15 (12-75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: Darrell Sweredoski, Reg. Hazardous Waste Remediation Engineer, Region 6
FROM: Joseph L. Slack, Director, Bureau of Eastern Remedial Action, DHWR
SUBJECT: Remedial Design EOD Burn Sites at Ft. Drum #623008
DATE: MAR 1 4 1990

Joseph L. Slack/arc

Attached is a document relating to a work plan for Remedial Design EOD Burn Sites at Fort Drum. Please have staff review and comment upon the document by April 9, 1990.

Please direct all comments and questions to Syed Uddin, of my staff. If phone contact is required, he can be reached at (518) 457-3976. Thank you for your cooperation.

Attachment

MISCELLANEOUS MILITARY AND CIVIL HAZARDOUS WASTE CLEANUP PROJECTS FOR U.S. ARMY CORPS OF ENGINEERS KANSAS CITY DISTRICT

WORK PLAN
FOR
REMEDIAL DESIGN
EOD BURN SITES
FORT DRUM, NEW YORK

CONTRACT NO. DACA41-89-D-0086
DO. N0. 008

CDM Federal Programs Corporation
8215 Melrose Dr., Suite 100
Lenexa, KS 66214

DISTRIBUTION LIST:

Commander 3
U.S. Army Engineer District
Kansas City
ATTN: CEMRK-ED-TD (Linda Houston)
601 E. 12th Street
Kansas City, MO 64106

U.S. Army Corps of Engineers 1
Department of the Army
ATTN: CEEC-B
Pulaski Building
Washington, DC 20317

U.S. Army Corps of Engineers 3
Missouri River Division
ATTN: CEMRD-ED-EA (Claudia Wiethop)
2945 South 132nd Street
Omaha, NE 68144

U.S. Army Corps of Engineers 1
Missouri River Division Laboratory
ATTN: CEMRD-ED-GL (Joseph Solsky)
420 S. 18th Street
Omaha, NE 68101

U.S. Army Corps of Engineers 1
North Atlantic Division
ATTN: NADCO-CE (Charles Feinberg)
90 Church Street
New York, NY 10007-9998

Commander 3
Army Environmental Hygiene Agency
ATTN: HSHB-ME-SE (Hoddinott)
Aberdeen Proving Ground, MD 21021-5422

Commander 1
U.S. Army Toxic & Hazardous Materials Agency
ATTN: CETHA-IR-A (Alavi)
Aberdeen Proving Ground, MD 21010-5401

Commander 1
U.S. Army Toxic & Hazardous Materials Agency
ATTN: CETHA-IR-A (McClellan)
Aberdeen Proving Ground, MD 21010-5401

Commander, Fort Drum 2
ATTN: AFZS-EH-E (Moss)
Building T4000
Fort Drum, NY 13602-5097

Mr. Darrell Sweredoski 2
Regional Hazardous Waste Remedial Engineer
Department of Environmental Conservation
State Office Building
317 Washington Street
Watertown, NY 13601

Mark A. Swatek
Jacqueline M. Mosher
PF

Rosemary Ellersick
Marty Mathamel

1.0 INTRODUCTION

The Corps of Engineers, Kansas City District (Corps) authorized CDM Federal Programs Corporation (CDM FPC) to provide Remedial Design Services at two EOD Burn Sites in Fort Drum, NY. These activities will be performed under Contract No. DACA-41-89-D-0086, Delivery Order No. 008. This work plan is based upon the Statement of Work received August 15, 1989, (included as Appendix A) and CDM FPC's proposal dated August 23, 1989, (included as Appendix B). The work covered under this work plan involves the professional services necessary to complete a Remedial Design at two EOD Burn Sites.

2.0 SITE DESCRIPTION

2.1 HISTORY

Two EOD Burn sites were used at Fort Drum.

2.1.1 RANGE 35 EOD SITE

The U.S. Air Force operated one site to collect practice bombs from the Range 35 bombing area and burn them to destroy residual white phosphorous charges. This is the Range 35 EOD burn site and will be referred to as "R35EOD". R35EOD has operated from the early 1970s until 1988 when the practice of open pit burning was ceased. The practice bombs are composite units consisting of cast iron casings, aluminum (or plastic) fins and a 3-inch white phosphorous charge. The bombs are collected quarterly from the range and are deposited into an excavated trench (approximately 6 feet deep, 50 feet long and 10 feet wide) along with burnable dunnage (timber, waste wood, logs, etc.). Approximately annually, the trench was set on fire to assure destruction of any residual white phosphorous. The trench and all residual materials were then backfilled and a new trench excavated. R35EOD consists of a site bounded by fence and brush on three sides and a road on the fourth. Site access is via maintained road (asphalt and gravel) to within 2 miles of the site. The remaining 2 miles consists of a single lane, unimproved dirt road.

Work must be coordinated with the USAF unit operating R35EOD and will only be allowed during inactive periods. Typically, the range is inactive on Sunday, Monday, and Tuesday, only.

2.1.2 RANGE 16 EOD SITE

The U.S. Army has operated an EOD burn site near Range 16 since at least 1940 (the "R16EOD" Site). Two types of burning operations occurred at the site. A burn drum was used to destroy small ordnance (ammunition, hand grenades, rockets, etc.) from practice areas that did not explode upon use. A burn trench (similar to R35EOD) was also used for larger ordnance.

The R16EOD comprises an area of 8 acres which is bounded by fence on all sides. The area of concern is approximately 6 acres. The area is covered with spent ammunition, spent rockets, and shrapnel which has landed on or near the ground surface. Other debris and spent ordnance has also been dumped at the site.

The site is approximately 10 miles from the center of the base of Ft. Drum and is accessed by gravel roads maintained by the Army. The last mile is over open ground. All work on site will be conducted with a representative of the base EOD unit present. Work will need to be coordinated in advance to assure that adjacent live fire ranges are inactive.

2.2 CONTAMINATION SCENARIO

The environmental media of concern at the R35EOD site include groundwater and soil. Potential contaminant pathways and receptors are summarized as follows:

Media	Pathway	Receptor
Groundwater	Ingestion/absorption	Humans, wildlife, domestic animals
	Uptake	Plants*
Soil	Incidental ingestion/ absorption	Humans, wildlife
	Inhalation	Humans, wildlife
	Uptake	Plants

*Via Irrigation

Potential human receptors of wastes are base personnel (military and civilian) who potentially inhale contaminated dust particles. On-site investigation teams are also potential receptors.

The environmental media of concern at the R16EOD site are the same as for the R35EOD site. However, since the disposal trench and burn can comprise a small portion of the entire site, the primary purpose of the design will be to remove the residue from the trench per L. Houston's direction.

3.0 SCOPE OF WORK

The Corps has specified that the following tasks be performed:

- o Task 1 - Preinvestigation
- o Task 2 - Draft Remedial Design
- o Task 3 - Draft Final Remedial Design Package
- o Task 4 - Final Remedial Design

3.1 TASK 1 - PREINVESTIGATION

Preinvestigation will consist of the following subtasks:

3.1.1 SUBTASK 1 - PREPARE WORK PLAN (WP)

This work plan has been prepared to provide our approach to conducting this study and outlines the operating and management controls that will affect project performance. It contains the Work Progression (Schedule) and the Data Management Plans specified by the Corps in the Statement of Work and presented in Sections 4.0 and 6.0 in this Work Plan.

3.1.2 SUBTASK 2 - RECORDS REVIEW AND EVALUATION (RRE)

CDM FPC will review the background information pertinent to the facility, contamination and interim measures which were or are being undertaken at the facility that has been provided to CDM FPC as of September 1, 1989. This will be used to modify, enhance or delete scopes of work based on site-specific situations (i.e., if the contamination problem at a facility is merely a small soil contamination problem then the field investigations should be scaled down accordingly). Any information which becomes available at a later date that changes the Scope of Work will be addressed to the Corps in a letter format.

Data, Information, and Services to be furnished by the Government:

- Previous site investigation records.
- Applicable Engineer Manuals (EM's), Technical Manuals (TM's), Engineering Regulations (ER's), and Engineering Technical Letters (ETL'S).
- Applicable Guide Specifications.
- Applicable standard drawings.
- Liaison with State Regulatory Agencies.
- Blank mylar drawing sheets with A-E title block and borders.
- Instruction on preparation of Government estimates.
- Other documents so indicated in the Documents Listing.

3.2 TASK 2 - DRAFT REMEDIAL DESIGN

3.2.1 SUBTASK 1 - SITE INVESTIGATION

Prior to initiating any field work the following activities will be completed for mobilization of field activities:

- Ensure that all QA sample analyses are scheduled through the COE Laboratory Program.
- Determine what type of equipment is needed and make sure the equipment is available.
- Obtain trip blanks and field blank water.

- Locate the Federal Express, Emery, or other overnight delivery service nearest the site and note its hours of operation. Determine whether the carrier will provide sample pick-up service.

- All equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling site). Different decontamination procedures are used for various types of equipment that perform the field activities. Decontamination stations will be established for all field activities.

The Site Investigation Subtask will include the following elements:

3.2.1.1 Magnetometer Survey

Per L. Houston's request on August 15, 1989, a magnetometer survey of the entire area at each site shall be performed to determine the location and depth of buried ordnance instead of a ground penetration radar scan. The purpose of the survey is to determine the probable extent of buried ordnance. This is in lieu of the combined magnetometer and ground penetrating radar survey originally proposed by CDM FPC.

3.2.1.2 Survey and Topographic Mapping

The R35EOD site is approximately 200' by 200'. The survey area will be 50' beyond the perimeter. The survey area for the R16EOD site will be 8 acres. The maps will be at a scale of 1" = 10' with a 2-foot contour interval. Each 10-foot contour interval will be indicated with a bold line. The maps will be referenced to the State Plane Coordinate Systems and to the National Geodetic Vertical Datum. All surface and below ground features within the area to be surveyed are to be shown and identified on the maps. The work also entails surveying the locations and elevations of all new monitoring wells after drilling and development of these wells are completed.

3.2.1.3 Hydrogeological Site Characterization

Four monitoring wells will be installed at the R35EOD site to identify and characterize the upper most aquifer and potential contaminant pathways. Data/information will be collected from past studies to support the placement of wells capable of determining the impact of the facility on the uppermost aquifer. Little data is known about the groundwater characteristics at this site. USGS geological maps indicate thin clay cover over bedrock in this area. Cover may range from a few feet to 25 feet. Wells are located to define hydrologic characteristics and determine extent of contamination.

Pursuant to a meeting with the Corps on August 1, 1989, no groundwater investigation will be performed at the R16EOD site.

3.2.1.4 Ground Water Sampling and Analysis

Prior to sampling, the elevation of the potentiometric surface in any monitoring well will be determined. In cases where imiscible contamination is found during the characterization, water level measurements will be adjusted to reflect its true elevation. Also, groundwater flow paths based on data obtained from groundwater monitoring wells installed upgradient and downgradient of the potential contaminant source will be identified.

A groundwater investigation will be conducted to characterize the distribution of contamination at the facility. Table 3-1 contains the sample matrix.

3.2.1.5 Soil Sampling and Analysis

A program will be conducted to characterize the soil and rock units and characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release(s). The investigation will include but not be limited to a description of the vertical and horizontal extent of contamination, descriptions of contaminant and soil chemical

EOD SAMPLE MATRIX

	GROUNDWATER	SOIL	SURFACE WATER	RESIDUE
METHOD 8240 VOLATILES	0	0	0	6
METHOD 8270 SEMI VOLATILES	0	0	0	6
BARIUM	4	10	2	6 (2)
ARSENIC	4	10	2	6
SELENIUM	4	10	2	6
CHROMIUM	4	10	2	6
CADMIUM	4	10	2	6
MERCURY	4	10	2	6
SILVER	4	10	2	6
LEAD	4	10	2	6
PHOSPHORUS	4	10	2	0
POLYNUCLEAR AROMATICS	4	10	2	0
EXPLOSIVES (1)	0	0	0	6
PCBs	0	0	0	6
PESTICIDES/HERBICIDES	0	0	0	6

(1) TNT,DNT,RDX,HMX,TETRYL,TNB
(2) EP TOXICITY METALS WILL BE PERFORMED ON THE RESIDUE SAMPLES

properties within the contaminant source area and plume (i.e., leachability and exchange capacity).

Two soil samples will be collected from each well for chemical and geotechnical analyses. This will enable us to determine the vertical extent of contamination. In addition, two surface soils will be collected from the trench at the R35EOD site. No surface samples will be collected at the R16EOD site due to the extent of shrapnel and rocket debris. Table 3-1 contains the sample matrix.

3.2.1.6 Surface Water Samples and Analysis

An investigation will be conducted to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation will include determination of the impact of the contaminants in the stream(s).

Two surface water samples of the standing water in the trench at the R35EOD site will be taken to determine characteristics of the water. No surface water was discovered at the R16EOD site. Table 3-1 contains the sample matrix.

3.2.1.7 Sediment Samples and Analysis

An investigation will be conducted to characterize contamination in the residue in the disposal trench and the burn can at the R16EOD site. The investigation will include determination of whether the residue has hazardous waste characteristics.

This analyses will determine the ultimate disposal method which will be incorporated in the remedial design. Three samples will be collected from the trench and three samples from the burn can. Table 3-1 contains the sample matrix.

3.2.1.8 Assumptions

- All field work will be performed in good weather (Temperature greater than 35°F with wind chill and no snow on the ground).
- No data validation services are required per conversation with Linda Houston.
- All field work will be contracted with Level D Health & Safety protection.
- All samples will be shipped as low to medium hazard.
- COE will supply coolers and bottles with preservatives for split and blank samples required for COE QA review.
- Trip blanks will be submitted to the laboratory contracted by A-E.
- Ten percent of the total number of samples will be submitted as QC samples per conversation with L. Houston on August 15, 1989.
- All waste generated by field activities will be drummed and will remain on site. Removal of this drummed waste will be part of the Remedial Action.
- Unless otherwise stated, work schedule shall be normal 5-day work weeks with field crews remaining in Watertown on alternating weekends and returning home on alternating weekends.
- COE will promptly review and approve all pre-investigation submittals to allow commencement of the field program by mid-September 1989.
- Both EOD areas will be scanned by base EOD personnel and both sites will be cleared of "live" bombs.

- One day will be spent with the EOD unit on base for ordnance safety training by the crew working on the EOD sites. (4 people).

- All practice bombs, fill and debris on the surface and in the trench area of the R35EOD site will be removed from the area by Air Force personnel prior to field work.

- All field work will be performed only on Sunday, Monday and Tuesday of each week at the R35EOD site.

- One EOD personnel will accompany the field crew at all times at the R16EOD site.

- Since the R16EOD site is an active impact area with small ordnance littering the entire site, the site investigation will only focus on the burn can where ordnance is burned and the trench area where the residue is disposed.

- Estimated number of sampling and drilling field days for both EOD sites is 6. This estimate does not include days to conduct the magnetometer survey.

3.2.2 SUBTASK 2 - SITE CHARACTERIZATION

All available site information including sampling results obtained during the site investigation will be used to characterize the physical characteristics of the site and the nature and extent of contamination. The available data will be used to address the following:

- Identification of contaminants.

- Volume, physical, and chemical characteristics at the site.

- Hydrogeological characteristics of the R35EOD site.

- Direction and gradient of groundwater flow at the R35EOD site.

- Total thickness of site overburden and thickness of unsaturated zones at the R35EOD site.

- Elevation of site bedrock surfaces at the R35EOD site.

- Maps illustrating suggested distribution of groundwater and oil contaminants at the R35EOD site.

- Current use of groundwater and surface water in the area at the R35EOD site.

- Potential for migration of contaminants from the sources surrounding the site.

- Brief comparison of contaminants and their levels to the Federal MCLs and the following New York State regulations:

  Ground Water

  New York State Water Quality Regulations - Ground Water Classifications and Standards (6 NYCRR Part 700-705)

  New York State Sanitary Code
  Drinking Water Supplies (10NYCRR Subpart 5-1)

  Surface Water

  New York State Pollution Discharge Elimination System (SPDES0) (6NYCRR Parts 750-757 and 701.5) and Technical and Operational Guidance Series (TOGS1.1.1)

  Ambient Water Quality Standards and Guidance Values

  New York Water Quality Regulations -
  Surface Water Classifications and Standards (6NYCRR Part 608)

3.2.3 SUBTASK 3 - SITE INVESTIGATION REPORT

The Site Investigation Report shall contain all data compiled as a result of the field activities. Conclusions and recommendations will also be presented in this submittal.

The report will be prepared to address each of the issues/conditons investigated during the field site investigation activities.

A preliminary outline of the report is found in Table 3-2.

3.2.4 SUBTASK 4 - DRAFT REMEDIAL DESIGN PACKAGE

A design package will be prepared to remove the residual debris remaining at each of the previously defined EOD sites.

The Draft Remedial Design will include preparation of the following:

- o Construction drawings
- o Technical specifications
- o Cost estimate

3.2.4.1 Assumptions

- o Drawings will be prepared on COE supplied blank mylar drawing sheets.
- o No groundwater treatment will be required.
- o Remedial action will consist of soil, ordnance and burn can removal.
- o The following drawings will be included with each package:
  - Cover Sheet/Index

- Vicinity Map/Location Map
- Site Plan (each site)
- Grading & Drainage Plan (each site)
- Cross Sections of Excavation and Fill (each site)
- Security Plans & Details (each site)
- Environmental Protection Sheet (each site)
- Miscellaneous Details (each site)

o The Remedial Design will not be prepared according to EPA Guidelines for Remedial Design Packages.

o A Chemical Data Management Specifications Plan shall be prepared.

o Specifications will be prepared using COE guide specs.

3.3 TASK 3 - DRAFT FINAL REMEDIAL DESIGN

The Draft Final Remedial Design shall address comments generated during the review of the Draft Remedial Design and modify the Draft Remedial Design accordingly.

3.4 TASK 4 - FINAL REMEDIAL DESIGN

The Final Remedial Design shall reflect comments generated during the review of the Draft Final Remediation.

TABLE 3-2

SITE INVESTIGATION REPORT OUTLINE

Executive Summary

1. Introduction
   - 1.1 Purpose of Report
   - 1.2 Site Background
     - 1.2.1 Site Description
     - 1.2.2 Site History
     - 1.2.3 Previous Investigations
   - 1.3 Report Organization

2. Study Area Investigation
   - 2.1 Surface Features
   - 2.2 Contaminant Source Investigations
   - 2.3 Meteorological Investigations
   - 2.4 Surface-Water and Sediment Investigations
   - 2.5 Geological Investigations
   - 2.6 Soil and Vadose Zone Investigations
   - 2.7 Groundwater Investigations

3. Physical Characteristics of the Study Area
   - 3.1 Surface Features
   - 3.2 Meteorology
   - 3.3 Surface-Water Hydrology
   - 3.4 Geology
   - 3.5 Soils
   - 3.6 Hydrogeology
   - 3.7 Demography and Land Use
   - 3.8 Ecology

4. Nature and Extent of Contamination
   - 4.1 Sources (lagoons, sludges, tanks, etc.)
   - 4.2 Soils and Vadose Zone
   - 4.3 Groundwater
   - 4.4 Surface Water and Sediments
   - 4.5 Air

5. Contaminant Fate and Transport
   - 5.1 Potential Routes of Migration (i.e., air, groundwater, etc.)

6. Summary and Conclusions
   - 6.1 Summary
     - 6.1.1 Nature and Extent of Contamination
     - 6.1.2 Fate and Transport
   - 6.2 Conclusions

Appendixes

A. Technical Memoranda on Field Activities (if available)
B. Analytical Data and QA/QC Evaluation Results

4.0 SCHEDULE

4.1 SCHEDULE

The schedule for the Remedial Design at the EOD Burn Sites is depicted in Figure 4-1. Key dates, as outlined in the Statement of Work, were used as the basis for development of this schedule.

It was assumed that Corps reviews required in the Scope of Work would be completed in 30 days. If the review takes longer than the allotted 30 days, the schedule shifts accordingly.

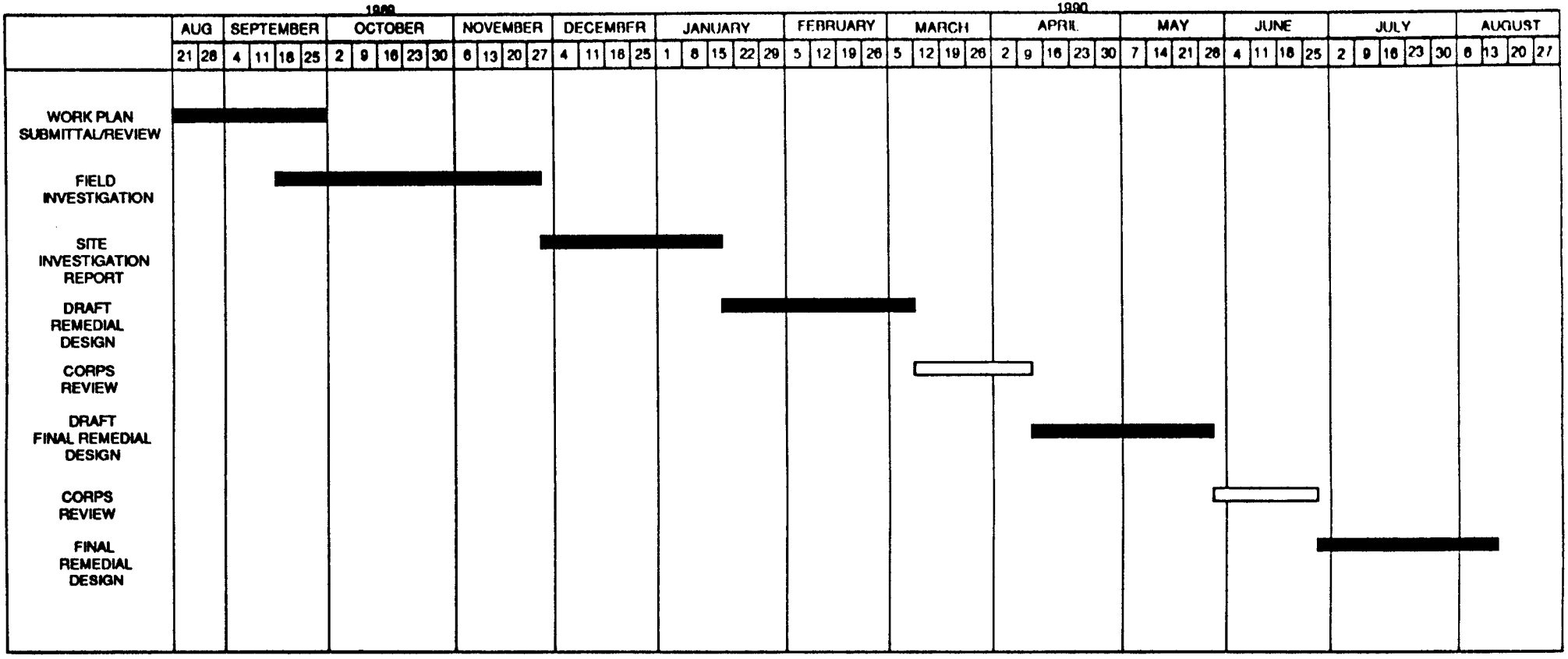
Development of this schedule is contingent upon performing all field work prior to November 23, 1989. If the field crew encounters adverse weather conditions which inhibit field work, the schedule will need to be adjusted to accommodate these conditions.

The anticipated cost expenditure chart is depicted in Figure 4-2. This graph depicts the projected cumulative expenditure rate for this project. This chart will be updated monthly to reflect earned value of the work completed at that time and submitted as part of the monthly report discussed below.

4.2 MONTHLY REPORT

Monthly progress reports will be submitted as part of the requirements detailed in the Statement of Work. The form in Figure 4-3 will be used as the basis for this report. In addition, updates of the schedule and cost expenditure chart will also be included in this report.

SCHEDULE -EOD REMEDIAL DESIGN

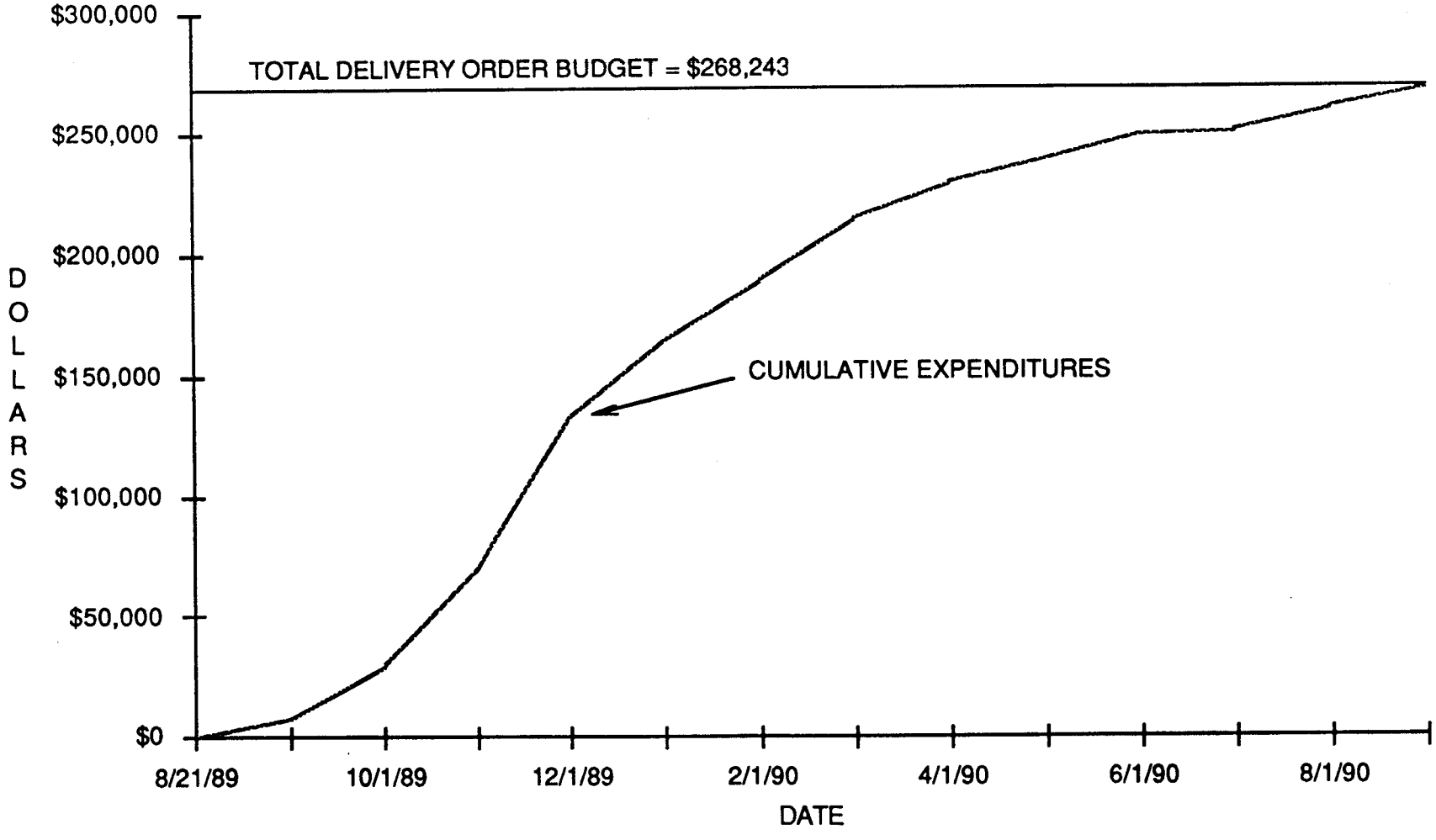


CDM Federal Programs Corporation

FIGURE 4-1

EOD REMEDIAL DESIGN

PROJECTED CUMULATIVE EXPENDITURES ANALYSIS



CDM Federal Programs Corporation

FIGURE 4-2

MONTHLY DELIVERY ORDER REPORT (TECHNICAL)

DELIVERY ORDER NUMBER:
SITE NAME/ACTIVITY:
PREPARED BY:
DATE:
PERIOD: Month, Year

1. Progress Made this Reporting Period - Description of progress made during the reporting period, including problem areas encountered, and recommendations.

2. Problems Resolved - Results obtained relating to previously identified problem areas.

3. Anticipated Problem Areas and Recommended Solutions - Anticipated problems and recommendations including technical, cost and scheduling implications, for resolution. Actual or projected overruns should be discussed here.

4. Upcoming Events/Activities Planned - Important upcoming dates; meetings, hearings, etc. Major tasks to be performed within the next reporting period, identification of decision points.

5. Subcontracting - Extent of subcontracting and results achieved.

6. Laboratory Analysis - Identify the number of samples analyzed at laboratories and where the analyses were performed.

5.0 PROJECT STAFFING PLAN

The key project staff are listed below:

- Contract Manager - Mark A. Swatek, P.E.
- Delivery Order Manager - Jacqueline M. Mosher, P.E.
- Site Manager - Chris Larkin
- Health & Safety Officer - Martin S. Mathamel
- Technical Advisory Committee - Mark A. Swatek, Bill Koski
- Quality Assurance Director - Rosemary Ellersick
- Field Crew: Freda Griffis
  Monte Morgan
  Susan Anton
  Pam Phillip

Other technical staff will be used during the performance of the identified tasks. These people will report directly to the Delivery Order Manager.

6.0 DATA MANAGEMENT PLAN

6.1 TYPES OF DATA

Several types of data will be collected during this Site Investigation:

- o Surface data are those obtained from the land survey which delineates the area in and around the site. This information will be provided by the topographic/planimetric survey which will be completed as part of the investigation and will be used to assess the size and location of the landfill.

- o Subsurface/geologic data pertain to soil types, stratigraphy and depth of the unsaturated zone in the area. This data will be provided by the monitoring well borings completed for this site and will be used to determine the geology of the site.

- o Subsurface data will also be collected during the magnetometer survey. The magnetometer survey will determine the extent of burial at each of the Burn Sites.

- o Hydrogeologic data (groundwater level measurements and permeability tests) will be collected from the monitoring wells and will be used to determine the direction and velocity of groundwater flow.

- o Chemical data will be obtained through analysis of groundwater, surface water, soil, and residue samples collected during the investigation. These data will be used to assess the type and concentration of contamination which exists in the area.

6.2 SURFACE DATA

The survey data collected by the land survey contractor will be recorded in ink in a standard field notebook. No erasures will be made in these books. Following collection, the surveyor will review the data for completeness and

accuracy. These data will be used to prepare the topographic and planimetric maps.

6.3 SUBSURFACE/GEOLOGIC DATA

The subsurface/geologic data collected during installation of the monitoring wells will be recorded in ink in a field notebook. A daily detailed driller's report will be maintained by both the drilling subcontractor and CDM FPC's on-site drilling inspector. The driller's log will be submitted to CDM FPC at the end of each work day. The report will give a complete description of all material encountered, number of feet drilled, number of samples collected and other pertinent data.

During drilling, CDM FPC's representative will maintain at the well site a complete log of the bore hole which will include the following:

- The reference point for all depth measurements.
- The depth at which each change of formation occurs.
- The thickness of each stratum.
- The identification of the material of which each stratum is composed according to the Unified Soil Classification System, or standard rock nomenclature, as necessary. Any signs of visual contamination will also be noted.
- The number of samples collected, time of collection and the depth interval from which each formation sample was taken.
- The depth at which hole diameter (bit sizes) change.
- The depth at which groundwater is first encountered.
- The depth to the static water level and changes in static water level with well depth.

- The total depth of the completed well.
- The depth or location of any loss of drill water, circulation, loss of tools or equipment.
- The location of any fractures, joints, faults, cavities or weathered zones.
- The depth of any grouting or sealing.
- The nominal hole diameters.
- Amount of cement used for grouting or sealing.
- The length and description of all casings used to construct the well.
- The length, description, depth setting, diameter, slot size, material and manufacturer of the completed well screen.
- Any sealing-off of water bearing strata.
- Types of materials (bentonite, cement) used to seal the annulus.
- Static water level upon completion of the well and after development.
- Drilling date or dates.
- Construction details of monitoring well.

The data contained in both CDM FPC's logs and the driller's logs will be used to prepare graphic representations of the geologic conditions at each well location.

6.4 HYDROLOGIC DATA

Hydrologic data will be collected from the monitoring wells following well development and will be recorded in the project field log. At least 3 sets of water level data and one set of permeability data will be collected during the investigation. The depth to groundwater data in conjunction with the land survey data will be used to determine groundwater elevations.

Following collection of the data, a table will be prepared which summarizes the elevations obtained at each location. This table will be included in the Site Investigation Report submitted following the Field Investigation. Graphic representations will also be included in the report as plan view maps illustrating groundwater flow direction and elevations.

6.5 CHEMICAL DATA

Chemical data will be collected for groundwater, surface water, soil, and residue. CDM FPC will receive this data from Southwest Laboratories, Inc., on standard laboratory report forms. Data will be reviewed as discussed in the Chemical Data Acquisition Plan. Per CDM FPC's conversation with L. Houston, data validation will be provided by the Corps' laboratory and not by CDM FPC.

Once the data has been reviewed, it will be tabulated in a computerized spreadsheet for easy retrieval. The data will be stored on floppy disks as well as hard copies for filing.

The chemical data will be presented in the Site Investigation Report in tabular and, where appropriate, graphic form. The tables will summarize the data by date in concentration versus location format.

7.0 QUALITY ASSURANCE

All deliverables will be subject to technical review by CDM FPC technical specialists. These reviews will take place for the following deliverables:

- o Work Plan
- o Site Investigation Report
- o Construction Bid Package

A Technical Review Committee, as outlined in Section 5.0, will meet to review the draft Site Investigation Report and the draft Construction Bid Package. The Technical Review Committee is comprised of technical experts who discuss the document in an open forum format. The committee will verify the overall concept of the project and determine whether the data collected during the investigation is adequate to achieve goals of the project.

In addition to the review of the deliverables, checking of all calculations will be performed throughout the job. The following minimum requirements will apply:

Calculations

- o All calculations will be checked by an independent reviewer.
- o Corrections will be clearly noted on the original calculations in red pencil; erroneous figures will be crossed out in red pencil and will not be erased.
- o All revisions will be reviewed with the individual who made the original calculations.
- o The name of the checker and date of checking will be included in the appropriate places on the calculation sheets.

Cost Estimates

- Cost estimates will be checked to ensure that all major categories have been covered including suitable contingency allowances.

- Cost estimates revisions will be shown in red pencil.

- Cost estimates will be checked regarding the reasonableness of data and assumptions used during the preparation of estimates and filed in the project QA file.

Drawings

- Each detail, dimension and note will be marked out with yellow pencil. Revisions and/or additions will be in red. All indicated changes will be verified by the checker and circled with green pencil.

- The checked set will identify the checker and date of check.

- All checked sets will be identified as indicated above and kept in the project QA file.

Specifications

- Every page of specifications will be thoroughly read to ensure correctness, appropriateness, and coordination with the drawings.

- Redundant verbiage will be eliminated.

- All corrections will be marked in red pencil and the revised specifications rechecked against the red penciled checking set.

- The checking set will identify the checker and dates of checking and revision and will be filed in the project QA file.

In accordance with CDM FPC's policy of auditing a certain percentage of work

assignments, a QA system audit may be conducted. If this assignment is audited, a written audit report will be distributed to the audited group and CDM FPC management.

APPENDIX A

STATEMENT OF WORK PROVIDED BY THE CORPS OF ENGINEERS

Original 30 June 1989
Revised 17 July 1989
Revised 1 August 1989

REMEDIAL DESIGN (RD)
FOR
THE EOD BURN SITES
AT
FORT DRUM, NEW YORK

SCOPE OF WORK

1. DESCRIPTION OF WORK: The work covered under this Scope of Work (SOW) involves the professional services necessary to complete a Remedial (RD) for the EOD Burn Sites at Fort Drum, New York. The following is to be accomplished as part of the project:

a. Perform a records review and evaluation.

b. Perform necessary site investigations to determine the nature and extent of contamination at the EOD Site. Prepare a Site Investigation Report.

c. Develop a Remedial Design (RD) package, including a cost estimate.

d. OPTION 1: Prepare construction documents for remedial action at the EOD sites.

2. A-E RESPONSIBILITY:

a. The A-E shall perform and shall assume all responsibility for the accuracy and completeness of the work and services for the described project in accordance with criteria and instructions.

b. In the event that discrepancies, omissions, or other errors in the drawings and reports are discovered after the final submission, the A-E shall revise the reports and/or drawings or prepare sketches and provide the necessary data, including a detailed cost estimate and information to permit issuance of amendments or modifications by the Government.

c. Should the A-E receive any directions or criteria that are not included in this contract that require additional effort beyond the contract criteria, the A-E shall notify the Contracting Officer in writing, describing the change(s) and impact on the effort.

3. RELEASE OF INFORMATION: The A-E shall not publicize nor

release in any manner information or data in regard to projects on which they may be working or negotiating with this office, nor discuss prior to public release by this office, a project, any future program, or any planning with anyone not directly concerned with the design of the project. Any inquiries in regard to these matters shall be referred to the Contracting Officer or District Project Manager.

4. CRITERIA: Performance criteria provided or referenced are intended to serve as a guide for the A-E in the preparation of a proposal for professional services. All aspects of this project are to meet all applicable Federal, state, and local statutes, codes, and regulations. Additional specific criteria is furnished for the A-E as described in the "Criteria and Instruction Documents Listing."

5. RECORDS REVIEW AND EVALUATION: The A-E shall review and evaluate existing records, studies, and data concerning the sites as provided by the Government, existing in the files of Government agencies, or otherwise readily available.

6. SERVICES TO BE PERFORMED BY THE ARCHITECT-ENGINEER: The A-E shall perform and shall assume all responsibility for the accuracy and completeness of the following work and services in accordance with criteria and instructions specified hereinafter.

a. Title I Services:

(1) Preinvestigation. Del * *

(a) Work Progression - A detailed narrative on how the investigative services will be accomplished, including the schedules.

(b) Data Management Plan.

(c) Records Review and Evaluation.

(2) Draft Remedial Design. Del * *

(a) Site Investigation.

(b) Site Characterization.

(c) Site Investigation Report.

(d) The Draft Remedial Design.

(e) Cost Estimate.

(f) Attend a review conference on the Draft Remedial Design at Fort Drum.

(3) Draft Final Remedial Design.

(a) Submit Draft Final Remedial Design.

(4) Final Remedial Design.

(a) Submit corrected Final RD.

7. SUBMISSIONS REQUIRED OF THE ARCHITECT-ENGINEER: The A-E will be required to make the following submissions at various stages of the project:

- Preinvestigation
- Site Investigation Report
- Draft Remedial Design
- Cost Estimate
- Draft Final Remedial Design
- Final Remedial Design

a. All drawings, analyses, and/or reports shall be physically assembled in sets, in one office, several working days prior to scheduled submittal to permit an overall coordination review and interference check by the A-E. The importance of careful checking and coordination of drawings and other project documents cannot be overemphasized. All project data shall be checked and coordinated prior to all submittals. Deficiencies, ambiguities, conflicts, and inconsistencies shall be rectified prior to submittal of documents.

b. A letter of transmittal shall accompany each submittal. The letter shall reference the project by title, number, and location. The letter of transmittal shall certify that all documents have been checked and coordinated prior to submittal. The letter shall also include a listing of material being submitted. A complete submission must be received by the Government before it will undertake review of such submission; partial submissions will not be accepted without prior approval.

c. Submissions will be made, in the quantities indicated to each office as designated in the attached Design Document Distribution Listing. Documents for all contract levels of work shall be distributed via courier service that will provide for

second-day delivery.

8. COMPLETION SCHEDULE: The A-E shall complete the design work and services as follows:

a. Preinvestigation submittal within 60 calendar days after receipt of notice to proceed.

b. Site Investigation Report within 120 calendar days after approval of the Preinvestigation Submittal.

c. Draft Remedial Design submittal within 55 calendar days after the Site Investigation Submittal.

d. Draft Final Remedial Design submittal within 45 calendar days after the review meeting of the Draft Remedial Design.

e. Final Remedial Design submittal within 50 calendar days after the receipt of comments generated during review of the Draft Final Remedial Design.

f. Services are contemplated to begin as outlined in the project schedule. Should the start of each phase or portions thereof be delayed more than 6 months by causes other than the A-E's negligence, the remaining fee and time schedule may be renegotiated at the A-E's request.

9. SUBMITTALS:

Del

a. Title I: The A-E shall complete all Title I work and services as listed in paragraph 7 and make submittals as specified in paragraph 8. The following additional instructions apply to the respective submittals. * *

(1) Preinvestigation.

(a) The work progression and data management plan shall be assembled in one document.

(b) Distribution of the preinvestigation submittal will be made by the A-E directly to the reviewing offices with the required number of copies as indicated on the Design Document Distribution Listing.

(2) Site Investigation Report.

(a) The Site Investigation Report shall

contain all data compiled as a result of the field activities. Conclusions and recommendations will also be presented in this submittal.

(3) Draft Remedial Design.

(a) The Draft Remedial Design shall be assembled as one document which shall include, but not be limited to, all information gathered during the site investigation, all analytical results, a discussion on environmental concerns, and a design to remediate the site.

(b) Distribution of the Draft Remedial Design submittal will be made by the A-E directly to the reviewing offices with the required number of copies as indicated on the Document Distribution Listing.

(c) The Draft Remedial Design review conference will be held at Fort Drum. Key persons involved with the project must be available to attend as well as the A-E Project Manager.

(4) Draft Final Remedial Design.

(a) The Draft Final Remedial Design shall address comments generated during the review of the Draft Remedial Design addressed and the Draft Final Remedial Design modified accordingly.

(b) Distribution of the Draft Final Remedial Design submittal will be made by the A-E directly to the reviewing offices with the required number of copies as indicated on the Document Distribution Listing.

(5) Final Remedial Design.

(a) The Final Remedial Design shall reflect comments generated during review of the Draft Final Remedial Design.

(b) The Final RD submittal will be made by the A-E directly to the reviewing offices with the required number of copies as indicated on the Document Distribution Listing.

(6) Cost Estimate.

(a) A cost estimate for the remedial action will be prepared.

10. GENERAL REQUIREMENTS AND STANDARDS:

a. Project Manager:

(1) The A-E shall assign a principal or key employee to serve as the Project Manager. The Project Manager shall oversee the coordination of the entire project design and shall be capable of administering all instructions from the Kansas City District Office and obtaining answers to all questions from the Kansas City District Office during and after RI work.

(2) During the prosecution of the work under the contract, the A-E shall keep in close liaison with the Corps of Engineers' Design Project Manager, who will coordinate work with all other agencies. All requests made to the A-E by other agencies shall be referred to the CE PM.

(3) All written comments transmitted to the A-E shall be annotated and returned to the CE. Annotated comments shall be resolved to the satisfaction of the CE.

b. Review of Progress and Technical Adequacy: At appropriate times, representatives of the Contracting Officer may review the progress and technical adequacy of the work. Such review will not relieve the A-E from performing all contract requirements, except as may be waived by written instruction.

Del * *

c. Data, Information, and Services to be Furnished by the Government:

(1) Previous site investigation records.

(2) Applicable Engineer Manuals (EM's), Technical Manuals (TM's), Engineering Regulations (ER's), and Engineering Technical Letters (ETL's).

(3) Applicable Guide Specifications.

(4) Applicable standard drawings.

(5) Liaison with State Regulatory Agencies.

(6) Blank mylar drawing sheets with A-E title block and borders.

(7) Instruction on preparation of Government estimates.

(8) Other documents so indicated in the Documents

Listing.

d. Environmental Permits:

(1) The A-E shall ensure that the project is in full compliance with the requirements of the Federal, state, and local clean air, clean water, and solid waste disposal standards, and the Federal Endangered Species Act. All applicable standards and criteria shall be obtained and reviewed by the A-E. the A-E shall identify, in the Design Analysis, all required permits and compliance requirements.

(2) If in the course of performing the RD the A-E is required to obtain a permit which requires a fee, the A-E shall pay such a fee and obtain a receipt thereof. The expenditures covering such fees shall constitute a reimbursable item under this contract and the A-E, upon presentation of a voucher thereof, duly supported by proper receipt attached thereto, shall be reimbursed for the full amount thereof.

e. Verification of Existing Conditions: The A-E is responsible for making the necessary field visits to assess existing conditions and to obtain such detail information as is required to complete the RI.

f. Conferences:

(1) The A-E shall be represented by personnel familiar with all aspects of the work submitted.

(2) The A-E shall be responsible for taking notes and preparing the minutes for all conferences. Conference minutes will be prepared in typed form, signed by the A-E Project Manager, and submitted in triplicate to the CE Project Manager within five (5) days after date of the conference.

(a) These minutes shall include the date, place, and a list of attendees, including organization and telephone number. Comments made during the conference, or decisions affecting criteria changes, must be recorded in the basic conference minutes. Any augmentation of written comments should be documented by the conference minutes.

(b) All written comments transmitted to the A-E by the CE Project Manager shall be annotated and attached to the minutes with the conference action noted. Conference action shall be "A" for an approved comment, "D" for a disapproved comment, "W" for a comment which has been withdrawn, and "E" for a comment that has an exception noted. Functional/criteria comments annotated "F" are mandatory and must be included in the project documents.

Technical comments annotated "T" are provided for consideration. Indicate comments not incorporated and provide a brief explanation for rejection. Annotated comments shall be resolved to the satisfaction of the Corps of Engineers.

g. Confirmation Notices: The A-E will be required to provide a record of all discussions, verbal directions, and telephone conversations participated in by the A-E and/or his representatives on matters relative to this contract and work, irrespective of whom the other participants may have been. These records, entitled "Confirmation Notices," will be numbered sequentially and shall fully identify participating personnel, subject discussed, and any conclusions reached. The A-E shall forward a reproducible copy of the confirmation notices on a biweekly basis to the Corps of Engineers Project Manager.

h. Project Records: At the request of the Government, at the completion of the project, the A-E shall provide a complete set of project records including add correspondence, memorandums, trip reports, confirmation notices, sampling plans, test results, submittals, photographs, and any other records or documents generated as a result of the project.

i. Notification of Site Visits: The A-E shall notify the CE Project Manager at least 10 days prior to site visits if possible or immediately upon decision to visit the site. Confirmation of site visits shall be made immediately prior to the site visits. Notification by phone is sufficient.

11. METHOD OF PAYMENT: Payment for work and services will be made in accordance with the following procedures:

a. Partial Payments: The A-E shall prepare and submit to the U.S. Army Engineer District, Kansas City, partial payment estimates in accordance with "Instructions for Completion of ENG Form 93." All partial payments shall be based on work completed as of the 15th day of the report month and shall be submitted to the office of the Contracting Officer by the 18th day of the month. The U.S. Army Engineer District, Kansas City, will prepare supporting payment documents after obtaining necessary approvals and forward all documents to the U.S. Army Engineer District, Omaha, for issuance of the payment check. All questions regarding payments shall be directed to the U.S. Army Engineer District, Kansas City. Payment under this contract, for which property or services are provided in a series of partial executions or deliveries, will be made within 15 days after receipt of an invoice which has been properly executed by the A-E, approved by the Contracting Officer, and received at the paying office.

b. Additional Conferences: Payment for furnishing the services of technically qualified representatives to attend additional conferences, when so requested in writing by the Contracting Officer, will be made at a rate per hour for the discipline involved plus travel expenses computed in accordance with Government Joint Travel Regulations in effect at the time travel is performed and actual cost of transportation. Payment for attending additional conferences shall be made after submittal of a separate ENG Form 93, which shall not be assigned a partial payment estimate number.

Del * *

12. ANALYTICAL METHODS. Analyses that will be conducted shall at a minimum include:

a. A search for volatile and semi-volatile organics at Range 18. * *

b. A search for barium, arsenic, selenium, chromium, cadmium, mercury, silver, phosphorous, and lead at both ranges.

c. A search for Polynuclear Aromatic Hydrocarbons at both Ranges.

Del * *

13. BORING, WELL, AND MONUMENT LOCATIONS.

a. Location Surveys. A 3.5 inch diameter, domed survey marker, (cap) composed of brass, bronze or aluminum alloy shall be permanently set in the concrete pad surrounding each well. Each survey marker shall be stamped with the following data by using steel dies that are a minimum of 1/8 inch tall:

USA-EDH, Huntsville, AL.
Identification Number or Name.
Month and Year Established.
Final Adjusted Coordinates.
Final Adjusted Elevation.

Coordinates and elevations shall be established for each monitoring well and soil boring. The coordinates shall be to the closest 0.1 foot and referenced to the State Plane Coordinate System. If the State Plane Coordinate System is not readily available, the existing local grid system shall be used. Elevations to the closest 0.01 foot shall be provided for the survey marker and the top of the casing at each well. These elevations shall be referenced to the National Geodetic Vertical Datum of 1929. If the the 1929 Datum is not readily available, the existing local vertical datum shall be used.

b. The location, identification, coordinates and elevations of the points shall be plotted on suitable maps to show their location with reference to all the surface features within the topo area. A tabulated list of the monitoring wells and monuments including their coordinates and elevations, all field books, and all computation sheets shall be prepared and submitted to the Huntsville Division (HND), ATTN: HNDED-CS. The tabulation shall consist of the designated number of the well or monument, the X and Y coordinates, and all the required elevations. These items shall be submitted to HND no later than the Draft Report Submission.

14. SAMPLING: Samples collected and prepared in the field shall include: ground water samples, soil samples, and field control samples, as described in succeeding paragraphs. All sample collections and subsequent sample handling procedures shall be in accordance with the Sampling/Analysis - QC/QA plan and with applicable EPA requirements. When arranging the schedule for sample collection, the A-E shall coordinate with CEMRD-ED-L and with the designated QA laboratory not less than 5 days before sampling, to assure that the laboratory is alerted to receive the QA samples and process them within the time limits specified by applicable EPA regulations and guidelines.

a. Ground Water Samples. Each of the ground water monitoring wells shall be sampled once. Should an organic phase amounting to 1% or more of the total sample withdrawn be observed, this phase should be separated from the aqueous phase and the CO contacted for further instructions. Should an organic phase be observed amounting to less than 1%, this phase is to be included with the aqueous phase in all samples. In addition, certain field control samples shall be prepared as described.

(1) Preparation. 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 and gravel pack. If the well does not recharge fast enough to permit removing five casing volumes, the well shall be pumped or bailed dry, and sampled as soon as sufficient recharge has occurred.

b. Soil Samples. Representative soil samples shall be collected and analyzed from sample locations determined by the A-E. In addition, one soil sample shall be collected in an area presenting the least potential for contamination and shall be used as a "background" soil sample. The samples shall be collected and analyzed using techniques and equipment described in the sampling

and analysis plan.

DOCUMENT DISTRIBUTION LISTING

	DRAFT	DRAFT FINAL	FINAL
Commander U.S. Army Engineer District, Kansas City ATTN: CEMRK-ED-TD (Linda Houston) 601 E. 12th Street Kansas City, MO 64106	3	3	3
U.S. Army Corps of Engineers Department of the Army ATTN: CEEC-B Pulaski Building Washington, DC 20317	1	1	1
U.S. Army Corps of Engineers Missouri River Division ATTN: CEMRD-ED-EA (Claudia Wiethop) 2945 South 132nd Street Omaha, NE 68144	3	3	3
U.S. Army Corps of Engineers Missouri River Division Laboratory ATTN: CEMRD-ED-GL (Joseph Solsky) 420 S. 18th Street Omaha, NE 68101	1	1	1
U.S. Army Corps of Engineers North Atlantic Division ATTN: NADCO-CE (Charles Feinberg) 90 Church Street New York, NY 10007-9998	1	1	1
Commander Army Environmental Hygiene Agency ATTN: HSHB-ME-SE (Hoddinott) Aberdeen Proving Ground, MD 21021-5422	3	3	3
Commander U.S. Army Toxic & Hazardous Materials Agency ATTN: CETHA-IR-A (Alavi) Aberdeen Proving Ground, MD 21010-5401	1	1	1
Commander U.S. Army Toxic & Hazardous Materials Agency ATTN: CETHA-IR-A (McClellan) Aberdeen Proving Ground, MD 21010-5401	1	1	1

Commander, Fort Drum ATTN: AFZS-EH-E (Moss) Building T4000 Fort Drum, NY 13602-5097	2	2	2
Mr. Darrell Sweredoski Regional Hazardous Waste Remedial Engineer Department of Environmental Conservation State Office Building 317 Washington Street Watertown, NY 13601	2	2	2

In your cover letter to the above addressee's, please include the following sentence: "Please review and provide comments by (30 days) to Linda Houston, U.S. Army Corps of Engineers, Kansas City District, ATTN: CEMRK-ED-TD, 700 Federal Building, 601 East 12th Street, Kansas City, MO 64106-2896".

CRITERIA AND INSTRUCTION DOCUMENTS LISTING

*1. Scope of Work

*2. Previous Site Reports

*3. Health and Safety Guidelines List.

4. Interim Standard Air Monitoring Guide for Hazardous Waste Sites, June 1984.

*5. ER 1110-1-263, Chemical Quality Management - Toxic and Hazardous Wastes.

*6. Forms:

ENG Form 93 - Payment Estimate Form
ENG Form 4025 - Shop Drawing Transmittal Form
ENG Form 4026 - Shop Drawing Routing Form
ENG Form 150 - Cost Estimating Form
MRD Form 0691 - Comments Form

7. Guidance on Remedial Investigations under CERCLA, EPA/540/G-85/002, June 1985.

8. Guidance on Feasibility Studies under CERCLA, EPA/540/G-85/003, June 1985.

*9. "Chemical Quality Management Protocol for Evaluation of Contract Laboratories Providing Analyses for Superfund or DERA Projects," USACE.

10. Contract Laboratory Program, SOW for Organic Analysis, 10/86, USEPA.

*11. EM 1110-2-505, Guidelines for Preliminary Selection of Remedial Action for Hazardous Waste Sites, 2 September 1986.

12. "Characterization of Hazardous Waste Sites, a Methods Manual, Vol. III, Available Laboratory Analytical Methods," PB 84-191048, U.S. Department of Commerce, National Technical Information Service.

APPENDIX B
STATEMENT OF WORK
FROM
CDM FPC'S PROPOSAL

SECTION 1 - SCOPE OF WORK

REMEDIAL DESIGN OF EOD BURN SITES

INTRODUCTION

A. Description of Work

The work covered under this Scope of Work (SOW) involves the professional services necessary to complete a Remedial (RD) for the EOD Burn Sites at Fort Drum, New York. The following is to be accomplished as part of the project:

a. Perform a records review and evaluation.

b. Perform necessary site investigations to determine the nature and extent of contamination at the EOD Site. Prepare a Site Investigation Report.

c. Develop a Remedial Design (RD) package, including a cost estimate.

B. Description of Site

Two EOD Burn sites were used at Fort Drum.

1. Range 35 EOD Site

The U.S. Air Force operated one site to collect practice bombs from the Range 35 bombing area and burn them to destroy residual white phosphorous charges. This is the Range 35 EOD burn site and will be referred to as "R35EOD". R35EOD has operated from the early 1970s until 1988 when the practice of open pit burning was ceased. The practice bombs are composite units consisting of cast iron casings, aluminum (or plastic) fins and a 3-inch white phosphorous charge. The bombs are collected quarterly from the range and are deposited into an excavated trench (approximately 6 feet deep, 50 feet long and 10 feet wide) along with burnable dunnage (timber, waste wood, logs, etc.). Approximately annually, the trench was set on fire to assure destruction of any residual white phosphorous. The trench and all residual materials were then backfilled and a new trench excavated. R35EOD consists of a site bounded by fence and brush on three sides and a road on the fourth. Site access is via maintained road (asphalt and gravel) to within 2 miles of the site. The remaining 2 miles consists of a single lane, unimproved dirt road.

Work must be coordinated with the USAF unit operating Range 35 and will only be allowed during inactive periods. Typically, the range is inactive on Sunday, Monday, and Tuesday, only.

2. Range 16 EOD Site

The U.S. Army has operated an EOD burn site near Range 16 since at least 1940 (the "R16EOD" SITE). Two types of burning operations occurred at the site. A burn drum was used to destroy small ordnance (ammunition, hand grenades, rockets, etc.) from practice areas that did not explode upon use. A burn trench (similar to R35EOD) was also used for larger ordnance.

The R16 EOD comprises an area of 8 acres which is bounded by fence on all sides. The area of concern is approximately 6 acres. The area is covered with spent ammunition, spent rockets, and shrapnel which has landed on or near the ground surface. Other debris and spent ordnance has also been dumped at the site.

The site is approximately 10 miles from the center of the base of Ft. Drum and is accessed by gravel roads maintained by the Army. The last mile is over open ground. All work on site will be conducted with a representative of the base EOD unit present. Work will need to be coordinated in advance to assure that adjacent live fire ranges are inactive.

SCOPE OF WORK

Task 1. Preinvestigation

Pursuant to a meeting on August 1, 1989 between the Corps and CDM, CDM was directed to delete the following elements of the Preinvestigation defined in the RFP Work Scope.

- Prepare Site-specific Health & Safety Plan (SSHP)
- Prepare the Chemical Data Acquisition Plan (CDAP)
- Prepare a Monthly Report
- Prepare Monitoring Well Plan

These items will be prepared under a separate delivery order:

The revised Preinvestigation activities will consist of the following subtasks:

Subtask 1. Prepare Work Plan (WP)

This WP has been divided into two sections; Data Management and Work Progression. The Data Management section discusses the type of data which will be collected as part of this investigation and also outlines the procedures which will be used to reduce, store, and present the collected data. The Work Progression section details the technical approach, project schedules, and the overall management approach to track the progress chart of the site investigation.

The Work Plan will be submitted for approval prior to the start of work and, once submitted and approved, the work plan shall become an integral part of this scope of work.

For Costing purposes we have assumed the following:

Approximate size of WP: 30 pages
Number of versions: 2 (Draft and Final)
Number of WP Copies: 21

Subtask 2. Records Review and Evaluation (RRE)

CDM will review all background information pertinent to the facility, contamination and interim measures which were or are being undertaken at the facility provided by the Corps as of September 1, 1989. These data include any previous investigations or inspections and other relevant data. Should any data become available during the course of the project that significantly impact the work provided, CDM will address these in a letter to the Contracting Officer.

Data, Information, and Services to be Furnished by the Government:

(a) Previous site investigation records.

(b) Applicable Engineer Manuals (EM's), Technical Manuals (TM's), Engineering Regulations (ER's), and Engineering TechLetters (ETL'S).

(c) Applicable Guide Specifications.

(d) Applicable standard drawings.

(e) Liaison with State Regulatory Agencies.

(f) Blank mylar drawing sheets with A-E title block and borders.

(g) Instruction on preparation of Government estimates.

(h) Other documents so indicated in the Documents Listing.

Task 2. Draft Remedial Design

During a meeting on August 1, 1989, CDM was directed by the Corps to delete the preparation of a risk assessment for this project.

1. The revised services requested include:

(Subtask a) Site Investigation

(Subtask b) Site Characterization

(Subtask c) Site Investigation Report

(Subtask d) Draft Remedial Design

2. Approach

Two Documents for each site will be prepared for this task - a Site Investigation Report and a Remedial Design package.

The Site Investigation Report will include the following subtasks:

Subtask a. Site Investigation

General Assumptions

- All field work will be performed in good weather (Temperature greater than 35°F with wind chill and no snow on the ground).
- No data validation services are required per conversation with Linda Houston.
- All field work will be contracted with Level D Health & Safety protection.
- All samples will be shipped as low to medium hazard.
- COE will supply coolers and bottles with preservatives for split and blank samples required for COE QA review.
- Trip blanks will be submitted to the laboratory contracted by A-E.
- Ten percent of the total number of samples will be submitted as QC samples per conversation with L. Houston on August 15, 1989.
- All waste generated field activities will be drummed and will remain on site. Removal of this drummed waste will be part of the Remedial Action.
- Unless otherwise stated, work schedule shall be a standard 5 day work week with per diem paid on alternating weekends and trips home on the intermediate weekends.
- COE will expedite review and approval of pre-investigation submittals to assure commencement of field activities by mid-September 1989.

Prior to initiating any field work the following activities will be completed for mobilization of field activities:

- Confirm that COE has obtained access permission for sampling activities.
- Ensure that all sample analyses are scheduled through the COE Laboratory Program.
- Determine what type of equipment is needed and make sure the equipment is available.

- Obtain trip blanks and field blank water.

- Locate the Federal Express, Emery, or other overnight delivery service nearest the site and note its hours of operation. Determine whether the office will provide sample pick-up service.

- All equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling site). Different decontamination procedures are used for various types of equipment that perform the field activities. Decontamination stations will be established for all field activities.

Site-Specific Assumptions

- Both EOD areas will be scanned by base EOD personnel and both sites will be cleared of "live" bombs.

- One day will be spent with the EOD unit on base for ordnance safety training by the crew working on the EOD sites. (4 people).

- All practice bombs, fill and debris on the surface and in the trench area of the Air Force EOD Site will be removed from the area by Air Force personnel prior to field work.

- All field work will be performed only on Sunday, Monday and Tuesday of each week at the Air Force site.

- One EOD personnel will accompany the field crew at all times at the Army EOD site.

- Since the Army EOD site is an active impact area with small ordnance littering the entire site, the site investigation will only focus on the burn can where ordnance is burned and the trench area where the residue is disposed.

- Estimated Number of field days for both EOD sites is 6.

Site Investigation Subtasks will include:

1) Magnetometer Survey

Per L. Houston's request on August 15, 1989, a magnetometer survey of the entire area at each site shall be performed to determine the location and depth of buried ordnance instead of a ground penetration radar scan. The purpose of the survey is to determine the probable extent of buried ordnance and to locate areas where wells can be installed safely.

2) Survey and Topographic Mapping

The Air Force EOD Site is approximately 200' by 200'. The

survey area will be 50' beyond the perimeter. The survey area for the Army EOD Site will be 8 acres. Both maps will be at a scale of 1' = 10' with a two-foot contour interval. Each 10-foot contour interval shall be indicated with a bold line. The maps will be referenced to the State Plane Coordinate Systems and to the National Geodetic Vertical Datum. All surface and below ground features within the area to be surveyed are to be shown and identified on the maps. The work also entails surveying the locations and elevations of all new monitoring wells after drilling and development of these wells are completed.

3) Hydrogeological Site Characterization

Monitoring wells will be installed to identify and characterize the upper most aquifer and potential contaminant pathways. Data/information will be collected from past studies to support the placement of wells capable of determining the impact of the facility on the uppermost aquifer.

EOD Air Force

Number of wells: 4
Location of wells: Along perimeter of site
Depth of wells: 25' (screen upper portion of water table)
Rationale: Little data is known about the groundwater characteristics at this site. USGS geological maps indicate thin clay cover over bedrock in this area. Cover may range from a few feet to 25 feet. Wells are located to define hydrologic characteristics and determine extent of contamination.

EOD Army

Pursuant to a meeting with the Corps on August 1, 1989, no groundwater investigation will be performed at the EOD-Army Site.

4) Ground Water Sampling and Analysis

Prior to sampling, the elevation of the potentiometric surface in any monitoring well will be determined. In cases where imiscible contamination is found during the characterization, water level measurements will be adjusted to reflect its true elevation. Also, the groundwater flow paths based on data obtained from groundwater monitoring wells installed upgradient and downgradient of the potential contaminant source will be identified.

A groundwater investigation will be identified to characterize the distribution of contamination at the sites.

For costing purposes we have assumed the following:

Number of Samples: 4
Number of QA Samples: 1
Total Number of Samples: 5
Sampling and analysis program: 1 set of samples
Chemical analytes and analysis: See Table 1
Rationale: Since no data is available on the sites, full scans will be done to determine the presence of toxics in the groundwater. Only one set of samples will be taken for characterization purposes.

5) Soil Sampling and Analysis

A program will be conducted to characterize the soil and rock units and characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release(s). The investigation will include but not be limited to a description of the vertical and horizontal extent of contamination, descriptions of contaminant and soil chemical properties within the contaminant source area and plume (i.e., leachability and exchange capacity).

For costing purposes we have assumed the following for chemical analysis:

Number of Samples for Chemical Analysis: 10
Number of QA Samples for Chemical Analysis: 1
Total Number of Samples for Chemical Analysis: 11
Number of Samples for Geotechnical Analysis: 8
Sampling and analysis program: One set of samples
Chemical analytes and analysis:
Chemical Analysis - See Table 1
Geotechnical Analysis -
1. Grain-size distribution (ASTM-D 421 & 422)
2. Atterburg limits (ASTM-D 423 & 424)
3. Moisture content (ASTM-D 2216)

Rationale: Two soil samples will be collected from each well. This will enable us to determine the vertical extent of contamination. In addition, two surface soils will be collected from the trench at the Air Force EOD site. No surface samples will be collected at the Army EOD site due to the extent of shrapnel and rocket debris.

6) Surface Water Samples and Analysis

An investigation will be conducted to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation will include determination of the impact of the contaminants in the stream(s).

For costing purposes we have assumed the following:

Number of Samples: 2
Number of QA Samples: 0
Total Number of Samples: 2
Sampling and analysis program: 1 set of samples
Chemical analytes and analysis: See Table 1
Rationale: Two surface water samples of the standing water in the trench at the Air Force EOD site will be taken to determine characteristics of the water. No surface water was discovered at the Army EOD site.

7) Residue Samples and Analysis

An investigation will be conducted to characterize contamination in the residue in the disposal trench and the burn can at the Army EOD site. The investigation will include determination of whether the residue has hazardous waste characteristics.

For costing purposes we have assumed the following:

Number of Samples: 6
Number of QA Samples: 1
Total Number of Samples: 7
Sampling and analysis program: 1 set of samples
Analytes and Analysis: See Table 2
Rationale: Samples of the residue will be collected to determine if the residue has hazardous waste characteristics. This analyses will determine the ultimate disposal method which will be incorporated in the remedial design.

Subtask b. Site Characterization

1. Requested Services

All available site information including sampling results obtained during the Site Investigation will be used to characterize the physical characteristics of the site and the nature and extent of contamination.

2. Approach

The available data will be used to address the following:

a. Identification of contaminants.

b. Volume, physical, and chemical characteristics at the Site.

c. Hydrogeological characteristics of the Site.

d. Direction and gradient of ground water flow.

e. Total thickness of site overburden and thickness of unsaturated zones.

f. Elevation of site bedrock surfaces.

g. Maps illustrating suggested distribution of groundwater and oil contaminants.

h. Current use of ground water and surface water in the area.

i. Potential for migration of contaminants from the sources surrounding the site.

j. Brief comparison of contaminants and the levels to the Federal MCLs and the following New York State regulations:

Ground Water

New York State Water Quality Regulations - Ground Water Classifications and Standards (6 NYCRR Part 700-705)

New York State Sanitary Code
Drinking Water Supplies (10NYCRR Subpart 5-1)

Surface Water

New York State Pollution Discharge Elimination System (SPDES0) (6NYCRR Parts 750-757 and 701.5) and Technical and Operational Guidance Series (TOGS1.1.1)
Ambient Water Quality Standards and Guidance Values.
New York Water Quality Regulations -
Surface Water Classifications and Standards (6NYCRR Part 608)

Subtask c. Site Investigation Report (SI)

1. Requested Services

The Site Investigation Report shall contain all data compiled as a result of the field activities. Conclusions and recommendations will also be presented in this submittal.

2. Approach

The report will be prepared to address each of the issues/conditions investigated during the field site investigation activities.

Approximate Size of SI Report: 100 pages
Number of Versions: 2 (Draft and Final)
Copies of SI Required: 21 (per version)

Number of meetings to review and finalize: 3

Subtask d. Draft Remedial Design Package

1. Requested Services

The Draft Remedial Design will include preparation of the following:

a) Construction drawings.
b) Technical Specifications
c) Cost Estimate

2. Approach

A design package will be prepared to remove the residual debris remaining at each of the previously defined EOD sites.

3. Assumptions

- o Drawings will be prepared on COE supplied blank myler drawing sheets.
- o No groundwater treatment will be required.
- o Remedial action will consist of soil, ordnance and burn can removal.
- o The following drawings will be included with each package:
  - Cover Sheet/Index
  - Vicinity Map/Location Map
  - Site Plan (each site)
  - Grading & Drainage Plan (each site)
  - Cross Sections of Excavation and Fill (each site)
  - Security Plans & Details (each site)
  - Environmental Protection Sheet (each site)
  - Miscellaneous Details (each site)
- o The Remedial Design will not be prepared according to EPA Guidelines for Remedial Design Packages
- o A Chemical Data Management Specifications Plan shall be prepared
- o Specifications will be prepared using COE guide specs

o Cost Assumption

- Drawings

  No. of Sheets: 16 at 24" x 36"
  No. of Submittals: 1
  Copies of Set: 30

- Specifications/Cost Estimate

  No. of Sheets: 75
  No. of Submittals: 1
  No. of copies: 21

- Meetings at Fort Drum: 1

Task 3. Draft Final Remedial Design

1. Requested services

   (a) Submit Draft Final Remedial Design.

2. Approach

   The Draft Final Remedial Design shall address comments generated during the review of the Draft Remedial Design and modify the Draft Remedial Design accordingly.

3. Assumptions

   - Drawings

     No. of Sheets: 16 at 24" x 36"
     No. of submittals: 1
     Copies of set: 30

   - Specifications/Cost Estimate

     No. of Sheets: 75
     No. of Submittals: 1
     No. of Copies: 21

   - Meetings at Fort Drum: 0

Task 4. Final Remedial Design

1. Requested services

   (a) Submit corrected Final RD.

2. Approach

   The Final Remedial Design shall reflect comments generated during the review of the Draft Final Remediation.

3. Assumptions

- Drawings

  No. of Sheets: 16 at 24" x 36"
  No. of submittals: 1
  Copies of set: 30

- Specifications/Cost Estimate

  No. of Sheets: 75
  No. of Submittals: 1
  No. of Copies: 21

- Meetings at Fort Drum: 0

TABLE 1

CHEMICAL ANALYSES

Range 35

Barium
Arsenic
Selenium
Chromium
Cadmium
Mercury
Silver
Lead
Phosphorus
Polynuclear Aromatic Hydrocarbons

Range 18

Method 8240 Volatile Organics
Method 8270 Semivolatile Organics
Barium, EP Toxicity
Arsenic, EP Toxicity
Selenium, EP Toxicity
Chromium, EP Toxicity
Cadmium, EP Toxicity
Mercury, EP Toxicity
Silver, EP Toxicity
Lead, EP Toxicity
TNT
DNT
RDX
HMX
Tetryl
TNB
PCBs
Pesticides
Herbicides