Corps of Engineers Safety and Health Requirements Manual," U.S. Army Engineering Manual No. EM-385-1-1, April 1981.

11.5 "Code of Federal Regulations, "Volume 40, Parts 260 through 265 plus 270, July 1986.

11.6 "American Society for Testing and Materials, " ASTM-D-421-, D-422, D-423, D-424, D-2216, and D-2436.

11.7 "Code of Federal Regulation," Volume 40, Part 300, July 1987.

11.8 "Methods for Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, Publ. No. EPA/625/6-7-003a.

11.9 "Test Methods for Evaluating Solid Wastes," USEPA Publ. No. SW- 846, July 1982.

11.10 "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," 40 CFR 136, Federal Register, Oct 26, 1984.

11.11 "RCRA Groundwater Monitoring Technical Enforcement Guidance Document" (Draft) Office of Waste Programs Enforcement, USEPA, August 1985.

11.12 "Handbook for Analytical Quality Control in Water and Wastewater Laboratories," EPA Manual 600/4-79-019, March 1979.

11.13 "Safety and Occupational Health Document Requirements for Hazardous Waste Site Remedial Actions," U.S. Army Engineering Regulation (ER) 385-1-192.

11.14 Engineer Guidance Design Manual for Architect-Engineer. US Army Corps of Engineer. HNDM-1110-1-1. Rev. 1986.

11.15 RCRA Corrective Action Plan, OSWER Directive 9902.3, November, 1986.

11.16 U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Initial Installation Assessment of Seneca Army Depot,
N.Y. Report no. AMXTH-IR-A-157, 1980.

11.17 U.S. Army Environmental Hygiene Agency (USAEHA), Final Report, Army Pollution Abatement Program Study No. D-1031-W, Landfill Leachate Study, Seneca Army Depot, 1981.

11.18 U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Update of the Initial Installation Assessment of Seneca Army Depot, N.Y. Report no. AMXTH-IR-A-157(U), 1988.

11.19 "Evaluation of Solid Waste Management Units, Seneca Army Depot", Interim Final Report, Groundwater Contamination Survey No.38-26-0868-88, U.S. Army Environmental Hygiene Agency

11.20 "Remedial Investigations/Feasibility Studies, Seneca Army Depot Burning Pit/Landfill, Site Investigation", Draft Final Report, ICF Technology Inc., March 1989.

11.21 Draft, "Guidance For Conducting Remedial Investigations/Feasibility Studies Under CERCLA", U.S. EPA, Office of Solid Waste and Emergency Response, March 1988.

9.1 "U.S. Corps of Engineers Safety and Health Requirements Manual," U.S. Army Engineering Manual No. EM-385-1-1, April 1981.

9.2 "Code of Federal Regulations, "Volume 40, Parts 260 through 265, 270, and 300, July 1986.

9.3 "U.S. Army Materiel Command Safety Manual, AMC-R 385-100. 1 Aug 1985.

9.4 "Handbook for Monitoring Industrial Waste Water," U.S. Environmen