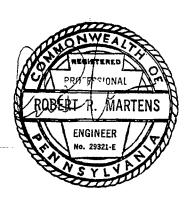
FINAL CONSTRUCTION SPECIFICATIONS

CAP CONSTRUCTION AND FLOOD RETENTION BASIN HAZARDOUS WASTE CLEAN-UP MILLCREEK SUPERFUND SITE ERIE COUNTY, PENNSYLVANIA

U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT CONTRACT NO. DACW45-89-C-0190 PROJECT 0285-33-2

NOVEMBER 1991



MALCOLM PIRNIE, INC.

S-3515 Abbott Road
P. O. Box 1938
Buffalo, New York 14219

0285-33-2101

APPENDIX B MODIFICATIONS

The following modifications/deletions are to be incorporated into the Final Construction Specifications included with Appendix B to the Order:

- 1. Delete the term "Contracting Officer" and substitute therefore "U.S. Environmental Protection Agency."
- 2. The term "Contractor" shall mean the Respondents and/or their contractor(s).
- 3. Delete all references to the "Chemical Quality Control Plan."
 A "Quality Control Plan" shall be developed and submitted in accordance with the Order.
- 4. Section 01100 (Special Clauses) delete entire section except for the following Clauses:
 - 1. Commencement, Prosecution, and Completion of Work.
 - 5. Physical Data.
 - 7. Availability of Utility Services.
 - 18. Daily Work Schedules.
 - 20. As Built Drawings.
 - 25. Accomodations for Government.
- 5. Section 01110 (Measurement and Payment) delete in its entirety.
- 6. Section 01150 (Special Project Procedures) delete Clause 3.6 (Submittal Register) and Clause 3.7 (Contractor Quality Control).
- 7. Section 01200 (Construction General) delete the following Clauses:
 - 16. Purchase Orders.
 - 17. Progress Charts.
 - 18. Project Sign.
 - 23. Submittals.
 - 24. Payment.

- 8. Section 01350 (Chemical Quality Management) delete in its entirety.
- 9. Section 01600 (Project Record Documents) delete Clause 5 Reference Library.
- 10. The following paragraphs of Section 02212 (Excavation, Handling and Disposal of Drummed and Contaminated Materials) are MODIFIED and now read:
 - 2.3. Any material determined, in accordance with paragraph 6.4. (Hazardous Waste Determination), to be hazardous waste as defined at 40 C.F.R. § 260.10.

6.4. HAZARDOUS WASTE DETERMINATION.

- 6.4.1. Except for hazardous waste determination, the referenced drum handling procedures list all necessary parameters to be tested to achieve the above objectives. The Contractor shall characterize and determine whether the waste is a hazardous waste, as defined at 40 C.F.R. § 260.10, or a non-hazardous waste.
- 6.4.2. The Contractor shall perform a determination in accordance with 40 C.F.R. Part 268 on all wastes shown to be hazardous under Section 6.4.1.
- 6.4.3. A copy of the characterization results, along with the Contractor's Hazardous/Non-Hazardous waste determination shall be submitted to the Contracting Officer prior to removing the material from the site.
- 11. If the event of conflict between the terms of the Order and the terms of Appendix B, then the terms in the Order shall govern.

FINAL TECHNICAL SPECIFICATIONS CAP CONSTRUCTION AND FLOOD RETENTION BASIN MILLCREEK SUPERFUND SITE ERIE COUNTY, PENNSYLVANIA BASIS - CORPS OF ENGINEERS - OMAHA DISTRICT INDEX OF GUIDE SPECIFICATIONS FOR MILITARY CONSTRUCTION AS OF 10/18/90

SPEC Number	TITLE	LEAD Date	SECTION
DIVISION 01	- GENERAL REQUIREMENTS		•
01010	Summary of Work		
01015	Contractor's Use of Site		
01020	Pre-Construction and Pre-Work Conference		
01021	Progress Meetings		
01100CW	Special Clauses (Civil Works)	Jun 90	Specs
01110	Measurement and Payment		
01150	Special Project Procedures		_
01200CW	Construction General (Civil Works)	Dec 88	Specs
01300CW	Environment Protection (Civil Works)	Dec 88	Specs
01310	Dust Control		
01320	Spill and Discharge Control		
01350	Chemical Quality Management		
01420	Vehicle and Bulky Debris Decontamination		
01430	Security		
01460	Safety, Health and Emergency Response		
01470	Requirements		
01470	Regulatory Requirement		
01510	Surveys for Record Drawings		
01520	Project Photographs As-Built Drawings		
01600	Project Record Documents		
01700	Demobilization and Project Closeout		
01700	Site Maintenance Plan		
01800	Site nathtenance Fian		
DIVISION 02	2 - SITE WORK		
02100	Clearing and Grubbing	Jun 88	Civil
02110	Bulky Debris Disposal		
02201	Excavation, Filling and Backfilling	Oct 89	Bldg
00010	for Structures		
02210 02212	Grading Type of the second se	Aug 90	Civil
02212	Excavation, Handling and Disposal of Drummed and Contaminated Materials		
	Drummed and Contaminated Materials		

SPEC Number	TITLE	LEAD DATE	SECTION			
02215CW	Geotextiles Used as Filters (Civil Works)	Dec 88	Specs			
02221	Excavation, Trenching, and Backfilling for Utilities System	Oct 89	Envir			
02222 02223	Gabion Mattresses					
02230	Riprap and Bedding Material Maintenance Access Road					
02241	Crushed-Aggregate Base Course	Jul 90	Civil			
02245	Topsoil Cap					
02250 02275	Synthetic Channel Liner Geotextile for Paved Areas	Oct 89	Civil			
02410	Subdrainage System (Toe Drain)	Jan 89				
02430	Storm-Drainage System	Jan 89				
02444	Chain Link Security Fence and Gates	Jan 89				
02480	Seeding	Jan 89				
02490	Trees, Shrubs, Ground Covers, and Vines	Jan 89				
02551	Bituminous Interm and Surface Course	Mar 89	Civil			
02558	(Central Plant Hot Mix) Bituminous Tack Coat	Oct 89	Civil			
02559	Bituminous Prime Coat	Oct 89				
02671	Monitoring Wells	000 05	01111			
02672	Modifying/Abandoning Ground Water Monitoring	ng Device	s			
02713	Water Lines	Jan 89	Civil			
DIVISION O	3 - CONCRETE					
03300 03410	Concrete for Building Construction Precast Concrete Manholes and Drop Inlets	Jan 90	Bldg			
DIVISION O	4 - MASONRY - Not Used					
DIVISION O	5 - METALS					
05500	Miscellaneous Metal	June 87				
	6 - WOOD AND PLASTIC - Not Used					
DIVISION 07 - THERMAL AND MOISTURE CONTROL - Not Used						
	8 - DOORS AND WINDOWS - Not Used					
	9 - FINISHES - Not Used					
DIVISION 10 - SPECIALTIES - Not Used						
DIVISION 11 - EQUIPMENT - Not Used						
DIVISION 1	2 - FURNISHINGS - Not Used					
0285-33-2/	CD -ii-					

SPEC NUMBER

TITLE

LEAD

DATE SECTION

DIVISION 13 - SPECIAL CONSTRUCTION - Not Used

DIVISION 14 - CONVEYING EQUIPMENT - Not Used

DIVISION 15 - MECHANICAL - Not Used

DIVISION 16 - ELECTRICAL

Electrical - Distribution and Street Lighting System; Under-

ground

LIST OF APPENDICES

Appendix Description

Geotechnical Site Investigation Boring Logs

Vertical Control Grid Node Elevations

ZERO ACCIDENTS

SECTION 01010 SUMMARY OF WORK

INDEX

1. SCOPE

2. GENERAL REQUIREMENTS

3. MATERIALS AND EQUIPMENT

4. DESCRIPTION OF WORK ACTIVITIES

5. WORK TO BE PERFORMED

6. CONTRACTORS USE OF SITE

- 1. SCOPE. This section includes a brief description of the major construction activities included under this contract. Individual activities are more thoroughly described in subsequent sections of the Specifications. The Contractor shall be responsible for ensuring that sufficient equipment, labor, and materials, including health and safety and quality control provisions, are supplied to execute all work activities for final acceptance by the Corps, EPA, and the State of Pennsylvania.
- 2. GENERAL REQUIREMENTS. As minimum requirements, Contractor shall observe and follow all appropriate and relevant applicable procedures identified in applicable Federal, State, and local rules and regulations in conducting the work. Other applicable regulations not explicitly included in these Specifications shall be adhered to in conducting the work. The Contractor shall be responsible for contacting and informing the proper Federal, State, and Town of Millcreek agencies of the nature and timing of work on-site (including transportation of materials off the site for off-site disposal and schedule for hauling of clean fill to the site) and for securing all necessary and applicable permits required to construct the work covered by this contract.
- 2.1. EXISTING FEATURES. The Contractor shall protect and maintain survey and grid stakes, existing monitoring wells, fences, roads, and any other items as directed in the field by the Contracting Officer's representative against damage from equipment and vehicular traffic. Any damage shall be repaired by the Contractor at no expense to the Government.
- 2.2. UTILITIES. The Contractor shall protect utility lines or appurtenances that are to remain. Utility locations have been shown on the contract drawings based on public record information and have not been field verified. It is the Contractor's responsibility to locate or verify existing utilities onsite. Any damage shall be repaired by the Contractor at no expense to the Government. The State of Pennsylvania provides a construction alert system for utilities at 1-800-242-1776.
- 3. MATERIALS AND EQUIPMENT shall be provided in sufficient quantities for required construction activities. Materials and equipment shall not be stored or used in such a manner as to create unsafe conditions, and shall meet requirements of applicable codes and the approval of the Contracting Officer.
- 4. **DESCRIPTION OF WORK.** The project includes construction of the following: an earthen cap over a hazardous work site approximately 78.4 acres in area, a flood retention basin, a gravel covered perimeter access road, drainage channel improvements and security fence around the disposal site. During site grading, buried drums may be encountered. The Contractor will be required to carefully

exhume encountered drums, overpack them as necessary, stage and characterize the contents. Drums containing RCRA hazardous wastes will require off-site disposal at a secure permitted facility. Drums not containing RCRA hazardous waste will be reburied onsite. The Contractor is responsible for providing all analytical services, temporary facilities and related materials and equipment for the performance of the described work. In addition, the Contractor is responsible for maintaining the site (excluding the ground water extraction and treatment system) for a period of one year following acceptance of the job by the Corps of Engineers.

- 5. WORK TO BE PERFORMED. The major construction activities included are summarized below.
- 5.1. TEMPORARY SITE FACILITIES. Preparation and maintenance of temporary site facilities including Contracting Officer's office, security and communication operations, personnel and equipment decontamination facilities, and project signs during the performance period of the Contract, and removal of same at the completion of remedial activities.
- 5.2. TEMPORARY SITE UTILITIES. This provision includes the operation, and maintenance of all temporary site utilities including telephone, electricity, water, and sanitation.
- 5.3. SITE OPERATIONAL PLANS. Development and implementation of the following plans, as identified in subsequent sections of the specifications.
 - 5.3.1. Chemical Quality Control Plan.
 - **5.3.2.** Safety, Health, and Emergency Response Plan (SHERP).
 - 5.3.3. Security Plan.
 - 5.3.4. Environmental Protection Plan.
 - 5.3.5. Quality Control Plan.

The Contractor shall also develop and implement all other plans required under this Contract and under applicable Federal, State, and local laws.

- **5.3.6.** Drum and Contaminated Materials Handling Plan.
- 5.4. CLEARING AND GRUBBING. Activities associated with clearing and grubbing of the site and with removal and disposal of debris either on-site or off-site, as required.
- 5.5. CAP SYSTEM. Construction of an earthen cap system, including grading, compaction, importing fill soil and topsoil, turf establishment and perimeter access road.
- 5.6. FLOOD RETENTION BASIN. Construction of a flood retention basin, including grading, basin liner, erosion protection, dewatering systems, and discharge structure.
- 5.7 DRAINAGE CHANNEL IMPROVEMENTS. Activities associated with construction of on-site drainage channels to improve on-site drainage as well as drainage channel improvements to Marshall's Run.
- 5.8. ANALYTICAL SERVICES. Perform all specified and necessary sampling and testing of soil, air and water.
 - 5.9. SECURITY. Provide the necessary security for control of the site.
- 5.10. QUALITY CONTROL. Maintain a quality control program to ensure that all operations performed by the Contractor and all subcontractors are completed in accordance with the provisions of this Contract.
- 5.11. PROJECT CLOSEOUT. Activities include, but are not limited to, decontamination and removal of all Contractor and Contracting Officer equipment, removal of all temporary construction facilities as directed by the Contracting Officer, disconnection and restoration of all temporary utilities, and transfer

of all record, drawings, and other project-related material to the Contracting Officer.

5.12. All other activities to satisfactorily complete all work covered by the specifications, any drawings not specifically discussed but necessary for the project construction and final acceptance.

5.13. All other work required by the Contracting Officer under the terms

of this contract.

6. CONTRACTOR'S USE OF SITE.

6.1. SCOPE. The Contractor will not have complete and exclusive use of the site for execution of the work. He shall share the site with the Ground Water Treatment Plant Operator, in addition to the USEPA, the COE, and their designated representatives. Contractor is responsible for coordinating all his activities with the Contractor for the ground water treatment system and the various government agencies.

6.2. CONTRACTOR RESPONSIBILITY. The Contractor shall assume full responsibility for the protection and safekeeping of his equipment and materials

located on-site.

ZERO ACCIDENTS

SECTION 01015 CONTRACTOR'S USE OF SITE

INDEX

1. SCOPE

EXECUTION

- 2. GENERAL REQUIREMENTS
- 1. SCOPE. This section covers the Contractor's rights and responsibilities with respect to the use of the Project Site.

2. GENERAL REQUIREMENTS.

- 2.1. Written approval of Chemical Quality Control Plan; the Safety, Health, and Emergency Response Plan (SHERP); Environmental Protection Plan; and Site Security Plan are required in accordance with SECTION: SPECIAL CLAUSES prior to allowing work in the project site. Only upon approval by the Contracting Officer will the Contractor have access to the whole of the site, except for the areas occupied by the Contracting Officer's office.
- 2.2. No construction activity will be permitted until required submittals, if applicable, for that activity have been approved by the Contracting Officer as provided in the individual sections of these specifications.
- 3. **EXECUTION.** The Contractor shall assume full responsibility for the health and safety of all on-site personnel and the protection of all equipment and materials.

ZERO ACCIDENTS

SECTION 01020 PRE-CONSTRUCTION AND PRE-WORK CONFERENCES

INDEX

1. SCOPE

- 3. PRE-WORK CONFERENCE
- 2. PRE-CONSTRUCTION CONFERENCE
- 4. CONFERENCES RECORD
- 1. SCOPE. This section covers the conferences required after the Notice to Proceed but prior to commencing with construction.
- 2. PRE-CONSTRUCTION CONFERENCE. Within 5 working days after issuance of the Notice to Proceed, the Contractor shall meet with the Contracting Officer for Pre-Construction Conference. The purpose of this conference is to review submittal procedures, safety, quality control, payroll and labor relations, environmental protection, progress schedules, and payment and procurement of materials. The principal features of work will also be reviewed and any questions regarding the contract and work site will be addressed.

3. PRE-WORK CONFERENCE.

- 3.1. Within 30 calendar days after the Notice to Proceed and prior to intrusive site work and in accordance with SPECIAL CLAUSES, a Pre-Work Conference will be held between the Contractor and Contracting Officer or his representative. Attendance by the Contractor's superintendent, quality control personnel, safety personnel, and any major subcontractors' superintendents will be required.
- 3.2. The purpose of this conference is to further define the quality control system, to thoroughly review the CQCP and to develop a mutual understanding of the specific requirements established by the contract. The specifics of the Contractor's other submittals will also be discussed so the emergency procedures and health and safety requirements are understood by all those directly related to the site work. Other procedures will also be discussed and any required modifications will be explained.
- 3.3. PRE-WORK SUBMITTALS. At least 5 working days prior to the Pre-Work Conference, the Contractor shall submit 10 copies of the following as described in other sections of the specifications.
 - 3.3.1. Chemical Quality Control Plan (CQCP).
 - 3.3.2. Safety, Health, and Emergency Response Plan (SHERP).
 - 3.3.3. Environmental Protection Plan.
 - 3.3.4. Security Plan.
 - 3.3.5. Project Schedule.
 - 3.3.6. Quality Control Plan.
 - 3.3.7. Drum and Contaminated Materials Handling Plan.

These will be briefly reviewed to provide the Contracting Officer with a general understanding of the quality control (QC) system. The Contractor's schedule, particularly for the initial start-up period, will be discussed. Questions concerning the administrative requirements outlined during the Pre-Construction Conference or any other aspect of the project may also be addressed.

4. CONFERENCE RECORD. The Contractor shall take notes of each conference and, within 3 days, distribute copies of a summary of all pertinent matters arising from the two conferences. The conference and requirements regarding the Contractor quality control are discussed in SECTION: SPECIAL CLAUSES.

ZERO ACCIDENTS

SECTION 01021 PROGRESS MEETINGS

INDEX

1. SCOPE

4. ATTENDANCE

2. MINIMUM REQUIREMENTS

5. SUGGESTED AGENDA

- 3. GENERAL REQUIREMENTS
- 1. SCOPE. This section covers the required progress meetings which will be held at the project site.
- 2. MINIMUM REQUIREMENTS. The Contractor shall schedule and administer at least one progress meeting per week and such additional meetings as required by the Contracting Officer and as necessary to meet project needs. These meetings shall be held at the project site.
- 3. **GENERAL REQUIREMENTS.** The Contractor shall administer the following general requirements.
 - 3.1. Prepare agenda for meetings.
 - 3.2. Make physical arrangements for meetings.
 - 3.3. Preside at meetings.
 - 3.4. Record the minutes; include significant proceedings and decisions.
- 3.5. Reproduce and distribute copies of minutes within 3 days after each meeting to meeting participants and to parties affected by decisions made at the meeting. Furnish three copies of the minutes to the Contracting Officer.
- 4. ATTENDANCE.
 - 4.1. Contracting Officer or his representative.
 - 4.2. Contractor's superintendent.
 - 4.3. Contractor's Quality Control supervisor.
 - 4.4. Contractor's Safety Officer/Industrial Hygienist.
 - 4.5. Subcontractors as appropriate to the agenda.
 - 4.6. Suppliers as appropriate to the agenda.
 - 4.7. Others as appropriate.
- SUGGESTED AGENDA.
 - 5.1. Review and approval of minutes of previous meeting.
 - 5.2. Review of work progress since previous meeting.
 - **5.3.** Field observations, problems, conflicts.
- 5.4. Problems which impede construction schedule and proposed corrective actions.
 - **5.5.** Review of off-site delivery schedules.
 - 5.6. Corrective measures and procedures to regain projected schedule.
 - 5.7. Revisions to construction schedule.
 - **5.8.** Projected progress during succeeding work period.
 - 5.9. Coordination of schedules.
 - 5.10. Review submittal schedules; expedite as required.
 - 5.11. Maintenance of quality and safety standards.

5.12. Changes and substitutions.
5.13. Review proposed changes for effect on construction schedule and on completion date, and effect on other contracts of the project.
5.14. Other business as appropriate.

ZERO ACCIDENTS

SECTION 01100 SPECIAL CLAUSES

INDEX

1.	COMMENCEMENT, PROSECUTION, AND	16.	NONDOMESTIC CONSTRUCTION
	COMPLETION OF WORK		MATERIALS
2.	LIQUIDATED DAMAGES-CONSTRUCTION	17.	NOT USED
2A.	ORDER OF WORK	18.	DAILY WORK SCHEDULES
3.	CONTRACT DRAWINGS AND	19.	EQUIPMENT OWNERSHIP AND
	SPECIFICATION		OPERATING EXPENSE SCHEDULE
4.	SPECIFICATION SUBMITTALS PHYSICAL DATA	20.	AS-BUILT DRAWINGS
5.	PHYSICAL DATA		SIGN
6.	PAYMENT		NOT USED
		23.	
8.	UTILITY SERVICE INTERRUPTIONS		CONTRACTORS
8A.	DIGGING PERMITS AND ROAD CLOSING	24.	NOT USED
9.	LAYOUT OF WORK	25,	ACCOMMODATIONS FOR GOVERNMENT
	QUANTITY SURVEYS	26.	NOT USED
	VARIATIONS IN ESTIMATED QUANTITIES		CONTRACTOR PREPARED NETWORK
10B.	VARIATIONS IN ESTIMATED QUANTITIES		ANALYSIS SYSTEM (NAS)
	- SUBDIVIDED ITEMS	28.	TIME EXTENSIONS
11.	TIME EXTENSIONS FOR UNUSUALLY	29.	PERFORMANCE EVALUATION OF
	TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER	30.	PERFORMANCE OF WORK BY
12.	NOT USED INSURANCE REQUIRED EPA INDEMNIFICATION UNDER CERCLA		CONTRACTOR
13.	INSURANCE REQUIRED	31.	
13A.	EPA INDEMNIFICATION UNDER CERCLA	32,	NOT USED
		33.	NOT USED
14.	FIXED PRICE CONTRACT IDENTIFICATION OF EMPLOYEES	34.	PROFIT
	VEHICLE IDENTIFICATION	35.	NOT USED
15.	CONTRACTOR QUALITY CONTROL (cqc)	36.	NOT USED
	(-4-)	37.	NOT USED
		38.	APPLICABILITY OF DAVIS-BACON ACT
		39.	
		;	,,,,,

Attachments:

Project Sign Std. Details OD15-9A12 and OD15-9A24

Submittal Register (ENG Form 4288)
Transmittal Form (ENG Form 4025)
Construction Quality Control Daily Report Form

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK. The Contractor shall commence work under this contract within ten (10) calendar days after the date of receipt by him of Notice to Proceed, prosecute said work diligently, and complete the entire work, except seeding ready for use not later than 730 calendar days after receipt of Notice to Proceed. The time stated for completion shall include final cleanup of the premises.

0285-33-2/CD

1.1. START WORK. Evidence that the Contractor has started procurement of materials, preparation and submission of shop drawings, preparation of subcontracts, and other preparatory work will satisfy the requirement that work commence within ten (10) calendar days after receipt of Notice to Proceed. Therefore, work need not be commenced at the construction site within ten (10) calendar days. (based on FAR 52.212-3)

2. LIQUIDATED DAMAGES-CONSTRUCTION.

- 2.1. FAILURE TO COMPLY. If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$500.00 for each day of delay.

 2.2. CONTRACT TERMINATED. If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.
- 2.3. CONTRACT NOT TERMINATED. If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted. (based on FAR 52.212-5)
- 2.4. EXCEPTION TO COMPLETION TIME AND LIQUIDATED DAMAGES SCHEDULES. In case the Contracting Officer determines that seeding, and/or the specified maintenance thereof is not feasible during the construction period, such work will be excepted from the completion time and liquidated damages. This work shall be accomplished during the first seeding, period and the specified maintenance period following the completion date.
- 2.5. COMPUTING COMPLETION DATES FOR NON-WORK PERIOD. No work will be allowed at the construction site during the period November 30 through March 31 inclusive during respective construction seasons. The days in this period will be counted when computing the calendar days for completion of the work. The Contractor may perform work at the site during all or any part of this period upon the Contracting Officer's approval. No time extensions will be granted for delays during this period.
- 2A. ORDER OF WORK. Contractor shall submit proposed order of work for review and approval as a Category 2 Submittal with project schedule.

3. CONTRACT DRAWINGS AND SPECIFICATIONS.

- 3.1. SETS FURNISHED. Seven (7) sets of half-size bid drawings and specifications including amendments (except applicable publications incorporated into the Technical Provisions by reference) will be mailed to the Contractor when the Notice To Proceed is issued. The bid drawings as amended shall be utilized in the performance of the work until contract drawings (i.e., bid drawings that have been posted with all amendment changes) are mailed to the Contractor. Eleven (11) sets of contract drawings (4 sets full size and 7 sets half-size)will be mailed to the Contractor as soon as possible, but no later than sixty (60) days after Notice to Proceed. The work shall conform to the contract drawings, set out in the drawing index, all of which form a part of these specifications. The work shall also conform to the standard details bound or referenced herein.
- 3.2. NOTIFICATION OF DISCREPANCIES. The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify

the Contracting Officer of any discrepancies. Dimensions marked on drawings shall be followed in lieu of scale measurements. Enlarged plans and details shall govern where the same work is shown at smaller scales. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

4. SUBMITTALS.

- SUBMITTAL REGISTER (ENG FORM 4288). The Contractor will be furnished 4.1. one (1) set of ENG Forms 4288 at the preconstruction conference on which will be listed each item of equipment and material of each type for which fabricators drawings, and/or related descriptive data, test reports, samples, spare parts lists, O&M manuals, or other types of submittals are required by the specifications. Columns c through o of ENG Form 4288 will be completed by the Government. A copy of the ENG Form 4288 may be obtained by written request to CEMRO-ED-DI, 215 N. 17th Street, Omaha, NE 68102-4978. The Contractor shall complete columns p, q, and r within twenty (20) calendar days after the preconstruction conference and return six (6) completed copies to the Contracting Officer's Representative for approval. Dates entered in columns p and q shall not include mail or delivery time. The ENG Forms 4288 will become a part of the contract after approval. Six (6) additional copies of a revised ENG Form 4288 with column a, NAS ACTIVITY CODE, filled in shall be submitted with the completed network analysis system when a network analysis system is a contract requirement. Column b shall be left blank for use later to record the respective transmittal and item number indicated for the submittal items(s) listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025).
- 4.1.1. Scheduling. Drawings on component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) will be allowed on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals or resubmittals for such items.

4.1.2. Application to Contract. The approved submittal register will become a part of the contract and Contractor will be subject to requirements thereof. This register and the progress schedules shall be coordinated.

SUBMITTAL PROCESS. The Contractor shall submit all items listed on the contract drawings and listed or specified in the other sections of these specifications. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective addresses set forth below. Each submittal shall be complete and in sufficient detail for ready determination of compliance with the contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) Engineer and each respective transmittal form (ENG Form 4025) shall be stamped, initialed, and dated by the CQC Engineer certifying that the accompanying submittal complies contract requirements. Submittals shall include such items as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operation charts or curves; test reports; test cylinders; samples, O&M manuals including parts lists;

certifications; warranties and other such required submittals. Submittals pertinent to materials and equipment which are subject to advance approval shall be scheduled and made prior to the acquisition or the delivery thereof.

4.2.1. Categories of Submittals. The categories of items specified to be submitted shall be submitted as follows:

4.2.1.1. Category I. All items listed as Category I submittals in the various sections shall be mailed directly to the addressee shown below as directed.

Technical Reviewer

Commander
911th Tactical Airlift Group
U.S. Army Engineer District, Baltimore
Pittsburgh Resident Office
Attn: Gary Lang
P.O. Box 193
Pittsburgh International Airport
Bldg. 210, Room 108
Pittsburgh. PA 15231

Mailing address of Architect-Engineer Firm:
Malcolm Pirnie, Inc.
P.O. Box 1938
S-3515 Abbott Road
Buffalo, NY 14219

Each required submittal which is in the form of a drawing shall be submitted as one (1) reproducible and one (1) print of the drawing. Drawing prints shall be either blue or black line permanent-type prints on a white background or blueprint. Reproducibles shall be brownline diazo or sepia and shall be of such quality that prints made therefrom are sufficiently clear for microfilm copying. All catalog and descriptive data shall be submitted in eight (8) copies. Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is proposed for approval. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit.

4.2.1.2. Category II. Except as noted below, data for all items listed as Category II Submittals in the various sections shall be submitted in five (5) copies to the Area Engineer using the transmittal form. Items not to be submitted in quintuplicate, such as samples and test cylinders, shall be submitted to the Area Engineer accompanied by five (5) copies of the transmittal form.

4.2.2. Control of Submittals. The Contractor shall carefully control his procurement operations to assure that each individual submittal is made on or before the corresponding date scheduled on his approved "SUBMITTAL REGISTER."

4.2.3. Transmittal Form (ENG Form 4025). The sample transmittal form attached to this section shall be used for submitting both the Category I and Category II submittals, in strict accordance with the instructions on the reverse side thereof. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care should be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item. A separate transmittal form shall be attached to each copy of the data being submitted.

4.2.4. Approval Action.

4.2.4.1. Category I. All Category I submittals are subject to advance approval. No construction or installation shall be done on any item identified as Category I until all shop drawings for that item have been approved. Upon completion of review of Category I submittals, the drawing reproducible and print and other pertinent data will be identified as having received approval by being so stamped and dated. The drawing print and six (6) sets of all catalog data and descriptive literature will be retained by the Contracting Officer and the drawing reproducible and two (2) sets of catalog data and descriptive literature will be returned to the Contractor.

4.2.4.2. Category II. Submittals may be required for "Approval" or for "Information Only." Within the terms of the CONTRACT CLAUSES clause entitled "Specifications and Drawings for Construction," Category II submittals "for approval" are considered to be "shop drawings" and Category II submittals "for information only" are not considered to be "shop drawings." Two (2) copies of Category II submittals for approval will be returned to the Contractor except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor. Submittals for "Information Only" will not be returned to the Contractor. No Corps of Engineers' approval action will be required prior to incorporating these "Information Only" items into the work. These Contractor approved "Information Only" submittals will be used to verify that material received and used in the job is the same as that described in the plans and specifications and will be used as record copies. Delegation of this approval authority to the CQC Engineer does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Officer from requiring removal and replacement if nonconforming material is incorporated in the work. This obligation does not relieve the Contractor from the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

4.2.5. Meaning of Approvals. The approval of the submittals by the Contracting Officer or his authorized representative shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist as the Contractor, under the CQC requirements of this contract, is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work. After submittals have been approved by the Contracting Officer or his authorized representative, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an acceptable explanation as to why a substitution is necessary.

4.2.6. When Not Approved. The Contractor shall make all corrections required by the Contracting Officer or his authorized representative and promptly furnish a corrected submittal in the form and number of copies as specified for initial submittals. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the CONTRACT CLAUSES clause entitled "Changes" should promptly be given to the Contracting Officer.

4.2.7. Withholding of Payment. Payment for materials incorporated into the work will not be made if required approvals have not been obtained.

- 4.3. CERTIFICATES OF COMPLIANCE. Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements. (EFARS 52.2/9108(c))
- 4.4. PURCHASE ORDERS. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review.

4.5. EQUIPMENT ROOM DRAWINGS. NOT USED.

- 4.6. OPERATION AND MAINTENANCE INSTRUCTIONS AND/OR MANUALS. NOT USED.
- 5. PHYSICAL DATA. Pursuant to CONTRACT CLAUSES clause: "Site Investigation and Conditions Affecting the Work," information and data furnished or referred to below are furnished for general information only and the Government may not be held liable for any interpretation or conclusions drawn therefrom by the Contractor.
- 5.1. SOURCE OF DATA. The physical conditions indicated on the drawings and in the specifications are the result of site investigations by surveys .]
- 5.2. WEATHER. Weather conditions shall have been investigated by the Contractor to satisfy himself as to the hazards likely to arise therefrom. Complete weather records and reports may be obtained from the local U.S. Weather Bureau.
- 5.3. ACCESS ROUTES. Transportation facilities shall have been investigated by the Contractor to satisfy himself as to the existence of access highways and railroad facilities. (based on FAR 52.236-4)
- 5.4. CONCURRENT CONSTRUCTION. Work closely related to and/or located at the site of the work under this contract, including operation of the ground water treatment plant and any potential reworking of the treatment plant facility or extraction trenches will be in progress simultaneously with work under this contract. The locations of this concurrent work is shown on the drawings or

described in these specifications. The Contractor shall cooperate with others as necessary in the interest of timely completion of all work. In the event of interference, the Contracting Officer shall be notified immediately for resolution and his decision shall be final.

5.5. TELEPHONE SERVICE. NOT USED.

PAYMENT.

6.1. PROMPT PAYMENT ACT. Pay requests authorized in CONTRACT CLAUSES clause: "Payments Under Fixed-Price Construction Contracts", will be paid pursuant to the clause, "Prompt Payment for Construction Contracts". Pay requests will be submitted on ENG Form 93 and 93a, "Payment Estimate-Contract Performance" and "Continuation". All information and substantiation required by the identified contract clauses will be submitted with the ENG Form 93, and the required certification will be included on the last page of the ENG Form 93a, signed by an authorized contractor official and dated when signed. The designated billing office is the Office of the Area Engineer.

6.2. PAYMENTS FOR MODIFICATIONS. Payments may be made for cost bearing change orders within the scope of the contract only to the extent funds are authorized in the order on a two-part modification. Contractor pricing proposed must be submitted at the earliest possible time after the change order is issued, or at a specific time as directed by the Contracting Officer. At the discretion of the Contracting Officer, any and all payments may be withheld on the modification until the Contractor has submitted a qualifying price proposal, in as much detail as required by the Contracting Officer, and the final price has

been agreed.

- 6.3. PAYMENT FOR MATERIALS DELIVERED OFFSITE. In accordance with CONTRACT CLAUSES clause: "Payments Under Fixed-Price Construction Contracts," the Contracting Officer, at his discretion, may authorize material delivered to the Contractor at locations other than the site be taken into consideration in the preparation of payment estimates. Such materials delivered to the Contractor offsite will only be considered if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized in the work covered under this contract.
- 7. AVAILABILITY OF UTILITY SERVICES. The Contractor shall arrange with the local utility companies for electricity, water and gas required by him for construction under this project and shall pay all costs in connection therewith. Reasonable amounts of domestic water will be made available to the Contractor by the Government from existing system outlets and supplies. The Contractor shall meter the amount of water used by him, and such amount of water will be paid for by or charged to the Contractor. The Contractor shall, at his own expense, make all temporary connections and install distribution lines. The Contractor shall furnish to the Contracting Officer a complete system layout drawing showing type of materials to be used and method of installation for all temporary electrical systems. All temporary lines shall be maintained by the Contractor in a workmanlike manner satisfactory to the Contracting Officer and shall be removed by the Contractor in like manner prior to final acceptance of the construction.

UTILITY SERVICE INTERRUPTIONS.

8.1. ADVANCE NOTICE. The Contractor shall submit written notification not less than 5 working days in advance of each interruption of each utility and communication service to or within existing buildings and facilities being used

0285-33-2/CD

by others. No single outage will exceed 4 hours unless approved in writing. The time and duration of all outages will be coordinated with the Using Agency by the Contracting Officer.

8.2. OVERTIME WORK BY BASE OPERATING AND MAINTENANCE (0&M) PERSONNEL. NOT USED.

8.3. BURIED UTILITIES. The Contractor shall coordinate all excavation work including excavation for sign posts, fence posts, and utility poles with the local utility companies prior to beginning work.

BA. DIGGING PERMITS AND ROAD CLOSING. NOT USED.

9. LAYOUT OF WORK. The Contractor shall lay out his work from project established base lines and bench marks indicated on the drawings and shall make all measurements in connection therewith. The Contractor shall furnish all stakes, templates, platforms, equipment, tools, and materials and labor as may be required in laying out any part of the work from the base lines and marks established by the Government. The Contractor shall execute the work to the lines and grades established or indicated and shall maintain and preserve all stakes and other control points established by the Contracting Officer until authorized to remove them. If such marks are destroyed by or through negligence of the Contractor, prior to their authorized removal, they may be replaced by the Contracting Officer at his discretion and the expense of replacement will be deducted from any amounts due or to become due the Contractor. (based on FAR 52.236-17)

10. QUANTITY SURVEYS.

- 10.1. The Contractor shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during each period for which a progress payment is to be made. The Contractor shall also make original and final surveys. The Government will make such computations as are necessary to verify the quantities of work performed or finally in place. Unless waived by the Contracting Officer in each specific case, quantity surveys made by the Contractor shall be made under the direction of a representative of the Contracting Officer.
- 10.2. All original field notes, computations, and other records of the Contractor for the purposes of layout, original, progress, and final surveys shall be recorded in duplicating field books, the original pages of which shall be furnished promptly in ring binders to the representative of the Contracting Officer at the site of the work and shall be used by the Contracting Officer to the extent necessary in determining the proper amounts of progress and final payments. (based on FAR 52.236-16)
- 10A. VARIATIONS IN ESTIMATED QUANTITIES. Significant variations from the contract unit priced quantities shall be covered in accordance with the CONTRACT CLAUSES clause: "Variation in Estimated Quantity."
- 10B. VARIATIONS IN ESTIMATED QUANTITIES SUBDIVIDED ITEMS. The Variation in Estimated Quantities clause is applicable only to Items Nos. 4, 5, 13, and 14.

 10B.1. In order to permit the Contractor to distribute his indirect costs properly to Item(s) No.(s.) 4, 5, 13 and 14 these item(s) have been subdivided into two or more subitems. All the Contractor's indirect costs for each of these item(s) will be included in the bid price for the first subitem listed under the

respective item. Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.

10B.2. Where the actual quantity of work performed for Items Nos. 4, 5, 13 and 14 is less than 85 percent of the quantity of the first sub-item listed under such item, the Contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.212-11, Variation

in Estimated Ouantities.

10B.3. If the quantity of work performed under the second sub-item or any subsequent sub-item under Items Nos. 4, 5, 13 and 14 exceeds 115 percent or is less than 85 percent of the estimated quantity of any such sub item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.212-11, Variation in Estimated Quantities.

11. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER.

11.1. ANTICIPATED WEATHER DELAYS. This clause specifies the procedure for the determination of time extensions for unusually severe weather under the authority of the contract clause entitled "Default (Fixed-Price Construction)." The listing below defines monthly anticipated adverse weather for the contract period and is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the geographic location of the project.

MONTHLY ANTICIPATED ADVERSE WEATHER WORK DAYS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(*) (*) (*) (10) (10) (07) (08) (06) (08) (11) (*)

*Anticipate losing entire month to adverse weather.

11.2. WEATHER TIME EXTENSIONS.

- 11.2.1. Evaluation. The above schedule of anticipated adverse weather will constitute the base line for monthly (or portion thereof) weather time evaluations. Upon acknowledgement of the Notice to Proceed and continuing throughout the contract on a monthly basis, actual adverse weather days will be recorded on a work day basis (including weekends and holidays) and compared to the monthly anticipated adverse weather schedule above. For purposes of this paragraph, the term "actual adverse weather days" shall be scheduled work days impacted by adverse weather.
- 11.2.2. Determination. The number of actual adverse weather days shall be recorded monthly during the construction period. Once the number of anticipated adverse weather days in the schedule above have been exceeded, the Contracting Officer will examine the actual adverse weather days to determine whether the Contractor is entitled to a time extension. These actual adverse weather days must prevent work for 50 percent or more of the Contractor's workday, delay scheduled work critical to the timely completion of the project, and be documented in the Contractor Quality Control reports. The Contracting Officer will convert any delays meeting the above requirements to calendar days and issue a modification under the authority of the contract clause entitled "Default (Fixed-Price Construction.)"

- 11.3. THE CONTRACTOR'S SCHEDULE must reflect the above anticipated adverse weather delays on all weather dependent activities.
- IOWA SALES AND USE TAX. NOT USED.
- 13. INSURANCE REQUIRED. In accordance with CONTRACT CLAUSES clause: "Insurance Work on a Government Installation," the Contractor shall procure the following minimum insurance:

Type Amount

Workmen's Compensation and Employer's Liability Insurance

\$100,000

General Liability Insurance

\$500,000 per occurrence

Automobile Liability Insurance Bodily injury

\$200,000 per person and \$500,000 per occurrence

Property damage

\$ 20,000 per occurrence

(Coverages per FAR 28.307-2)

- 13A. INSURANCE LIABILITY TO THIRD PERSON COMMERCIAL ORGANIZATIONS. CONTRACT CLAUSES "EPA INDEMNIFICATION UNDER CERCLA - FIXED PRICE CONTRACT."
- 14. IDENTIFICATION OF EMPLOYEES. The Contractor shall furnish to each employee and require each employee engaged on the work to display, such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon release of any employees. When the contract involves work in restricted security areas, only employees who are U.S. citizens will be permitted to enter. Proof of U.S. citizenship is required prior to entry. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project. (based on FAR 52.236-7007)
- 14A. VEHICLE IDENTIFICATION. NOT USED.
- 15. CONTRACTOR QUALITY CONTROL (CQC). In conformance with the requirements of CONTRACT CLAUSES clause: "Inspection of Construction," the Contractor shall establish and maintain an effective Quality Control Program.
- 15.1. GENERAL. Except for isolated tests or other items of work specified to be performed by the Government, the quality of all work shall be the responsibility of the Contractor. Sufficient inspections and tests of all items of work, including that of subcontractors, to ensure conformance to applicable specifications and drawings with respect to the quality of materials, workmanship, construction, finish, functional performance, and identification shall be performed on a continuing basis. The Contractor shall furnish qualified personnel, appropriate facilities, instruments and testing devices necessary for the performance of the quality control function. The controls shall be adequate to cover all construction operations both on and offsite, shall be keyed to the

0285-33-2/CD

proposed construction sequence and shall be correlated by the Contractor's

quality control personnel.

15.2. PRECONSTRUCTION PLANNING. The Government will consider an interim CQC plan for the first days of operation. However, within ten (10) calendar days after the date of receipt by him of Notice to Proceed, and prior to starting onsite construction, the Contractor shall meet with the Contracting Officer and discuss the quality control requirements. During this meeting the Contractor shall submit for approval his proposed written QC plan which shall include all features outlined below. The proposed plan will be reviewed and the meeting shall develop mutual understanding relative to details of the system, including the personnel, facilities, forms, etc., to be used for the inspections, tests and the administration of the system. Minutes of the meeting shall be prepared by the Area Office Resident Engineer or Contractor as agreed to at the mutual understanding meeting and shall be signed by both the Contractor and the Contracting Officer or Contracting Officer's Representative. The minutes shall be implemented without written concurrence by the Contracting Officer.

15.3. ACCEPTANCE OF CQC PLAN. Acceptance of the Contractor's quality control plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations as necessary to obtain the quality

specified.

15.4. CONTRACTOR'S PROPOSED (QC) PLAN. The Contractor's proposed written quality control plan (for submittal at the mutual understanding meeting) shall include as a minimum:

15.4.1. The quality control organization.

15.4.2. Names, number, and qualification of personnel to be used for this purpose.

15.4.3. Authority and responsibilities of all quality control personnel.

15.4.4. Schedule of Use of inspection personnel by types and phase of work.

15.4.5. A list of preparatory and initial inspections to be performed shall be included as part of the Quality Control Program.

15.4.6. A list of tests specified to be performed with proposed test methods including specification paragraph number and names of technicians or qualified testing laboratory to be used.

15.4.7. Location and availability of test facilities and equipment.

15.4.8. Procedures for advance notice and coordination of special inspections and tests where required.

15.4.9. Procedures for reviewing all shop drawings, samples, certificates, or other submittals for contract compliance and certifying them for submission to the Government.

15.4.10. Method of performing, documenting, and enforcing quality control operations of both prime and subcontract work including inspection and testing both onsite and offsite. Include proposed forms for approval, and indicate who will prepare, sign, and submit the reports.

15.4.11. Responsibilities and procedures for correcting deficiencies.
15.4.12. A copy of a letter of direction to the Contractor's representative responsible for quality control, outlining his duties and

responsibilities, and signed by a responsible officer of the firm.

15.4.13. Method of documenting and tracking deficiencies and corrective actions.

- 15.5. CONTROL OF ON-SITE CONSTRUCTION. The Contractor's quality control program shall include four phases of inspection and tests. The Contracting Officer's representative shall be notified at least 24 hours in advance of each such test.
- 15.5.1. Preparatory Inspections shall be performed prior to beginning each feature of work on any on-site construction work. Preparatory inspections for the applicable feature of work shall include (i) review of submittal requirements and all other contract requirements with the foremen or supervisors directly responsible for the performance of the work; (ii) check to assure that provisions have been made to provide required field control testing; (iii) examine the work area to ascertain that all preliminary work has been completed; (iiii) verify all field dimensions and advise the Contracting Officer of any discrepancies; and (iiiii) perform a physical examination of materials and equipment to assure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand.
- 15.5.2. Initial Inspection shall be performed as soon as work begins on a representative portion of the particular feature of work and shall include examination of the quality of workmanship as well as a review of control testing for compliance with contract requirements.
- 15.5.3. Follow-up Inspections shall be performed as any particular feature of work progresses, to assure compliance with contract requirements including control testing, until completion of that feature of the work.
- 15.5.4. Safety Inspections. The Contractor shall perform daily safety inspections of the job site and the work in progress to assure compliance with EM 385-1-1 and other occupational health and safety requirements of the contract. Daily Quality Control reports as required under paragraph: REPORTING shall be used to document the inspection and shall include a notation of the safety deficiencies observed and the corrective actions taken. The Contractor shall use his designated Quality Control Staff to perform the required inspections and shall supplement the staff with additional personnel as required. Additional personnel shall be provided at no additional cost to the Government.
- 15.5.5. Recording Inspection Results. The results of all inspections shall be made a matter of record in the Contractor's Quality Control documentation as required by paragraph DOCUMENTATION below.
- 15.6. QUALITY CONTROL STAFF. In addition to the Contractor's job supervisory staff, a separate quality control group shall be provided. This group shall report to the Contractor's management at a level no lower than an executive of the company. As a minimum, the overall strength of the quality control group for this contract shall be as follows:
- approved, qualified engineer or technician whose sole responsibility is to ensure compliance with the contract plans and specifications. This person shall demonstrate ability to perform correctly the duties required to the satisfaction of the Contracting Officer and shall be physically at the project site whenever work is in progress and will be in charge of the Contractor's Quality Control program for this project. All the Contractor's submittals for approval shall be reviewed and modified or corrected as needed by the Quality Control Supervisory Engineer (or authorized assistants) and approved correct prior to forwarding of such submittals to the Contracting Officer.

15.6.2. NOT USED.

15.6.3. NOT USED.

15.6.4. For additional Quality Control Staff see SECTION: CHEMICAL QUALITY MANAGEMENT.

15.7. TESTS.

15.7.1. Testing Procedure. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. The Contractor shall procure the services of an industry recognized testing laboratory approved by the Contracting Officer, or may establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

15.7.1.1. Verify that testing procedures comply with

contract requirements.

15.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

15.7.1.3. Check test instrument calibration data against

certified standards.

15.7.1.4. Verify that recording forms, including all of the test documentation requirements, have been prepared.

15.7.2. Testing.

15.7.2.1. Capability Check. The Contracting Officer's Representative (COR) will have the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques.

15.7.2.2. Capability Re-Check. If the selected laboratory fails the capability check, the Contractor will be assessed the actual cost for the re-check as reimbursement to the Government for each succeeding re-check of the laboratory or the checking of a subsequently-selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

15.7.2.3. Project Laboratory. The COR will have the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

15.8. REPORTING. All inspections and test results shall be recorded daily.
15.8.1. Daily Submittals. The attached sample "Quality Control Daily Report" form or other approved form shall be reproduced and fully executed to show all inspections and tests and submitted in duplicate to the Contracting Officer's representative on the first work day following the date covered by the report.

15.8.2. Results of Tests. Triplicate copies of complete results of tests shall be submitted not later than 3 calendar days after performing the test.

15.9. COMPLETION INSPECTIONS.

15.9.1. Contractor's Quality Control Completion Inspection. Based upon the Contracting Officer's concurrence that the work is nearing substantial completion, and at least 14 days prior to pre-final inspection, the Contractor's Quality Control Inspection personnel shall conduct a detailed inspection. The Contracting Officer's Representative shall be notified of the inspection date in order that he may participate, if he so elects. The work shall be inspected for conformance to plans, specifications, quality, workmanship, and completeness. The Contractor shall prepare an itemized list of work not properly completed,

inferior workmanship, or not conforming to plans and specifications. The list shall also include outstanding administrative items such as-built drawings, 0&M Manuals, and spare parts. The list shall be included in the Quality Control documentation and submitted to the Contracting Officer with an estimated date for correction of each deficiency within five (5) working days after conducting this inspection.

15.9.2. Pre-Final Inspection. The Contractor's Quality Control aspection personnel, his superintendent, or other primary management person and the Contracting Officer's representatives will be in attendance at this inspection. Additional Government personnel, including but not limited to those from the Environmental Protection Agency, U.S. Army Corps of Engineers, Pennsylvania Department of Environmental Resource, and Millcreek Township Engineering staff may be in attendance. The prefinal inspection will be formally scheduled by the Contracting Officer based upon notice from the Contractor. This notice will be given to the Contracting Officer at least 14 days prior to the pre-final inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining contract work, will be complete and acceptable by the date scheduled for the prefinal inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection costs in accordance with the contract clause entitled, "Inspection of Construction." At this inspection the Contracting Officer will develop a specific list of incomplete and/or unacceptable work performed under the contract and will subsequently furnish this list to the Contractor. Failure of the Contracting Officer to detect and list all incomplete and/or unacceptable work during this inspection will not relieve the Contractor from acceptably performing all work required by the contract documents.

15.9.3. Final Acceptance Inspection. The Contractor's Quality Control Inspection personnel, his superintendent or other primary management person and the Contracting Officer's representative will be in attendance at this inspection. Additional Government personnel including, but not limited to, those from the Environmental Protection Agency, U.S. Army Corps of Engineers, Pennsylvania Department of Environmental Resource, and Millcreek Township Engineering staff may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon notice from the Contractor. This notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection costs in accordance with the contract clause entitled "Inspection of Construction".

15.10. DOCUMENTATION.

15.10.1. The Contractor shall maintain current records of quality control operations, activities, and tests performed including the work of suppliers and subcontractors. These records shall be on an acceptable form and indicate a description of trades working on the project, the number of personnel working, the weather conditions encountered, any delays encountered, and acknowledgment of deficiencies noted along with the corrective actions taken on

current and previous deficiencies. These records shall include factual evidence that required activities or tests have been performed, including but not limited to the following:

15.10.1.1. Type, number, and results of control activities

and tests involved.

15.10.1.2. Nature of defects and causes of rejection.

15.10.1.3. Proposed remedial action.

15.10.1.4. Corrective actions taken.

15.10.2. These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. Legible copies of these records shall be furnished to the COR daily.

15.11. ENFORCEMENT. The Contractor shall stop work on any item or feature, pending satisfactory correction of any deficiency noted by his quality control staff or by the Contracting Officer's representative. Construction shall not proceed upon any feature of work containing uncorrected work. Notations on quality control reports will not be acceptable as a substitution for other written reports by the Contractor if required under CONTRACT CLAUSES clause: "Changes," "Differing Site Conditions," or "Default (Fixed-Price Construction)."

15.12. NOTIFICATION OF NONCOMPLIANCE. The Contracting Officer will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

At the election of the Contracting Officer, no payment 15.13. PAYMENT. estimate will be processed under this contract until the entire Quality Control Plan has been approved or until overdue daily QC reports are properly executed

and furnished.

- NONDOMESTIC CONSTRUCTION MATERIALS. The requirements of this contract entitled Buy American Act Construction Materials do not apply to construction materials or their components included in the list set forth in paragraph 25.108 of the Federal Acquisition Regulation.
- NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (MAY 1986). NOT USED. 17.
- DAILY WORK SCHEDULES. In order to closely coordinate work under this contract, the Contractor shall prepare for and attend a weekly coordination meeting with the Contracting Officer and Using Service at which time the Contractor shall submit for coordination and approval, his proposed daily work schedule for the next two week period. Required temporary utility services, time and duration of interruptions, and protection of adjoining areas shall be included with the Contractor's proposed 2-week work schedule. At this meeting, the Contractor shall also submit his schedule of proposed dates and times of all preparatory inspections to be performed during the next 2 weeks. The items of

0285-33-2/CD

work listed on the proposed 2-week schedule are to be keyed to the NAS by activity number and description for each activity anticipated to be performed during the next 2-week period. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings.

- EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. (1985 JAN HO USACE.) 19.1. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data when the Government can determine both ownership and operating costs for each piece of equipment or equipment groups of similar serial and series from the Contractor's accounting records. When both ownership and operating costs cannot be determined from the Contractor's accounting records, equipment costs shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule, "S/N EP 1110-1-8, Vol. L, Region 1. Copies of each regional schedule may be obtained from the U.S. Government Printing Office (301-953-7974) at a cost of \$11.00 per schedule. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the Schedule in effect at the time of negotiations shall apply. For retrospective pricing, the Schedule in effect at the time the work was performed shall apply.
- 19.2. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36, substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase, or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.
- 19.3. When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the Contractor grants to the Contracting Officer or an authorizing representative the right to examine those books, records, documents, and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement, the Contractor shall certify that the equipment costs or pricing data submitted are accurate, complete, and current. (EFARS 52.2/9108(f).)
- 20. AS-BUILT DRAWINGS. The Contractor shall maintain two separate sets of red-lined full scale, as-built construction drawings marked-up to fully indicate as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the work and shall be available for review by Government personnel at all times. The location, general description, approximate depth below finished grade of all underground utilities encountered, and all variations from the contract drawings, for whatever reason, including those occasioned by optional materials and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail utilized in the initial contract drawings. Both sets of as-built

construction drawings shall be furnished to the Contracting Officer on the date The submittal requirement for as-built construction of final inspection. drawings shall be shown as a separate activity on the Contractor prepared progress bar chart or network analysis system, whichever is applicable. As-built drawings shall be completed as specified in SECTION: AS-BUILT DRAWINGS.

SIGN. On commencement of work on this project, the Contractor shall furnish and erect the temporary sign in the location selected by the Contracting Officer near the project site. The Contractor shall maintain the sign in good condition through the project construction period and on completion of the project shall remove the sign from the premises. The project sign shall conform to attached figures 01100-1 and 01100-2 bound herein. A decal of the "Engineer Castle" and the Pennsylvania Department of Environmental Resources emblem will be furnished the Contractor upon request.

21.1 SAFETY SIGN. On commencement of work on this project, the Contractor shall furnish and erect the safety sign in the location selected by the Contracting Officer near the project site. The Contractor shall maintain the safety sign in good condition through the project construction period and on completion of the project shall remove the sign from the premises. The safety sign shall conform to attached figures 01100-1 and 01100-3 which are attached hereto. The data required by the sign shall be corrected daily, with light colored metallic or nonmetallic numerals. Numerals, including mounting hardware,

shall be subject to the approval of the Contracting Officer.

22. GOVERNMENT-FURNISHED PROPERTY. NOT USED.

SUPERINTENDENCE OF SUBCONTRACTORS.

23.1. ADDED SUPERINTENDENTS. The Contractor shall furnish the following. in addition to the superintendence required by the CONTRACT CLAUSES clause entitled "Superintendence by the Contractor."

23.1.1. If more than 50 percent and less than 70 percent of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

23.1.2. If 70 percent or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

- 23.2. WAIVER OF ADDED SUPERINTENDENTS. If the Contracting Officer, at any time after 50 percent of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made (based on FAR 52.236-7008).
- CONTRACTOR FURNISHED EQUIPMENT DATA. NOT USED.
- ACCOMMODATIONS FOR GOVERNMENT INSPECTORS. The Contractor shall furnish a temporary office facility approximately 10 feet x 20 feet with a minimum of 200 square feet of floor space. It shall be located where directed and shall be reserved for Government personnel only. Drinking water facilities, adequate

0285-33-2/CD

lighting, [local commercial telephone service,] air-conditioning, heating equipment, and a partition enclosed flush toilet shall be furnished and maintained by the Contractor. The office shall be furnished with one legal size filing cabinet with four drawers, one drafting table with stool, one plan rack, one desk, and three chairs. Used furniture, in good condition, will be acceptable. Entrance doors shall be equipped with a substantial lock. The Contractor shall provide weekly janitor service, fuel for the heating facilities, electricity, telephone and water, all at no cost to the Government, except the Contractor will not be liable for Government long-distance calls. Building shall be constructed so as to be easily moved and the Contractor shall relocate the building twice during the contract, if so directed. The entire facility, including furniture, will remain the property of the Contractor and shall be removed from the site after completion of the work.

The Contractor shall also furnish the additional accommodations for

government personnel only:

1. One telecopier machine connectable to telephone system supplied with office, capable of sending and receiving multiple documents, one carton of telecopier paper and all peripheral hardware and cables to connect the equipment supplied.

2. One copy machine, Sharp Model SF-8100, Minolta Model EP4102, or

approved equal.

3. Telephone service to include three lines (two for voice & one for

telecopier/computer) and two telephones.

- 4. A computer work station and related furniture for the sole use of the Contracting Officer's representative and shall include the following minimum equipment:
 - a. An IBM AT or compatible computer including:

(1) 286 Micro Processor

(2) 287 Math Co-processor

(3) 10 - 12 MHz Clock Speed

(4) 1 Megabyte of Random Access Memory (RAM)(5) 360 Kilobyte Floppy Disk Drive

(6) 1.2 Megabyte Floppy Drive

- (7) 40 Megabyte On-Board Hard Disk Storage (solely for government use)
- (8) Additional Hard Disk Storage as required for Contractor Data (i.e., Scheduling Software)

(9) Internal 2400 Baud Modem

(10) EGA Video Card

- b. An EGA compatible color monitor
- c. A Dot Matrix Printer capable of handling 15" wide paper

d. A Type 101 keyboard

e. A Serial or Bus Mouse (Two Button minimum)

- f. All necessary cables, connectors and supplies to install the system.
- g. A 1 KVA Uninterruptible Power Source/Power Filter

h. The following Software:

(1) MS-DOS Operating System, Version 4.0 or Newer

(2) Informix SQL Database system Version 2.10.00 (Relational Database Systems, Inc.)

(3) Informix ESQL/C Database system Version 2.10.00 (Relational Database Systems, Inc.)

(4) Microsoft "C" Compiler version 4.0 or later

(5) Uniplex Business Software, Current Version (Uniplex)

(6) ProComm Communications Software, Current Version (Datastorm Technologies, Inc.)

(7) Primavera Scheduling Software (latest version)

(8) Any Contractor required software

The system shall be promptly installed and shall be maintained in operating condition by the Contractor for the duration of the contract. The Contractor shall also provide 1 box of floppy diskettes and one box each of 14-inch and 9-inch paper. The equipment will become the property of the USACE and shall remain on-site for the one year maintenance period of the disposal area cap.

The Contractor shall provide 24 hours training for three individuals on the

use of the NAS system software.

26. LABORATORY BUILDING. NOT USED.

27. CONTRACTOR PREPARED NETWORK ANALYSIS SYSTEM (NAS).

27.1. The progress chart to be prepared by the Contractor pursuant to the CONTRACT CLAUSE entitled "SCHEDULE FOR CONSTRUCTION CONTRACTS" shall employ a network analysis system as described below. Implementing this system for the planning and scheduling of construction shall be the responsibility of the Contractor.

27.1.1. The Contractor prepared management system shall employ a computerized Network Analysis system (Critical Path Method (CPM)). Contractor may elect to use either the network analysis software identical to that used by the Contracting Officer, or other IBM compatible CPM scheduling software. The Contracting Officer uses the Primavera Project Planner Software and Primavision Graphics Software by Primavera Systems, Inc., Two Bala Plaza, Bala Cynwyd, PA 19004, telephone (215) 667-8600. Should the Contractor elect to use IBM compatible scheduling software other than Primavera Project Planner and Primavision, the Contractor will be required to provide software that can export network analysis data in a format directly readable by the Contracting Officer's software in compliance with SECTION: SCHEDULING DATA EXCHANGE FORMAT. The operating system and memory of the computer selected shall be capable of supporting the number of activities required for the project. The computer and its peripherals must have capability for report writing, allowing flexible formatting and summarization and graphical output using a dot matrix printer or other similar type plotter/printer(s). The Contractor is required to provide to the Contracting Officer one set of IBM compatible data diskettes (5.25" double sided, double density floppy disks formatted to 360k) of all required network analysis submissions and updates in addition to the specified number of hard copies of reports and network diagrams.

27.1.2. Scheduling personnel shall have the expertise to operate the CPM network analysis system software to address all project activities and resources on a real time or interactive basis and be capable of rapidly evaluating alternative scenarios to optimize project management. Evidence of technical expertise of the personnel with the system selected shall be submitted for the Contracting Officer's approval within ten (10) calendar days after issuance of Notice to Proceed (NTP).

27.1.3. The Contractors CPM and activity schedules shall be based on a 7 day week, with no weekends or holidays. The diagram shall show the order and interdependence of activities and the sequence in which the work is to be

0285-33-2/CD

accomplished as planned by the Contractor in coordination with the subcontractors. The basic concept of an arrow or node diagram shall be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities. A narrative shall be provided that explains the logic used to determine the interdependence of activities and their duration.

- 27.2. The arrow or node diagram shall include, in addition to construction activities, the submittal and approval of samples of materials and shop drawings, the procurement of critical materials and equipment, and their installation and testing. All activities of the Government that affect progress, and contract required dates for completion of all or part of the work shall be shown. The diagram shall show early completion of certain portions of the project as specified herein. The schedule shall provide 20 calendar days for the Government to review, approve, and dispatch each shop drawing or submittal after its receipt by the Contracting Officer.
- The selection and number of activities shall be subject to the Contracting Officer's approval. Detailed networks shall be drafted to show a continuous flow from left to right. The following information shall be shown on the diagrams for each activity: Preceding and following event number, description of the activity, and activity duration in calendar days. The total monetary value of all activities shall equal the amount of the contract. number of activities and features shall be determined by the Contractor subject to the approval of the Contracting Officer. The detail of information shall be such that duration of each activity will normally range from 1 to 30 days. (The scheduled interval shall extend from Notice to Proceed to the contract completion date that is specified in paragraph "COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK." The schedule shall start no earlier than the date that the Notice to Proceed was acknowledged. Completion of the last activity in the schedule shall be constrained by the contract completion date. This constraint shall be such that if late finish of the last activity falls beyond the contract completion date, then the float calculation shall reflect a negative float on the critical path. Contractually specified interim dates shall also constrain the schedule.)
- 27.4. The mathematical analysis of the network diagram shall be accomplished by a computer base and have the following minimum characteristics: 27.4.1. The capability of ingesting and tabulating all data required

in the diagram and as stated above.

27.4.2. Must be able to accept and tabulate input data as follows: 27.4.2.1. Percent completed for any activities as reported. 27.4.2.1.1. Actual start date for any activity

(by calendar date).

27.4.2.2. Actual finish date for any activity (by calendar

date).

27.4.3. Compute and tabulate:

27.4.3.1. Preceding and following event numbers.

27.4.3.2. Activity description.

27.4.3.3. Estimated duration of activities (by calendar

days).

27.4.3.4. Earliest start date (by calendar date).

27.4.3.5. Earliest finish date (by calendar date).

27.4.3.6. Latest start date (by calendar date). 27.4.3.7. Latest finish date (by calendar date).

27.4.3.8. Float (by calendar days).

0285-33-2/CD

27.4.3.9. Monetary value of activity.

27.4.3.10. Contractor's earnings based on percentage of

activity completed.

27.5. The monthly program used in making the sort or schedule shall be capable of compiling the total value of completed and partially completed activities and subtotals from separate buildings or features listed above. The program shall also be capable of accepting revised completion dates as modified by approved time adjustments and recomputations of all tabulation dates and float accordingly.

27.6. The program shall list and the Contractor shall provide the

activities in sorts or schedules as follows:

27.6.1. I.J. or node sort, by the activity or event number lowest to highest.

27.6.2. Float sort, by the amount of float then in order of event number.

27.6.3. Early start sort, in order of earliest allowable start dates, then in order of event numbers.

27.6.4. Late start sort, in order of latest allowable start dates, then in order of event numbers.

27.6.5. Cash flow projection as required by a scheduled earnings curve.

27.6.6. Predecessor/Successor sort, I.J. node sort including all

preceding and succeeding activities or events.

27.7. Cover sheet, a monitor of the input data for each periodic report listing: contract number, contractor, project name, reporting period, scheduled completion date and actual completion date.

27.8. Cover sheet to summarize the following data: Progress in the reporting period by dollar value, days worked and percent progress. Total project progress by dollar value, days worked, and percent progress.

27.9. Submission and approval of the network analysis system shall be

as follows:

- 27.9.1. A preliminary network defining the Contractor's planned operation during the first sixty (60) calendar days after Notice to Proceed shall be submitted within ten (10) calendar days. The Contractor's general approach for the balance of the project shall be indicated. Cost of the activities expected to be completed or partially completed before submission and approval of the whole schedule should be included.
- 27.9.2. The complete network analysis system consisting of the detailed schedules and arrow or node diagram shall be submitted within forty-five (45) calendar days after receipt of Notice to Proceed.
 - 27.9.3. Each updated copy shall show a date of the latest revision.
- 27.9.4. Initial submittal of the CPM diagram and partial revisions shall be submitted in five (5) copies.
- 27.9.5. Initial submittal of the computer schedules shall be in five (5) copies.
 - 27.9.6. All sorts shall be submitted monthly in five (5) copies.
- 27.9.7. The required initial and monthly updated copies may be provided as two hard copies and three copies on IBM compatible data diskettes in a format directly readable by the Contracting Officer's software as specified in SECTION: SCHEDULING DATA EXCHANGE FORMAT. The diskettes shall be labeled with cover sheet information.

- 27.10. The first updating after review and approval by the Contracting Officer shall include a scheduled earnings curve. The curve (time versus scheduled earnings) shall be developed for the total contract to reflect the scheduled earnings in percentages using both the early and late finish of the activities. The curve shall be updated concurrently with the computer schedule to reflect actual earnings.
- 27.11. The Contractor shall participate in a review and evaluation of the proposed arrow or node diagram and schedules by the Contracting Officer. Any revisions necessary as a result of this review shall be resubmitted for approval of the Contracting Officer within three (3) calendar days after the conference. The approved schedule shall then be the schedule to be used by the Contractor for planning, organizing, and directing the work and for reporting progress and requesting payment for work accomplished. If the Contractor thereafter desires to make changes in his method of operating and scheduling, he shall request approval by the Contracting Officer in writing specifically identifying every change and stating the reasons for the change. The Contracting Officer may require the Contractor to revise and submit for approval, without additional cost to the Government, all of the affected portions of the CPM diagram and schedules to show the effect on the entire project.
- 27.12. Prior to requesting payment for work accomplished, the Contractor shall prepare a report of the actual construction progress by updating the previous schedule. Entering of updating information into the program will be subject to the approval of the Contracting Officer. The report shall show the activities or portions of activities completed during the reporting period and their total value shall be the basis for the Contractor's periodic request for payment.
- 27.13. Payments made pursuant to the CONTRACT CLAUSE entitled "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS" will be based on the total value of such activities completed after verification by the Contracting Officer, as reflected by the updated schedules. The report will state the percent of the work actually completed and scheduled as of the report date and the progress along the critical path in terms of days ahead of or behind the allowable dates. If the progress is behind schedule, progress along other less critical paths shall also be reported. The Contractor shall also submit a narrative report with the update which shall include but not limited to a description of the problem areas, current and anticipated, delaying factors and their impact, in an explanation of corrective actions taken or proposed.
- 27.14. When Notice to Proceed for changes in the work or time extensions is issued, the Contractor shall revise the network logic and/or duration time estimates of all activities affected by the modification or time on the next succeeding updating report after the Notice to Proceed. These revisions shall be submitted for concurrence of the Contracting Officer prior to the inclusion in the network. If the Contractor fails or refuses to submit or include such revisions within ten (10) days after date of Notice to Proceed, the Contracting Officer may furnish to the Contractor the suggested logic and/or duration time changes to be entered into the network and be used in all subsequent updating reports until such time that the time has been settled or until actual dates supersede the estimated data. Inclusion in the network and use of revised logic and/or duration time estimates for updating, whether furnished by the Contractor or by the Contracting Officer, will not be construed as extensions of time to the dates required in the contract. If it becomes necessary for the Contracting Officer to furnish the suggested logic and/or duration time revisions because of

the Contractor's failure to furnish acceptable data on time, and if the Contractor has any objections to the data furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer promptly, in writing, of such objections fully supported by a counterplan; however, the Contractor shall continue to use the revisions suggested by the Contracting Officer for all updating reports until such time as the Contracting Officer may approve alternate data. If the Contractor fails to submit, in writing, his objections to the revisions along with supporting data and counterplan within twenty (20) days after receipt, the Contractor will be deemed to have concurred in the Contracting Officer's suggested logic/duration time changes, which changes then will be the basis for equitable adjustment of the time for performance of the work.

- 27.15. Float or slack is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for all the activities in the NAS schedule. Float or slack is not time for the exclusive use or benefit of either the Government or the Contractor. Extensions of time for performance required under the CONTRACT CLAUSES entitled "CHANGES," "DIFFERING SITE CONDITIONS," "DEFAULT (FIXED PRICE CONSTRUCTION)," or "SUSPENSION OF WORK" shall be granted only to the extent that the completion of the contract is actually delayed and equitable time adjustment for the activity or activities affected exceeds the total float or slack along the path involved.
- 28. TIME EXTENSIONS. Notwithstanding any other provisions of this contract, the time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements so delayed and that the remaining contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages pursuant to the new completion schedule. (based on FAR 52.212-6)
- PERFORMANCE EVALUATION OF CONTRACTOR. The Contractor's performance will be evaluated upon final acceptance of the work. However, interim evaluation may be prepared at any time during contract performance when determined to be in the best interest of the Government. The format for the evaluation will be SF 1420, and the Contractor will be rated either outstanding, satisfactory, unsatisfactory in the areas of Contractor Quality Control, Timely Performance, Effectiveness of Management, Compliance with Labor Standards, and Compliance with Safety Standards. The Contractor will be advised of any unsatisfactory rating, either in an individual element or in the overall rating, prior to completing the evaluation, and all Contractor comments will be made a part of the official record. The final report will be supplemented or amended as necessary through the warranty period of the contract to reflect changes in the evaluation of performance elements based on compliance with warranty requirements. Performance Evaluation Reports will be available to all DOD Contracting offices for their future use in determining Contractor responsibility, in compliance with DFARS 36.201(c)(1). (based on EFARS 52.2/9006.)
- 30. PERFORMANCE OF WORK BY CONTRACTOR (1984 APR). The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty (20) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if,

0285-33-2/CD

during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government. (FAR 52.236-1)

- 31. ASBESTOS (OCCUPATIONAL HEALTH AND ENVIRONMENT). NOT USED.
- 32. OPERATIONS AND MAINTENANCE DATA AND TRAINING REQUIREMENTS. NOT USED.
- 33. INTERIM CHANGE TO CONTRACT CLAUSE FAR 52.236-13 ACCIDENT PREVENTION. NOT USED.

34. PROFIT.

34.1. Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors shall be as follows:

<u>Factor</u>	<u>Rate</u>	<u>Weight</u>	<u>Value</u>
Degree of Risk	20		
Relative difficulty of work	15		
Size of Job	15		
Period of performance	15		
Contractor's investment	5		
Assistance by Government	5		
Subcontracting	<u>25</u>		
	100		

- 34.2. Based on the circumstances of each procurement action, each of the above factors shall be weighted from .03 to .12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totalled indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.
- 34.2.1. Degree of Risk. Where the work involves no risk or the degree of risk is very small, the weighting should be .03; as the degree of risk increases, the weighting should be increased up to a maximum of .12. Lump sum items will have, generally, a higher weighted value than the unit price items for which quantities are provided. Other things to consider: the portion of the work to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

 34.2.2. Relative Difficulty of Work. If the work is most difficult
- 34.2.2. Relative Difficulty of Work. If the work is most difficult and complex, the weighting should be .12 and should be proportionately reduced to .03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, and what is the time schedule.
- 34.2.3. Size of Job. All work not in excess of \$100,000 shall be weighted at .12. Work estimated between \$100,000 and \$5,000,000 shall be proportionately weighted from .12 to .05.
- 34.2.4. Periods of Performance. Jobs in excess of 24 months are to be weighted at .12. Jobs of lesser duration are to be proportionately weighted to a minimum of .03 for jobs not to exceed 30 days. No weight where additional time not required.

34.2.5. Contractor's Investment. To be weighted from .03 to .12 on the basis of below average, average, and above average. Things to consider: amount of subcontracting, mobilization payment item, Government furnished property, equipment and facilities, and expediting assistance.

34.2.6. Assistance by Government. To be weighted from .12 to .03 on the basis of average to above average. Things to consider: use of Government-owned property, equipment and facilities, and expediting assistance.

- owned property, equipment and facilities, and expediting assistance.

 34.2.7. Subcontracting. To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted, the weighting is to be .03 and such weighting proportionately increased to .12 where all the work is performed by the Contractor's own forces.
- 35. EXTENDED OVERHEAD. NOT USED.
- 36. OVERHEAD. NOT USED.
- 37. INCENTIVE PROGRAM FOR SUBCONTRACTING WITH SMALL AND SMALL DISADVANTAGED BUSINESS CONCERNS, HISTORICALLY BLACK COLLEGES AND UNIVERSITIES AND MINORITY INSTITUTIONS (FEB 1988). NOT USED.
- 38. APPLICABILITY OF DAVIS-BACON ACT. It is the position of the Department of Defense that the Davis-Bacon Act, 40 U.S.C. 276a is applicable to temporary facilities such as batch plants, sandpits, rock quarries, and similar operations, located off the immediate site of the construction but set up exclusively to furnish required materials for a construction project on the site of the work. Clause "Payrolls and Basic Records" of the CONTRACT CLAUSES is applicable to such operations.
- 39. SOLID WASTE DISPOSAL REQUIREMENTS. NOT USED.

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Note: Above lettering styles are Helios Extra Bold Condensed and Helios Bold II. Helvetica Black Roman and Helvetica Bold Roman are acceptable substitutes.

STANDARD
ALPHABET & NUMERALS

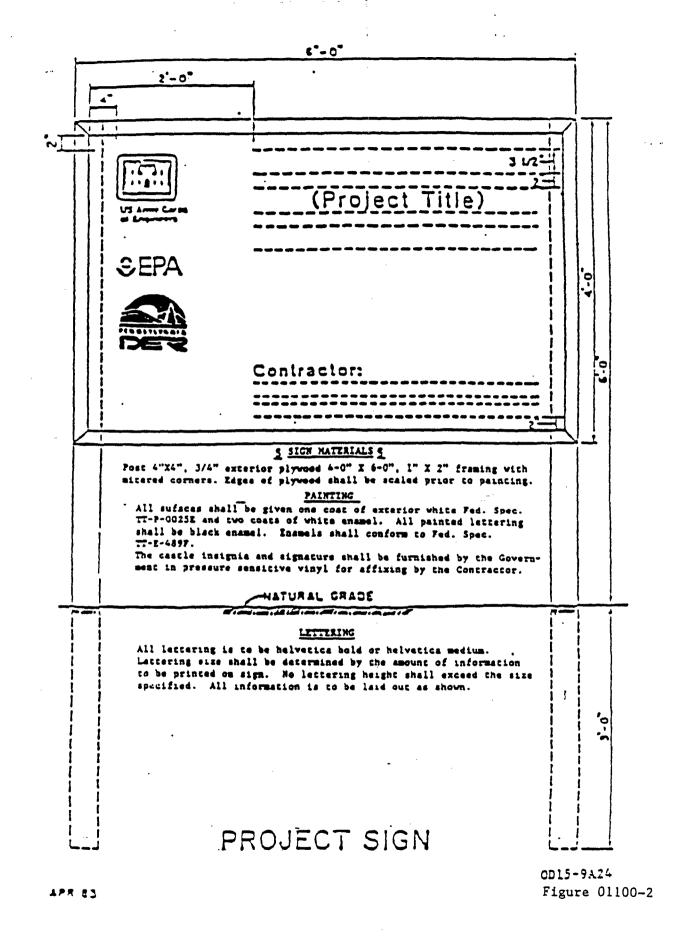
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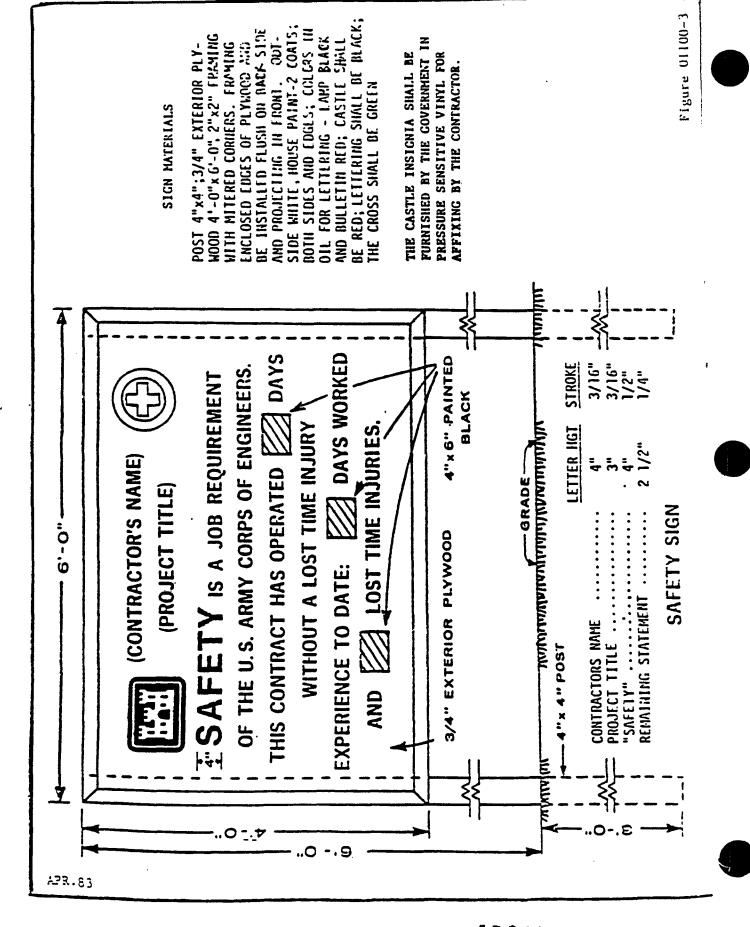
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SECTION 01110 MEASUREMENT AND PAYMENT

INDEX

- 1. ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS NOT INCLUDED IN PARAGRAPHS 2 THROUGH 14, BID ITEM 1
- 2. SITE CLEARING, BID ITEM 2
- SUBGRADE PREPARATION, BID ITEM 3
- 4. DRUM EXCAVATION AND STAGING, BID
- 5. OFFSITE DISPOSAL OF DRUMS AND CONTAMINANT MATERIALS, BID ITEM 5
- 6. CAP CONSTRUCTION, BID ITEM 6.

- 7. WTP ACCESS AND MAINTENANCE ROAD CONSTRUCTION, BID ITEM 7
- 8. FLOOD RETENTION BASIN, CONSTRUCTION AND DRAINAGE IMPROVEMENTS, BID ITEM 8
- 9. SEEDING AND LANDSCAPING, BID ITEM 9
- 10. PERIMETER FENCING, BID ITEM 10
- 11. MONITORING WELLS, BID ITEM 11
- 12. SITE MAINTENANCE, BID ITEM 12
- 13. ANALYTICAL TESTING DRUM CHAR-ACTERIZATION, BID ITEM 13
- 14. ANALYTICAL TÉSTING TRANSPORT-ER/DISPOSAL REQUIREMENTS, BID ITEM 14
- 15. ALLOWANCES
- 1. ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS NOT INCLUDED IN PARAGRAPHS 2 THROUGH 15, BID ITEM 1.
- WORK INCLUDED. The work includes all materials, equipment, and labor for all other work specified in the contract documents that is not included in Paragraphs 2 through 15, inclusive, but not limited to, posting all forms of financial quarantees, performance and payment bonds; all materials, equipment, labor, and permits as required for providing, installing, and maintaining erosion and runoff control; for building, establishing, and maintaining a temporary site access road(s); for providing, relocating, installing, and maintaining security fences and gates; for site security personnel for installing and maintaining the on-site temporary and permanent utility systems and temporary facilities, constructing staging areas and facilities; all required survey work; photographs and any other documentation required during construction; health and safety related monitoring, analyses, clothing, equipment, and personnel required; providing, installing, equipping, and maintaining all field offices, decontamination facilities; dust control; medical surveillance program including required physical examinations; all project records and documents; project record drawings; construction scheduling; site maintenance and cleanup; shop drawing/certification, test sample submittals; submittals of all project plans and reports as listed in the Submittal Register; and collection and disposal of sanitary wastes.
 - 1.2. MEASUREMENT. Lump sum.
- 1.3 PAYMENT. Payment shall be on a progress basis, based upon the percentage of work completed.
- 2. SITE CLEARING, BID ITEM 2.
- 2.1. WORK INCLUDED. The work includes all materials, labor and equipment to clear the site work zones, of all trees and brush, grub all stumps, roots and matted roots and miscellaneous debris indicated in specification Section:

0285-33-2/CD

CLEARING AND GRUBBING and dispose of material in accordance with the contract documents. The work also includes on-site disposal of felled trees and brush associated with the previous on-site construction activities and any incidental clearing and grubbing as required to facilitate construction activities.

2.2 MEASUREMENT. Lump sum.

2.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

3. SUBGRADE PREPARATION, BID ITEM 3.

- 3.1 WORK INCLUDED. The work incudes all materials, labor and equipment to prepare the earthen cap subgrade in accordance with the contract documents, and includes all subgrade excavation for Bid Items 6 and 8. Such work shall include, but not be limited to excavation, backfilling and compacting on-site and imported fill soil, excavation for stream channel improvements to Marshall's Run, erosion protection, and excavation of on-site drainage channels, in accordance with contract documents.
 - 3.2 MEASUREMENT. Lump sum.
- 3.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

4. DRUM EXCAVATION AND STAGING, BID ITEM 4.

4.1 WORK INCLUDED. The work includes all materials, special equipment, and labor necessary to excavate, overpack (as needed) and stage drums encountered during subgrade preparation.

4.2 MEASUREMENT. Measurement for drum excavation, initial screening,

overpacking and staging will be on a per drum unit basis.

4.3 PAYMENT. Payment for this item shall be as designated in SECTION: SPECIAL CLAUSES paragraph 10A and 10B. Payment for drum excavation, overpacking and staging will be based on the total number of drums excavated during subgrade preparation that are overpacked (if necessary) and staged for characterization of contents.

5. OFFSITE DISPOSAL OF DRUMS AND HAZARDOUS MATERIALS, BID ITEM 5.

- 5.1 WORK INCLUDED. The work shall include all materials, equipment and labor necessary to dispose of drums containing hazardous materials characterized as RCRA wastes and other requirements of SECTION: HANDLING AND DISPOSAL OF CONTAMINATED MATERIALS.
- 5.2 MEASUREMENT. Measurement for excavation and offsite disposal of hazardous materials will be on a per drum basis for each bid sub-item. The following sub-items are included:

<u>Sub-Item</u>	<u>Description</u>
5a.	metal containing wastes
5b.	delisted organic wastes (i.e., hazardous organic wastes which have been treated such that they are no longer hazardous as defined by 40 CFR261.24, July 1, 1990); and

5c. F001-F005 listed wastes requiring incineration.
5.3 PAYMENT. Payment for this item shall be as designed in SECTION: SPECIAL CLAUSES paragraph 10A and 10B. Payment for offsite disposal of drums containing hazardous materials will be based on the actual number of drums accepted at the offsite disposal site. The Contractor shall submit copies of disposal manifests identifying the quantity of drums accepted by the offsite

disposal site as a basis for payment.

- 6. CAP CONSTRUCTION, BID ITEM 6.
- 6.1 WORK INCLUDED. The work includes all materials, labor and equipment to place and finish grade topsoil cap in accordance with the contract documents.
 - 6.2 **MEASUREMENT.** Lump sum.
- 6.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

7. WTP ACCESS AND MAINTENANCE ROAD CONSTRUCTION, BID ITEM 7.

- 7.1 WORK INCLUDED. The work includes all materials, labor and equipment to construct the gravel-covered perimeter maintenance road, bituminous-covered water treatment plant access road and access road box culvert in accordance with the contract documents.
 - 7.2 **MEASUREMENT.** Lump sum.
- 7.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

B. FLOOD RETENTION BASIN CONSTRUCTION AND DRAINAGE IMPROVEMENT, BID ITEM 6.

- 8.1 WORK INCLUDED. The work includes all additional materials, labor and equipment to construct the flood retention basin control structure and side discharge weir; the water treatment plant bypass culvert, channel liner (where required), riprap and other channel erosion control materials, miscellaneous culvert pipings, pinch valves associated with Marshall's Run realignment, manholes, and drop inlets. Such work will also include dewatering systems to maintain dewatering during excavation for earthen berms and concrete structures, constructing the diversion structures and/or temporary bypass pumping facilities for Marshall's Run and constructing the side-discharge weir, low-level control structure (dam), and water treatment plant bypass culvert.
 - 8.2 **MEASUREMENT.** Lump sum.
- 8.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

9. SEEDING AND LANDSCAPING, BID ITEM 9.

- 9.1 WORK INCLUDED. The work includes all materials, labor and equipment to seed, fertilize and mulch cap areas and associated areas disturbed by construction, and plant visual barrier trees in accordance with the contract documents.
 - 9.2 **MEASUREMENT.** Lump sum.
- 9.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed.

10. PERIMETER FENCING, BID ITEM 10.

- 10.1 WORK INCLUDED. The work includes all materials, labor and equipment to install permanent chain link security fencing in accordance with the contract documents.
 - 10.2 MEASUREMENT. Lump sum.
- 10.3 PAYMENT. The payment shall be on a progress basis, based on the percentage of the work completed minus material cost credits for use of salvaged fence materials.

11. MONITORING WELLS, BID ITEM 11.

11.1 WORK INCLUDED. The work shall include all materials, equipment and labor to abandon, extend and replace existing monitoring wells and all other

requirements of SECTIONS: MONITORING WELLS and MODIFYING AND ABANDONING GROUND WATER MONITORING DEVICES.

- 11.2 MEASUREMENT. Lump sum.
- 11.3 PAYMENT. The payment will be a lump sum bid, on a progress basis based on the percentage of work completed.

12. SITE MAINTENANCE, BID ITEM 12.

- 12.1 WORK INCLUDED. The work shall include all materials, equipment and labor to maintain the site for one year after construction for periodic inspections, repairs, and grass mowing.
 - 12.2 MEASUREMENT. Lump sum.
- 12.3 PAYMENT. The payment will be a lump sum bid, on a progress basis, based on the percentage of work completed.

13. ANALYTICAL TESTING - DRUM CHARACTERIZATION, BID ITEM 13.

- 13.1 WORK INCLUDED. The work shall include all materials, equipment, and labor to complete sampling and analysis of staged drum contents and soils collected and drummed surrounding excavated drums suspected to be contaminated from leaking drum contents in accordance with the contract documents.
 - 13.2 MEASUREMENT. For each analysis.
- 13.3 PAYMENT. Payment for this item shall be as designated in SECTION: SPECIAL CLAUSES, Paragraph 10A and 10B. The payment for testing shall be the unit price item times the actual approved tests completed.

14. ANALYTICAL TESTING - TRANSPORTATION/DISPOSAL REQUIREMENTS, BID ITEM 14.

- 14.1 WORK INCLUDED. The work shall include all materials, equipment, and labor to complete additional sampling and analysis of excavated drums and soils required for offsite disposal at a RCRA-permitted facility.
 - 14.2 MEASUREMENT. For each analysis.
- 14.3 PAYMENT. Payment for this item shall be as designated in SECTION: SPECIAL CLAUSES, Paragraph 10A and 10B. The payment for testing shall be the unit price item times the actual approved tests completed.

15. ALLOWANCES, BID ITEM 15.

- 15.1 WORK INCLUDED. The work shall include all payments made to utility companies for relocation of pipelines, cables, poles, and other equipment and materials; as required to facilitate execution of Bid Items 1 through 14 above.
 - 15.2 MEASUREMENT. Bid price for Item 15 shall be \$100,000.
- 15.3 PAYMENT. Payment shall be made on invoices submitted by the Utilities, which shall be based on contractual agreements made between the Contractor and the Utilities.

SECTION 01150 SPECIAL PROJECT PROCEDURES

INDEX

- 1. GENERAL REQUIREMENTS
- 2. RELATED SECTIONS
- SPECIAL PROJECT PROCEDURE PLANS
- 1. GENERAL REQUIREMENTS. Special project procedures are required of the Contractor due to the potentially hazardous nature of the work. The Contractor shall submit the necessary information, as specified herein, to the Contracting Officer within 30 calendar days after receiving Notice to Proceed. Approval of these special project procedure plans by the Contracting Officer is a prerequisite for project startup. The Contracting Officer, at his discretion, may give consideration to accept partial submittals; however, the submittal must be approved prior to implementation of any activity pertaining to that submittal. The Contractor shall implement and maintain these special project procedures at the appropriate time prior to and during performance of work.
- 2. **RELATED SECTIONS.** The information and criteria presented in the following sections are for guideline purposes and provide the Contractor with the benefit of data accumulated to date. The Contractor is responsible for the content and implementation of all special project procedures. These special project procedures are described in the following sections:
 - 2.1 Section: SUMMARY OF WORK.
 - 2.2 Section: ENVIRONMENTAL PROTECTION.
 - 2.3 Section: SAFETY, HEALTH AND EMERGENCY RESPONSE.
 - 2.4 Section: SPILL AND DISCHARGE CONTROL.
 - 2.5 Section: SPECIAL CLAUSES.
 - 2.6 Section: CONSTRUCTION GENERAL.
 - 2.7 Section: DUST CONTROL.
 - 2.8 Section: CHEMICAL QUALITY MANAGEMENT.
 - 2.9 Section: EXCAVATION, HANDLING AND DISPOSAL OF DRUMMED AND CONTAMINATED MATERIALS.
- 3. SPECIAL PROJECT PROCEDURE PLANS. The Contractor shall be responsible for the development of the special project procedure plans. These special project procedure plans, once approved and complete with all comments addressed, shall be made a part of the Contract Documents, prior to the Contracting Officer issuing a Notice to Proceed with the work related to the special project procedure. The special project procedure plans are referenced and discussed within the following paragraphs.
- 3.1. Section: Safety, Health, and Emergency Response. A Safety, Health, and Emergency Response Plan (SHERP) shall be submitted and include delineation of site work areas and the appropriate levels of personnel protection, specifications of personnel training operations, medical surveillance requirements, emergency and first aid equipment requirements, accident prevention, activity hazard analysis, and emergency response plans. The Contracting Officer

may give consideration to approve portions of the SHERP pertaining to site set-up activities.

- 3.1.2. Section: Air Monitoring. An Air Monitoring Plan shall be submitted as part of the SHERP and shall include delineation of site work areas and the necessary continuous on-site area, personnel, and perimeter air monitoring requirements.
- 3.2. Dust Migration Control Plan. The Contractor shall prepare this plan describing site procedures to minimize the creation and dispersion of dust during construction activities.
- 3.3. Spill and Discharge Control Plan. The Contractor's Spill and Discharge Control Plan shall outline mitigative actions in the case of liquid spills during the project work. See Section: SPILL AND DISCHARGE CONTROL.
- 3.4. Drum and Contaminated Materials Handling Plan. Specifications pertaining to management of drums containing hazardous materials are provided in Section: EXCAVATION, HANDLING, AND DISPOSAL OF DRUMMED AND CONTAMINATED MATERIALS. This plan shall be prepared and submitted to the Contracting Officer and EPA for approval.
- 3.5. Environmental Protection Plan. The Environmental Protection Plan shall outline his procedures for minimizing the pollution of air, water, and land and controlling noise and the disposal of trash and debris. The plan shall be submitted to the Contracting Officer and the EPA for approval. See Section: ENVIRONMENTAL PROTECTION.
- **3.6.** Submittal Register. A submittal register assigned to each specification section on which submittals are required shall be completed as specified in Section: SPECIAL CLAUSES.
 - 3.7. Contractor Quality Control.
- 3.7.1. Section: Special Clauses. This specification details the requirements for the Contractor Quality Control Plan.
- 3.7.2. Section: Chemical Quality Management. This specification details the requirements for the chemical quality management section and the laboratory QA/QC program section of the Contractor Quality Control Plan. The strategy and requirements for sampling and sample handling are procedures to be included as part of the Contractor Quality Control Plan.
 - 3.8. General Site Work Plan.
- 3.8.1 Section: Summary of Work. This specification presents a general sequence of construction. The Contractor shall submit a Plan of Operation detailing his planned construction sequence and methods of construction. Particular attention shall be given to clearing, subgrade preparation, improvements to Marshall's Run, installation of box culverts, dewatering and construction of the flood retention basin. The Plan shall also include a synopsis of the Drummed and Contaminated Materials Plan.
- 3.9 Traffic Control Plan. A Traffic Control Plan shall outline Contractors' procedures, site access, safety and frequency of Traffic, avoidance of traffic interference and safe and efficient flow of construction traffic on public road systems used by the Contractor. See Section: CONSTRUCTION GENERAL.
- 3.10 Security Plan. A plan outlining security facilities and procedures shall be submitted to the Contracting Officer and EPA for approval. Reference SECTION 01490: SECURITY.
- **3.11 Vehicle Decontamination Plan.** A plan outlining the criteria, facilities, and procedures to be used in decontaminating vehicles shall be submitted to the Contracting Officer and EPA for approval. Reference SECTION 01420: VEHICLE AND BULKY DEBRIS DECONTAMINATION.

SECTION 01200 CONSTRUCTION GENERAL

INDEX

1.	SCOPE	13.	COORDINATION AND OUTAGES
*2.	CONSTRUCTION RIGHT-OF-WAY	14.	UNLOADING, HANDLING AND STORAGE
3.	PROTECTION OF EXISTING FACILITIES	*15.	SERVICES OF ERECTING ENGINEERS
	AND WORKS	16.	PURCHASE ORDERS
4.	DRAINAGE	17.	PROGRESS CHARTS
5.	DISPOSITION OF CONSTRUCTION	18.	PROJECT SIGN
	FACILITIES	*19.	AGGREGATE OR GRANULAR MATERIALS
6.	ACCESS ROADS AND HAUL ROADS	20.	GUARANTY
7.	PUBLIC ROADS	*21.	SUPERVISION
8.	COOPERATION WITH OTHERS	22.	ACCOMMODATIONS FOR GOVERNMENT
9.	WORK BY OTHERS		PERSONNEL
10.	AREA USE SCHEDULE	23.	SUBMITTALS
11.	ORDER OF WORK	24.	PAYMENT
12.	WINTER WORK		

1. SCOPE. The work covered in this section is outlined as a statement of construction requirements common to all the work. Specific requirements for materials and installations are provided under the Technical Sections herewith. No claims for extras shall be made on account of items presumed to have been omitted from this section.

2. CONSTRUCTION RIGHT-OF-WAY.

- 2.1. The Contractor will be assigned construction areas or construction right-of-way limits for use in the prosecution of work under this contract, subject to the CONTRACT CLAUSES clause entitled "Operations and Storage Areas." In the event that the Contractor finds it necessary to utilize for any purpose whatsoever, additional right-of-way, plant or construction area for the performance of this contract, he will be required to do the following: Notify the Contracting Officer as the need for additional construction easements is identified and provide an written explanation for additional easements and indicate on a scaled plan to the nearest foot additional easement areas and dimensions.
- 2.2. Where the additional required area is owned or controlled by the Government, the area may be assigned to the Contractor upon request, provided the area is not needed for other purposes and provided there is no additional cost to the Government. All necessary grading and drainage shall be done at the Contractor's expense.
- 2. CONSTRUCTION RIGHT-OF-WAY. NOT USED.

- PROTECTION OF EXISTING FACILITIES AND WORKS. The Contractor shall be 3. responsible for the protection of work area from damage and upon completion of the work shall leave existing works in a condition equal to that which existed when the work started. All work, storage of materials, and construction plant shall be kept within the limits of the areas assigned. Prior to construction operations, the Contractor shall confer with the Contracting Officer's representative to determine the proximity of any possible underground obstructions, pipe or equipment which could be damaged as a result of construction operations. Existing utility lines that are shown on the drawings or the locations are otherwise made known to the Contractor shall be protected from damage, and if damaged, shall be repaired by the Contractor at no expense to the Government. In the event that the Contractor damages any existing utility lines that are not shown or the locations of which have not been made known to the Contractor. report thereof shall be made immediately to the Contracting Officer. Contracting Officer determines that repairs shall be made by the Contractor, such repairs will be ordered under CONTRACT CLAUSES clause entitled "Changes." Contractor will be responsible for the protection of structures from any structural damage during the construction operations. Roads and surfaces shall be protected from damage by the work or if damaged shall be repaired with equal materials. At all times the plant and work areas shall be kept in a condition conducive to safety of workmen and the public and neat in appearance. Waste or surplus materials shall not be allowed to accumulate in the construction areas.
- 3.1. Protection of Appurtenances from Bituminous Material Applications. It shall be the responsibility of the Contractor to cover and protect the surfaces of roadway appurtenances, structures and installations by approved methods in advance of any bituminous material application adjacent thereto. Damages or defacement thereof shall be corrected as directed, by and at the expense of the Contractor.
- 3.2. Interruption of Electric Power. If it is necessary to cut off power in transmission lines that pass through construction areas, it shall be the Contractor's responsibility to make the necessary arrangements with the owner of the powerline, and the Contractor shall pay all costs therefor.
- 3.3. Flood Protection Works. In all cases where materials in the existing flood protection works are used or connected with the construction of new work under this contract, the work shall be so planned and executed that the new work shall be completed to provide protection equivalent to the existing protection as the existing protection is weakened or removed. These operating restrictions shall be followed in order that the new work may be tied in, or connected promptly, by the Contractor, with the existing facilities so as to furnish a continuous service in an emergency. These ties or connections shall be made during periods of suspended construction operations and the Contractor shall leave incomplete pipe outlets and other structures in such conditions as to not interfere with the natural drainage from areas served by these pipes or structures.
- **3.4.** Dust Control and Removal. Special measures shall be taken to minimize air-borne dust in work areas. See SECTION: DUST CONTROL.
- 4. DRAINAGE. The Contractor shall provide and maintain ditches, dikes, and other facilities within and adjacent to the work areas, to divert water from surface and subsurface flow away from work in place or under construction by this and other contracts to prevent damage and interference. The basis for design, location, type and size of drainage facilities are subject to review and approval

prior to construction. The Contractor shall reference the approved Erosion Control Plan for the project when addressing drainage issues.

5. DISPOSITION OF CONSTRUCTION FACILITIES. All buildings and facilities constructed by the Contractor shall be maintained in a satisfactory condition with strict observance of the rules of sanitation, safety and order as may be established by the Contracting Officer. Prior to final payment under the contract, all buildings and facilities constructed by the Contractor for his own use shall be removed from the site by the Contractor.

ACCESS ROADS AND HAUL ROADS.

6.1. Access Roads. Access roads as required for the prosecution of the work shall be maintained (including sprinkling for dust control, safety personnel, signals and control) within the work areas assigned to the Contractor. Consideration shall be given to the avoidance of interference with others, safety and frequency of traffic. The Contractor shall prepare a Traffic Control Plan that will be subject to review and approval prior to construction. Access road areas shall be restored to their original or suitable condition upon completion of this contract. The Contractor shall be responsible for repair of damage to

existing roads caused by his operation.

- The Contractor shall construct haul roads as may be Haul Roads. necessary for the conduct of the work without additional cost to the Government. The Contractor shall arrange his hauling operations so as to cause a minimum interference with traffic and shall furnish flagmen and other facilities as required to avoid additional hazards to the public. Lines, grades and widths for haul roads, shall be selected to fulfill the requirements for safe and efficient hauling operations and shall be approved by the Contracting Officer prior to construction. Haul roads shall have ample width to provide safety. Preference shall be given to one-way haul roads when these are feasible. All roads shall be maintained in first class condition during all periods of their use. shall be sprinkled whenever, in the opinion of the Contracting Officer, control of dust is necessary to insure safe movements of construction traffic. completion of work under this contract, roads shall be disposed of as directed by the Contracting Officer. All signs, culverts, guards, fences and other improvements on roads constructed for the Contractor's convenience and operations shall be removed from the project site and shall remain his property. Use and repair of existing roads and bridges shall be subject to the requirements of local authorities. Prior to start of hauling operations on public roads, the Contractor shall furnish written evidence to the Contracting Officer that an agreement has been consummated with State and County officials on the use of public roads and bridges. Such agreements shall clearly relieve the Government of any responsibility for damage resulting from hauling across or on these roads.
- 6.3. Joint Use of Transportation Facilities. The Contractor may use jointly with contractors and others, existing access and haul roads constructed by the Government or by others. Unless otherwise specifically authorized in writing, the Contractor will not be granted exclusive use of any access or haul road whether it be an existing road or one constructed by the Contractor. However, the use by others of roads constructed by or assigned to the Contractor primarily for his own use will be limited by the Contracting Officer to the minimum considered consistent with efficient prosecution of the work under this and other contracts in force. Maintenance of jointly used facilities shall be shared in proportion to use. In the event of a disagreement between this

0285-33-2/CD

Contractor and others as to the use of any road, the decision of the Contracting Officer shall be final. The Contractor shall not obstruct any existing road on the land controlled by the Government.

- 6.4. Waterway Crossings. The Contractor shall construct approved crossings where hauling is to be done across waterways with adequate openings for drainage and streamflow. Structures for crossings shall be safe for all operating equipment and vehicles and shall be adequate for drainage and flow of the waterway. After haul for construction has ceased, the structures constructed by the Contractor shall be removed and disposed of as directed.
- 6.5. Ramps. Ramps shall be provided and maintained for access of hauling equipment into excavation and waste areas. Locations, grades and width are subject to review and approval by the Contracting Officer prior to construction.
- 6.6. Drainage. The Contractor shall provide and maintain ditches, dikes and other facilities within and adjacent to the work areas to direct the surface and subsurface flow of water away from abutting private property and work in place or under construction by this and other contracts. The design, location, type and size of drainage facilities are subject to review and approval by the Contracting Officer prior to construction. The Contractor shall reference the approved Erosion Control Plan for the project when addressing drainage issues.

7. PUBLIC ROADS.

- 7.1. Traffic Control. The Contractor shall be responsible for the safe control of traffic on all haul and access roads used primarily for the work under these specifications and at their crossings with roads used by others. The Contractor shall, at his own expense, furnish all personnel, signal devices and signal necessary for the safe and efficient control of construction traffic on road systems used by the Contractor. A Traffic Control Plan, including a listing of equipment and its employment, shall be submitted for review and approval prior to construction.
- 7.2. Operations. When operations are being conducted near a U. S. or State Highway or when construction equipment is being used on or adjacent to such highway, the Contractor shall furnish signalmen and such warning signs as are necessary to provide adequate warning to the traveling public. The highways and streets shall be kept open at all times.
- 7.3. Barricades. At each location designated by the Contracting Officer and where safe operation requires the closing of roads, streets or other travel arteries leading to the work under this contract, the Contractor shall maintain a heavy plank barricade or other effective barrier during construction. Arrangements for closure of roads, streets or other travel arteries shall be made by the Contractor with local State, County or City officials. The Contractor shall notify the appropriate official in writing at least ten (10) days in advance of the date he desires to close a road to traffic and shall furnish a copy of the agreement to the Contracting Officer prior to closure. A satisfactory sign shall be placed on each barricade stating that the artery is closed. The cost of barricades shall be at the expense of the Contractor.
- 7.4. State and Federal Highways. Where the Contractor hauls across or on State or Federal highways, he shall enter into all agreements with the State Highway Commission and shall comply with any restrictions they may impose relative to load limits, care of traffic and cleanup. Such agreements shall clearly relieve the Government of any responsibility for damages resulting from hauling across or on State highways. Copies of such agreements shall be

furnished to the Contracting Officer before the Contractor begins hauling on these highways.

7.5. State and Local Public Roads.

7.5.1. Load Limits. NOT USED.

- 7.5.2. Hauling Regulations. Prior to start of hauling operations on public roads, the Contractor shall furnish evidence to the Contracting Officer that an agreement has been consummated with State and County officials on the use of public roads and bridges. Such agreements shall clearly relieve the Government of any responsibility for damage resulting from hauling across or on these roads.
- 7.6. City Streets. Where the Contractor intends to cross or to use city streets for haul roads he shall enter into an agreement with the City and shall comply with any restrictions the City may impose relative to load limits, care of traffic and cleanup. Such agreements shall clearly relieve the Government of any responsibility for damage resulting from hauling across or on these highways. A copy of all such agreements shall be furnished the Contracting Officer before the Contractor begins hauling in city streets.
- 7.7. Utility Lines. It shall be the responsibility and obligation of the Contractor to make all arrangements with the affected companies for the necessary moving and alterations of utility lines and the continuation of service during construction as covered by the plans and specifications.
 - 7.8. Railroad Crossings. NOT USED.
- 8. COOPERATION WITH OTHER CONTRACTORS. The Contractor shall cooperate and coordinate his work with that of the State and others working in the area during the life of this contract. The Contractor shall coordinate his work with others to avoid undue interference and shall conduct his operations, other than approved required access, within the limits of the assigned construction area or construction right-of-way limits. The Contractor shall cooperate with others as necessary in the interest of timely completion of all work and in the event of disagreement the decision of the Contracting Officer shall be final.
- 8.1. Coordination With Others. Other contractors on U. S. Government work (including Government personnel) may be working in the area during the life of this contract. The Contractor shall coordinate his work with others to avoid undue interference and shall conduct his operations, other than approved required access, within the limits of the assigned construction area or construction right-of-way limits. The Contractor shall cooperate with others as necessary in the interest of timely completion of all work and in the event of disagreement the decision of the Contracting Officer shall be final.
- 9. WORK BY OTHERS. Public and private authorities may be working in the area during the life of this contract. The Contractor shall coordinate his work with others to avoid undue interference, and shall conduct his operations, other than required access, within the limits of the assigned construction area or construction right-of-way limits. Specifications and drawings showing work under other contracts are available for examination at the Corps of Engineers District Office, 1612 U.S. Post Office and Courthouse, 215 North 17th Street, Omaha, Nebraska 68102-4978, or at the Office of the Area Engineer, J Street, Bldg. 5285, New Cumberland Army Depot, New Cumberland, PA 17070, (717-782-3750) or at the Project Office, Commander, 911th Tactical Airlift Group, Pittsburgh Resident Airport, Bldg. 210, Room 108, Pittsburgh, PA 15231 (412) 269-8134.

10. AREA USE SCHEDULE.

10.1. General. The purpose of this paragraph is to supplement and expand the information and requirements as shown on the Area Use Plan drawing. Other contractors have been assigned adjacent areas and the Contractor shall be responsible for investigating the site to determine the existing areas and conditions. Close cooperation by all contractors will be required in all joint-use areas and of the common boundaries of areas to facilitate the orderly and timely construction of all contracts.

10.1.1. Area A. (etc.)

- 11. ORDER OF WORK. The sequence of operations shall be maintained so that the maximum amount of work may be done under favorable working conditions in accordance with the completion time set forth in SECTION: SPECIAL CLAUSES, paragraph: Commencement, Prosecution, and Completion of Work. The Contractor shall submit for approval, within 15 days after receipt of notice to proceed a narrative description of his proposed method of operation.
- 12. WINTER WORK. Should the Contractor exercise his option to work during the non-work period set forth in SECTION: SPECIAL CLAUSES, or at any other time during the life of this contract, there will be no separate payment for winterizing or other protective measures required by the Contractor to maintain his schedule progress.
- 13. COORDINATION AND OUTAGES. The Contractor's employees shall not open, close or tamper with switches, valves or control devices for existing installed equipment. Only Government operating personnel will be authorized to open or close existing switches, valves and control devices to enable the Contractor to make connections or modifications to existing equipment. Work shall be coordinated and scheduled to reduce the "Down" time of operating equipment or systems to a minimum.

14. UNLOADING, HANDLING AND STORAGE.

- 14.1. Unloading. The Contractor shall be responsible for prompt acceptance on delivery. When practical he shall check material received against shipping lists; however, he shall not open shipments which are provided with protective coverings for storage until such materials are needed unless the shipment indicates possible damages. Protective coverings on damaged shipments shall be replaced or repaired by the Contractor after inspection. Shipments which are stored when received shall be opened when needed and checked against the shipping list in the presence of the Contracting Officer's representative. Any shortage shall be reported to the Contracting Officer.
- 14.2. Handling. The Contractor shall exercise due care in the unloading, hauling and handling of materials and equipment and shall make use of special handling means provided by the manufacturer. Care shall be taken not to damage materials and equipment during handling.
- 14.3. Storage. The Contractor shall be responsible for the care and storage of material shall be stored in a suitable manner to protect them from the elements, pilfering, distortion, or any other damage.
- 15. SERVICES OF ERECTING ENGINEERS. NOT USED.

- 16. PURCHASE ORDERS. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review.
- 17. PROGRESS CHARTS submitted in accordance with the CONTRACT CLAUSES clause entitled "Schedule for Construction Contracts" shall indicate the required data for each of the principal features of the work.
- 18. PROJECT SIGN. The Contractor shall provide a new project sign constructed in accordance with Drawings Nos. 0D15-9A24 (01100-2) and 01100-3 appearing at the end of the Special Clauses Section. The sign shall be erected at the project site by the Contractor at the location determined by the Contracting Officer. The project sign shall remain the property of the Contractor and upon completion of the contract, shall be removed from the premises by the Contractor. (The project sign shall be left in place until completion of the contract work. No separate payment will be made for the sign.
- 19. AGGREGATE OR GRANULAR MATERIALS. NOT USED.
- GUARANTY. Unless subject to other warranties set out elsewhere in this contract, the equipment and supplies to be furnished under this contract shall be guaranteed for a period of one year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design and workmanship. Upon receipt of notice from the Government of failure of any of the guaranteed equipment during the guaranty period, new replacement parts shall be furnished and installed promptly by the Contractor at no additional cost to the Government. The Contractor shall submit a list of all equipment items which are specified to be guaranteed accompanied by a copy of each specific guarantee therefor. Also, the Contractor shall obtain and deliver to the Contracting Officer any guarantees of equipment or supplies which the subcontractors, manufacturers or suppliers would give in normal commercial practice. For each specific guaranteed item or normal commercial guaranteed item, the name, address, and telephone number of the prime contractor. the subcontractor who installed equipment, equipment supplier or distributor, and equipment manufacturer shall be furnished. The beginning and end dates of the guarantee period corresponding to the applicable specifications requirements for each guaranteed item shall be indicated.
- 21. SUPERVISION. NOT USED.
- **22. ACCOMMODATIONS FOR GOVERNMENT PERSONNEL.** NOT USED. See SECTION: SPECIAL CLAUSES Accommodation for Government Inspectors.

- 23. SUBMITTALS. In accordance with SECTION: SPECIAL CLAUSES, the Contractor shall submit the following items required by this section:
 - 23.1. Category I.
 23.2. Category II.
 (For Approval)
 Proposed methods of operation
 Progress charts
- 24. PAYMENT. No separate measurement or payment will be made for work referred to in this section. All costs of operations therefor shall be considered a subsidiary obligation of the Contractor to be included in the applicable contract unit price or prices.

SECTION 01300 **ENVIRONMENT PROTECTION**

INDEX

1.	GENERAL	8.	BURNING
2.	IMPLEMENTATION	9.	DUST CONTROL
3.	PRECONSTRUCTION SURVEY	10.	EROSION CONTROL
4.	PROTECTION OF LAND AREAS	11.	CORRECTIVE ACTION
5.	PROTECTION OF TREES AND SHRUBS	12.	POST-CONSTRUCTION CLEANUP OR
6.	PROTECTION OF WATER RESOURCES		OBLITERATION
7.	WASTE DISPOSAL		

- The Contractor shall perform all work in such manner as to minimize the polluting of air, water, or land, and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants.
- IMPLEMENTATION. Within 20 calendar days after Notice to Proceed and prior 2. to commencement of the work at the site, the Contractor shall:
- Submit in writing his detailed proposal for implementing the requirements for environmental pollution control specified herein.
- Meet with representatives of the Contracting Officer to review and alter his proposal as needed for compliance with the environmental pollution control program.
- PRECONSTRUCTION SURVEY. Prior to start of any on-site construction activities, the Contractor and the Contracting Officer shall make a joint condition survey after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs and grassed areas immediately adjacent to the site of the work and adjacent to his assigned storage area and access route(s) as applicable. This report will be signed by both the Contracting Officer and Contractor upon mutual agreement as to its accuracy and completeness.
- PROTECTION OF LAND AREAS. Except for any work or storage area and access routes specifically assigned for the use of the Contractor under this contract, the land areas outside the limits of permanent work performed under this contract shall, in accordance with CONTRACT CLAUSES clause: "Protection of Existing Vegetation, Structures, Utilities and Improvements," be preserved in their present condition. Contractor shall confine his construction activities to areas defined for work on the plans or specifically assigned for his use. In accordance with CONTRACT CLAUSES clause: "Operations and Storage Areas," storage and related areas and access routes required temporarily by the Contractor in the performance of the work will be assigned by the Contracting Officer. No other areas on Government premises shall be used by the Contractor without written consent of the Contracting Officer.

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5. PROTECTION OF TREES AND SHRUBS. CONTRACT CLAUSES clause: "Protection of Existing Vegetation, Structures, Utilities and Improvements," is hereby supplemented as follows: Except for trees or shrubs marked on the plans to be removed, or if not shown, those required for the Contractor to complete contract work and as agreed upon by the Contracting Officer, the Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without special authority. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages.

5.1. TREE PROTECTIVE STRUCTURES. Where, in the opinion of the Contracting Officer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his other operations, he may direct the Contractor to provide temporary protection of such trees by placing boards,

planks, or poles around them.

- 5.2. RESTORATION OF DAMAGED TREES. Any tree scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense. All scars made on trees not designated on the plans to be removed by construction operations shall be coated as soon as possible with an approved tree wound dressing. Trees that are to remain, either within or outside established clearing limits, that are damaged by the Contractor so as to be beyond saving in the opinion of the Contracting Officer, shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size.
- of fuels, oils, bitumens, calcium chloride, acids or harmful materials, both on and off the Government premises and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams while performing work under this contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters. Water used in on-site material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom.
- 7. WASTE DISPOSAL. As part of his proposed implementation under paragraph 2, and prior to on-site construction, the Contractor shall submit a description of his scheme for disposing of waste materials resulting from the work under this contract. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed areas. Where directed, contaminated ground shall be excavated, disposed of as approved, and replaced with suitable fill material, all at the expense of the Contractor.
- 8. BURNING. Air pollution restrictions applicable to this project are as follows. Material shall not be burned on the Government premises. If the Contractor elects to dispose of waste materials off the Government premises, by burning, he shall make his own arrangements for such burning area and shall, as specified in CONTRACT CLAUSES clause: "Permits and Responsibilities," conform to all local regulations.

- 9. **DUST CONTROL.** The Contractor shall maintain all excavations, embankments, stockpiles, access roads, waste areas, borrow areas, and all other work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Using Service or to others. Approved temporary methods consisting of sprinkling, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.
- 10. EROSION CONTROL. Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall be graded to control erosion within acceptable limits. Temporary control measures shall be provided and maintained until permanent drainage facilities are completed and operative. The area of bare soil exposed at any one time by construction operations should be held to a minimum. The Contractors shall reference the approved Erosion Control Plan for the project when addressing erosion issues. In addition, the Contractor shall adhere to the following requirements:
- 10.1. No disturbed areas will be left denuded for more than 14 calendar days unless other wise authorized by the Contracting Officer.
- 10.2. All erosion and sediment control measures are to be installed prior to or as the first step in grading.
- 10.3. All storm and sanitary sewer trenches not in streets or paved areas are to be backfilled, compacted, seeded, and mulched within 14 days after the trench has been excavated. No more than 500 linear feet are to be open at any one time.
- 10.4. All graded slopes greater than 3:1 shall be seeded and mulched within 7 days after grading.
- 10.5. All temporary earth berms, diversions, and sediment dams are to be seeded and mulched for temporary vegetative cover within 7 days after grading.
- 10.6. All erosion and sedimentation measures shall be maintained and/or modified as approved by the Contracting Officer during constructing to fulfill the intent of this specification and Erosion Control Plan.
- 10.7. Any disturbed area not paved, sodded, or built upon by 1 November, or disturbed after that date, is to be seeded within 15 days with oats, abuzzi rye, or equivalent and mulched with hay or straw mulch at the rate of 2 tons/acre.
- 10.8. Structural measures such as berms, dikes, traps, basins, will be installed and stabilized prior to any other grading, clearing, or disturbance of the site.
 - 10.9. Use temporary bridges or culverts for crossing streams.
- 11. CORRECTIVE ACTION. The Contractor shall, upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

12. POST-CONSTRUCTION CLEANUP OR OBLITERATION. In accordance with CONTRACT CLAUSES clause: "Cleaning Up," the Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed areas shall be graded and filled and the entire area seeded.

SECTION 01310 DUST CONTROL

INDEX

1. GENERAL REQUIREMENTS

SUBMITTALS

2. RELATED SECTIONS

- DUST CONTROL
- 1. **GENERAL REQUIREMENTS.** The Contractor shall conduct operations and maintain the project site so as to minimize the creation and dispersion of dust, vapors, and odors.
- 2. RELATED SECTIONS.
 - 2.1. Section: SPECIAL CLAUSES.
 - 2.2. Section: SPECIAL PROJECT PROCEDURES.
 - 2.3. Section: SAFETY, HEALTH AND EMERGENCY RESPONSE.
- 3. SUBMITTALS. In accordance with Section: SPECIAL CLAUSES, the Contractor shall submit data for the following item required by this section.
 - 3.1. Category I.
- 3.1.1. Dust Migration Control Plan. The Contractor shall describe site procedures to minimize the creation and dispersion of dust during construction activities.
- 4. DUST CONTROL.
 - 4.1. Water Application.
- 4.1.1. Material. Provide clean water, free from salt, oil, and other deleterious materials.
- **4.1.2. Equipment.** Apply water with equipment consisting of a tank, spray bar, and pump with discharge pressure gauge.
- 4.1.3. Methodology. Arrange spray bar height above grade; arrange nozzle spacing and spray pattern to provide complete coverage of ground with water.

SECTION 01320 SPILL AND DISCHARGE CONTROL

INDEX

- 1. GENERAL REQUIREMENTS
- 2. RELATED SECTIONS

- 3. SUBMITTALS
- 4. DISCHARGE CONTROL PLAN

1. GENERAL REQUIREMENTS. This section describes the minimum procedures the Contractor shall take in the event of spills during site work.

- 1.1. Spill and Discharge Control Plan. The Contractor shall develop, implement, maintain, supervise, and be responsible for a Spill and Discharge Control Plan. This plan shall provide contingency measures for potential spills of construction-related materials such as diesel fuel and discharges from dewatering of contaminated surface water pits on or surrounding the existing cap.
- 1.2. Facilities. The Contractor shall provide methods, means, and facilities required to prevent contamination of soil, water, atmosphere, uncontaminated structures, equipment, or material by the discharge of bulk wastes from spills due to Contractor's operations.
- 1.3. Equipment. The Contractor shall provide equipment and personnel to perform emergency measures required to contain any spillages and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material shall be properly disposed of at the Contractor's expense.
- 1.4. Decontamination. The Contractor shall provide equipment and personnel to perform decontamination measures that may be required to remove spillage from previously uncontaminated structures, equipment, or material. Decontamination residues must be properly disposed of at the Contractor's expense.
- 2. RELATED SECTIONS.
 - 2.1. SECTION: ENVIRONMENTAL PROTECTION.
 - 2.2. SECTION: SPECIAL PROJECT PROCEDURES.
- 3. SUBMITTALS. In accordance with SECTION: SPECIAL CLAUSES, the Contractor shall submit data for the following items required by this section.
 - 3.1. Category I.
 - 3.1.1. Spill and Discharge Control Plan.
 - 3.2. Category II. For information only.
 - 3.2.1. Spill Incident Reports.
- 4. SPILL AND DISCHARGE CONTROL PLAN. Contractor shall submit a Spill and Discharge Control Plan within 21 days after receiving Notice of Award. The plan shall contain:
 - 4.1. Procedures for Containing Dry and Liquid Spills.
 - 4.2. Absorbent Material Available On-Site.
 - 4.3. Storage of Spilled Materials.

- 4.4. Decontamination Procedures. Decontamination procedures may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level. Acceptable level shall be determined by the Contracting Officer in consultation with the USEPA. Complete cleanup may require removal of contaminated soils. Personnel decontamination shall include showers and cleansing of disposing of clothing and equipment. All contaminated materials such as soil and wood that cannot be decontaminated must be properly containerized, labeled, and properly disposed of as soon as possible.
- 4.5. Spill Incident Report. A written report detailing the spill or discharge shall include, at a minimum, the cause and resolution of incident, outside agencies involved, and date occurred. The report shall be submitted to the Contracting Officer within 48 hours of the incident. The Contractor shall document all spills on the site Drawings and submit the Drawings to the Contracting Officer at project completion.
- **4.6.** Notification. The Contracting Officer shall be notified immediately of a spill or discharge.

ZERO ACCIDENTS

SECTION 01350 CHEMICAL QUALITY MANAGEMENT

INDEX

- 1. SCOPE
- 2. APPLICABLE PUBLICATIONS
- CONTRACTOR'S REQUIREMENTS
- 4. SUBMITTALS

- 5. LABORATORY VALIDATION TIMETABLE GUIDELINES
- 6. ATTACHMENTS
 - A. SAMPLE FORMAT Request for Evaluation of Commercial Laboratory
 - B. FORM Cooler Receipt Form
- 1. SCOPE. This section covers the specifications to govern chemical sampling, sample handling, custody, documentation, and analytical procedures to be used during the construction of the earthen cap and flood retention basin. This information shall be used by the Contractor as guidance in the development of a Contractor's Chemical Data Acquisition Plan (CDAP). The CDAP is developed to assure that the chemical data collected during this project are scientifically and legally defensible.
- 2. APPLICABLE PUBLICATIONS. The Contractor shall review and use, as appropriate, all applicable State and Federal publications and requirements in the development of the CDAP. At a minimum, the following applicable publications form a part of this specification to the extent referenced:
- 2.1. U.S. Army Corps of Engineers "Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Waste", Appendix F of ER1110-1-263, October 1990.
- 2.2. Test Methods for Evaluating Solid Waste, USEPA Office of Solid Waste, SW-846, 3rd Edition, November 1986, revised December 1987.
- 2.3. TCLP as described in 40CFR, Part 261, Appendix II, 7-1-90. See also Federal Register, Vol. 55, 11862, 3-39-90 and Vol. 55, 26987, 6-29-90.
- 2.4. Methods for Chemical Analysis of Water and Wastes, USEPA Environmental Monitoring and Support Laboratory, EPA 600/4-79-020, Revised March 1983.
- 2.5. Standard Methods for the Examination of Water and Wastewater 16th Edition, 1985.
- 2.6. Characterization of Hazardous Waste Sites A Methods Manual: Volume II Available Sampling Methods, EPA-600/4-84-076, 2nd Edition, December 1984.
- 2.7. U.S. Army Corps of Engineers, Interim Standard Air Monitoring Guide for Hazardous Waste Sites, June 1984.
- 2.8. Chemical Data Quality Management for Hazardous Waste Remedial Activities ER1110-1-263, October 1990. U.S. Army Corps of Engineers.

CONTRACTOR'S REQUIREMENTS.

3.1. The Contractor shall prepare a Chemical Data Acquisition Plan (CDAP) which describes quality assurance (QA) and quality control (QC) procedures and a quality management (QM) program. The CDAP shall address all requirements of State, EPA, USACE, NIOSH and OSHA regulations.

- 3.2. The Contractor shall submit his CDAP to the Contracting Officer for review within 30 calendar days after Notice to Proceed and prior to commencement of the work at the site. The Contractor shall make all necessary changes as required by the Contracting Officer, until the CDAP is accepted, by written approval, by the Contracting Officer. Sampling will not be permitted until the CDAP has been approved by the Contracting Officer.
- 3.3. The Contractor's CDAP shall include at a minimum the following elements:

3.3.1.

- 1. Title Page
- 2. Table of Contents
- 3. Project Description
- 4. Contractor Laboratory Requirements
- 5. Project Organization and Quality Management Responsibilities
- 6. Chemical Data Quality Objectives
- 7. Laboratory Qualifications
- 8. Analytical Methods/Procedures
- 9. Internal Quality Control Checks
- 10. Data Assessment and Validation
- 11. Corrective Action
- 12. Calibration Procedures and Frequency
- 13. Preventative Maintenance
- 14. Data Reporting
- 15. Data Management
- 16. Contractor Reports
- **3.3.2.** The organizational structure of the Contractor's and all subcontractor's quality management (QM) personnel, including their:
 - names
 - resumes
 - responsibilities
 - authorities
 - qualifications
- 3.3.3. A copy of a letter signed by a responsible corporate officer of the Contractor describing the authority and responsibilities of the QM manager.
- 3.3.4. Provision for a properly equipped (USACE validated and EPA certified) laboratory and experienced staff, including a description of facilities and instrumentation, and names and qualifications of analytical and technical personnel.
- 3.3.5. Proposed sample collection, handling, storage, transfer and sampling equipment and procedures, including chain of custody procedures and equipment decontamination procedures.
 - **3.3.6.** Proposed analytical methods.
- **3.3.7.** Schedule of field and laboratory inspections by the Contractor.
- 3.3.8. Procedures for assessing precision, accuracy, degree of representation, comparability and completeness of samples and data, including performance audits.
 - **3.3.9.** Proposed protocols for corrective measures.
- ${\bf 3.3.10.}$ Planned preparation of daily and project summary quality control reports.

3.3.11. A listing of all laboratory methods, procedures and documents. The Contractor shall not begin any analytical work until the Contracting Officer is satisfied that all laboratory procedures are in accordance with the contract requirements and that the laboratory to be used is validated.

3.3.12. A statement that the sampling program is in accordance with

the contract requirements.

3.4. CONTRACTOR LABORATORY REQUIREMENTS.

approved EPA certified, USACE validated laboratory(ies) to perform specified services and analyses. The laboratory performing the air analyses by NIOSH Methods must be an American Industrial Hygiene Association (AIHA) accredited and/or a successful National Institute for Occupational Safety and Health (NIOSH) proficiency test program participant for the appropriate analyses. Laboratory capabilities shall be provided for the duration of the construction of the earthen cap and flood retention basin. To be USACE-validated, the facilities shall meet at a minimum the requirements and procedures of Paragraph "USACE Commercial Laboratory Validation Procedures." Section 5.0 is provided as a guideline for the validation initiation procedures, implementation procedures, and approximate timetable. The Contractor shall ensure the laboratory(s) are validated by USACE before beginning sample analyses.

3.4.2. The Contractor shall be aware that the laboratory evaluation process can be time consuming. If the Contractor selects a laboratory which does not have a current (within one year) USACE validation for all analytes and matrices for which the Contractor plans to have analyzed by that laboratory, then that laboratory must be validated prior to approval of the Contractor's CDAP. The Contractor shall submit the names of all testing laboratories to the Contracting Officer for approval as soon as possible after contract award to ensure that the laboratory evaluation procedure does not cause a delay in the

project schedule.

3.4.2.1. The Contractor shall coordinate with the Resident Engineer of the local USACE Construction Division/District to initiate the commercial laboratory validation process as described in the Paragraph: "Initiation Procedure."

3.4.3. Samples may not be subcontracted to another laboratory without knowledge and approval of the Contracting Officer and unless the second

laboratory is validated for the parameters concerned.

3.4.4. The Contractor's laboratories shall be required to successfully analyze performance audit samples to be supplied through the USACE CEMRD-EP-EC. If required by USEPA, the Contractor's laboratory shall be required to successfully analyze performance evaluation samples supplied by the USEPA.

3.4.5. After analysis of the analyte and matrix specific performance audit (PA) samples has been successfully completed, a representative of CEMRD-EP-EC and/or the USACE QA Laboratory (acting as an agent for CEMRD-EP-EC) reserves the right to conduct an approximate 6-hour on-site laboratory inspection.

3.4.6. The Contractor shall provide for prompt sampling and turn-

around of analysis so as not to delay the project.

3.4.7. USACE Commercial Laboratory Validation Procedures.

3.4.7.1. Initiation Procedure. The Contractor shall coordinate with the Resident Engineer of the local USACE Construction District/Division to provide the following information to initiate the contract laboratory validation process.

3.4.7.1.1. Name of the project

3.4.7.1.2. Contract number of the project

3.4.7.1.3. Analytical methods to be used

3.4.7.1.4. Number of samples of each matrix

3.4.7.1.5. Estimated dates of sampling

3.4.7.1.6. Any special certification

requirements

The above listed information shall be provided in writing by memorandum or by using the form, "Request for Evaluation of Commercial Laboratory" (see SAMPLE FORMAT at the end of Section 5.0.

3.4.7.2. Implementation Procedure. Ordinarily each step in this sequence is completed before the subsequent step is initiated.

3.4.7.2.1. Step 1 - Submittal and Review of Laboratory Qualifications. The laboratory must submit its qualifications. This submittal may be in the form of an off-the-shelf Quality Management Manual (LQMM) or in some other format. Blank information tables can be requested for the USACE-MRD Chemical Review Branch (CEMRD-EP-EC). The submittal includes the following information:

3.4.7.2.1.1. Lab name, address, POC, phone number, lab age, number of employees, square footage, etc.

3.4.7.2.1.2. Type of analytical work

routinely performed.

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and floor plan.

3.4.7.2.1.3. Organizational chart

3.4.7.2.1.4. Special capabilities.

Previous evaluation/

3.4.7.2.1.5. validation program and most recent results.

3.4.7.2.1.6. List of EPA and USACE

contracts held in the last two years.

3.4.7.2.1.7. Copies of laboratory

certificates for other environmental programs or states.

s or states.
3.4.7.2.1.8. Chart of employees

training and experience or chronological resumes.

3.4.7.2.1.9. Copies of QA manual

and/or in-house SOPs for analyses to be conducted for the contract.

3.4.7.2.1.10. List of the instruments

to be used for the contract and date of purchase.

Audits. The Government will provide the contract laboratory with performance audit (PA) samples. The analytical results shall be submitted as directed within 20 working days after receipt of the PA samples. Failure to analyze these samples correctly and within the required time frame may result in termination of the validation process. If any of the results are unacceptable, a second set of PA samples may be allowed. Analytical results for a second set of PA samples (if approved) typically must be submitted within 5 working days after receipt of samples. The performance audit samples are method and matrix specific. The results are considered passing if a particular method has no results outside three standard deviations as determined by the Government, and no more than two parameters outside two standard deviations.

3.4.7.2.3. Step 3 - Laboratory Inspection. When the "Evaluation of the Commercial Laboratory" and "PA" have been successfully completed, the Government reserves the right to conduct an approximate 6-hour on-site laboratory inspection. An exit interview will be held with laboratory personnel in which any problems encountered are discussed. Required inspection

is intended to assist in determination of probable compliance of the work with the requirements, but does not relieve the Contractor of the responsibility for those compliances, or for general fulfillment of requirements of Contract Documents. Specified inspections are not intended to limit Contractor's quality control program.

3.5. PROJECT ORGANIZATION AND QM RESPONSIBILITIES.

3.5.1. The Contractor shall provide an organizational chart outlining assigned individuals in the Quality Management (QM) hierarchy. Any subcontractors selected must also list personnel with QC responsibilities. The project organization must address Contractor-subcontractor QC interactions. All individuals listed must also be accompanied by a description of their QC responsibilities for the project.

3.5.2. The Contractor shall name a Project QC manager. The QC manager shall implement the CDAP for the project. Specific supervision and inventory of the QC manager's responsibilities include, but are not limited to:

- Ensuring that field personnel are familiar with and adhere to proper sampling procedures, field measurement techniques, and sample identification and chain-of-custody procedures,

 Coordinating with the analytical laboratory for the receipt of samples, the reporting of analytical results and recommending corrective actions to correct deficiencies in the analytical protocol or sampling,

 Ensuring that split, duplicate and appropriate blank samples are provided to the USACE QA laboratory as necessary.

3.5.2.1. The QC Manager shall have at least one year of experience in the review of chemical data. The QC Manager shall assess the data quality and implement corrective actions in situations where unacceptable data has been generated.

3.5.3. The QA/QC manager at the analytical laboratory has the responsibilities as described in Section 3.8. The Lab QA/QC manager shall ensure that only experienced operators shall operate analytical instruments for the Millcreek Site samples.

3.5.4. The Contractor's QC manager shall report to a Senior Company Officer. This officer shall provide a signed letter to the QC manager describing the QC manager's responsibilities and authorities in the QM program. A copy of this letter shall be included in the CDAP.

3.5.5. The Contractor's laboratory shall provide detailed resumes of the laboratory's QC personnel. The resumes shall describe relevant education, years and types of work experience, and specifically describe instrument experience. The personnel listed shall include all applicable technicians, chemists, supervisors and QC managers.

3.5.6. Chemical Data Quality Objectives. This section of the CDAP shall include a description of the general scope of work and relevant background information as it relates to the acquisition of chemical analytical data. State the objectives of the project: what questions must be answered and what decisions must be made. Describe the level and extent of chemical data required to answer questions and support decisions during the project: the approach for sample collection, sample analysis, and QA/QC which will result in the required chemical data. The extent of analytical effort and data validation procedures to be required must be specified. Guidance for this requirement can be found in "Data Quality Objectives for Remedial Response Activities", EPA 540/G-87/003.

3.6. SAMPLING AND SAMPLE CUSTODY PROCEDURES.

- 3.6.1. The Contractor shall prepare a sampling plan which thoroughly addresses procedures to be used to obtain representative soil, chemical waste, air and sediment, descriptions of sampling equipment, containers, and sample size. The Contractor must address the entire sample protocol in the CDAP.
- 3.6.2. The Contractor shall prepare his sampling program and sample custody procedures in accordance with appropriate EPA and USACE guidelines referenced in Paragraph 2 - Applicable Publications. If any conflicts arise between different agency procedures the Contracting Officer will decide which method is to be used.
- 3.6.3. The CDAP shall include a detailed description of techniques used in selecting sampling locations. Sampling and analytical procedures used must be identified, including sample preparation and analytical methodologies, as in EPA/SW-846 and EPA 600/4-79-020. The Contractor shall use the most recent version of all guidance documents when preparing the CDAP and analytical protocol.
- 3.6.4. A bound field log book shall be maintained in which to record daily field sampling activities. All entries shall be made in indelible ink. Incorrect entries shall be corrected by a single stroke through the error and shall be verified with the recorder's initials. Entries to the log book shall include but not be limited to the following:
 - Date
 - Start and finish times of the work
 - Summary of work performed (including samples collected)
 - Names of personnel presentNames of visitors

 - Observations and remarks
 - Signature of person making entry
- The sampling personnel shall be trained by the Contractor in the specific procedures to be used for this project. The Contractor shall provide the qualifications of the sampling team personnel.
- 3.6.6. The Contractor shall follow the chain of custody procedures outlined in the USACE "Sample Handling Protocol for Low, Medium and High Concentration Samples of Hazardous Waste." These procedures provide a method of completing and transferring chain-of-custody records. Use of the chain-ofcustody guidelines creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and its introduction as evidence. The guidelines are applicable to chain-of-custody control for samples collected during project activities.
- The Contractor shall ensure that the following custody 3.6.7. objectives are met:
 - All samples are uniquely identified.
 - The correct samples are tested and are traceable to their source.
 - Important sample characteristics are preserved.
 - Samples are protected from loss or damage.
 - Any alteration of samples from preservation or filtration is documented, and
 - A record of sample integrity is established and maintained through the entire custody process.
- Chain-of-custody records begin in the field at 3.6.7.1. the time of sampling. A person is in custody of a sample if the sample is:

- in that person's physical possession;
- in view after being in that person's physical possession;
- placed in a locked repository by that person, or;
- placed in a secure, restricted area by that person.
- 3.6.7.2. The Contractor shall complete chain-of-custody form(s) at the time of sample collection. Chain-of-custody form(s) shall accompany the samples to the laboratory.

3.6.7.3. The Contractor shall ensure that a chain-of-custody record is maintained on all samples. A chain-of-custody record is a printed three-part form that accompanies a sample or group of samples as custody is transferred from person to person. Chain-of-custody records document custody transfer from person to person. A chain-of-custody record is a controlled document.

3.6.7.4. As soon as practical after sample collection, the following information shall be entered on the chain-of-custody form. All information shall be recorded in ink.

- Project number. Enter the alphanumeric designation assigned by the field team that uniquely identifies the project site.
- Project name. Enter the site name.
- Samplers. Sign the name(s) of the sampler(s).
- Station number. Enter the sample number for each sample in the shipment. This number appears on the sample identification label.
- Date. Enter a six-digit number indicating the year, month, and day of sample collection.
- Time. Enter a four-digit number indicating the military time of collection; for example, 1354.
- Composite or grab. Indicate the type of sample.
- Station location. Describe the location where the sample was collected.
- Number of containers. For each sample number, enter the number of sample bottles that are contained in the shipment.
- Type of sample preservation.
- Remarks. Enter any appropriate remarks.
- 3.6.7.5. Transferring Custody to Common Carrier. Transfer custody of samples to a common carrier as follows:
 - Sign, date, and enter time under "Relinquished by" entry.
 - Enter name of carrier (e.g., UPS, Federal Express) under "Received by."
 - Enter bill-of-lading or airbill number under "Remarks."
 - Place the original of the chain-of-custody form in the appropriate sample shipping package. Retain a copy with field records.
 - Sign and date the custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field.

- Wrap the seal across filament tape that has been wrapped around the hinges of the shipping package at least twice.
- Fold the custody seal over on itself so that it sticks together.

Complete other carrier-required shipping papers.

3.6.7.6. In instances when the Common carrier will not accept responsibility for handling chain-of-custody forms, the Contractor shall ensure that the record is packed within the sample package.

- 3.6.8. Sample Identification. The Contractor shall require that all samples be identified with a sample label in addition to an entry on a chain-of-custody record. Indelible ink shall be used to complete sample labels, then labels will be covered with clear plastic waterproof tape. The label shall be identified upon receipt by the laboratory and cross-referenced to the chain-of-custody record.
- 3.6.9. Sample Labels. The Contractor shall provide the following information on a sample label for each sample bottle:
 - Site Name
 - Job Number
 - Unique Sample Number
 - Sample Description
 - Company Name
 - Parameters to be Analyzed
 - Date
 - Time
 - Preservation Technique Employed

Sample labels shall be attached to the sample bottles.

- 3.6.10. Sample Shipment. Custody of samples shall be maintained through the shipment of samples to the selected laboratory(ies). All samples shall be packaged and shipped daily to ensure that no sample is held at the site more than 24 hours. Samples shall be packaged for shipment in accordance with USACE "Draft Sample Handling Protocol for Low, Medium and High Concentration Samples of Hazardous Waste".
- 3.6.11. Cooler Receipt Form. When the sample arrives at the laboratory following shipment, the sample is received by the sample custodian. Any inconsistencies shall be noted on the Cooler Receipt Form. Laboratory personnel shall notify the Contractor's Quality Control Officer and the Project Manager immediately if any inconsistencies exist in the paper work associated with the samples. The Contractor shall use the USACE "Cooler Receipt Form" to document the quality of the field sampling, sample handling, packing and shipping, and sample custody procedures. A copy of the Cooler Receipt Form follows Paragraph 5 of this specification.
- **3.6.12.** Laboratory Custody Procedures. Once the samples arrive at the labs via the various shipment methods, the Contractor shall ensure that custody of the samples shall be maintained by laboratory personnel. The laboratory shall, at a minimum, document the following stages of analysis:
 - Sample Receipt
 - Sample Extraction/Preparation
 - Sample Analysis
 - Data Reduction
 - Data Reporting
- 3.6.13. All sampling equipment and sample containers shall be certified clean by the Contractor's laboratory or precleaned in accordance with

approved EPA methods. All sampling containers shall be obtained from a source that certifies them to be clean and that performs appropriate QC analysis to ensure cleanliness.

3.6.14. The Contractor shall collect all decontamination fluids and dispose of them into on-site depressions (See Section 02221, Paragraph 3.3 "Dewatering").

3.7. SAMPLING PROGRAM ORGANIZATION.

3.7.1. The Contractor shall establish the sampling program organization to be followed during the field sampling program.

3.7.2. The Contractor shall list any and all subcontractors with

responsibility for any field sampling.

3.7.3. Field QA/QC Program. The Contractor shall be responsible for the collection of QA/QC samples to independently evaluate whether analytical data are within control limits.

3.7.3.1. Equipment rinsates (QA and QC) shall be prepared in the field by passing Type II Reagent Water through sampling equipment after decontamination and prior to sample collection to assure that proper decontamination was performed. However, if dedicated sampling equipment is used or the sample is collected directly into the sample container, then no equipment rinsate blank is required. The Type II Reagent Water shall be supplied by the Contractor's laboratory. Equipment rinsate samples apply to liquid samples only. The rinsate blanks shall be at the rate of 10% of the aqueous field samples.

3.7.3.2. Two sets (QA & QC) of splits or duplicates, as

appropriate for the sample matrix and analytical parameters, shall be collected at a rate of 10 percent of the samples collected which require analysis for offsite disposal purposes and for samples collected for air analysis by EPA Methods. Air samples for QA/QC shall be collected from a downwind air monitoring station. One set of duplicates shall be sent to the Contractor's laboratory for analysis (QC) and the other set of duplicates sent to the USACE QA lab as designated by the Contracting Officer. The Contractor shall notify the USACE QA Lab of the beginning of the sampling activities approximately 7 days prior to the QA Sample Shipment. Saturday arrival shall be cleared with the QA lab at least twenty-four (24) hours in advance. The QA Lab shall also be notified when the final shipment of QA Samples has been sent at the project end. The Contractor shall furnish all material and equipment necessary to obtain all of the required samples. includes the sample bottles, preservatives, ice bags, and coolers for the Contractor's laboratory as well as the USACE QA Lab. Transportation of the samples to the respective labs shall be at the Contractor's expense. The coolers used for shipping the QA Samples will be returned to the address indicated by the Contractor.

3.7.3.3. The Contractor shall specify in the CDAP all equipment decontamination procedures to be followed in the sampling program.

3.7.3.4. The Contractor shall specify in detail in the CDAP all sample preservation methods to be followed during the sample program.

3.7.3.5. The Contractor shall specify in the CDAP the procedure to be employed to transport field samples to the Contractor's laboratory and the USACE QA laboratory.

3.7.3.6. The Contractor shall specify the name of the container supplier.

3.7.3.7. The Contractor shall specify the methods of compliance with appropriate DOT, EPA and USACE shipping requirements.

3.8. ANALYTICAL METHODS AND PROCEDURES.

- 3.8.1. The analytical methods used shall be in accordance with SW-846, 3rd Ed. wherever possible. If an appropriate method is not provided in SW-846, the following sources shall be used for the appropriate testing methods: other EPA references, ASTM, NIOSH (for air methods unless specific EPA methods are specified). Generally, nonstandard methods are not allowed. In special cases that require the consideration of nonstandard methods, the contract laboratory shall be prepared to provide method validation data. The use of proposed nonstandard methods require prior approval of the Contracting Officer.
- 3.8.2. The Contractor shall list and provide references for the specific analytical methods and procedures which will be required to perform all soil, air, sediment, water, and waste chemical analyses associated with this project. Each of the following details shall be described and referenced unless already clearly covered by the EPA, ASTM, or NIOSH method, in which case it should be referenced fully.

3.8.2.1. Analytical Instrumentation. The apparatus to be used for all analyses shall be identified including:

- Specific field and laboratory instrumentation, including manufacturers, model and detectors.
- Operating parameters of the instruments and identification of any applicable accessories, such as chromatography columns.
- Laboratory chemicals necessary to perform analyses, including list of sources and purity.
- Standards needed for calibration.

3.8.2.2. Analytical Methodology Details. Published analytical methods used for this contract shall be properly referenced. Any method proposed which is not published shall be described in such detail as to provide the following information:

- Applicability of the method. Specific chemicals or classes of chemicals and appropriate concentration ranges and matrices.
- Sensitivity and detection limits of each method which must be sufficient for the objectives of the analysis.
- Possible matrix or chemical interferences.
- 3.8.2.3. Analytical Procedures to be used including:
- A detailed step-by-step procedure for analyzing samples, as well as instrument calibration procedures, or a reference to the appropriate published method.
- The procedures used to validate the method used when they are not specified in or differ from those described in the method. These procedures may include method blank analysis, calibration checks, surrogate recoveries, matrix spike recoveries, and duplicate sample analysis.
- Procedures for sample extraction for all matrices shall follow EPA protocols specified in SW-846, 3rd edition, if provided. Sample extraction procedures not provided in SW-846 shall be taken from other described references as appropriate.
- 3.8.2.4. Calculations. Describe in detail the manner used to obtain sample concentrations from responses obtained in the analysis as they appear in the raw data.
 - QUALITY CONTROL AND QUALITY ASSURANCE SAMPLES.

- 3.9.1. Internal Laboratory QC Check Samples. The Contractor's laboratory(s) shall provide a system of internal quality control checks designed to establish technically sound criteria for each measurement parameter which will serve to accept or reject data in a uniform and systematic manner. Ten percent (10%) to twenty percent (20%) of the total number of a given type of sample shall be devoted to internal QC checks. These checks are designed to insure that the sample preparation procedures and the analytical methods are correctly followed to achieve accuracy and precision in the analytical system. The QC check samples include laboratory blanks, laboratory duplicates, matrix spikes, matrix spike duplicates, calibration verification, surrogate standards, reference standards and performance evaluation samples.
- **3.9.2. Field QA/QC Samples.** Field quality assurance and quality control samples shall be collected and analyzed as previously described in Paragraph: Field QA/QC Program, in Section 3.7.

3.10. DATA ASSESSMENT AND VALIDATION.

- 3.10.1. Criteria for data acceptance shall address the following items in a concise manner. Requirements for accuracy, sensitivity and precision shall be no less stringent than the guidelines listed in EPA publication SW-846.
- 3.10.2. Accuracy of Each Analytical Method. Discussion shall include the accuracy of each analytical method as applied to a given analytical instrument for given analysis in given matrices and the degree of accuracy required for this project. Analytical methods shall be validated for the same or similar matrix. This may require discussion of instrumentation, reference standards or spiked samples, sample collection, analytical procedures, calibration procedures and performance evaluation samples.
- 3.10.3. Sensitivity of Each Analytical Method. Discussion shall include the sensitivity of each proposed analytical method in each matrix involved at this site and the sensitivity required for this project. Sensitivity shall be related to detection levels required for this project. Calibration methods for determining detection levels shall be addressed, as well as a discussion of the appropriate contract required detection limits.
- **3.10.4.** Precision of Each Analytical Method. Discussion shall include the analytical methodology used to determine the precision of each analytical method using duplicate samples and instrumentation checks, and the degree of precision necessary for this project. In determining the precision of the analytical method for given analyses, the exact sample matrix shall be taken into account.
- **3.10.5.** Data Comparability. Discussion shall include the methodology for data comparison, listing specific units, equations and data formats to be used.
- 3.10.5.1. Checks for transmittal, data reduction and reporting errors.
- 3.10.5.2. Any process used for data validation must be close to the origin of the data, while being independent of the data production process.
- **3.10.5.3.** Supportive rationale that samples are representative of the matrix being analyzed or the site location.
 - 3.11. CORRECTIVE ACTION
- **3.11.1.** The CDAP shall also include a discussion of the corrective action to be taken if values are questionable or outside the established control limits. The following items shall be addressed in this section of the CDAP.

- 3.11.2. Limits of data acceptability for each analytical parameter and sample matrix along with the corrective action to be taken when these limits are exceeded.
- 3.11.3. Information regarding the poor precision shall be documented if the limits are exceeded.
- 3.11.4. Personnel responsible for initiating and performing the corrective action shall be indicated.

3.12. CALIBRATION PROCEDURES AND FREQUENCY.

- 3.12.1. The Contractor shall describe in detail, or present references to, the procedures for the calibration of all analytical instrumentation to be used either in the laboratory or on-site (including the frequency of these checks) to assure that the equipment is functioning optimally. Information shall be provided on instrumentation manufacturer, model and accessories.
- **3.12.2.** The calibration procedures and instrumentation shall be consistent with the sample analysis requirements of this project and applicable EPA approved methods.

3.13. PREVENTIVE MAINTENANCE.

- **3.13.1.** The Contractor shall provide and describe in the CDAP a system for the preventive maintenance of all analytical equipment and instrumentation to be used either in the laboratory or on-site (including the frequency of these maintenance operations).
- 3.13.2. Detailed records of these operations shall be maintained and must be available for inspection by the Contracting Officer on request.
- 3.13.3. Maintenance operations shall be performed by qualified maintenance personnel. Experience and qualifications of these personnel shall be included in the CDAP.
- 3.14. DATA MANAGEMENT. The Contractor shall describe the specific system to be used in handling the raw data from the time of analysis until the time of reporting. As a minimum the Contractor shall address the following items for each analytical method and major measurement parameter anticipated during this project.
- 3.14.1. The data analysis scheme, including units and equations, required to calculate concentrations or the value of the measured parameter.
- **3.14.2.** The principal criteria used to assure data integrity during collection and reporting.
 - 3.14.3. Plans for treating outliers or other questionable data.
- 3.14.4. Description of the data management systems including, but not limited to, the collection of raw data, data storage, and data quality assurance.
- 3.14.5. Identification of raw data, data storage and data quality control and quality assurance documentation.
- **3.14.6.** Identification of individuals to be involved in the reporting sequence.
- 3.15. DATA REPORTING. Data generated by the analytical testing shall be supplied to the USACE-NED QA Laboratory through the Contracting Officer both in hard copy and electronically as it becomes available, along with the weekly information supplied to the Contracting Officer in the Contractor Daily Quality Control Reports, or on an alternative schedule which is agreeable to the Contracting Officer and the USACE-NED QA Laboratory. The Contractor shall report in writing within two working days any significant problems with analytical procedures, instrument calibrations or QC limit upsets along with the corrective actions that have been taken to solve the problems. The Contractor shall

describe in the CDAP how and at what frequencies the Contractor will submit data

to the Contracting Officer.

3.15.1. Reporting Examples. The Contractor's CDAP shall contain general data and internal quality control data reporting examples for project specific analytes for approval by the Contracting Office during the technical review of the document.

3.15.2. Recommended Data Format. If the Contractor wishes to use a reporting format other than the one described, the Contractor may propose an alternative format in the CDAP. It is recommended the Contractor consult with

the USACE-NED QA Laboratory before proposing an alternative format.

3.15.2.1. Hard Copy Format. The suggested format is the CLP reporting forms or equivalent) as given in the most recent issue of the Statement of Work for Inorganic Analysis (Document No. ILM01.0) and the Statement of Work for Organic Analysis (Document No. OLM01.0) from the USEPA Contract Laboratory Program (CLP).

Although chromatograms, spectra, and other raw data should not be enclosed in the hard copy results, the "Contractor's laboratory(s) or the Contractor shall retain appropriate information electronically for a minimum of 3 years such that a full CLP reporting package can be

generated upon request of the Contracting Officer.

3.15.2.2. Electronic Format. The recommended analytical data reporting format for electronic deliverables is spreadsheet ASCII, text file format, (Lotus 1-2-3 or equivalent) with the sample ID as columns and test parameters as rows. The recommended recording media is 5.25 inch floppy DS/DD diskettes which are readable on IBM or IBM-compatible computers. If the Contractor wishes to use a reporting format other than the one described, the Contractor is urged to consult with the USACE-NED Laboratory.

3.15.3. Minimum Data Reporting Requirements. Hard copy reports shall contain the following information with all analytical results presented in

tabular form:

a. Case narrative

b. Quality assurance review by the Laboratory QA Officer

c. Listing of analytical methods

d. Cross reference list of field sample IDs and laboratory sample numbers along with the corresponding sample IDs of QA samples sent to the USACE-NED Laboratory

e. Sample results

f. Field blank results (including rinsates and trip blanks) along with a list of corresponding field sample IDs

g. Field QC duplicate/split sample results

h. Laboratory duplicate results

i. Method blanks results

j. Laboratory Control Standards (when run) along with control limits for LCSs

k. Dates of sampling, extraction, and analysis

1. Surrogate spike concentrations and surrogate recoveries

m. Matrix spike and matrix spike duplicate recoveries

n. Laboratory control limits for surrogates, matrix spikes (accuracy) and matrix spike replicates (precision)

o. Copies of field notes

p. Copies of chains-of-custody

q. Copies of cooler receipt forms (available from USACE-NED Laboratory)

40285-33-2/CD

01350-13

- r. Relative Percent Differences (RPDs) for all field duplicate, laboratory duplicate, and matrix spike duplicate pairs
- Evaluations of surrogate recoveries, precision, and accuracy.

General Organic and Inorganic Reporting - For each analytical method run, the Contractor shall report all analytes for each sample as a detected concentration or as less than the specific limits of quantitation. Generally, all samples with out-of-control spike recoveries which are being blamed on matrix interferences shall be designated as such. All soil, sediment and solid waste sample results shall be reported on a dry-weight basis with percent solids also reported. The Contractor's laboratory(s) shall also report dilution factors. Any out-of-control surrogate spike recoveries (as defined in the specified method) shall result in the sample being re-run (both sets of data are to be reported) or data being flagged. Matrix spike recoveries shall be reported for all organic and inorganic analyses. When matrix problems cause missed recovery windows or otherwise out-of-control situations, the Contractor's Laboratory(s) shall report the sample/parameter specific data designated as such.

4. SUBMITTALS. The Contractor shall submit the following reports. 4.1. CATEGORY I.

4.1.1. CDAP. The Contractor shall prepare and submit a Chemical Data Acquisition Plan (CDAP) to the Contracting Officer at least five working days prior to the Pre-Work Conference. The Contractor shall not conduct any chemical sampling or data analysis until the CDAP is reviewed and approved by Corps personnel. The Contractor must use an MRD validated laboratory for all chemical sampling and analysis activities.

4.1.2. Daily Quality Control Report.

4.1.2.1. At the conclusion of each day of work involving sampling, the Contractor shall complete a report summarizing the sampling activities completed that day. This report is known as the Contractor Daily Quality Control (DQC) report. The DQC shall be submitted to the Contracting Officer on a weekly basis. The Contractor DQC shall include, at a minimum:

- Date
- Task/site location
- Weather conditions
- Work performed
- Types of tests performed and personnel conducting testing
- Results of chemical testing (if available)
- Calibration procedures and recordings
- Sampling performed and personnel conducting sampling
- Levels of protection used during sampling
- Problems and corrective action taken
- Quality control activities initiated
- Written instructions from government personnel for retesting or change of work
- General remarks

4.1.2.2. This report shall be dated and signed by the Contractor's chemical quality control manager. It is the responsibility of the Contractor to report to the CO in writing within 2 working days any significant problems with analytical procedures, instrument calibrations or QC along with corrective action taken to solve the problem.

Contractor Quality Control Summary Report (CQCSR). 4.1.3.

The Contractor Quality Control Summary Report 4.1.3.1. shall be prepared by the Contractor at the completion of the work. This report shall be submitted to the Contracting Officer for approval. The report will include, at a minimum, the following items.

> 4.1.3.1.1. A brief summary of

procedures, noting any deviations from procedures proposed in the CDAP.

4.1.3.1.2. A consolidation and summary of

Contractor DOC reports.

4.1.3.1.3. Analytical results, including detection limits, in tabular format.

4.1.3.1.4. An outline of QC practices employed,

including problems encountered and corrective actions taken.

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

4.1.3.2. The Contractor shall ensure that at the end of the project all temporary on-site facilities have been demobilized. Prior to leaving the site, all equipment, facilities (trailers), and temporary utilities which are suspected to be contaminated shall be decontaminated. This final decontamination must be documented and signed by the Contractor and submitted as part of the Chemical Quality Control Project Summary Report.

LABORATORY VALIDATION TIMETABLE GUIDELINES

In general, certification of an on-site laboratory follows the same procedure as certification of an off-site laboratory. Typical validation times for off-site commercial laboratories are as follows:

- Labs which have current USACE validation status 2 to 3 weeks

4 to 8 weeks - Labs previously, but not currently, USACE validated

6 to 12 weeks Labs which have never been validated by USACE

Usually the timetable for on-site laboratory certification can be shortened by 3 to 4 weeks compared to off-site laboratory. This is primarily because an onsite laboratory is dedicated to a single project and, therefore, can provide faster turnaround analysis of Performance Audit (PA) samples during the second step of the USACE's validation procedure. This assumes PA sample analysis is successful upon first attempt. The Contractor should bear in mind that an onsite laboratory typically requires more frequent re-certification due to higher turnover of laboratory personnel, equipment changeout, or moving the laboratory from one location to another on the project site. Listed below is an outline of the initiation procedure and the three (3) implementation steps of the USACE Commercial Laboratory validation. The three implementation steps are:

Submittal and Review of Laboratory Qualifications (1)

(2) Laboratory Performance Audits

(3)

Laboratory Inspection Procedure Outline. USACE-MRD has primary responsibility for evaluating contract laboratories. These responsibilities are discharged through the Missouri River Division Chemical Review Branch (CEMRD-EP-EC) and the USACE-MRD designated USACE Division Quality Assurance (QA) laboratory (USACE-NED for

this project). The responsibility for initiation and coordination lies with the Contracting Officer (CO) or his representative (COR) for construction.

The following outline of the USACE Commercial Laboratory Validation Procedures is not intended to cover every detail of the validation procedure. The indicated timetable is approximate. The full details of the validation procedures are available in the October 1, 1990, USACE Engineering Regulation 1110-1-263 or by contacting CEMRD-EP-EC.

5.2.1. Timetable.

Initiation Procedure: (Steps 1, 1,2 & 4)

1. Contractor identifies lab(s) he proposes to use to the Resident Engineer (RE) of the local USACE Construction District/Division.

1 to 2 weeks

- 2. RE requests USACE-MRD to validate the proposed contract lab(s) and to designate which USACE Division lab will serve as Government QA Lab. The following information must be supplied with the request in a memorandum or by using the "Request for Evaluation of Commercial Laboratory" (attached at the end):
 - name of the project
 - contract number of the project
 - analytical methods to be used
 - number of samples of each matrix
 - estimated dates of sampling
 - any special certification requirements

NOTE: IF THE CONTRACTOR COMPILES THE ABOVE LISTED ITEMS FOR THE RE'S USE AT THE SAME TIME AS IDENTIFYING WHICH LAB(S) TO EVALUATE, THE TIME TO INITIATE THE VALIDATION PROCEDURE COULD BE REDUCED.

- 3. USACE-MRD contracts proposed contract lab(s) and requests each laboratory submit their qualifications; e.g., an off-the-shelf Laboratory Quality Management Manual (LQMM) or equivalent. NOTE: TO EXPEDITE THE VALIDATION PROCEDURE, RE MAY CONTACT CONTRACT LAB(S) DIRECTLY TO REQUEST LQMM(S) BE SENT TO USACE-MRD AND DESIGNATED GOVERNMENT QA LAB.
- 4. Each proposed lab forwards their qualifications to USACE-MRD and to the designated Gov't QA Lab.

Implementation Procedure: (steps 5 through 12)

1 week

5. USACE-MRD and designated Gov't QA Lab reviews LQMM(s).

1 week

6. If LQMM is acceptable, USACE-MRD notifies USACE-WES to send appropriate PA samples to respective labs. USACE-WES sends PA samples within 5 working days. NOTE: IF INITIAL ANALYSIS ATTEMPT FAILS, UP TO 10 ADDITIONAL WORKING DAYS COULD BE REQUIRED TO PROCESS AND SHIP REPLACEMENT PA SAMPLES AFTER USACE-MRD APPROVAL.

1 to 5 weeks

7. Contract lab has up to 20 working days to complete PA samples analyses and send results to USACE-MRD. NOTE: TYPICALLY RESULTS FROM REPLACEMENT PA SAMPLES MUST BE SENT TO USACE-MRD WITHIN 5 WORKING DAYS.

2 to 3 weeks

8. USACE-MRD reviewed contact lab's results from PA samples.

2 weeks

9. Lab inspections are scheduled within two weeks <u>after PA</u> samples analyses are accepted. Lab inspections will be conducted by USACE-MRD personnel or by USACE-MRD representative(s); e.g., Regional USACE Division Laboratory (USACE-NED) acting as an agent for USACE-MRD.

Steps 10, 11 and 12

10. Lab inspector prepares a written inspection report (and sends it to USACE-MRD if inspected by someone other than USACE-MRD personnel). Inspector makes recommendations (but should not specify approval) in the report based on the lab inspection.

0 to 2*

The format of the inspection checklist to be used and of the inspection report will be provided to the inspector by USACE-MRD.

- 11. USACE-MRD will evaluate overall lab performance on the preceding steps and make an approval recommendation by letter to the requesting USACE Construction District/Division RE. A copy of the inspection report will also be sent by USACE-MRD to the RE.
- 12. Construction District approves/disapproves the contract lab(s).
- * NOTE: STEPS 10-12 CAN BE ACCOMPLISHED BY PHONE IMMEDIATELY FOLLOWING THE LAB INSPECTION IF ALL ASPECTS OF THE VALIDATION PROCEDURE WENT WELL. A WRITTEN INSPECTION REPORT MUST STILL FOLLOW, EVEN IF VERBAL APPROVAL IS GIVEN.

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(SAMPLE FORMAT)

TO: CEMRD-EP-EC	FROM:			DATE	//_
SUBJECT: Request f	or Evaluatio	n of Commerci	ial Laborator	у	
Project Name:			:		_ Contract
No.:					
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If the laboratory is planning to subcontract any samples to another laboratory or location, all of these are to be evaluated separately. This request should be sent for verification of laboratory status regardless of expiration date on the list of validated laboratories.

0285-33-2/CD

COOLER RECEIPT FORM

PROJECT: Date received:		
USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.		
A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: C-of-C Number:		
by (print) (sign)	*	
1. Did cooler come with a shipping slip (air bill, etc.)?	YES	NO
If YES, enter carrier name & air bill number here:		
2. Were custody seals on outside of cooler?	YES	NO
How many & where:, seal date:, seal name		
3. Were custody seals unbroken and intact at the date and time of arrival?	YES	NO
4. Did you screen samples for radioactivity using the Geiger Counter	YES	NO
5. Were custody papers sealed in a plastic bag & taped inside to the lid?	YES	NO
6. Were custody papers filled out properly (ink, signed, etc.)?	YES	NO
7. Did you sign custody papers in the appropriate place?	YES	NO
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form.	YES	NO
9. If required, was enough ice used? Type of ice:	YES	NO
10. Have designated person initial here to acknowledge receipt of cooler:(date)		
B. LOG-IN PHASE: Date samples were logged-in:		
by (print) (sign)		
11. Describe type of packing in cooler:		
12. Were all bottles sealed in separate plastic bags?	YES	NO
13. Did all bottles arrive unbroken & were labels in good condition?	YES	NO
14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	YES	NO
15. Did all bottle labels agree with custody papers?	YES	NO
16. Were correct containers used for the tests indicated?	YES	NO
17. Were correct preservatives added to samples?	YES	NO
18. Was a sufficient amount of sample sent for tests indicated?	YES	NO
19. Were bubbles absent in Volatile samples? If NO, list by QA#:	YES	NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form.	YES	NO
21. Who was called ? By whom ? (date)		

ZERO ACCIDENTS

SECTION 01420 VEHICLE AND BULKY DEBRIS DECONTAMINATION

INDEX

1.	HEALTH AND SAFETY REQUIREMENTS	7.	MISCELLANEOUS EQUIPMENT
2.	SUBMITTALS	8.	NEED FOR DECONTAMINATION
3.	CONTRACTOR RESPONSIBILITY		EXTENT OF DECONTAMINATION
4.	PRESSURE WASHER	10.	OPERATION AND MAINTENANCE
5.	HOSING AND FITTINGS		OF DECONTAMINATION PAD
6.	VACUUM BREAKER/BACKFLOW	11.	LIMITATION ON WATER USE

PART 1 - GENERAL

1. **HEALTH AND SAFETY REQUIREMENTS.** All work shall be completed in accordance with Section: SAFETY, HEALTH, AND EMERGENCY RESPONSE.

2. SUBMITTALS.

- 2.1. Category I. The Contractor shall submit to the Contracting Officer a Vehicle Decontamination Plan (VDP) for approval 2 weeks prior to the start of work. The VDP shall detail all equipment (catalog cuts shall be provided) and procedures proposed for the decontamination of bulky debris and vehicles leaving the site.
 - 2.2. Category II. Not used.
- 3. CONTRACTOR RESPONSIBILITY. The Contractor shall be responsible for provision and maintenance of the equipment required for decontamination of vehicle as specified in PART 2 MATERIALS and for the maintenance of the decontamination pad, drainage pipe, and manholes draining the pad. The Contractor shall be responsible for proper operation of the decontamination system. The Contractor shall be responsible for decontamination of all vehicles and bulky debris requiring decontamination, as specified in paragraph: NEED FOR DECONTAMINATION, including any vehicles of the Contracting Officer or visitors authorized by the Contractor or Contracting Officer.

PART 2 - MATERIALS

- 4. PRESSURE WASHER. The Contractor shall provide portable low volume, high pressure washer(s). The pressure washer(s) shall be the property and responsibility of the Contractor.
- 5. HOSING AND FITTINGS. The Contractor shall provide all necessary hosing and fittings necessary to connect the pressure washer(s) to the water supply hydrant shown on the contract drawings.
- 6. VACUUM BREAKER/BACKFLOW PREVENTOR. The Contractor shall provide a vacuum breaker or backflow preventor for the water supply hydrant. The equipment must satisfy all requirements of applicable City of Erie Codes. The equipment shall be the property of the Contractor. The Contractor shall maintain the equipment in working order during all construction activities.

0285-33-2/CD

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7. MISCELLANEOUS EQUIPMENT. The Contractor shall be responsible for providing all scrub brushes or other equipment necessary to remove caked or hardened material from the vehicles. Disposal of all miscellaneous equipment shall be in accordance with Section: HANDLING AND DISPOSAL OF DRUMMED AND CONTAMINATED MATERIAL.

PART 3 - EXECUTION

8. NEED FOR DECONTAMINATION.

- 8.1. All vehicles entering the Exclusion Zone, as defined in Section: SAFETY, HEALTH, AND EMERGENCY RESPONSE, from the start of work to the time the first lift of the topsoil cap is fully installed, as determined by the Contracting Officer, shall require decontamination. Once the topsoil layer of the RCRA cap has been fully installed, the washing of excessive mud from the vehicles may be required, as determined by the Contracting Officer, to prevent the excessive tracking of soil onto the City of Erie roadways or pedestrian walkways.
- 8.2. All bulky debris identified for removal shall require decontamination. All bulky debris shall be cleared of excessive mud and washed to the extent that visible soil is removed from bulky debris. Particular attention shall be given to areas of bulky debris that either contained or were in contact with onsite waste fill.
- 9. **EXTENT OF DECONTAMINATION.** All vehicles requiring decontamination, as defined in paragraph: NEED FOR DECONTAMINATION, shall be washed to the extent that visible soil is removed from the vehicle body and undercarriage and no visible tracking of soil onto City of Erie roadways or pedestrian walkways occurs, as determined by the Contracting Officer.
- 10. OPERATION AND MAINTENANCE OF THE DECONTAMINATION PAD. The decontamination process shall be performed in such a manner that all water used and soil removed during decontamination falls onto the pad and is captured by the trench drain provided on the decontamination pad. Soil captured by the trench drain shall be removed on a daily basis or as required by the Contracting Officer. The decontamination pad shall be washed down at the completion of each day of work. All soil removed from the trench drain shall be handled in accordance with Section: HANDLING AND DISPOSAL OF DRUMMED AND CONTAMINATED MATERIAL.
- 11. **LIMITATION ON WATER USE.** All water used for decontamination shall be taken from the provided water supply hydrant. Water service shall be coordinated by the Contractor with the water treatment plant operator in accordance with Section: SPECIAL CLAUSES. Water from the water supply hydrant shall be used only for the decontamination process.
- 12. DISPOSAL OF DECONTAMINATION WATERS. All decontamination waters are to be disposed of on-site by pumping decontamination waters into on-site depressions in a centralized area to receive fill. The Contractor shall maintain a depression for decon and dewater water disposal at all times until capping activities are near completion.

ZERO ACCIDENTS

SECTION 01430 SECURITY

INDEX

- 1. SCOPE
- 2. PERSONNEL
- SITE ACCESS

- 4. SUBMITTALS
- 5. SITE SECURITY
- OFF-SITE SECURITY
- 1. SCOPE. This section describes site security measures to be implemented during construction.

2. PERSONNEL.

- 2.1. The Contractor shall provide identification cards to on-site personnel and visitors authorized to enter the project site. These cards shall include the following:
 - a. Name of the individual.
 - b. Occupation.
 - c. Name of Employer.
- 2.2. The Contractor shall maintain a current list of authorized persons and submit copies of the updated list to the Contracting Officer on request, for information only.
- 3. SITE ACCESS. The Contractor shall be responsible for the control of all persons and vehicles entering and leaving the project site. Security personnel shall:
 - a. Require display of proper identification by each person. The Contractor shall remove from the site personnel not properly identified
 - b. Require personnel to sign in upon entering the site and to sign out when leaving.
 - c. Maintain a log of all vehicles and equipment entering and leaving the
 - d. Allow no visitors without the approval of the Contracting Officer.
 - e. Maintain a log of visitors.
 - f. Require visitors to read the Contractor's Site-Specific Safety Plan and to sign the master copy of the plan. The signature acknowledges that the visitor understands the potential hazards associated with site entry.
- 4. SUBMITTALS. The Contractor shall submit a Security Plan to the Contracting Officer for approval no later than 5 working days prior to the Pre-Work Conference. On-site mobilization may not begin prior to receipt of written approval of the Security Plan. This plan shall address:
 - a. Number of security personnel.
 - b. Duties of security personnel.
 - c. Name and qualifications of security personnel.
 - d. Description of proposed daily security operation (e.g., walking patrols, gate control, use of dogs, armed vs. unarmed.
 - e. Provisions for conducting security checks, including method and frequency.

0285-33-2/CD

- f. Description of how the following breaches of security will be handled: unauthorized personnel on the site, penetration of site boundary (e.g., broken fence), unauthorized persons attempting to gain access to the site.
- 4.1. CATEGORY I. Site Security Plan.
- 4.2. CATEGORY II. None.
- 5. SITE SECURITY. The Contractor shall be responsible for maintaining uninterrupted day and night (24-hour) security within the project area throughout the contract, including weekends and holidays.
- **5.1.** The Contractor shall post signs in the Hazardous Work Areas at conspicuous intervals: "WARNING, HAZARDOUS WORK AREA, DO NOT ENTER UNLESS AUTHORIZED."
- **5.2.** The Contractor shall provide sufficient security personnel to implement and enforce the requirements of the SITE ACCESS paragraph, as well as to periodically inspect site facilities. The Contractor shall be responsible for ensuring that security personnel comply with the requirements of SECTION: SAFETY, HEALTH, AND EMERGENCY RESPONSE, including training and medical examinations as specified.
- **5.3.** The Contractor shall be responsible for maintaining a log of all security incidents. This log shall be furnished to the Contracting Officer upon request.
- **5.4.** The Contracting Officer will have the right of approval and rejection of any and all security personnel of the Contractor during the period of this project.
- 5.5. The Contractor shall contact law enforcement officials, emergency medical care units, local fire departments, and utility emergency teams to ascertain the type of response required to any emergency situation and to coordinate the responses of the various units. A standard operating procedure describing security force response to foreseeable emergencies shall be developed. The Contractor shall also prepare a list of emergency points of contact, telephone numbers, radio frequencies, and call signs so that dependable responses can be executed.
- **5.6.** The Contractor shall maintain a security post or office located near the main entrance to the site. This office shall have communication links to all supporting agencies as mentioned above.
- **5.7.** The Contractor shall minimize personnel on-site. Off-duty personnel shall leave the site as soon as possible.

ZERO ACCIDENTS

SECTION 01460 SAFETY, HEALTH AND EMERGENCY RESPONSE REQUIREMENTS

INDEX

			· · · · · · · · · · · · · · · · · · ·
1.	GENERAL	9.	DECONTAMINATION
2.	SAFETY, HEALTH AND EMERGENCY	10.	EMERGENCY EQUIPMENT AND FIRST AID
	RESPONSE PLAN (SHERP)		REQUIREMENTS
3.	TRAINING	11.	EMERGENCY RESPONSE AND CONTINGENCY
4.	MEDICAL SURVEILLANCE	12,	ACCIDENT AND FIRE PREVENTION PLANS
5.	WORK ZONES	13.	POSTED REGULATIONS
6.	ENVIRONMENTAL AND PERSONNEL	14.	LOGS, REPORTS AND RECORD KEEPING
	MONITORING	15.	COMMUNICATIONS
7.	AIR MONITORING	16.	INTERIM CHANGES TO EM 385-1-1
8.	PERSONAL SAFETY EQUIPMENT AND		SAFETY AND HEALTH MANUAL
	PROTECTIVE CLOTHING	ATTA	CHMENT: OCCURRENCE OF CONTAMINANTS

GENERAL.

1.1. SITE DESCRIPTION. The Millcreek site is an approximately 78.4 acre inactive hazardous waste site in Millcreek Township, Erie County, Pennsylvania. This site is on the United States Environmental Protection Agency's National Priorities List of Sites. The contamination is both organic and inorganic in nature. Based on extensive sampling, the major contaminants are chlorinated ethanes and ethenes, vinyl chloride, polynuclear aromatic hydrocarbons, PCBs and lead. Attached referenced Tables QM-1 through QM-4 indicate chemical compounds detected, frequency and concentration ranges found on-site.

1.1.1. The following documents provide additional information

regarding site contaminants.

1.1.1.1. NUS Corporation, Remedial Investigation/Feasibility Study Report, Millcreek Superfund Site, prepared for USEPA, August 1985.

1.1.1.2. Engineering Report, Millcreek Superfund Site, prepared by Malcolm Pirnie, Inc. for U.S. Army Corps of Engineers, August 1989.

- 1.2. SCOPE. Health and Safety protection procedures shall be required of the Contractor due to the potentially hazardous conditions at the site and in accordance with 29 CFR 1910.120.
- 1.2.1. Applicable Publications. The Contractor shall review and use, as appropriate, all applicable State and Federal publications, guidelines and requirements in the development of health and safety protection procedures. At a minimum, the following publications shall be utilized:

1.2.1.1. U.S. Army Corps of Engineers, Safety and Health

Requirements Manual, EM385-1-1, October 1987.

1.2.1.2. American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices (latest edition).

1.2.1.3. NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985.

1.2.1.4. NIOSH, Manual of Analytical Methods 3rd Edition,

August 15, 1987.

1.2.1.5. USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, latest edition.

11.2.1.6. U.S. Army Corps of Engineers, Guide Outline for

Accident Prevention Proposal

1.2.1.7. U.S. Army Corps of Engineers, Phase Plan

Guidelines

1.2.1.8. 29 CFR Part 1926 Subpart P, 10-31-91, Standards for Excavation and Trenching

1.3. HEALTH AND SAFETY PROTECTION REQUIREMENTS.

- 1.3.1. The Contractor shall prepare a Safety, Health and Emergency Response Plan (SHERP) for implementing these procedures. The SHERP shall be submitted to the Contracting Officer a minimum of one week prior to the Pre-Work Conference. This plan shall be revised to address review comments, as needed, and accepted by Contracting Officer prior to any work on the site being initiated.
- 1.3.2. The accepted plans for implementing these procedures shall be part of the Contract Documents.

1.3.3. The Contractor shall implement, maintain and enforce these

procedures at all times prior to and during all phases of the Work.

1.4. DEFINITIONS AND DESCRIPTION OF REQUIREMENTS. The following definitions along with the contract clauses shall apply to all work of this Contract.

- 1.4.1. Contracting Officer (CO). Any person chosen by U.S. Army Corps of Engineers who has been delegated authority and responsibility for day-to-day surveillance activities.
- 1.4.2. On-Scene Coordinator (OSC). Any person designated by the State Government for field surveillance duties. The Contractor shall take direction only from the Contracting Officer. Any responses or directives from the OSC will be directed only to the Contracting Officer.
- 1.4.3. On-Site Personnel. Includes the Contracting Officer and his representative(s) and the designated State and Federal representatives.
- 1.4.4. Contractor Personnel. Includes all Contractor employees, representatives and subcontractor employees and representatives.
- 1.4.5. Visitor. All other personnel on site with exception of the On-site Personnel and Contractor Personnel.

1.4.6. Safety and Health Personnel.

1.4.6.1. Safety Officer/Industrial Hygienist. The Contractor's employee or Subcontractor with overall responsibility for the preparation, implementation and enforcement of the Site SHERP. The Safety Officer shall also conduct the initial site specific training on site and provide regular support for all health and safety activities, including upgrading or downgrading the level of personnel protection, as needed and only with documented approval by the Contracting Officer. The Safety Officer shall be a Certified

Copies of this document may be obtained through: Safety and Occupational Health Office Attn: CEMRO-SO U.S. Army Engineer District, Omaha 215 North 17th Street Omaha, Nebraska 68102-4978

Industrial Hygienist (American Board of Industrial Hygiene) with a minimum of three years of specialized experience on sites with hazardous wastes or hazardous materials with hazards similar to those anticipated on this project. This person shall also have demonstrable expertise in air monitoring techniques and development of respiratory protection programs for working in potentially toxic atmospheres. The Safety Officer shall have a broad working knowledge of State and Federal occupational safety and health regulations and formal educational training in occupational safety and health. The Safety Officer may delegate the implementation and enforcement of the SHERP to the Safety and Health Specialist/Industrial Hygiene Technician defined below, with regular on-site supervision and continued evaluation of effectiveness of the plans to be performed by the Safety Officer.

The Site Safety Officer or designated representative safety personnel are expected to be on-site at all times for cap and flood retention basin construction activities that potentially involve exposure to contaminants of concern. Non-intrusive activities that would not result in potential exposure (i.e., seeding, maintenance inspections) will not require on-site presence of a designated safety official.

1.4.6.2. Safety and Health Specialist/Industrial Hygiene Technician. The Contractor's or subcontractor's employee assigned to the site on a full time basis for the duration of the project with sole functional responsibility for implementation and enforcement of the Site SHERP. The Safety and Health Specialist shall have authority to stop work any time unsafe work conditions are determined. The Safety and Health Specialist shall complete a daily diary of activities with Health and Safety relevance including references to maintenance and calibration of Health and Safety equipment and shall maintain a written log containing the names of personnel, site entry and exit times and names of visitors. The Safety and Health Specialist/Industrial Hygiene Technician shall have a minimum of 6 months working experience on sites with hazardous wastes or hazardous materials with hazards similar to those anticipated on this project, and shall have a sound working knowledge of State and Federal occupational safety and health regulations. In addition the Safety and Health Specialist/Industrial Hygiene Technician shall have specialized training in personal and respiratory protective equipment program implementation and in the proper use of air monitoring instruments, air sampling methods and procedures and have current certification in first aid and CPR as provided by a recognized approved organization such as the American Red Cross or the American Heart Foundation. Name, qualifications and work experience shall be submitted to the Contracting Officer prior to commencement of work at the site.

1.4.7. Project Manager. The Contractor's employee responsible for conducting the work and for assuring that the work is conducted in accordance with the requirements of the Contract Documents. The Project Manager shall be site-dedicated for the duration of the Contract, and shall be experienced in and familiar with the management and day-do-day activities of hazardous waste clean-up operations.

1.4.8. Custodian. The Contractor's employee or subcontractor responsible for keeping all health and safety equipment clean and all facilities properly equipped and maintained.

1.4.9. Security Officer. The Contractor's employee responsible for maintaining the security of the Site.

1.4.10. Site. The site shall be the Support Zone, Contaminant Reduction Zones, Exclusion Zones and any access roads and parking areas within the limits of the Contract as shown on the drawings.

- 1.4.11. Monitoring. Indicates use of direct or indirect reading field instrumentation to provide information regarding the levels of gases, vapors and particulates which are being released during remedial action. Monitoring shall be conducted to evaluate employee exposure to airborne toxic materials.
- 1.4.12. Physician. A licensed physician, Board Certified Occupational Medicine by the American Board of Preventive Medicine, with experience in the practice of occupational medicine, and provided by the Contractor.
- 1.4.13. First Aid Technician. The Contractor shall have at least one certified First Aid Technician on the site at all times. This person may perform other duties, but shall be immediately available to render first aid when needed. The First Aid individual should be certified in "Multi-Media First Aid" and CPR by the American Red Cross or equivalent.
- 1.4.14. Work Zones. Work zones shall be established and communicated to all employees and visitors by Safety Officer. The zones include:

Exclusion Zone ("Contaminated Zone" or "Hot Zone"): Area where contamination may be present. All personnel entering the Exclusion Zone shall wear the prescribed level of personal protective equipment.

<u>Support Zone</u>: Area of the site which is considered non-contaminated or "clean". Support equipment is located in this zone. Personnel may wear normal work clothes within this zone. Any potentially contaminated clothing, equipment, and samples shall remain in the Contamination Reduction Zone until decontaminated.

<u>Contaminant Reduction Zone</u>: The transition zone between Exclusion and Support Zones. Zone where decontamination of personnel and equipment takes place.

1.5. REGULATORY REQUIREMENTS.

1.5.1. Regulatory Requirements. Occupational Safety and Health Administration (OSHA) Standards. Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), including the Final Rule for Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) as published in the Federal Register (54 FR 9294; March 6, 1989).

2. SAFETY, HEALTH AND EMERGENCY RESPONSE PLAN (SHERP).

2.1. GENERAL.

- 2.1.1. The Contractor, via the Safety Officer, shall be responsible for development and implementation of a site-specific SHERP consistent with the following guidelines, whichever provides the greater degree of protection:
 - Occupational Safety and Health Administration (OSHA) Standards. Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), including the Final Rule for Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) as published in the Federal Register (54 FR 9294; March 6, 1989).
 - U.S. Army Corps of Engineers. "Safety and Health Requirements Manual, EM 385-1-1, Accident Prevention, April 1981, revised October 1987.
 - NIOSH/OSHA/USCG/EPA. Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, DHHS (NIOSH) Publ. No. 85-115.

- EPA "Standard Operating Safety Guides", July 1988.

2.1.2. The SHERP, including the Air Monitoring Program, shall include, but not necessarily be limited to, the following components:

- Site Description and Evaluation.

 Names of key personnel and alternates responsible for site safety and health in addition to all employees assigned to the site (responsibilities, chain of command and qualifications).

- Safety and health hazard assessment and risk analysis for each

site task and operator (Accident Prevention Plan).

 Hazard communication and training requirements, both off-site and on-site.

- Medical surveillance and exposure monitoring.

- Work zones and site control.

- "Action" levels.
- Personnel hygiene and decontamination.

- Equipment decontamination.

- Personal safety equipment and protective clothing.

- Posted regulations.

- Log, reports and record keeping.

Communications.

- Standard operating and safety procedures.

- Safe Work Practices.

Environmental and personnel monitoring.

- Emergency response and contingency planning.

- 2.1.3. The SHERP shall be submitted to the Contracting Officer for review and approval a minimum of one week prior to the Pre-Work Conference. The SHERP must be accepted by the Contracting Officer prior to commencement of any on-site work.
- **2.1.4.** Determination of the appropriate level of worker safety equipment, action levels and procedures shall be made by the Contractor via the Safety Officer as a result of review of existing data, the initial site survey and continued safety and health monitoring performed by Contractor's Safety Officer.
- 2.1.4.1. The Contractor shall assess the following work activities, at a minimum, in detail as part of the SHERP. Both potential hazards and minimum required protection levels shall be described and assessed.
 - Field Engineering and Surveying
 - Clearing, Grubbing, Brush Removal and Grading
 - Temporary Construction Facilities
 - Unloading Incoming Materials
 - Excavation
 - Dewatering
 - Backfilling
 - Flood Retention Basin Construction
 - Excavation, Characterizing Staging and Handling of Drums Encountered During Grading.

2.1.5. Levels of Protection.

2.1.5.1. Levels of worker protection will depend on the work being performed and are defined in the guidelines referred to in Paragraph: PERSONAL SAFETY EQUIPMENT AND PROTECTIVE CLOTHING. The following minimum levels of protection should be considered based upon the general criteria presented.

2.1.5.2. Determination of the actual level of protection while work is being performed based on the action levels at the site shall be made by the Contractor via the Safety Officer in conformance with these specifications and the Site Specific SHERP. Levels of protection established by the Contractor shall be approved by the COE Contracting Officer.

- 2.1.5.3. Level D Criteria for Use. Level D shall be used where there is no contact with soils or with ground water in contaminated areas. Examples of activities include: all Support Zone activities, reconnaissance, traffic control, equipment and supply deliveries, construction of Support Zone facilities.
- 2.1.5.4. Modified Level D Criteria for Use. Modified Le $\,$ l D shall be used where there is limited potential soils contact in contaminated areas. Examples of general activities include: Contaminant Reduction Zone, clearing and grubbing, excavating, backfilling, and surveying.

2.1.5.5. Level C Criteria for Use. Level C protection shall be used where there is potential contact with soil or ground water in contaminated areas. Examples of general activities include: excavation and dewatering.

2.1.5.6. Level B Criteria for Use. Level B protection shall be used for confined space entry and for drum removal activities.

2.1.6. Specifications delineated in this Section are in addition to or are an amplification of procedures and requirements of the above referenced regulations and documents.

- 2.1.7. Should any unforeseen or site specific safety related factor, hazard, or condition become evident during the performance of work at this site, it shall be the Contractor's responsibility to bring such to the attention of the Contracting Officer both verbally and in writing as quickly as possible, for resolution. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.
- 2.1.8. Should the Contractor seek relief from, or substitution for, any portion or provision of the SHERP, such relief or substitution shall be requested of the Contracting Officer in writing.
- 2.1.9. Any disregard for the provision of these Health and Safety specifications shall be deemed just and sufficient cause for termination of contract or any subcontract without compromise or prejudice to the rights of the Contracting Officer.
- 2.1.10. The SHERP developed by the Contractor shall include provisions for work related to general site preparation prior to implementation of the facilities described in this Contract. Initially the Contractor shall assume the entire existing site is an Exclusion Zone.
- **2.1.11.** It shall be the responsibility of the Contractor to conduct whatever air surveillance monitoring is necessary to assure a safe operation during the general site preparation work.
- 2.1.12. Any temporary facilities or special construction procedures required to construct the Support Zones shall be the responsibility of the Contractor and shall be delineated in the SHERP.
- 2.1.13. The Contractor shall follow all applicable Confined Space Entry Procedures and trench safety regulations.

3. TRAINING.

3.1. The Contractor shall certify that all Contractor personnel assigned to or regularly entering areas of the site other than the Support Zone (once established) for the purpose of performing or supervising work, for health, safety, security, or administrative purposes, for maintenance, or for any other site related function, have received appropriate health and safety training in accordance with 29 CFR1910.120. These training requirements also apply to site visitors who enter the Contaminant Reduction Zone or Exclusion Zone.

3.2. The training shall include a minimum of forty hours of general health and safety training and three days of on-site supervised experience. In addition, the Contractor's supervisory personnel shall have a minimum of 8 hours additional specialized training on managing hazardous waste operations. Documentation of all such training shall be submitted to the Contracting Officer before any person shall be allowed to enter any potentially contaminated area (namely, the Exclusion Zone or the Contaminant Reduction Zone).

Workers occasionally on-site for specific limited tasks and who are unlikely to be exposed over permissible exposure limits shall receive a minimum of 24 hours of health and safety off-site instruction, and the minimum of one day field experience under the direct supervision of a trained, experienced supervisor.

- 3.3. A site-specific refresher safety training program shall include, at a minimum, training in the following areas:
 - Hazard analysis: chemical, physical
 - Standard safety operating procedures
 - Safety equipment to be used
 - Personal protective equipment to be worn including care, use and proper fitting
 - Decontamination procedures
 - Areas of restricted access and prohibitions in work areas
 - Emergency procedures and plans
 - Respiratory equipment training and qualitative fit-testing protocols (banana oil and irritant smoke)
 - Use of Self Contained Breathing Apparatus (SCBA) and emergency supplied-air respirators
 - Relevant first aid procedures
 - On-site and off-site communications
 - Hazardous materials handling procedures
 - Air monitoring instrumentation use and calibration
 - Sample collection
 - Hazardous materials recognition
 - The "Buddy System" to be used at the site
- 3.4. The Contractor shall provide and require that all previously trained Contractor personnel including support personnel assigned to or entering the site complete one site-specific refresher training session of at least four hours to assure that all such personnel are capable and familiar with the use of safety, health, respiratory and protective equipment and with the safety and security procedures required for this site. The Contractor shall notify the Contracting Officer at least five (5) days prior to the site-specific training session so that government personnel involved in the project may attend.
- 3.5. All personnel who complete the general training course will be required to complete the site-specific refresher training course identified in paragraph: TRAINING. Follow-up refresher training sessions for personnel or visitors shall be conducted by the Safety Officer or the Safety and Health Specialist/Industrial Hygiene Technician using the training curriculum outlines developed by the Safety Officer in the SHERP.
- **3.6.** Safety and health briefings shall be conducted at least weekly by the Safety and Health Specialist for all personnel assigned to work at the site. Should an operational change affecting on-site field work be made, a meeting prior to implementation of the change shall be convened to explain health and safety procedures.
- **3.7.** All Contractor personnel shall receive a minimum of 8 hours per year of retraining while working on the site.

- 3.8. The Contractor shall submit proof of training for all on-site personnel to the Contracting Officer prior to the commencement of their work. The Contractor also shall be responsible for, and shall guarantee that, personnel who have not successfully completed the required training shall not be permitted to enter the Exclusion Zone or the Contaminant Reduction Zone.
- 3.9. A post-remediation health and safety briefing shall be conducted by the Site Safety Officer to review, discuss and evaluate the project activities. A report of the meeting shall be submitted to the CO.

4. MEDICAL SURVEILLANCE.

- 4.1. The Contractor shall utilize the services of the occupational physician (as defined in 1.4.12.) to provide the medical examinations and surveillance specified herein. The name of the physician and evidence of examination of all Contractor Personnel shall be provided to the Contracting Officer prior to assigning these personnel to work on site or permitting these personnel to enter the Exclusion Zone or the Contaminant Reduction Zone.
- 4.2. All Contractor personnel who will enter the Exclusion Zone or Contaminant Reduction Zone shall be provided with medical surveillance within 30 days prior to commencing work (entrance examination), and within 30 days after the conclusion of the Contractor's personnel's work (exit examination).

4.3. Medical Surveillance Protocol.

- 4.3.1. Medical surveillance protocol is the physician's responsibility but shall meet the requirements of OSHA standard 29 CFR 1910 for all personnel. The following protocol shall be considered a minimum:
 - Medical History
 - General Physical Examination including evaluation of all major organ system
 - Pulmonary Function testing (FEV_{1.0} and FVC)
 - Biological Profile 20 Channel
 - CBC
 - Urinalysis
 - Methemoglobin
 - Urine Heavy Metals
 - Chest X-ray*
 - Serum Lead
 - Zinc Protoporphyrin
 - Visual Acuity
 - Otoscopic Exam
 - Audiometric Exam
 - Stress Test**
 - Tetanus***
 - * The frequency and number of chest X-rays shall be at the direction of the Physician.
- ** At the discretion of the examining occupational physician a stress test may be administered to any individual during any routinely scheduled examination.
- *** As part of this medical examination, tetanus vaccinations shall be updated.
- 4.3.2. Additional clinical tests may be included at the discretion of the attending physician performing the physical examination.

4.4. PERIODIC SURVEILLANCE EXAMINATIONS.

4.4.1. The Contractor shall provide medical examinations performed by a Board Certified Physician annually for all employees participating in medical surveillance program.

- 4.4.2. Periodic surveillance examinations shall be as specified above for medical surveillance protocol except that the requirement for the chest x-rays shall be at the discretion of the attending physician performing the physical examination.
 - 4.5. NON-SCHEDULED MEDICAL EXAMINATIONS.
- 4.5.1. Non-scheduled medical examinations shall be conducted under the following circumstances:
 - **4.5.1.1.** After acute exposure to any toxic or hazardous

4.5.1.2. At the discretion of the Contracting Officer, the Safety Officer and/or consulting physician, when an employee has been exposed to potentially dangerous levels of toxic or hazardous materials.

4.5.1.3. At the discretion of the Contracting Officer, the Safety Officer and/or consulting occupational physician, and at the request of an employee with demonstrated symptoms of exposure of toxic or hazardous materials.

- **4.6.** The ability of on-site personnel to wear respiratory protection during hazardous waste activities shall be certified by the physician. Cardiopulmonary system examination and pulmonary function testing are minimum requirements. A copy of the physician's certification shall be submitted to the Contracting Officer prior to any on-site work for each person required to wear respiratory protection.
- 4.7. Any employee who develops a time loss illness or injury during the period of the contract must be evaluated by a qualified physician (as defined in 1.4.12.). The Contractor must be provided with a written statement indicating employee's fitness signed by the physician prior to allowing the employee to reenter the work site. A copy of the written statement shall be submitted to the Contracting Officer.
- 4.8. The Contractor shall maintain and provide access for employees to his medical surveillance records according to OSHA requirements (29 CFR 1910.20). Medical records will not be released to anyone without the express written authorization of the employee.

5. WORK ZONES.

- **5.1.** The Contractor shall clearly lay out and identify the work Zones in the field and shall limit equipment, operations and personnel in the Zones as described in USEPA Standard Operating Safety Guides.
- 5.1.1. Exclusion Zone(s) ("Contaminated Zone" or "Hot Zone"). Initially the entire site shall be designated an Exclusion Zone. After establishing the Support and Contaminant Reduction Zones, the remaining portions of the Site shall be the Exclusion Zone. The level of personnel protective equipment required in this Zone shall be specified in the Contractor's SHERP.
- 5.1.2. Contaminant Reduction (Buffer) Zone(s). This Zone shall occur at the interface of Exclusion and Support Zones and shall provide for the following: (1) transfer of construction materials from clean areas to site dedicated equipment, (2) the decontamination of waste transport vehicles prior to entering the Support Zone; (3) decontamination of personnel and clothing prior to entering the Support Zone, and (4) the physical segregation of the Support and Exclusion Zones. The level of personnel protective equipment required in this Zone shall be specified in the Contractor's SHERP.
- 5.1.3. Support (Safe or Clean) Zone(s). This Zone shall be established on the Site as the area outside the zone of contamination. The Support Zone shall be clearly delineated and shall be secured against active or

passive contamination from the work site. Eating, drinking and smoking will be allowed only in this zone. The level of personnel protective equipment required in the Zone shall be specified in the Contractor's SHERP. The function of the Support Zone shall be to provide:

- An entry area for personnel, material and equipment to the

Exclusion Zone of site operations.

- An exit area for decontaminated personnel, materials and equipment from the Contamination Reduction Zone of site operation;
- An area for location of Support Area facilities; and
- A storage area for clean safety and work equipment.

6. ENVIRONMENTAL AND PERSONNEL MONITORING.

- 6.1. AIR. The Contractor's Safety Officer/Industrial Hygienist shall design, develop and implement an Air Monitoring Program as specified in paragraph: AIR MONITORING to assure that site workers will not be exposed to harmful levels of airborne toxic chemicals in either the vapor or particulate form, or to explosive atmospheres. At a minimum, the Contractor's Air Monitoring Program shall provide multi-stage detection and identification of contaminants.
- **6.2. HEAT STRESS.** The climate combined with the requirements for personal protective equipment may create heat stress. The Contractor shall design, develop and implement a program of heat stress monitoring and a program to

alleviate heat stress.

- **6.2.1.** For monitoring the body's recuperative abilities to excess heat, the following techniques shall be used.
- **6.2.1.1.** Monitoring of heat stress conditions for persons wearing permeable clothing shall comply with current ACGIH TLV's for heat stress.
- **6.2.1.2.** Monitoring of personnel wearing impervious clothing shall commence when the ambient temperature is 70 degrees F. or above.
- 6.2.2. Monitoring frequency shall increase as ambient temperature increases or as slow recovery rates are observed.
- **6.2.3.** Continued monitoring shall be specified according to guidance provided in the NIOSH/OSHA/USCG/USEPA <u>Occupational Safety and Health</u> Guidance Manual for Hazardous Waste <u>Site</u> Activities.
- 6.2.4. Monitoring shall be performed by a person with a current first aid certification who is trained to recognize the symptoms of heat stress.
- 6.2.5. The heat stress monitoring shall include, but not be limited to, the following:
 - Heart Rate (HR)
 - Oral Temperature
 - Body Water Loss
- **6.2.6.** The Safety Officer/Industrial Hygienist shall specify the work cycle period and the rest period based on this heat stress monitoring. The action levels at which the corrective action shall be taken shall be addressed in the Contractor's written SHERP.
- 6.3. The Contractor shall design, develop and implement a cold stress monitoring program and a program to alleviate cold stress. To guard against cold injury, the Contractor shall provide appropriate clothing, warm shelter for the rest periods and shall monitor worker's condition using one or more of the following techniques. All workers certified as suitable for exposure shall adhere to the Work Warmup schedule as specified in the current ACGIH Threshold Limit Values and Biological Exposure Indices booklet, including adopted threshold limit values for cold stress.

7. AIR MONITORING.

7.1. AIR MONITORING INSTRUMENTATION.

7.1.1. The Contractor shall furnish and maintain the following intrinsically-safe instruments and necessary calibration equipment for air monitoring during remediation activities:

7.1.1.1. Foxboro Analytical Century Model OVA-128 Portable

Organic Vapor Analyzer, or approved equal.

7.1.1.2. HNU Model PI 101 photoionization detector fitted

with a 10.2 eV lamp, or approved equal.

7.1.1.3. MSA Portable Indicator and Alarm (Combustible Gas and Oxygen) Model 261, or approved equal.

7.1.1.4. MIE, Inc. Miniram Model PDM-3 (Miniature Real-

Time Aerosol Monitor), or approved equal.

7.1.1.5. High volume particulate sampling stations.

7.1.2. All monitoring instruments shall be protected from surface contamination during use to allow easy decontamination. All instrumentation shall be calibrated before use; periodic calibration checks shall be made and documented in the field over the duration of the field activities.

7.1.3. All monitoring instruments shall become the property of the USACE at the conclusion of the project.

7.2. AIR MONITORING REQUIREMENTS.

7.2.1. The Safety Officer/Industrial Hygienist shall establish action levels which will apply to persistent readings in the breathing zone of personnel conducting field remediation activities. These action levels shall be consistent with action levels specified in Paragraph: AIR MONITORING. Organic vapor action levels shall be consistent with EPA's rationale for relating total atmospheric vapor concentrations to the selection of the level of personal protection as provided in the EPA 1988 Standard Operating Safety Guides.

7.2.2. Real-time air monitoring is required near each active work zone in the Exclusion Zone and in the Contaminant Reduction Zone. Real-time monitoring of the work zone is required continuously during all activities in which the potential for exposure to contaminated soils or water exists, including but not limited to, excavation, backfilling and handling of contaminated liquids.

7.2.3. Background air concentrations for VOCs and particulates shall be determined prior to the start of work each day. Instrument readings shall be obtained at the site perimeter both downwind and upwind (background) of the active work zone(s). The wind direction shall be determined with the aid of a wind sock.

7.2.4. Real-time air monitoring for explosive atmospheres and for oxygen shall be performed in each work zone. For atmospheres at less than 10% of the lower explosive limit (LEL), work may be performed without additional precautions. For atmospheres between 10% and 25% LEL, work zone monitoring shall be continued, with extreme caution as higher levels are encountered. At greater than 25% LEL, an explosion hazard exists and workers shall be withdrawn from the area immediately.

7.2.5. Oxygen levels at less than 19.5% oxygen by volume shall require continuous monitoring and self-contained breathing apparatus for workers. Oxygen levels between 19.5% and 25% by volume are acceptable to continue work. Deviations from the normal level may be due to the presence of other substances. Oxygen levels greater than 25% by volume present a fire hazard potential. Work shall be discontinued and the fire department or other fire safety specialist

shall be consulted.

- 7.2.6. Real-time air monitoring to VOCs shall be performed in each work zone as specific in Paragraph 7.2.2. Action levels for VOCs in the work zone shall be determined by the Industrial Hygienist with appropriate respiratory protection requirements for each action level.
- 7.2.7. An action level of 5 mg/m³ for the respirable fraction of particulates in the work zone will be acceptable for determining when respiratory protection against dusts will be required. This limit is consistent with OSHA Permissible Exposure Limits (8-hour time-weighted average) in 29 CFR 1910.1000.
- 7.2.8. Real-time air monitoring of VOCs at the site perimeter is required any time that respiratory protection from VOCs is in use in the work zone (e.g., Level B or Level C). VOC concentrations shall be recorded hourly at both the upwind and the downwind site perimeters. To protect the health and welfare of the community, the Contractor is required to implement preventive measures if real-time site perimeter monitoring indicates that VOCs are persistently greater than background at the downwind site perimeter.
- 7.2.9. Real-time respirable particulate monitoring shall be required continuously near the work zone during all earth-moving activities, including but not limited to, excavation, hauling and grading. A personal monitoring device (such as a Miniram) may be used for work zone monitoring; attaching the device to a fixed location near the work zone will be an acceptable particulate monitoring method. An action level of 5.0 mg/m³ in the work zone will require respiratory protection for workers in the work zone and shall necessitate dust source control by the Contractor to reduce work zone concentrations to acceptable levels.
- **7.2.10.** In the event that respirable dust concentrations in the work zone exceed 5.0 mg/m³, real-time air particulate monitoring shall be required at the downwind site perimeter. If this real-time monitoring indicates respirable particulate concentrations in excess of 5.0 mg/m³ at the site perimeter, the Contractor shall implement preventive measures to protect the health of the community. These preventative measures may include on-site engineering controls (preferred) or some other measure deemed appropriate for the given site conditions. The implementation of any preventative measures shall be coordinated with the CO.

7.3. PERIMETER SAMPLING REQUIREMENTS.

- 7.3.1. Samples shall be collected at the site perimeter (perimeter shall be defined as the site boundary) to document any potential migration of harmful substances that might occur during site activities. Sampling stations shall be established at four (4) locations at the east, west, north and south site perimeters. Because the wind direction may vary from day to day, it may be necessary to temporarily relocate the stations to maintain them in an upwind/downwind configurations.
- 7.3.2. Background samples. Prior to commencement of earth-moving activities on-site, three samples from each station shall be collected and submitted for analysis of total suspended particulates (TSP), lead and total polynuclear aromatic hydrocarbons (PAHs). These samples will be collected during a 24-hour period on three consecutive days at each of the four stations. Methods shall be as specified in 7.3.3.
- 7.3.3. Throughout the duration of earth-moving activities samples shall be collected from each of the four sampling stations. Frequency and methods of sample collection and analysis shall be as described below. Sample requirements are summarized in Table 1. Analytical results for all samples (background and those collected during site activities) shall be reported to the CO within three weeks of sample collection.

Total suspended particulates (TSP). 7.3.3.1. shall be collected and analyzed each day using the EPA Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume

Method) (40 CFR 50, Appendix B).

7.3.3.2. Lead. Samples collected for TSP shall also be analyzed for lead three times from each sampling station during earth moving activities using the EPA Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air (40 CFR 50, Appendix G). Dates for lead analysis shall be scheduled in coordination with and with the approval of the CO.

7.3.3.3. Polynuclear aromatic hydrocarbons Samples shall be collected and analyzed for PAHs three times from each sampling station during earth moving activities, using EPA Method TO-13, "Determination of Benzo(a)Pyrene (B(a)P) and Other Gas Chromatography (GC) and High Performance Liquid Chromatography (HPLC)." This method is published in "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air," EPA-600/4-84-041. Dates for PAH analysis shall be scheduled in coordination with and with the approval of the CO.

SAMPL	TABLE 1 ING (AT EACH SAMPLING STA	ATION)
Frequency of Collection and Analysis	Analytical Parameter	Method Reference
Daily during earth- moving activities (24-hr sample)	Total Suspended Particulates (TSP)	40 CFR 50 App B
Three times during earth-moving activities (24-hr sample)	Lead	40 CFR 50 App G
Three times during earth-moving activities (24-hr sample)	PAH	EPA Method TO-13
* This table does not in	nclude background samples	described in 7.3.2.

7.4. DATA.

7.4.1. The following real-time monitoring data information shall be recorded by the Safety Officer/Industrial Hygienist or his designee:

- Date and time of monitoring.
- Air monitoring location.
- Instrument, model #, serial #.
- Calibration/background levels.
- Results of monitoring.
- Safety and Health Specialist/Industrial Hygienist Technician Signature.
- Interpretation of the data and any further recommendations 7.4.2. shall be made by either the Safety Officer/Industrial Hygienist or the Safety and Health Specialist/Industrial Hygienist Technician in consultation with the Safety Officer/Industrial Hygienist.

- 7.4.3. These results shall be given verbally to the Contracting Officer following each site scan that indicates volatile organic vapor concentrations, particulate concentrations, or combustible gases in excess of the action levels and documented in writing by the end of each work day with three (3) copies provided to the CO.
- 8. PERSONAL SAFETY EQUIPMENT AND PROTECTIVE CLOTHING.
- 8.1. The Contractor shall provide all on-site personnel including the Contracting Officer with appropriate personal safety equipment and protective clothing. The Contractor shall provide up to four sets of equipment for Contracting Officer's Use. The Contractor shall ensure that all safety equipment is used properly and protective clothing is kept clean and well maintained. The Safety Officer/Industrial Hygienist shall establish "action levels" at which the specified minimum levels of protection are either upgraded or downgraded based upon air monitoring results and direct contact potential. Protocols for formally changing the level of protection and the communication network for doing so shall be described in the SHERP.
- 8.2. Level B protection should be selected when the highest level of respiratory protection is needed.
 - 8.2.1. Equipment.
 - Pressure-demand SCBA or supplied air respiratory system (OSHA/NIOSH approved), operated in the positive pressure mode and equipped with an emergency escape cylinder.
 - Hooded, one-or two-piece chemical-resistant suit, Saranexcoated Tyvek or equivalent.
 - Gloves Outer (Neoprene, nitrile or equivalent).
 - Gloves Inner (latex).
 - Boots Outer (Neoprene).
 - Boots Inner (steel toe and shank).
 - Two-way radio communications.
 - Hard hat.
- 8.3. Level C protection shall be selected when the types and concentrations of respirable material are known, when appropriate air purifying cartridges are available for the known contaminants, and continuous air monitoring of the site and individual work areas has been established.
 - 8.3.1. Equipment.
 - Full-face piece, air-purifying respirator with disposable cartridges approved for toxic dusts, fumes, mists and organic vapors, in combination with a high efficiency particulate air (HEPA) cartridges (OSHA/NIOSH approved).
 - Half-face piece, air-purifying respirator with a HEPA cartridge (OSHA/NIOSH-approved). (For particulate protection only).
 - Hooded one-or two-piece chemical resistant suit, Tyvek or equivalent (Saranex coated if splash hazard exists).
 - Gloves Outer (Neoprene, nitrile or equivalent).
 - Gloves Inner (latex).
 - Hard hat.
 - Boots Outer (Neoprene); Inner (steel toe an shank); or combination.
 - Two-way radio communications (for remote operations).
 - Escape air mask (for IDLH conditions).

- 8.3.2. The requirement for the use of the respirator may be waived by the SO/IH if no respiratory protection is needed, but dermal protection is desirable.
- 8.4 Level D is the basic work uniform and should be worn only outside the Contaminant Reduction Zone and Exclusion Zone at this site.

8.4.1. Equipment.

- Coveralls.
- Boots/shoes steel toe and shank.
- Hard hat (face shield optional).
- Gloves.
- Safety Glasses.
- Two-way Radio Communications for contact with site operations.
- 8.5. All prescription eyeglasses in use on the site shall be safety glasses. Prescription lens inserts shall be provided for full-face piece respirators. Contact lenses shall be prohibited in the Exclusion Zone and the Contamination Reduction Zone.
- **8.6.** Programs for respiratory protection shall conform to OSHA 1910.134 and ANSI Z88.2-1980. A written respiratory protection program addressing site-specific respirator usage shall be submitted as part of the SHERP for review.
- 8.7. Contractor's personnel unable to pass a fit-test shall not enter or work in the Exclusion Zone or Contamination Reduction Zone.
- 8.8. All on-site personnel shall wear a hard hat when in the Exclusion Zone and Contamination Reduction Zone.
- 8.9. All personal protective equipment worn on-site shall be decontaminated before being reissued. Disposable equipment shall be properly disposed of (as contaminated solid waste) at the end of the work day. The Safety and Health Specialist/Industrial Hygiene Technician is responsible for ensuring all personal protective equipment is decontaminated before being reissued (see paragraph: DECONTAMINATION for additional requirements). Disposed material shall be temporarily retained in a fully covered container which is kept within a fenced, secured area of the site.
- **8.10.** Each respirator shall be individually assigned and not interchanged between workers without cleaning and sanitizing. Cartridges/ canisters and filters shall be changed daily or upon breakthrough, whichever occurs first. If breakthrough occurs, a reevaluation by the Contractor of the protection level is warranted. A procedure for assuring periodic cleaning, maintenance and change of filters shall be provided by the Contractor and addressed in his written SHERP.
- **8.11.** All safety clothing including work clothing and safety boots which have entered the Contamination Reduction and Exclusion Zones shall be properly decontaminated or disposed of at the end of the work day.
- 8.12. Power equipment may generate excessive noise levels (in excess of 85 decibels). Proper ear protection shall be provided by the Contractor and shall be used in accordance with OSHA 29 CFR 1926.52.

9. DECONTAMINATION.

- 9.1. EQUIPMENT DECONTAMINATION. Procedures for decontamination of vehicles and equipment shall be described in the SHERP.
- **9.1.1.** All work crews exiting from the Exclusion Zone must pass through the Contaminant Reduction Zone. All vehicles and equipment used in the Exclusion Zone shall be decontaminated in the Contaminant Reduction Zone prior to leaving the site.

0285-33-2/CD

- 9.1.2. No vehicles shall leave the Contaminant Reduction Zone of the site until they are properly decontaminated and shall be inspected and approved by the Safety Officer for general cleanliness of frame and tires before leaving the Contaminant Reduction Zone.
- 9.1.3. No vehicle shall leave the site unless it is in a broom clean condition, free of loose dirt or stabilized material on tailgates, axles, wheels, etc.
- 9.1.4. Procedures for decontamination of vehicles and equipment shall be provided to the Contracting Officer for review and approval.
- 9.1.5. Equipment decontamination wash water residues shall be collected for disposal at the designated on-site ground water disposal area.
- 9.1.6. Personnel engaged in vehicle decontamination shall wear protective equipment including appropriate protective clothing and respiratory protection consistent with the established Health and Safety Program as defined in the Contractor's SHERP.
- 9.1.7. The Contractor shall provide an equipment decontamination pad within each Contaminant Reduction Zone for removing soil from all equipment leaving the work area. As a minimum, this shall include a high pressure wash area for equipment and vehicles and a steam cleaning system for use after the mud and/or dirt has been cleaned from the equipment. A special "clean area" should be established for performing equipment maintenance. This area should be used when personnel are required by normal practices to come in contact with soil, i.e., vehicle repair. All equipment being decontaminated by washdown shall be located in the Contaminant Reduction Zone prior to maintenance work.
- 9.1.8. Seats and flooring in equipment and vehicles used in the Exclusion Zone shall be covered with disposable plastic.
- 9.1.9. Only clean water shall be used for personnel, equipment and vehicle decontamination.

9.2. PERSONNEL HYGIENE AND DECONTAMINATION.

- 9.2.1. The Contractor shall ensure that all Contractor personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids, observe and adhere to the personnel hygiene-related provisions of this Section. A detailed discussion of personnel decontamination protocols to be followed on-site shall be submitted as part of the SHERP. Specific procedures for each level of protection shall be developed and described. At minimum, they shall be no less effective than those referenced in Paragraph 2.1.1.
- 9.2.2. Contractor personnel found to be repeatedly disregarding the personnel hygiene-related provisions of the SHERP shall be barred from the site by the Safety and Health Specialist/Industrial Hygiene Technician.
- 9.2.3. The Contractor shall provide personnel hygiene sanitation and decontamination facilities in accordance with OSHA 29 CFR 1910.120 (N) and 1910.120 (K). The following shall be included as a minimum for these facilities.

 9.2.3.1. Storage and disposal containers for used
- disposable outerwear.
- 9.2.3.2. Shower facilities for all on-site personnel, including soap, shampoo, wash cloths and towels.
 - 9.2.3.3. Hand washing facilities.
- 9.2.3.4. Changing facilities and space for storing work clothing separate from street clothing.
 - 9.2.3.5. An uncontaminated lunch area.
 - 9.2.3.6. An uncontaminated rest/break area.
 - 9.2.3.7. Toilets.

General location of the facilities is to be shown on the 9.2.4.

Contractor's drawings.

Change, shower, lunch and rest/break facilities shall be 9.2.5. provided by the Contractor and all personnel must enter and leave the work site through the facilities. Two portable chemical toilets shall be located in the Support Zone.

> 9.2.5.1. General location of the facilities is shown on

the Contractor's plans.

The Contractor shall submit a drawing showing the 9.2.5.2. layout of the actual facilities for review and acceptance by the Contracting Officer.

9.2.5.3. Features shall include:

Smooth, watertight floors graded to drain to facili-

tate daily cleaning.

- Provisions for employees in the Exclusion Zone and Contamination Reduction Zone to remove protective outer clothing and wash face and hands before eating lunch. Chairs shall be provided to facilitate removal of protective outer clothing (Shower if needed.)
- Provisions for employees working in the Exclusion Zone and Contaminant Reduction Zone to remove all clothing and undergarments and "shower out" before leaving the work site.

Heating and lighting systems.

Hot and cold water systems to provide warm water for showers.

Benches, tables, lockers, boot racks, etc.

Wastewater from sinks, showers and the floor drains shall be collected by the Contractor and disposed of as sanitary sewage.

Provisions for washing contamination from boots and clothing. Personal decontamination wastewater shall be disposed of in the designated on-site ground water disposal area.

Sufficient shower heads.

Pure (nonperfumed) liquid soap and shampoo shall be provided.

9.2.5.4. Changeroom(s). All Exclusion Zone clothing and additional clothing for Contamination Reduction Zone employees shall be donned and removed in this area. Provide benches plus tables or lockers for clothing and equipment.

9.2.5.5. **Shower Room(s).** Sufficient shower heads shall

be provided including deck or mats for walkways and floor drain.

Utility Areas shall include floor drain, boot 9.2.5.6. rack for washed boots to drain, hot water heater, sink and table for cleaning respirators, etc., as appropriate.

9.2.5.7. **Lunch Room.** Daily scrubbing of tables and floor

with detergent or other suitable solution shall be required.

9.2.5.8. Clean Room shall include space for employees' street clothes and benches. Daily scrubbing of floor with detergent or other suitable solution shall be required.

- 9.2.6. Boots, gloves, and respirators shall be free of soil or liquid from the Exclusion Zone by means of decontamination washdown performed prior to entering other areas.
- 9.2.7. Used disposable outerwear shall not be reused, and when removed, shall be placed inside disposal containers provided for the purpose located in the Contamination Reduction Zone.
- **9.2.8.** Smoking and chewing tobacco shall be prohibited except in a designated Contractor-provided break area within the Support Zone.

9.2.9. Eating and drinking shall be prohibited except in a designated Contractor-provided lunch or break area within the Support Zone.

9.2.10. Contractor personnel shall be required to remove all outer protective clothing (i.e., chemically protective suits, gloves and boots), thoroughly cleanse their hands and other exposed areas before entering the break or lunch area.

10. EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS.

- 10.1. Each active work area shall be provided with approved emergency eye wash and shower units, and 20A-80 B:C-type dry chemical fire extinguisher. These units may be portable. Three units shall be supplied and located in the Contaminant Reduction Zone.
- 10.2. At least one "industrial" first aid kit and stretcher shall be provided and maintained fully stocked at an easily accessible uncontaminated location.
- 10.3. Should active work areas be so isolated or separated as to make one first aid location impractical, then first aid stations shall be established as required in close proximity to the work, but not inside a hazardous work area.
- 10.4. First aid kit locations shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions. First aid stations shall be supplied with buffer solutions for treating acid and caustic burns.
- 10.5. The Contractor shall have at least one certified First Aid Technician on the site at all times. This person may perform other duties, but must be immediately available to render first aid when needed. Certification shall be by the American Red Cross or other approved agency.
- 10.6. Dry chemical fire extinguishers shall be provided at the Contractor's office, Contracting Officer's office, and at any other site location where flammable materials may present a fire risk.
- 10.7. A minimum of two (2) self-contained breathing apparatus (SCBA's) shall be maintained in each Contamination Reduction Zone for emergency use.

10.8. Provisions for on-site communications will be available.

10.8.1. Mobile CB radios, FM transceivers or other portable communication devices shall be used to enable personnel to maintain contact with the Field Manager and Site Safety Officer during field activities.

10.8.2. In addition, a CB radio shall be available on-site to allow for immediate contact with response personnel in the event of an emergency.

11. EMERGENCY RESPONSE AND CONTINGENCY PLANNING.

- 11.1. The Contractor shall develop and submit emergency response and contingency plans for on-site emergencies as specified in OSHA 29 CFR 1910.120(1) for the following potential emergencies:
 - Chemical exposure.
 - Personal injury.
 - Potential and actual fire or explosion.

Environmental accident (spill or release).

Discovery of radioactive material.

11.2. Such emergency response and contingency plans shall be submitted by the Contractor as part of the SHERP. These plans shall address at a minimum:

Pre-emergency planning.

- Personnel roles, lines of authority, training and communication.
- Emergency recognition and prevention.

Safe distances and place of refuge.

- Site security and control.

Evacuation routes and procedures.

- Community notification and contingency planning to protect offsite receptors.

Decontamination.

Emergency Medical treatment and first aid.

Emergency alerting and response procedures.

Critique of response and follow-up.

PPE and emergency equipment.

11.2.1. Emergency equipment shall be readily accessible and distinctly marked. Emergency equipment shall include:

11.2.1.1. Fire extinguishers.

11.2.1.2. First aid kits.

11.2.1.3. Eye wash.

11.2.1.4. Emergency sprayer.

11.3. In the event of an emergency associated with remedial action, the Contractor shall, without delay: take diligent action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute whatever measures might be necessary to prevent any repetition of any conditions or actions leading to, or resulting in, the emergency.

11.4. Procedures and Contractor personnel responsibilities for potential emergencies shall be identified in the SHERP. Emphasis in the contingency

planning section shall be placed on procedures.

11.5. In the event that an accident or some other incident such as an explosion, a theft of any hazardous material, or accidental exposure occurs during the course of the project, the Contracting Officer shall be telephoned immediately and receive a written notification within 24 hours. The report shall include the following items:

11.5.1. Name, organization, telephone number, and location of the

Contractor.

11.5.2. Name and title of the person(s) reporting.

11.5.3. Date and time of accident/incident.

11.5.4. Location of accident/incident, i.e. site location, facility

name.

11.5.5. Brief summary of accident/incident giving pertinent details including type of operation ongoing at time of accident.

11.5.6. Cause of accident/incident, if known.

- 11.5.7. Casualties (fatalities, disabling injuries).
- 11.5.8. Details of any existing chemical hazard or contamination.

11.5.9. Estimated property damage, if applicable.

- 11.5.10. Nature of damage; affect on contract schedule.
- 11.5.11. Action taken by contractor to insure safety and security.
- 11.5.12. Other damage or injuries sustained (public or private).

11.6. EMERGENCY MEDICAL CARE.

11.6.1. The Contractor shall pre-arrange for emergency medical care services at a nearby medical facility and establish emergency routes.

11.6.2. The staff at the facility shall be advised of the potential medical emergencies that might result and that the patient's clothing and skin might be contaminated.

11.6.3. The Contractor shall establish emergency communications with health and emergency care services.

11.6.4. The name of this facility, name of contact, emergency routes and emergency communications arrangements shall be posted at the site.

11.6.5. The posted list shall include the following minimum points:

- Contractor physician name, address, and telephone number.
- Ambulance service and fire department telephone numbers.
- Procedure for prompt notification of Contracting Officer and EPA.
- Location of emergency showers/eye lavages.
- Location of self-contained breathing devices.
- Specific procedures for handling personnel with excessive exposure to chemicals or contaminated soil.
- Names and telephone numbers of Contracting Officer, doctor, ambulance, fire, and police will be posted at all project phones.
- 11.6.6. All-site support vehicles shall be equipped with route maps providing directions to the off-site medical facility.
- 11.6.7. All drivers of support vehicles shall become familiar with the emergency route and the travel time required.

12. ACCIDENT AND FIRE PREVENTION PLANS.

12.1. GENERAL.

12.1.1. The Contractor shall submit for acceptance as part of the SHERP an Accident Prevention Plan (APP) and Fire Prevention Plan.

12.1.2. The Contractor's APP shall be consistent with the Corps APP found in EM 385-1-1 referenced in paragraph 2.1.1, Appendix Y, "Suggested Contractor's Accident Prevention Plan Format;" "Guide Outline for Accident Proposal;" and "Phase Plan Guidelines."

12.1.3. A preconstruction conference will be scheduled prior to beginning of site work at which time representatives of the Contracting Officer will review and discuss requirements relative to planning and administration of the overall safety program. The Accident Prevention Plan shall be submitted and approved prior to the start of construction.

12.1.4. The approved APP shall be the accident prevention policy to be adhered to by the Contractor and his Subcontractors during construction and remedial activities.

12.1.5. The Contractor shall be responsible for implementation of the APP by all personnel and Subcontractors under his direction. The APP shall address, at a minimum, the following items:

- Hazards to be expected and preventative measures to be taken.
- Personnel responsibilities.
- Phase-specific safety procedures.
- Subcontractor supervision.
- "Tool Box" Safety meetings.
- Fire prevention and protection.
- Site housekeeping.

- Mechanical equipment inspection.
- First aid and medical facilities.
- Sanitation.
- Accident reporting.
- Daily safety inspections.
- Activity Hazard Analyses (Phase Plans)
- Introduction of new employees

12.2. INSPECTION.

- 12.2.1. The Contractor shall perform daily safety inspections of the job site and the work in progress to ensure compliance with the Corps of Engineers Manual EM 385-1-1 and other occupational health and safety requirements of the contract.
- 12.2.2. Daily safety logs, as required under paragraph: LOGS, REPORTS AND RECORD KEEPING, shall be used to document the inspection, noting safety deficiencies and corrective actions taken.
- 12.2.3. The Contractor shall use his designated quality control staff and/or health and safety staff to perform the required inspections and shall supplement the staff with additional personnel as required.
- 12.2.4. Additional personnel shall be provided at no additional cost to the Government.
- 12.3. The Contractor shall prepare and submit to the CO a Fire Prevention Plan (FPP).
 - 12.3.1. Essential considerations for the FPP shall include:
- 12.3.1.1. Proper site preparation and safe storage of combustible and flammable materials.
- 12.3.1.2. Availability of the coordination with private and public fire authorities.
- 12.3.1.3. Adequate job-site fire protection and inspections for fire prevention.
- **12.3.1.4.** Adequate indoctrination and training of employees.
- 12.3.2. All storage, handling or use of flammable and combustible substances shall be under the supervision of qualified persons.
- 12.3.3. All tanks, containers and pumping equipment used for the storage or handling of flammable and combustible liquids shall meet the recommendations of the National Fire Protection Association (NFPA).
- 12.3.4. Recommended practices and standards of the NFPA shall be followed in the development and application of the FPP.

13. POSTED REGULATIONS.

- 13.1. The Contractor shall develop a series of posted regulations which shall be reviewed and approved by the Contracting Officer. These regulations shall address the on-site protocol regarding use of personal protective equipment, personal hygiene, and provisions for smoking and eating.
- 13.2. These protocols shall be posted in all on-site trailers, and at the entrance of the site and shall be reviewed with Contractor's personnel.

14. LOGS, REPORTS AND RECORD KEEPING.

14.1. The Contractor shall maintain logs and reports covering the implementation of the SHERP and the Air Monitoring Program. The format shall be developed by the Contractor to include training logs, daily logs, weekly reports and a phase out report.

- The training logs shall include both initial training and refresher 14.2. training.
 - 14.2.1. Initial Site-Specific Training.
 - Employee's or Visitor's Name (attendance check).
 - b. Time allocation in training session.
 - Topics covered.
 - Materials used.
 - Equipment demonstration.
 - Equipment practice for each employee.
 - Prohibitions covered.
 - Other.
 - Buddy-System explanation.
 - Signature of trainer and date.
 - 14.2.2. Refresher Training (if conducted).
 - Employee's or visitor's name (attendance check). a.
 - Time allocation. h.
 - Date and place. c.
 - Signature of trainer and date. d.
 - 14.3. DAILY SAFETY LOGS.
 - 14.3.1. Date.
 - 14.3.2. Area (site specific) checked.
 - 14.3.3. Employees in a particular area.
 - Equipment being utilized by employees. 14.3.4.
 - 14.3.5. Protective clothing being worn by employees.
 - 14.3.6. Protective devices being used by:
 - Contractor's Personnel a.
 - **Visitors** b.
 - Designated State and Federal Representatives
 - 14.3.7. Air monitoring date.
- 14.3.8. Monitoring for heat stress or cold stress, as required in accordance with weather conditions.
- Safety and Health Specialist/Industrial Hygiene Technician 14.3.9. signature and date.
 - EMPLOYEE'S AND VISITOR'S LOG. 14.4.
 - 14.4.1. Date
 - 14.4.2. Name
 - 14.4.3. Address
 - 14.4.4. Representing Agency or Company
 - 14.4.5. Time entering site
 - 14.4.6. Time exiting site
 - 14.5. WEEKLY REPORTS.
 - 14.5.1. Summary sheet covering the range of work being done.
 - 14.5.2. Any incidents of:
 - Non-use of protective devices in an area where required. Non-use of protective clothing. a.
 - b.
 - Disregard of buddy system. c.
 - Eating, smoking, or chewing in prohibited areas. d.
 - Misuse of any of the above. e.
 - f. Job related injuries and illness.
 - Heat stress or cold stress.
- Safety and Health Specialist/Industrial Hygiene Technician 14.5.3. signature and date.

Date specified for the Weekly Report to be in the Office 14.5.4. of the Contracting Officer.

> Copies of daily logs attached. 14.5.5.

PHASE-OUT REPORT. At the completion of the work, the Contractor shall submit a phase-out report. The report shall include.

Final physical/medical and decontamination certification. 14.6.1.

14.6.2. Procedures and techniques used to decontaminate:

Equipment and vehicles. a.

Shower facility. b.

Portable chemical toilets, etc. c.

Laundry facilities. d.

14.6.3. Complete summary of monitoring accomplished on the job to include air monitoring and decontamination verification.

14.6.4. Signed and dated by the Contractor and the Safety

Officer / Industrial Hygienist.

14.6.5. Shall be submitted to the Contracting Officer 30 days prior

to final acceptance of the work.

14.7. EMPLOYER OBLIGATION. The Contractor should be aware that Federal laws such as OSHA (29CFR) require chemical exposure records and/or medical records be maintained by the employer for a specified length of time (30 years) after the termination of the job.

COMMUNICATIONS.

15.1. The Contractor shall provide hardline telephone communication at his site field office and at the Contracting Officer's field office.

15.2. Emergency numbers, including police, fire, ambulance, hospital, poison control center, and EPA, shall be prominently posted near all on-site telephones.

15.3. The Contractor shall provide two-way radio communication between the communication control center and each of the site activity areas and the Safety

and Health Specialist/Industrial Hygiene Technician.

15.4. The Security Officer shall supervise site communications and manage the communication control center. The control center shall be located within the Security Officer's office.

15.5. On-site personnel shall be in constant visual contact ("buddy

system") with each other while working in the Exclusion Zone.

INTERIM CHANGES TO EM 385-1-1 - SAFETY AND HEALTH MANUAL.

16.1. Page 21, Section 07.A.03, replace with the following:

"07.A.03 - Protective footwear, such as rubber boots, protective covers, ice clamp-ons, and steel-toed safety boots, shall be worn by all persons exposed to hazards to the feet (including, but not limited to impact, puncture, slipping, electrical, or chemical hazards).

a. For all activities in which Corps or contractor personnel or official visitors are potentially exposed to foot hazards, the applicable job/activity hazard analysis, accident prevention plan, or project safety plan shall include an analysis of, and prescribe specific protective measures to be enforced for, foot hazards.

b. Footwear providing protection against impact and compressive forces, conduction hazards, electrical hazards, and sole puncture shall meet the applicable requirements of ANSI Z41."

16.2. Page 143, Section 18.C.05, replace with the following:

"18.C.05 - All load drums on loading-hoisting equipment shall be equipped with at least one positive holding device. This device should be applied directly to the motor shaft or some part of the gear train. It is not necessary that the positive holding device utilize shearing of metal to meet this requirement. Friction surfaces are acceptable."

16.3. Page 145, add Sections 18.C.24 and 18.C.25 which will read:

"18.C.24 - During personnel handling operations load and boom hoist drum brakes, swing brakes, <u>and</u> locking devices such as pawls or dogs shall be engaged when the occupied platform is in a stationary working position.

"18.C.25 - During personnel handling operations the load hoist drum shall have a system or device on the power train other than the load hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering). Free fall is prohibited."

16.4. Page 146, Section 18.D.09, replace with the following:

"18.D.09 - All telescopic boom cranes engaged in standard lift operations (including concrete bucket) should be equipped with a two-block warning feature(s), a two-block damage prevention feature, or an anti-two block device for all points of two-blocking (i.e., jibs, extension, etc). In addition, all new telescopic boom cranes shall be equipped with an anti-two block device or a two-block damage prevention feature for all points of two-blocking. Cranes that are used exclusively as duty cycle machines (clamshell, dragline, grapple, pile driving operations) are exempt from this requirement but will meet the requirements of ANSI/ASME-B30.5-1982 (as revised). To alleviate difficulties associated with attaining compliance, an implementation time period until 1 January 1991 is granted. In all cases where cranes are utilized without these safeguards equivalent protection shall be established, documented and approved by the designated authority."

16.5. Page 146, add Sections 18.D.10 and 18.D.11, which will read:

"18.D.10 - All lattice boom cranes engaged in standard lift crane operations (including concrete bucket) shall be equipped with a two-block warning feature which functions for all points of two-blocking. Cranes that are used exclusively as duty cycle machines (clamshell, dragline, grapple, pile driving operations) are exempt from this requirement but will meet the requirements of ANSI/ASME-B30.5-1982 (as revised). To alleviate difficulties associated with attaining compliance, an implementation time period until I January 1991 is granted. In all cases where cranes are utilized without these safeguards equivalent protection shall be established and documented and then approved by the designated authority."

"18.D.11 - During personnel handling operations all telescopic and lattice boom cranes shall be equipped with a device which when activated disengages all functions whose movement can cause contact between the load block or overhaul ball and the boom tip (anti-two block device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two-block damage prevention feature). The device or system must be installed for all points of two-blocking (i.e. jib or boom points) and in the case of the anti-two block device the crane must be equipped with automatic brakes on each hoist line; hoist lines not so equipped must be taken out of service while personnel lifts are being made."

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		CONCEN	TRATION	11			CONCENT	RATION
PARAMETER	FREQUENCY	MAXIMUM	HUHIHUH	11	PARAMETER	FREQUENCY	MAXIMUM	MUMINIM
VOLATILE ORGANICS (ug/l)		1			TOTAL METALS (mg/l)	1]	
1,1,1-Trichloroethane	3	510	63	ii	Aluminum	29	26	0.18
1,1,2-Trichloroethane	0	İ	,	ii	Antimony	i o		
1,1-Dichloroethane	6	420	9	ii	Arsenic	16	0.10	0.005
1,1-Dichloroethene	2	7	4	I	Barium	28	1.1	0.06
1,2-Dichloroethane	1	3		II	Cadmium	24	0.017	0.005
1,2-Dichloroethene (total)	14	4900	1	Ï	Calcium	29	230	0.49
Acetone	26	8100	28	11	Chromium	10	0.036	0.007
Benzene	15	4	0.1	11	Copper	21	1.25	0.006
Chloroethane	0	•		11	Iron	29	80	0.06
Chloroform	0	<u> </u>		II	Lead	15	0.17	0.05
Ethylbenzene	0	1		II	Magnesium	29	140	0.21
Methylene Chloride	8	690	2	11	Hanganese	29	2.8	0.096
[Tetrachloroethene	0	1		11	Hercury	0	1	
Toluene	1	0.2		11	Nickel] 3	0.10	0.07
Total xylenes	2	110	2	11	Silver	1 4	0.009	0.005
Trichloroethene	6	1000	0.9	11	Sodium	29	340	13
t-1,2-Dichloroethene	0	ł		11	Zinc	29	0.46	0.025
Vinyl chloride	8	470	30	11		1	1	
1	1	1		11	SOLUBLE METALS (mg/l)	1	1	
ACID EXTRACTABLES (ug/l)		1		11	Aluminum	29	3	0.03
2,4-Dimethylphenol	1	2		11	Antimony	1 0	1	
1	ŀ	1		11	Arsenic	1 13	0.027	0.005
BASE/NEUTRAL EXTRAC. (ug/l)		1		11	Barium	28	0.56	0.05
Acenaphthene	1	0.4		11	Cadmium	1 7	0.010	0.006
Bis (2-ethylhexyl) phthalate	6	81	8.0	11	Calcium	29	170	0.12
Diethylphthalate	1	0.2		11	Chronium	1	0.010	
Di-n-butyl phthalate	1	0.4		H	Copper	12	0.073	0.006
Fluorene	1	1 0.2		11	Iron	29	21	0.02
Isophorone	4	180	1	11	Lead	1 4	0.07	0.05
Naphthalene	2	4	1	11	Magnesium	29	86	0.13
N-Nitrosodiphenylamine	11	1	0.2	11	Hanganese	29	1.7	0.006
Phenanthrene	1	1 0.2		11	Mercury	1 0	1	
1	l	1		H	Nickel	1	0.06	
PCBs (ug/l)	1	1		11	Silver	1 4	0.011	0.006
Arocior-1260	2	0.44	0.24	11	Sodium	29	300	11
1		1		11	Žinc	26	0.15	0.006
TRPH (mg/t)	5	1.30	1	11		1	1	

NOTES:

- 1. Number of detections does not include QC duplicate samples.
- 2. Total number of samples collected: 29
- 3. List includes parameters detected during previous RI.

		CONCEN.	TRATION [I.	1 1	CONCENT	RATION
PARAMETER	FREQUENCY	MAXIMUM	MUNINUM	PARAMETER	FREQUENCY	HUHIXAM	MINIMU
OLATILE TRGANICS (ug/kg)			1	BASE/NEUTRAL EXT (ug/kg)	1	 	
,1,1-Trichloroethane	4	99	43	2-Chioronaphthalene	<u> </u>	430	
,1,2,2-' trachloroethane	j 1 j	1		2-Methylnapthalene	85	20,000	
,1-Dichtwooethane	2	55		Acenaphthene	37	•	1
,2-Dichlorgethene(total)	8	6,800	5	Acenaphthylene	1	530	
-Butanone	1	32		Anthracene	39	180,000	3
-Hexanone	0			Benzidine	17	1,800,000	100
-Kethyl-2-pentanone	1	19,000		Benzoic acid	1	140	
cetone	50	51,000	14	Benzo (b) anthracene	1 0	İ	
lenzene	28	190	0.3	Benzo(a)anthracene	82	220,000	
Promodichloromethane	1	1		Benzo(a)pyrene	85	190,000	;
arbon disulfide	2	41	4	Benzo(b)fluoranthene	86	590,000	9
thloroform	[13	510	0.3	[Benzo(g,h,i)perylene	70	97,000	11
thylbenzene	. 8	150,000		Benzo(k)fluoranthene	i o	•	
Methylene Chloride	1 107	•		Bis (2-ethylhexyl) phthalate	41	16,000	
etrachloroethene	1 12	•		Butyl benzyl phthalate	1	120	
Toluene	56	•		[[Chrysene	91	140,000	
Total xylenes	•	1,600,000		Dibenzo(a,h)anthracene	51	39,000	
Trichloroethene	27	• • •		Dibenzofuran	52	39,000	
:-1,2-Dichloroethene	5	18		Diethylphthalate	2	9	4
/inyl acetate	1	1 1	·	Dimethyl phthalate	1 0	i	
/inyl chloride	1 0	. 0		Di-n-butyl phthalate	56	7,600	1
rinye circor roa				Di-n-octylphthalate	16	1,400	
ACID EXTRACTABLE (ug/kg)	1	1] Fluoranthene	82	510,000	
2,4-Dimethylphenol	1 13	1 12,000	44	Fluorene	1 13	•	
2-Methylphenol	19			[[Indeno(1,2,3-cd)pyrene	70	110,000	
4-Chloro-3-methylphenol	1 1	4,800	<i>.</i>	Isophorone	1 4	•	
4-Methylphenol	24	•	4	Naphthalene	72	•	
	21	1 14,000		N-Nitrosodiphenylamine	1 40	•	
Phenoi	•	14,000		Phenanthrene	1 80	•	
Benzyi alcohol	2	, 00	20	::	•	300,000	
WETAL & ATOTAL & A	l .			Pyrene	83	390,000	,
HETALS (TOTAL) (ug/g)	1	1	0.70	11 11 11 11 11 11 11 11 11 11 11 11 11	· ·	i	
Antimony	1 16	100		PCBs (ug/kg)		1	_
Arsenic	1 108	•		Arochlor-1248	14		
Barium	110	•		Arochlor-1254	11	-	
Cadmium	50	790		Arochlor-1260	1 7	8,200)
Chromium	110	•		* *	*********	••••••	
Copper	108	19,000		· · · · · · · · · · · · · · · · · · ·			
Iron	1 110	209,000		NOTES:			
Lead	1 103	•		11			
Manganese	110	32,500	74	11			
Hercury	24	1.5]]1. Frequency of detection ba		•	ly.
Hickel	110	3,010	3.4	2. Total number of samples of	ollected:	110	
Selenium	[21	[11	0.66	[[3. Parameter list includes o	nly those	chemicals (detecte
Silver	67	33	0.55	1988 field investigation	and 1985 R	i.	
Zinc	89	12,300	8.9	4. Minimum concentration lis	ited includ	es estimat	ed (1)
				values.			

TABLE QM-3: SUMMARY OF RESULTS: WETLAND SEDIMENT

SAMPLE DATE PARAMETER SAMPLE TYPE	50-A1 2/23/69 Discrete	SD-A2 2/23/89 Discrete	SD-A4 2/24/89 Discrete	SD-83 2/24/89 Discrete	SD-C1 2/23/89 Discrete	SD-A-COMP 2/24/89 Composite	SD-A-COMP SD-8-COMP SD-C-COMP SD-A1D 2/24/89 2/24/89 2/24/89 2/23/88 Composite Composite Duplic	SD-C-COMP 2/24/89 Composite	SD-A1D 2/23/89 Duplicate	SD-A1M 2/23/89 Matrix Sp	SD-A-COMP SD-8-COMP SD-6-COMP SD-A1M TB-SD 2/24/89 2/24/89 2/24/89 2/23/89 2/23/89 Composite Composite Composite Duplicate Matrix SpkTrip Blnk	R-QC 2/23/89 Rinsate
VOLATILE ORGANICS (ug/kg)		; ; ; ;	: : : : : :	• • • • • • • • • • • • • • • • • • •		· · · · · · · · · · · · · · · · · · ·	; ; ; ; ;		4 4 4 8 9 9 9	# # # # # # #	(1/gn)	(1/gn)
Acetone		52 DJ	22	0 085	1100 D	¥	¥	¥	2			480 D
Methylene Chloride						¥	¥	¥		2 83		21 01
Tetrachloroethene				Ta 5	_	¥	¥	¥				
Toluene		2 07	0.4 J	2 07		¥	¥	¥	0.2 J		0.2 8	3 08
BASE/NEUTRAL EXTRAC. (ug/kg)											(1/6n)	(1/6n)
2-Nethyinapthalene	310 1	H	8	YN .	¥	22	10 J				¥	
3,3-Dichlorobenzidine	14.	¥.		X	¥					14 J	KA	
Acenaphthene	75 7	×	12 J	X	¥					•	¥	
Anthracene	7 7 7	¥	36 J	¥	¥				51 5	r 87	¥	
Benzo(a)anthracene	130 J	¥	150 J	N	¥				120 1	110 J	¥	
Benzo(a)pyrene	160 -	¥	230 J	¥	¥	20.	12 J		120 J	120 J	¥	
Benzo(b)fluoranthene	210 J	×	7 09Z	¥	¥	67 J	17 J		180 L	160 J	¥	
Benzo(g,h,i)perylene	8	¥	120 J	¥	¥.	30		-	7	. 88	¥	
Benzo(k)fluoranthene	185	¥	260 J	K	¥	1 22	16 J			140 1	¥	;
Bis (2-ethylhexyl) phthalate	150 67	¥	300 8	YN	¥	440 BJ	110 83	130 BJ	720 B	220	¥	M
Butyl benzyl phthalate	75 7	¥	13 J	KN	¥						¥¥	0.3
Chrysene	180	¥	200 T	¥	¥		21 5		170	160 J	¥	
Dibenz(a,h)anthracene	7 82 -	*	27 J	K	¥				7 62 24	16 J	¥	
Dibenzofuran	7 %	¥		K	¥	۲ ک			110 J	110 J	¥	
Diethylphthalate	7 52	X		YX	¥							
Di-n-butyl phthalate	1 450 BJ	X	330 83	X	¥	240 BJ	280 BJ	650 BJ	350 BJ	320 87		
Di-n-octylphthalate	٠ ٥	¥		XX	¥						¥	
Fluoranthene	180	¥	S80 J	Y _N	¥	f 67			170 J		ž	
Fluorene	23 -	¥		42	¥				31 7	78 78	¥	
Indeno(1,2,3-cd)pyrene	67 1	¥	130 J	4 2	¥	33 1			r 12	26 J	¥	
Naphthalene	410 3	X	120 J	¥¥	¥	<i>11</i> J				7 09 ⁴	¥	-
Phenanthrene	250 J	¥	220 J	YX	¥	54 J	5 0 7	19 J	300	760 J	¥	
			-	4	43	1 17					¥	

MILLCREEK

SAMPLE NUMBER SD-A1 SAMPLE DATE 2/23/89 PARAMETER SAMPLE TYPE Discrete	50-A1 2/23/89 Discrete	SD-A2 2/23/89 Discrete	SD-A4 2/24/89 Discrete	SD-B3 2/24/89 Discrete	SD-C1 2/23/89 Discrete	SD-A-COMP 2/24/89 Composite	SD-A-CCMP SD-B-CCMP SD-C-CCMP SD-A1D SD-A1M TB-SD 2/24/89 2/24/89 2/23/89 2/23/89 2/23/89 Composite Composite Composite Duplicate Matrix SpkTrip Blnk	SD-C-COMP 2/24/89 Composite	s0-A10 2/23/89 Duplicate	SD-A1H 2/23/89 Hatrix Sp	TB-50 2/23/89 *Trip Blnk	R-0C 2/23/89 Rinsete
DCRe (140/kg)	-	4 1 1 1 1				5 9 5 9 6 6 6			6 6 6 9 6 1 1	1 1 1 1 1 1 1 1 1 1	(1/gn)	(1/gu)
A 10 10 10 10 10 10 10 10 10 10 10 10 10		*	2300	×	¥	130	140				X.	
Aroclor-1254	520	≨		¥	K				88		*	
											(1/01)	(J/a/)
ACID EXTRACTABLES (ug/kg)	_	;		;	;				77		Va A	
2,4-Dichlorophenol	:			¥ :	≨ :				•	*	£ \$	
2,4-Dimethylphenol	31.7			≨	¥	•			,	3 8		
2-Methylphenol	- 61	¥		¥	¥	100			2	2	¥ :	
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Phenol		¥		¥	¥	510 J					¥.	
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Mandana	1200	K	2	¥	¥	180	150	130			¥	
Mercury	0.11	¥	0.23	¥	Y.	0.15	0.13				¥	- :
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Zinc	520	¥.	4600	KA K	W	2100	290	٤			ž	
		ų, K	82	25	53	26	55	58			NA .	

B: Analyte detected in lab blank D: Analyte detected at secondary dilution of sample J: Estimated concentration of analyte

MILLCREEK

Sample Number 8-2 Sample Date 5/22/89 Sample Type Soil		B-6 5/23/89 Soil	8-9 5/17/89 Soil	8-90L 5/17/89 Soit	B-10 5/17/89 Soil	8-14 5/18/89 Soil	B-14MS 5/18/89 Soil	8-14MSD 5/18/89 Soil	8-15 5/23/89 Soil	8-15MS 5/23/89 Soil	8-15MSD 5/23/89 Soil	8-150 5/23/89 soit
VOLATILE ORGANICS			; ; ; ; ; ;	1 1 1 1 1 1	† 1 1 1 1 1				• • • • • • • • • • • • • • • • • • •		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 4 4 4 5 6 1
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Carbon disulfide	7 4		0.5 J									
Chlorobenzene			7									
Chloroform									0.8 8	_		
1,1-Dichloroethane												16
1,1-Dichloroethene			0.0									
1,2-Dichloroethene (total)		280	1500 E	1200 D	230	2800	2700	2600	~	2	٠,	20
Ethylbenzene									0.3	0.08	_	
Methylene Chloride	2.5	5 83	2 83		J 12 B		350 J	330 1	2 3	2	2 2	4
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1,1,1-Trichloroethane	:					-			7 10			,
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Vinyl chloride	•	~	10 J									m
Xylenes (total)	•											0.1
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Percent Moisture	11	>	2	5	7	*	±	<u>•</u>	2	2	2	-

ABBREVIATIONS:

B - Analyte detected associated blank

D - Analyte detected in secondary dilution of sample

J - Estimated concentration

E - Exceeded calibrated linear range of instrument

MS - Matrix spike

MSD - Matrix spike duplicate 15D - Duplicate sample boring 15

SECTION 01470 REGULATORY REQUIREMENTS

INDEX

- 1. GENERAL REQUIREMENTS
- 2. REGULATORY REQUIREMENTS
- EXECUTION
- 1. **GENERAL REQUIREMENTS.** This section covers the regulatory requirements applicable to the work. The Contractor shall conduct all work involved in the tasks of this project in accordance with the appropriate federal, state, and local regulations/laws.
- 2. **REGULATORY REQUIREMENTS.** The following regulations shall be considered by the Contractor as the minimum requirements for conducting the work involved.
 - 2.1. RESOURCE CONSERVATION AND RECOVERY ACT.
 - 2.1.1. 40 CFR Part 260
 - 2.1.2 40 CFR Part 261
 - 2.1.3 40 CFR Part 262
 - 2.1.4 40 CFR Part 263
 - 2.1.5 40 CFR Part 264
 - 2.1.6 40 CFR Part 265
 - 2.2 TOXIC SUBSTANCE CONTROL ACT: 40 CFR Part 761.
 - 2.3 OCCUPATIONAL SAFETY AND HEALTH STANDARDS: 29 CFR Part 1910 and 1926.

3. EXECUTION.

3.1. The Contractor shall observe the procedures as identified within these regulations as well as obtain other appropriate permits in conducting the work outlined, i.e., potable water well, building, and construction permits, road permits, etc. The Contractor shall be responsible for alerting the proper state and local agencies of the nature and timing of activities which will be occurring at the work site. The Contractor shall inform and update the Contracting Officer on permit status and regulatory compliance.

SECTION 01510 SURVEYS FOR RECORD DRAWINGS

INDEX

1. SCOPE

4. EXECUTION

2. GENERAL REQUIREMENTS

5. RECORD DRAWINGS

- 3. SUBMITTALS
- 1. SCOPE. This section covers the requirements for surveys conducted by the Contractor prior to, during, and after construction activities.
- 2. **GENERAL REQUIREMENTS.** Complete, accurate, legible field notes shall be kept of all surveys conducted by the Contractor. Notes shall provide data which will allow the recovery of control points and temporary benchmarks established by the Contractor as the work progresses.

2.1. CONTROLLING BENCHMARKS. The existing controlling benchmarks for the

project are shown on the Existing Conditions Plan in the design drawings.

2.2. ADDITIONAL BENCHMARKS. The Contractor shall establish any additional benchmarks that he may require for performance of the work and for post-construction documentation. Additional benchmarks shall be based on Erie vertical control datum.

2.3. ACCURACY. Horizontal and vertical control shall conform to standard third order accuracy, as follows:

H = 1/5,000 or 5 seconds of arc

V = .05 ft. per M, where M = length of loop in miles

2.4. FIELD NOTES. Field notes shall be as follows.

2.4.1. Records. Records of field notes shall be kept in duplicate in K&E Duplicating field book, No. 820062, or other similar books, as approved. Records for each day of survey operations shall show the contract name and number, the book number, the date, the weather conditions, and the names of the survey party personnel. Each subsequent page shall contain the same information in an abbreviated form adequate to maintain relationship in case pages become separated or mixed.

2.4.2. Traverse Notes. Traverse notes shall include traverse data sketches showing property or section lines, baseline or centerline alignment, control points, major visible features, existing roads, and other pertinent detail. Control point locations shall be noted with a sketch showing the

distance and bearing to each reference object.

2.4.3. Level Notes. Level notes shall be recorded for each control level circuit showing BM of origin, BMs and TBMs established, BM tied to, and error of closure. Level notes for such items as grade stakes, blue tops, and isolated elevation control checks are exempt from the requirements herein. Benchmarks and temporary benchmarks shall be clearly described and location recorded by maryland State coordinate system grid point.

2.5. EQUIPMENT CALIBRATION. Surveying instruments shall be calibrated prior to the start of work. The Contractor shall submit certificates attesting this calibration to the Contracting Officer prior to performing survey work.

2.6 HORIZONTAL CONTROL. Horizontal control shall be in accordance with the State of Maryland coordinate grid system.

- 3. SUBMITTALS. The Contractor shall submit the following items:
 - 3.1. Certificates on survey instruments (for information only).
 - 3.2. Description of all permanent control survey monuments.
- 3.3. Topographic map with a 2-foot contour interval at 1 inch 30 feet scale to cover the entire site.
- 3.4. Alignment, location, and elevation of all below grade permanent structures including but not limited to sewer line, subsurface drains, slurry walls, wells, and all other structures to prepare record drawings.
 - 3.5. Copies of Progress Record Drawings and final Record Drawings.
- 4.5 EXECUTION. The Contractor shall make all measurements and check all dimensions necessary for proper execution of the project tasks as required by the drawings and specifications. The Contractor shall provide all survey activities needed to assure proper construction of the project and development of record drawings indicating final locations and elevations of site improvements.
- 5. RECORD DRAWINGS. The Contractor shall be responsible for the preparation of as-built marked drawings showing actual locations and elevations of all site improvements identified in the project plans and specifications. The as-built drawings shall be kept current and available on the jobsite at all time. Preparation of as-built drawings is specified in SECTION: AS-BUILT DRAWINGS.

SECTION 01520 PROJECT PHOTOGRAPHS

INDEX

- 1. GENERAL REQUIREMENTS
- 2. SUBMITTALS
- 3. VIEWS REQUIRED

- 4. PRINTS
- 5. SLIDES
- 6. DELIVERY OF PRINTS AND SLIDES
- 1. GENERAL REQUIREMENTS. The Contractor shall provide color prints and slides for every photograph taken during the project.
- 2. SUBMITTALS. In accordance with SECTION: SPECIAL CLAUSES, the Contractor shall submit data for the following items required by this section.
 - 2.1. CATEGORY I. None.
 - 2.2. CATEGORY II.
 - 2.2.1. Prints, for approval.
 - 2.2.2. Slides, for approval.
- 3. VIEWS REQUIRED.
- 3.1. AREAS AND ACTIVITIES. The following work tasks and areas are to be photographed.
 - 3.1.1. Staging areas and activities.
 - 3.1.2. Sampling techniques.
 - 3.1.3. Support area.
 - 3.1.4. Any spill cleanup activities.
 - 3.1.5. Loading and transportation procedures.
 - 3.1.6. Equipment decontamination.
 - 3.1.7. Completion of work views.
 - 3.1.8. Air Monitoring Techniques.
- **3.2. PROGRESS.** Photograph from various locations to illustrate condition of work and state of progress. As a minimum, photographs shall be taken twice a month with a minimum of 5 photographs taken each time the photographer is at the site.
- 3.3. SUCCESSIVE VIEWS. At successive periods of photography, take at least one photograph from the same overall view as previously used.
- 3.4. ADDITIONAL VIEWS. Consult with Contractor Officer at each period of photography for instructions concerning views required.
- 4. PRINTS.
 - 4.1. COLOR.
 - 4.1.1. Paper. Single weight.
 - 4.1.2. Finish. Smooth surface, glossy.
 - **4.1.3.** Size. 5 in. x 7 in.
 - 4.2. IDENTIFY EACH PRINT ON BACK listing the following:
 - **4.2.1.** Name of project.
 - 4.2.2. Orientation of view.
 - **4.2.3.** Date and time of exposure.

- 4.2.4. Name and address of photographer.
- 4.2.5. Photographer's numbered identification of exposure.
- 5. SLIDES.
 - 5.1. COLOR.
 - 5.1.1. Type--35 mm.
- 5.2. IDENTIFY EACH SLIDE by number on slide and provide corresponding field book, listing:
 - **5.2.1.** Number of slide.
 - 5.2.2. Name of project.
 - 5.2.3. Orientation of view.
 - **5.2.4.** Date and time of exposure.
 - 5.2.5. Name and address of photographer.
- 6. **DELIVERY OF PRINTS AND SLIDES.** The Contractor shall deliver prints and slides to the Contracting Officer within 2 weeks after taking the photographs. Contractor shall submit one slide and two prints of each photograph taken.

SECTION 01530 AS-BUILT DRAWINGS

INDEX

1. GENERAL 4. DRAWING PREPARATION 2. PROGRESS MARKED UP AS-BUILT PRINTS 5. FINAL REQUIREMENTS

3. PRELIMINARY SUBMITTAL 6. PAYMENT

1. **GENERAL.** This section covers the preparation of as-built marked drawings complete, as a requirement of this contract.

- 2. PROGRESS MARKED UP AS-BUILT PRINTS. The Contractor shall mark up one set of paper prints to show the as-built conditions. These as-built marked prints shall be kept current and available on the job site at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. The as-built marked prints will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Construction Contractor prior to submission of each monthly pay estimate. The drawings shall show the following information, but not limited thereto:
- 2.1. The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.
- 2.2. Correct grade or alignment of pipelines or utilities if any changes were made from contract plans.

2.3. Correct elevations if changes were made in site grading.

- 2.4. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, installation plans and placing details, pipe sizes, etc.
- 2.5. The topography and grades of all drawings installed or affected as a part of the project construction.
 - 2.6. All changes or modifications which result from the final inspection.
- 2.7. Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built drawings.
- 3. PRELIMINARY SUBMITTAL. The Contractor shall prepare two copies of the progress as-built prints and these shall be delivered to the Contracting Officer at the time of final inspection for his review and approval. These as-built marked prints shall be neat, legible, and accurate. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the as-built marked prints to the Contracting Officer within 10 days.

4. DRAWING PREPARATION.

- 4.1. Upon approval of the as-built prints submitted, the Contractor will be furnished the original set of contract drawings with all amendments incorporated. These drawings shall be modified as may be necessary to correctly show all the features of the project as it has been constructed by bringing the contract set into agreement with the approved as-built prints, adding such additional drawings as may be necessary. These drawings are part of the per anent records of this project and the Contractor shall be responsible for the projection and safety thereof until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at his expense.
- 4.2. Only personnel proficient in the preparation of engineering drawings to standards satisfactory and acceptable to the Government shall be employed to modify the original contract drawing or prepare additional new drawings. All additions and corrections to the contract drawings shall be neat, clean, and legible, and shall match the adjacent existing linework and/or lettering being annotated in type, density, size, and style. All drafting work shall be done using the same medium (pencil, plastic lead, or ink) that was employed on the original contract drawings and with graphite lead on paper base material. The Contracting Officer will review all as-built drawings for accuracy and conformance to the above-specified drafting standards. The Contractor shall make all corrections, changes, additions, and deletions required to meet these standards. The title block to be used for any new as-built drawings shall be similar to that used on the original drawings.
- 4.3. When final revisions have been completed, each drawing will be lettered or stamped with the words "RECORD DRAWING AS-BUILT" followed by the name of the General Contractor in letters at least 3/16 inch high. All original contract drawings shall be marked either "As-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. All original contract drawings must be dated in the revision block (see Attachments 1 and 2).
- 5. FINAL REQUIREMENTS. After receipt by the Contractor of the approved marked as-built prints and the original contract drawings, the Contractor will, within 30 days for contracts less than \$5 million or 60 days for contracts \$5 million and above, make the final as-built submittal. This submittal shall consist of the completed as-built drawings, two blue line prints of these drawings, and the return of the approved marked as-built prints. They shall be complete in all details. All paper prints and reproducible drawings will become the property of the Government upon final approval. Failure to submit as-built drawings and marked prints as required herein shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.
- 6. **PAYMENT.** No separate payment will be made for the as-built drawings required under this contract, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

SECTION 01600 PROJECT RECORD DOCUMENTS

INDEX

- 1. GENERAL REQUIREMENTS
 2. SUBMITTALS
 3. DOCUMENT REQUIREMENTS
 4. MAINTENANCE OF DOCUMENTS
 5. REFERENCE LIBRARY
- 1. **GENERAL REQUIREMENTS.** The Contractor shall prepare, maintain and submit project record documents as required by the Specifications.
- 2. SUBMITTALS. In accordance with Section: SPECIAL CLAUSES, the Contractor shall submit data for the following items required by this section.
 - 2.1 Category I. None.
 - 2.2 Category II. For approval.
- 2.2.1. Delivery. At the completion of field operations, the Contractor shall deliver record documents to the Contracting Officer.
- 2.2.2. List of Documents Required. Accompany submittal with transmittal letter in duplicate, containing:
 - 2.2.2.1. Date.
 - 2.2.2. Project title and number.
 - 2.2.2.3. Contractor's name and address.
 - 2.2.2.4. Title and number of each record document.
 - 2.2.2.5. Signature of Contractor's authorized

representative.

- 3. DOCUMENT REQUIREMENTS.
- 3.1 Record Copies. The Contractor shall maintain at the site for the Contracting Officer one record copy of:
 - 3.1.1. Drawings.
 - 3.1.2. Specifications
 - 3.1.3. Addenda.
 - 3.1.4. Modifications to the Contract.
 - 3.1.5. Contracting Officer's Field Orders or Written Instructions.
 - 3.1.6. Daily Work Activity Summary Reports, Including:
 - 3.1.6.1 Field Test Records.
 - 3.1.6.2. Photographs.
 - 3.1.6.3. Reports on any Emergency Response Actions.
 - 3.1.6.4. Manifest Documents and Variance Reports.
 - 3.1.6.5. records of all Site Work, Including Quantities

of Drums and Material Handled.

- 3.1.6.6. Chain-of-Custody Documents.
- 3.1.6.7. Truck-Load Tickets and Shipping Papers

(Manifests).

- 3.1.6.8. All Laboratory Analytical Results.
- 3.1.6.9. Meteorological Records.
- **3.1.6.10.** Daily Inspection Records for Staging/Storage

Areas.

0285-33-2/CD

01600-1

- 3.1.6.11. All Safety and Accident Incident Reports.
- 3.1.6.12. Reports on all Spill Accidents.
- 3.1.6.13. Air Monitoring Reports and Data.
- 3.1.6.14. Daily Construction Quality Control Reports.
- 3.1.6.15. Other Items as may be required by the Contracting

Officer.

- 3.1.7. Approved Safety, Health, and Emergency Response Plan.
- 3.2. All documents shall be suitable for microfilm.

4. MAINTENANCE OF DOCUMENTS.

- 4.1. General. The Contractor shall store documents and samples in the Contractor's field office apart from documents used for work. The Contractor shall:
 - 4.1.1. Provide Files and Racks for Storage of Documents.
 - 4.1.2. Provide Locking Cabinets or Secure Storage Space.
- 4.2. Filing. Documents and samples shall be filed to facilitate retrieval. Documents shall be maintained in a clean, dry, legible condition and in good order. Record documents shall not be used for work purposes.
- 4.3. Actual Work. The Contractor shall legibly mark drawings to record actual work, including:
 - 4.3.1. Field Changes of Dimension and Detail.
 - 4.3.2. Changes Made by Field Order or by Change Order.
 - 4.3.3. Details not on Original Contract Drawings.
- **4.4. Changes.** The Contractor shall legibly mark each section of the Specifications and Addenda to record changes made by Field Order or by Change Order.
- 4.5. Availability. The Contractor shall make documents available at all times for inspection by the Contracting Officer.
- 5. REFERENCE LIBRARY. The Contractor shall provide the following list of references. The references shall be available at all times for review by all site employees including Government personnel.
- 5.1. <u>Safety and Health Requirements Manual</u>, U.S. Army Corps of Engineers, EM 385-1-1. revised October 1984.
 - 5.2. Standard First Aid Manual, American Red Cross.
 - 5.3. OSHA Safety and Health Standards, 29 CFR 1910 and 1926.
- 5.4. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/USEPA, 1985.
 - 5.5. Standard Operating Safety Guides, USEPA, 1984.
 - 5.6. NIOSH Manual of Analytical Methods, 3rd Edition, 1984.
- 5.7. Occupational Health Guidelines for Chemical Hazards, NIOSH/OSHA, 1981.
- 5.8. <u>Threshold Limit Values and Biological Exposure Indices for 1990-1991</u>, or latest edition. ACGIH.
 - 5.9. Dangerous Properties of Industrial Materials, Sax, 6th edition, 1984.
- 5.10. <u>Personal Protective Equipment for Hazardous Material Incidents: A Selection Guide</u>, NIOSH, 1984.
- 5.11. <u>Test Methods for Evaluating Solid Waste, Physical/Chemical Methods</u>, USEPA, Latest Revision, (SW-846).
- 5.12. Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air, USEPA, 1984. (EPA-600/4-84-041).

0285-33-2/CD

5.13. Methods for Organic Chemical Analysis for Municipal and Industrial

Waste Water. USEPA (EPA-600/4-82-057).

5.14. Guidelines Establishing Test Procedures for Analysis of Pollutants under the Clean Water Act. Federal Register, October 26, 1984 and January 4, 1985.

5.15. Characterization of Hazardous Waste Sites - A Methods Manual: Volume II, Available Sampling Method. USEPA, 1983 (EPA-600/4-83-040).

- 5.16. Preparation of Soil Sampling Protocol Techniques and Strategies.
 USEPA, 1983 ((EPA-600/4-83-020).
 5.17. Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Waste, (Sample Handling Protocol), USACOE, Appendix F of ER1110-1-263, October 1990.
- 5.18. <u>Determination of Particulate Matter as PM₁₀ in the Atmosphere</u>, Federal Register, Volume 52, No. 126, July 1, 1987, pp. 24664-24666.
- 5.19. Chemical Data Quality Management for Hazardous Waste Remedial Activities, (Chemical Quality Management) USACOE, ER1110-1-263, October 1990.

5.20. Drum Handling Procedures at Hazardous Waste Sites, USEPA (EPA-600/2-

86-013) (NTIS PB 86-165362), January 1986.

5.21. Final Plans and Construction Specifications. Prepared for Omaha USACOE by Malcolm Pirnie, Inc., October 1991.

SECTION 01700 DEMOBILIZATION AND PROJECT CLOSEOUT

INDEX

- 1. SCOPE
- 2. GENERAL REQUIREMENTS

4. UTILITIES

DECONTAMINATION

- 5. SECURITY
- 1. SCOPE. This section covers the activities that the Contractor must complete prior to final demobilization from the site.
- 2. GENERAL REQUIREMENTS. Work activities shall include the following:
- 2.1. Decontamination and removal from site of all Contractor equipment and materials.
- 2.2. Collection nd disposal of all Contractor-generated contaminated materials and equipment for which decontamination is inappropriate.
- 2.3. Decontamination of site-dedicated equipment and facilities operated by the Contractor and removal from site of same.
 - 2.4. Disconnection and removal from site of same.
- **2.5.** Removal of support area facilities specified in SECTION: SPECIAL CLAUSES.
- **2.6.** Removal of support area facilities specified in SECTION: SPECIAL CLAUSES.
- **2.7.** Demolition and disposal of decontamination pad and discharge lines as specified in SECTION: DEMOLITION.

3. DECONTAMINATION.

- 3.1. APPLICABILITY. All facilities, equipment, and materials shall be decontaminated prior to final removal.
- **3.1.1. Vehicles.** All vehicles shall be decontaminated at the vehicle decontamination facility prior to leaving the site. Vehicle decontamination procedures are specified in SECTION: VEHICLE DECONTAMINATION FACILITY.
- 3.1.2. Other Materials, Equipment, and Facilities. All Contractor materials, equipment, and facilities that can be certified decontaminated shall be decontaminated and inspected and approved by the Contracting Officer prior to removal from the site. All small tools and other materials for which decontamination is difficult or uncertain shall remain onsite until completion of the project and shall be packaged and disposed of by the Contractor in accordance with appropriate and relevant disposal regulations for contaminated materials. Examples of such equipment or materials are personal protective equipment, rope, lumber, plastic, etc.
- 3.2. APPROVAL PROCEDURE. Prior to removal from the site, all decontaminated equipment and materials shall be inspected and approved by the Contracting Officer.
- 3.2.1. Certificate of Decontamination. The Contractor shall provide a certificate of decontamination for all equipment and materials removed from the project site. Certificates of decontamination shall be removed from the project site. Certificates of decontamination shall be attested by the

Contractor's Site Safety and Health Supervisor. The Contractor shall provide a copy of each decontamination certificate to the Contracting Officer and shall maintain the original certificate at the Contractor's office.

4. UTILITIES. The Contractor shall disconnect and remove all temporary utilities from the site.

5. SECURITY.

- 5.1. Upon completion of the decontamination of equipment, materials, and personnel, and the removal of same from the site, the Contractor shall inspect the perimeter and security fences and repair any damaged portions of the fences or gates. All locks used onsite shall be removed. The Contractor shall give prior notice to the Contracting Officer when this inspection will be performed.
- 5.2. Padlocks shall be of solid brass case with a minimum of four-pin tumbler locking mechanism. Shackle shall be hardened steel, and shall be 1/4-inch in diameter. Padlocks will be provided to the Contractor by the Contracting Officer.

SECTION 01800 SITE MAINTENANCE PLAN

INDEX

- SCOPE
- 2. GENERAL REQUIREMENTS
- 3. SUBMITTALS

- 4. SITE MAINTENANCE AND INSPECTION ACTIVITIES
- 5. ACCEPTANCE OF WORK
- 6. PAYMENT
- 1. SCOPE. This section describes the Contractor's responsibilities for operation and maintenance activities during the first year after construction of remedial activities.
- 2. **GENERAL REQUIREMENTS.** The Contractor shall be responsible for conducting monthly inspections of the site after completion of construction. The purpose of the inspections will be to identify required maintenance activities. Specifically, the Contractor shall:
 - 2.1 The Contractor shall reference the approved Site Maintenance Plan

when conducting routine inspection and maintenance activities.

- 2.2 Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other damage in accordance with the approved Site Maintenance Plan.
 - 2.3 Maintain the ground water monitoring system.
- 2.4 Prevent storm water runoff from eroding or otherwise damaging the final cover.
 - 2.5 Maintain the flood retention basin control release structures.
 - 2.6 Maintain the maintenance access road.
 - 2.7 Maintain the integrity and effectiveness of the security fence.
- 3. SUBMITTALS.
 - 3.1 Category I. None.
 - 3.2 Category II.
- **3.2.1.** Inspection Reports. The Contractor shall furnish copies of inspection reports within 7 calendar days after completion of all site inspections.
 - 3.2.2. Notification of Maintenance Activities.
 - 3.2.3 Maintenance Completion Reports.
- 4. SITE INSPECTION AND MAINTENANCE ACTIVITIES. The Contractor shall reference the approved Site Inspection and Maintenance Plan (MIP). The MIP describes the Contractor's approach to implementing maintenance and inspection activities at the site. The MIP includes a description of operation and maintenance (0&M) requirements and procedures for the specific equipment that the Contractor has installed. The MIP also addresses monitoring procedures, personnel qualifications, and shall be in accordance with Section: CHEMICAL QUALITY MANAGEMENT.

- 4.1 Inspection Activities. All site inspections shall include, at a minimum:
- **4.1.1.** Inspection for evidence of ground subsidence areas over the cap surface.
- 4.1.2. Inspection of the condition of the vegetative cover and any erosion control devices (i.e., riprap).
- 4.1.3. Inspection of flood retention basin embankments for erosion and stability. Particular concern should be paid to the condition of vegetation and development of erosive conditions along the face of the embankment.
- 4.1.4. Inspection of flood retention basin control and release structures.
 - **4.1.4.1.** Inspection for indications of clogging in release

pipes.

- 4.1.4.2. Inspection of the integrity of the diversion structure trash rack and weir along Marshall's Run (southeast corner of site).
- 4.1.4.3. Inspection of ground water monitoring wells. Annual routine maintenance of monitoring wells will include inspection and maintenance of identification markings on each well, and inspection and replacement as necessary of caps, locks, seals, and grouting.
 - 4.1.4.4. Inspection of maintenance access road.
 - 4.1.4.5. Inspection of perimeter fence.
- 4.2 Inspection Reports. Complete and detailed inspection reports are to be prepared. Reports, as a minimum, should include:
 - 4.2.1. Inspector's name and title.
 - 4.2.2. Date of inspection.
- **4.2.3.** Detailed narrative of each inspected item, including vegetative condition, erosion effect, reported subsidence, silt accumulation, fence and gate condition, and security assurance.
- 4.2.4. Maintenance recommendations and repairs/replacements completed.

Reports are to be prepared monthly during the first year after completion of construction.

4.5 Maintenance and Repair Requirements.

- 4.5.1. Cover Maintenance. The vegetative cover shall be mowed twice per month from May through October to prevent weed and brush growth and to encourage development of a good grass growth to control erosion. Reseeding of areas which are noted during inspection to have poor vegetative growth shall be performed and the area maintained in accordance with Section: SEEDING.
- 4.5.2. Erosion Control Maintenance. Erosion of the cover system, identified during site inspections, shall be repaired as needed in a manner which provides a long-term solution to such damage. The activities required to repair erosive damage to the cover system will depend on the extent of the erosion into the cover. The disturbed area shall be seeded in accordance with Section: SEEDING. Erosion of site runoff control structures (drainage ditches) identified during site inspections shall be repaired as needed in a manner and schedule similar to that described above. The activities required to repair erosive damage to the ditches shall also depend on the extent of the damage. Replacement of riprap shall be in accordance with Section: STORM DRAINAGE SYSTEM. The final grades of all repaired areas shall conform to the grades and slopes as shown on Final Conditions Plan.

- 4.5.3. Settlement and Subsidence Control. The corrective action for subsidence of drainage ditches and the cover system shall be by the addition of soil material to the topsoil layer in conformance with Section: Topsoil.
- 4.5.4. Access Road Maintenance. Routine inspections will identify uneven settlement areas or erosive damage and repairs shall be implemented by spreading and compacting additional gravel material where required, in accordance with Section: MAINTENANCE ACCESS ROAD.
- 4.5.5. Fence Maintenance. Routine fence inspections will identify holes in the chain-link and erosion rills or animal burrows beneath the fence. Repairs shall be implemented within 1 day of identification. Routine fence maintenance will include oiling gate hinges and replacement of worn locks. Fence repairs shall be in accordance with Section: CHAIN LINK SECURITY FENCE AND GATE.

5. ACCEPTANCE OF WORK.

- 5.1. Notification. The Contractor shall notify the Contracting Officer in writing at least 5 working days in advance of conducting major maintenance activities. Minor maintenance activities that can be conducted during the site inspection do not require Contracting Officer notification. The Contractor shall identify the maintenance activities to be conducted and the personnel, equipment, and materials that will be used to conduct the required maintenance. The Contracting Officer will, at his discretion, approve the maintenance activity, or provide the Contractor with alternative specifications for the repairs to be conducted.
- 5.2. Witness During Construction. A representative of the Contracting Officer will be present onsite to witness maintenance activities. The Contracting Officer's representative will determine whether the maintenance activities have been completed in a manner acceptable to the Contracting Officer.
- **5.3.** Maintenance Completion Report. Upon completion of any maintenance or repair activities, the Contractor shall prepare a maintenance completion report. The report shall include:
- **5.3.1.** The names and qualifications of personnel that conducted the maintenance activity.
 - 5.3.2. Listing of equipment or materials used.
 - 5.3.3. Description of maintenance procedures.

The Maintenance Completion Report shall be submitted within 7 working days after completion of maintenance/repair activities.

6. PAYMENT. Inspection and monitoring requirements are included in BID ITEM SITE MAINTENANCE. Required maintenance and repair activities are subject to the requirements of Section: WARRANTY OF CONSTRUCTION, and, as such are not reimbursable costs to the Contractor.

SECTION 02100 CLEARING AND GRUBBING

INDEX

- **DEFINITIONS**
- *2. **MEASUREMENT**
- *3. PAYMENT
- CLEARING

- 5. GRUBBING
- TREE REMOVAL
- DISPOSAL OF MATERIALS
- * NOT USED

1. DEFINITIONS.

CLEARING. Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

GRUBBING. Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the

designated grubbing areas.

- NOT USED. 2. MEASUREMENT.
- 3. PAYMENT. NOT USED.
- 4. CLEARING. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. The Contractor shall perform clearing operations on the site to the limits indicated on the plans and to the limits necessary to complete the work. Clearing limits indicated on the Plans are approximate and are provided for bidding reference purposes. Clearing limits may require revisions to facilitate construction. The Contractor will not be reimbursed for areas cleared beyond the limits indicated on the plans.
- GRUBBING. Material to be grubbed, together with logs and other organic or metallic debris not suitable for subgrade purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for capping, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground. Stumps and roots may be left in place in accordance with the following requirements:
 - in areas where fill is required to achieve desired subgrades, stumps must be covered with a minimum of one (1) foot of fill;
 - stumps left in place will not be allowed to exceed one (1) foot in height above existing ground surface; and
 - stumps must never protrude through the final subgrade.

0285-33-2/CD

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6. TREE REMOVAL. Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified hereinafter in paragraph DISPOSAL OF MATERIALS.

7. DISPOSAL OF MATERIALS.

7.1. SALABLE TIMBER. All felled timber from which saw logs, pulpwood, pose, poles, ties, mine props, or cordwood can be produced shall be considered as salable timber, and may be disposed of by the Contractor off the project site premises and credit for the value thereof, if any, shall have been reflected in the Contractor's bid price(s). Materials removed from the Exclusion Zone must be decontaminated in accordance with SECTION 01460: SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS. The Contractor has the option to dispose of logs, stumps and roots on-site, see Paragraph 7.2.

- 7.2. DISPOSAL ON-SITE. Logs less than or equal to three (3) inches in diameter, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be chipped and buried in a thin layer not to exceed three (3) inches in depth in designated areas to be filled to proposed design grades. Other disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility. Unchipped logs greater than three (3) inches in diameter, stumps and roots and miscellaneous nonchippable debris may be selectively buried within designated areas to be covered with fill during site regrading. Locations for burial and selection of debris for burial shall be preapproved by the Contracting Officer. All logs to be buried unchipped shall be cut to a maximum length of four (4) feet. Logs cut to length, stumps and roots to be buried unchipped shall not exceed one (1) lift in any given fill area and be covered with a minimum of one (1) foot of fill.
- **7.3.** The Contractor is responsible for quantification and disposal of felled trees and brush from the extraction trench contract. All debris and brush shall be disposed of on-site in accordance with requirements presented in the preceding paragraphs.

SECTION 02110 BULKY DEBRIS DISPOSAL

INDEX

- SCOPE
- 2. DEFINITION
- 3. GENERAL
- 4. STAGING

- 5. DECONTAMINATION
- 6. SUBMITTALS
- 7. DISPOSAL
- 1. SCOPE. This section describes measures to be implemented during bulky debris removal activities.
- 2. **DEFINITION.** Bulky debris is defined as any man-made item which is not readily relocated by hand to either the designated staging area or disposal area. Handling and disposal of drums is addressed in the appropriate section of these Contract Documents.
- 3. **GENERAL.** An attempt has been made to locate bulky debris on the Millcreek site and identify them on the Plans. The inventory of bulky debris provided in the plan schedule was developed using best available information and should not be assumed to be a comprehensive list of all bulky debris present at the site. CONTRACTOR shall satisfy himself that all of the bulky debris on the site has been located and identified. CONTRACTOR shall be responsible for disposing of all bulky debris on the site in accordance with the specification.
- **4. STAGING.** Bulky debris shall be relocated to the permanent staging area as the course of the work progresses. Debris location and description shall be noted by the CONTRACTOR and a debris log kept for documentation purposes.
- 5. **DECONTAMINATION.** All bulky debris shall be decontaminated in accordance with the SECTION: VEHICLE AND BULKY DEBRIS DECONTAMINATION. Wipe tests on decontaminated debris will not be required.
- 6. SUBMITTALS. The CONTRACTOR shall submit the following information in his Operating Plan:
 - **6.1.** Name of off-site bulky debris disposal facility for approval.
 - 6.2. Schedule for disposal of bulky debris.

7. DISPOSAL.

- 7.1. General. Bulky debris shall be removed from the site for disposal of an approved facility on the same day as decontamination is performed. Units shall be lifted and transported whole.
- 7.2. Chain of Custody. No bulky debris shall leave the site until the Contract Manager has approved and noted such in the Debris Log. Receipt slips for each piece of bulky debris transported off-site by the Contractor must be presented to the Contract Officer and will be kept as a permanent record of activity at the Site.

SECTION 02201 EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES

INDEX

1.	APPLICABLE PUBLICATIONS	*	7.	FOUNDATION DRAINAGE
2.	DEFINITIONS	:	8.	BACKFILLING
3.	PROTECTION OF EXISTING VEGETATION,		9.	FILLING AND COMPACTION
	STRUCTURES, UTILITIES, AND	*	10.	CAPILLARY WATER BARRIER
	IMPROVEMENTS	*	11.	SOIL POISONING
4.	CLEARING AND GRUBBING	*	12.	GRADING
5.	CONSERVATION OF TOPSOIL	*	13.	TOPSOIL PLACING
6.	EXCAVATION	*	14.	PROTECTION

* Not used

1. APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

.1.	AMERICAN SOCIETY	FOR TESTING AND MATERIALS (ASTM) STANDARDS.
	D 1556-82	Density of Soil in Place by the Sand-Cone
		Method
	D 1557-78	Moisture-Density Relations of Soils and
		Soil-Aggregate Mixtures Using 10-1b (4.54 kg)
		Rammer and 18-in. (457 mm) Drop
	D 2487-85	Classification of Soils for Engineering
	D 0000 01	Purposes
	D 2922-81	Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
	D 3017-88	Water Content of Soil and Rock in Place by
		Nuclear Methods (Shallow Depth)
	D 4318-84	Liquid Limit, Plastic Limit, and Plasticity
		Index of Soils

2. DEFINITIONS.

- 2.1. SUITABLE MATERIALS include all material not included in the unsuitable materials definition below.
- 2.2. UNSUITABLE MATERIALS include all material that contains debris, roots, organic matter, frozen matter, stone with any dimension greater than one-half the loose layer thickness, or other materials that are determined by the Contracting Officer as unsuitable for providing a stable subgrade or stable foundation for structures. Also included are materials classified in ASTM D 2487 as PT, OH, OL, and MH. Otherwise suitable material which contains excess moisture will not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials satisfactorily as determined by the Contracting Officer. Expansive soils shall be considered unsuitable for use as fill and backfill material.
- 2.3. COHESIONLESS AND COHESIVE MATERIALS. Cohesionless materials are defined as materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials are defined as materials classified as GC, SC, ML, CL, MH, and CH.

Materials classified as GM and SM will be identified as cohesionless when the fines are nonplastic, and cohesive when the fines are plastic.

- 2.4. NON-EXPANSIVE SOIL is defined as any suitable material having a plasticity index equal to or less than 12 percent when tested in accordance with ASTM D 4318. The maximum particle size in any dimension shall be 2 inches.
- 2.5. EXPANSIVE SOIL is defined as any soil not included in the non-expansive definition above.
 - 2.6. CAPILLARY WATER BARRIER MATERIALS Not used.
 - 2.7. ACCEPTABLE TOPSOIL. Not used.
- 2.8. DEGREE OF COMPACTION required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method B, C, or D, abbreviated hereinafter as percent laboratory maximum density.
- 3. PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS is specified in the CONTRACT CLAUSES. Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense. Any existing utility lines that are to be retained and that are not shown on the drawings or the locations of which are not made known to the Contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor, and adjustment in payment will be made. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time for the necessary measures to be taken to prevent interruption of the service.

4. CLEARING AND GRUBBING.

- 4.1. GENERAL. Unless otherwise shown, the areas within lines 10 feet outside of each structure line shall be cleared of trees, stumps, roots, brush, and other vegetation, debris, and other items that would interfere with construction operations. Stumps, logs, roots, and other organic matter shall be completely removed. The resulting depressions shall be completely filled and compacted in accordance with paragraph: FILLING AND COMPACTION unless further excavation is required.
- 4.2. DISPOSAL OF CLEARED AND GRUBBED MATERIALS. Not used. See Section: CLEARING AND GRUBBING.
- 5. CONSERVATION OF TOPSOIL. Topsoil shall be used to cover all graded areas and shall not be placed until receiving approval from the Contracting Officer.

6. EXCAVATION.

6.1. GENERAL. The excavation shall conform to the dimensions and elevations indicated for each structure, except as specified hereinafter, and all work incidental thereto. Excavation shall allow for placing and removal of forms, installation of services, and for inspection. Excavations shall not be carried below indicated depths except to remove unsuitable material. Unsuitable material not shown, but which is encountered shall be immediately reported to the Contracting Officer who will define in writing the limit and the depth of removal of such unsuitable material as the work proceeds. In cases where overexcavation is ordered to remove unsuitable material, an equitable adjustment in contract price will be made in accordance with the clause entitled "Changes" of the

CONTRACT CLAUSES to cover the additional cost of performing the overexcavation, disposing of the unsuitable material and backfilling the overexcavation. Material removed below the depths indicated without specific direction of the Contracting Officer shall be replaced, at no additional cost to the Government, to the indicated excavation grade with suitable materials placed and compacted as specified in paragraph: FILLING AND COMPACTION, except that concrete footings shall be increased in thickness to the bottom of the overdepth excavations.

6.1.1. Overexcavation of Existing Materials. The existing soil shall be removed to the depth and extent indicated on the drawings. Unless further excavation is required, the resulting depressions shall be backfilled up to the subgrades indicated with approved suitable nonexpansive fill material. Backfilling of the overexcavated area shall commence as soon as possible, and shall be diligently carried out until completed. Subgrade protection shall be provided as specified in paragraph: FOUNDATION PROTECTION and Protection of Overexcavation Subgrades. Backfill materials shall be placed and compacted as

specified in paragraph: FILLING AND COMPACTION.

6.2. DRAINAGE. Excavation and site grading shall be performed in such manner that the area of the site and the area immediately surrounding the site will be continually and effectively drained by gravity or by temporary pumps. Water shall not be permitted to accumulate in the excavation or adjacent to structure foundations. The excavation shall be drained by methods which will prevent wetting of the foundation bottom, undercutting of footings, or other conditions detrimental to proper construction procedures. The excavation shall be kept dry during digging, subgrade preparation, and continually thereafter until the structure to be built is completed to the extent that all footings and foundation walls have been placed and foundation trenches are backfilled and no damage from hydrostatic pressure, flotation, or other causes will result. All excavations for structures or trenches which extend down to or below ground water level shall be dewatered by lowering and keeping the ground water level 12 inches or more below the bottom of the excavation.

It is anticipated that subsurface ground water pumping will be required for this project. Payment for subsurface ground water pumping shall be included in

the price bid for Bid Item 8 - FRB and Drainage Improvements.

6.3. FOUNDATION PROTECTION. All foundation soils on which concrete footings are placed shall be protected from movement or other damage due to frost penetration. Soil backfill, insulation, heat, or other approved methods shall be used to protect the foundation system during periods of the year in which frost penetration is possible.

6.4. SHORING, including sheet piling, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled,

in a manner to prevent caving.

- 6.5. UTILITY AND DRAIN TRENCHES. Trenches for underground utilities systems and drain lines shall be excavated to the required alinements and depths. The bottom of trenches shall be graded to secure the required slope and shall be tamped to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Unsuitable material shall be removed and replaced with suitable material placed and compacted as specified in paragraph: FILLING AND COMPACTION.
- 6.6. BORROW. Where suitable materials are not available in sufficient quantity from all required excavations under this contract, approved materials shall be obtained from approved sources outside the limits of Government-controlled land at the Contractor's responsibility.

0285-33-2/CD

- 6.6.1. Site Assessment of Borrow Sources. The Contractor will be required to conduct a Phase 2 Environmental Real Estate Assessment of all offsite borrow areas or source by an independent organization experienced in conducting site assessments. The site assessment will include, but will not be limited to the following:
 - legal title searches;
 - review of regulatory agency hazardous waste site registries (federal, state, and county) including USEPA NPL, CERCLIS FINDS Lists; PADER registry of Inactive Hazardous Waste Sites, Active and Inactive Spill Lists, Storage Tank Registries; and County Lists and/or Maps of Solid and Hazardous Waste Site;
 - communication with local and state environmental officials/ agencies regarding current and previous activities; and
 site inspection.

The site assessment will be conducted in accordance with current practices. A site assessment report of all potential borrow areas will be submitted to the Contracting Officer for review. Sites that are listed on hazardous waste site registries where widespread contamination is suspected through site inspections, sites with questionable histories or documented information with local and state officials on questionable activities or incidences will be cause for rejection by the Contracting Officer. Borrow soils can only be obtained from approved sites. The Contractor shall provide documentation for the source of each incoming truckload of fill and/or topsoil.

- 6.7. DISPOSAL OF EXCAVATED MATERIALS. Excavated material shall be made available for use in other portions of the permanent site work required for the contract project. Stockpiles and wasted materials shall be placed, graded, and shaped for proper drainage and neat appearance giving due consideration to drainage from adjacent properties.
- 6.8. FINAL GRADE (OTHER THAN AT PILING). Care shall be taken not to disturb the bottom of the excavation. All subgrades beneath footings, structure slabs, , and paved areas which have a density less than that specified in paragraph: COMPACTION, shall be scarified to a depth of 6 inches and compacted to that specified density.
 - 6.9. FINAL GRADE AT PILINGS. Not used.
- FOUNDATION DRAINAGE. Not used.
- BACKFILLING shall not begin until construction below finish grade has been 8. inspected, and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Backfill material and its compaction shall be the same as fill material specified under paragraph: FILLING AND COMPACTION. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted by power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes to avoid damage. Backfill shall no be placed against foundation walls until concrete has gained its full design Backfill shall be brought up evenly on each side of the wall and sl ed to drain away from the wall. Where fill or backfill is to be placed and compacted against structure walls, the walls shall be supported laterally as necessary to prevent damaging or displacing the walls. Any wall so damaged as

a result of the Contractor's operation shall be completely and promptly replaced.

9. FILLING AND COMPACTION. Suitable material shall be used in fills and backfills and for replacing unsuitable material as defined hereinbefore. Fill and backfill material shall be nonexpansive soil. Sampling and testing shall be nonexpansive soil.

be performed as hereinafter specified.

9.1. MOISTURE DENSITY DETERMINATIONS. Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with the requirements of ASTM D 1557, except that a mechanical tamper may be used provided the results are correlated with those obtained with the referenced hand tamper. Samples shall be representative of the materials to be placed. An optimum moisture density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for compaction. The above testing shall include Atterberg limits, grain size determinations, and specific gravity. A copy of these tests shall be furnished to the Contracting Officer with the construction quality control daily report.

9.2. PREPARATION OF GROUND SURFACES. Unsuitable material in surfaces to receive fill or in excavated areas shall be removed and replaced with suitable materials. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up in such manner that the fill material will bond with the existing material. When subgrades are of less than the specified density, the ground surface shall be broken up, pulverized, and compacted to the specified density in paragraph: COMPACTION, hereinafter. Where a fill is adjacent to a required excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as

specified for the adjacent fill.

9.3. PLACING. The approved suitable materials shall be placed in successive horizontal uniformly spread layers of loose material not more than 6 inches thick except that in areas not accessible or permitted for the use of self-propelled rollers or vibrators the loose layer shall be not more than 4 inches thick. Fill shall not be placed until subgrade is checked and approved. Fills shall not be placed on muddy or frozen subbase. Topsoil shall be placed in the areas shown on the drawings as specified under the SECTION: GRADING. paragraph: TOPSOIL PLACING.

9.4. COMPACTION shall be accomplished by sheep's-foot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. When questionable or borderline materials are encountered the Contracting Officer will determine the compaction requirements to be used. Cohesive soils shall be at a moisture content between 1 percent below and 4 percent above optimum moisture when compacted. Cohesionless soils shall be compacted at a moisture content as required to facilitate compaction without bulking. Each layer shall be compacted to not less than the percentage of maximum density specified below:

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Maximum Density

	Cohesive <u>Material</u>	Cohesionless
Fill, embankment, backfill, paved areas	90	95
Subgrade under proposed structure, and footings	95	95

9.5. TESTS FOR AND CONTROL OF DENSITY.

9.5.1. Sampling and Testing. All quality control sampling and testing shall be performed by the Contractor. (See clause: CONTRACTOR QUALITY CONTROL of SECTION: SPECIAL CLAUSES.)

- Density Control. The Contractor shall adequately control 9.5.2. his compaction operations by tests made in accordance with ASTM Standard D 1556 or ASTM D 2922 and ASTM D 3017 to insure placement of materials within the limits of densities specified above. When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph "Calibration" of ASTM D 2922. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with the density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every 10 tests performed according to ASTM D 2922 for correlation of test results. A minimum of two density tests are required for each 4,000 sq. ft. or less of area filled or backfilled in each lift. The location of the tests shall be as directed by the Contracting Officer. The Contractor shall make as many additional tests as he requires to obtain the specified density at all points. Copies of all test results shall be furnished to the Contracting Officer with the Construction Quality Control Daily Report. Tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such tests for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.
- 9.6. RECONDITIONING OF SUBGRADES. Approved compacted subgrades that are disturbed by Contractor's subsequent operations or adverse weather shall be scarified and compacted as specified hereinbefore to the required density and moisture limits prior to further construction thereon. Recompaction over underground utilities and heating lines shall be by hand tamping.
- 10. CAPILLARY WATER BARRIER Not used.
- 11. SOIL POISONING. Not used.
- 12. GRADING. Not used.
- 13. TOPSOIL PLACING. Not used. See Section: Topsoil.
- PROTECTION. Not used.

ZERO ACCIDENTS

SECTION 02210 GRADING

INDEX

1.	APPLICABLE PUBLICATIONS	11.	PREPARATION OF GROUND SURFACE
2.	DEFINITIONS		FOR FILL
3.	EXCAVATION	12.	FILL
4.	UTILIZATION OF EXCAVATED MATERIALS	13.	COMPACTION
5.	CONSERVATION OF TOPSOIL	14.	TOPSOIL PLACING
6.	SELECTION OF BORROW MATERIAL	15.	FINISHED EXCAVATION, FILLS
7.	OPENING AND DRAINAGE OF BORROW		AND EMBANKMENTS
	PITS	16.	SUBGRADE AND EMBANKMENT
8.	EXCAVATION OF DITCHES		PROTECTION
9.	PROTECTION OF EXISTING SERVICE	17.	EXISTING MANHOLES, VALVE
	LINES AND UTILITIES STRUCTURES		BOXES, OR INLETS
10.	BACKFILL ADJACENT TO STRUCTURES		

* Not used

1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS.

D 1556-82 Density of Soil in Place by the Sand-Cone Method

D 1557-78 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-1b (4.54 kg) Rammer and 18-in. (457 mm) Drop D 2487-85 Classification of Soils for Engineering

D 2487-85 Classification of Soils for Engineering Purposes
D 2922-81 Density of Soil and Soil-Aggregate in Place

by Nuclear Methods (Shallow Depth)

D 3017-78 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

2. DEFINITIONS.

2.1. SUITABLE MATERIALS include all material not included in the unsuitable materials definition below. Embankment materials are further described in paragraph:

2.2. UNSUITABLE MATERIALS include all materials that contain debris, roots, organic or frozen materials, materials classified in ASTM D 2487 as MH, PT, OH, and OL, stone having a maximum dimension larger than 4 inches in the upper 6 inches of fill or larger than 6 inches for the remainder of fill and materials that are determined by the Contracting Officer as unsuitable for providing a stable slope, fill, subgrade or foundation for structures. Otherwise suitable material which is unsuitable due to excess moisture content will not be classified as unsuitable material unless it can not be dried by manipulation, aeration, or blending with other materials satisfactorily as determined by the Contracting Officer.

0285-33-2/CD

2.3. COHESIONLESS AND COHESIVE MATERIALS. Cohesionless materials are defined as materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials are defined as materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless when the fines are nonplastic, and cohesive when the fines are plastic.

2.4. ACCEPTABLE TOPSOIL Not used. See SECTION: TOPSOIL CAP.

2.5. SPOT SUBGRADE REINFORCEMENT MATERIAL includes sound, tough, durable crushed stone, slag or gravel, consisting of pieces varying from 1 inch to 3-1/2 inches in diameter, or other approved material, with necessary filler. When a finer material is necessary for filler, broken stone chips, screened gravel, or sand may be used to completely fill all voids.

2.6. PAVEMENTS shall include all roads, walk areas, graveled parking or

walk areas, or any other type of surfaced area for driving or walking.

- 2.7. STANDARD FRAME AND GRATE OR COVER shall mean heavy-duty type frame and grate or cover as a minimum.
- 3. Excavation of every description, regardless of material EXCAVATION. encountered, within the grading limits of the project shall be performed to the lines and grades indicated including removal of existing culverts, storm drains, Excavated material shall be transported to and and storm drain structures. placed in fill areas within project cap limits. Unsuitable material encountered within the limits of the work shall be excavated below the grade shown and replaced with suitable material as directed. Such material excavated and the selected material ordered as replacement will be paid for by an equitable adjustment of the contract price under the clause of the CONTRACT CLAUSES of the contract entitled "Changes." Unsuitable and surplus excavated material shall be disposed of by the Contractor in designated cap areas. During construction, excavation and filling shall be performed in a manner and sequence that will utilize all suitable material from required excavation prior to obtaining material from borrow and will provide drainage at all times.
- 4. UTILIZATION OF EXCAVATED MATERIALS. Material removed from required excavation under this section and any excess material from structure excavation shall be utilized in the formation of slopes to be capped. No excavated material shall be deposited at any time in a manner that may endanger a partly finished structure by direct pressure, by overloading banks contiguous to the operations, or that may in any other way be detrimental to the completed work.
- 5. CONSERVATION OF TOPSOIL. Not used.
- 6. **SELECTION OF BORROW MATERIAL.** Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. The Contractor shall procure all required borrow material from outside the limits of Government-controlled land, shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expenses of developing the sources, including rights-of-way for hauling. No borrow shall be obtained within the limits of the project site.
 - 6.1. Site Assessment of Borrow Sources.
- **6.1.1.** Site Assessment of Borrow Sources. The Contractor will be required to conduct a Phase 2 Environmental Real Estate Assessment of all offsite borrow areas or source by an independent organization experienced in conducting site assessments. The site assessment will include, but will not be limited to the following:

legal title searches;

review of regulatory agency hazardous waste site registries (federal, state, and county) including USEPA NPL, CERCLIS FINDS Lists; PADER registry of Inactive Hazardous Waste Sites, Active and Inactive Spill Lists, Storage Tank Registries; and County Lists and/or Maps of Solid and Hazardous Waste Site;

 communication with local and state environmental officials/ agencies regarding current and previous activities; and

site inspection.

The site assessment will be conducted in accordance with current practices. A site assessment report of all potential borrow areas will be submitted to the Contracting Officer for review. Sites that are listed on hazardous waste site registries where widespread contamination is suspected through site inspections, sites with questionable histories or documented information with local and state officials on questionable activities or incidences will be cause for rejection by the Contracting Officer. Borrow soils can only be obtained from approved sites. The Contractor shall provide documentation for the source of each incoming truckload of fill and/or topsoil.

7. OPENING AND DRAINAGE OF BORROW PITS. Not used.

- 8. EXCAVATION OF DITCHES. Ditches shall be cut accurately to the cross sections and grades indicated. All roots, stumps, rock and foreign matter in the sides and bottom of ditches shall be cut to conform to the slope, grade, and shape of the section shown. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade with suitable, thoroughly compacted material as directed. All ditches excavated under this section shall be maintained until final acceptance of the work. Suitable material excavated from ditches shall be placed in fill areas as directed. Unsuitable and excess excavated material shall be disposed of as specified above. No excavated material shall be deposited closer than 3 feet from the edges of the ditches.
- 9. PROTECTION OF EXISTING SERVICE LINES AND UTILITIES STRUCTURES. Existing utility lines that are shown on the drawings, or the locations of which are made known to the Contractor prior to excavation that are to be retained, as well as utility lines constructed during excavation operations, shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines that are not shown, or the locations of which are not made known to the Contractor, report thereof shall be made immediately to the Contracting Officer. If determined that repairs are to be made by the Contractor, such repairs will be made in accordance with the clause Entitled "Changes" of the CONTRACT CLAUSES.
- 10. BACKFILL ADJACENT TO STRUCTURES shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used. Backfill for culverts, and storm drains and subdrains, including the bedding, shall conform

to the additional requirements as specified in SECTION: STORM-DRAINAGE SYSTEM and SECTION: SUBDRAINAGE SYSTEM. Backfill for structures other than culverts, storm drains, and subdrains shall conform to the additional requirements in SECTION: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

- 11. PREPARATION OF GROUND SURFACE FOR FILL. All surface vegetation, such as brush, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsuitable material within the area upon which fill is to be placed shall be removed before the fill is started in accordance with SECTION: CLEARING AND GRUBBING. Sloped ground surfaces steeper than 1 vertical to 4 horizontal on which fill is to be placed shall be plowed, stepped or benched, or broken up as directed, in such a manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted, aerated or dried as may be required to obtain the compaction specified.
- 11.1. Minimum and Maximum Grades. the areas affected by grading activities, as indicated on the Construction Plans, shall be graded such that the minimum slope shall be 3 percent and the maximum slope shall be 25 percent. Ditch and channel sideslopes shall be graded to a maximum slope of 18 percent. 12. FILL. Fills and embankments herein designated as fills shall be constructed at the locations and to lines and grades indicated on the drawings. The completed fill shall correspond to the shape of the typical sections shown on the drawings and shall meet the requirements of the particular case. Suitable material removed from the excavation shall be used in forming the necessary fill. Where otherwise suitable material is too wet, it shall be aerated or dried to provide the moisture content specified for compaction. The material shall be placed in successive horizontal layers of 8 inches to 12 inches in loose depth for the full width of the cross section, and compacted.
- 12.1. Closure of On-Site Water Disposal Ponds and Depressions. On-site ponds and depressions used for the disposal dewatering and decontamination waters will be backfilled with select fill to water level. No compaction of fill below water level will be required. Subsequent fill shall be compacted in accordance with paragraph: COMPACTION.
- 13. COMPACTION shall be accomplished by means specified and to the following densities for various parts of the work. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.
- 13.1. OVER-ALL OR OVERLOT AREAS. Each layer of the fills constructed under this section except for topsoil shall be compacted to a density of at least 90% of the maximum density determined as specified hereinafter. Cohesive soils shall be at a moisture content between 1 percent below and 4 percent above optimum moisture when compacted. Cohesionless soils shall be compacted at a moisture content as required to facilitate compaction without bulking.
- 13.1.1. During cap construction, all on-site fill will be compacted with a minimum of three (3) passes using a 10,000-lb vibrating drum or sheepsfoot compactor. All off-site fill will be compacted to 90% of the Standard Proctor density. Surcharge loads from compaction and construction equipment, and fill placed to achieve desired grades will promote primary settlement, if any, of loosely compacted subfill. Should settlement occur during grading/filling operations, the Contractor will be required to place additional fill in settled area to achieve desired grades.
- 13.1.2. Fill soil covering the debris will be compacted to not less than 90% Standard Proctor density. Debris will be crushed, placed, and compacted by similar methods utilized to compact sanitary refuse (5 passes with a dozer or

trash compactor). The Contractor will be required to limit the thickness of the debris material to less than five (5) feet to minimize the long-term potential for settlement.

13.2. AREAS TO RECEIVE PAVEMENTS. All fills or embankments for paved areas shall be compacted as specified for OVER-ALL OR OVERLOT AREAS, with the exception that the upper layer forming the subgrade for pavements in both cut and fill areas, shall be compacted to a density of 95% of maximum density determined as specified hereinafter.

13.2.1. Subgrade Preparation. The subgrade shall be shaped to line, grade and cross section with approved compaction equipment so as to provide a minimum compacted subgrade thickness of 6 inches. This operation shall include any reshaping, aeration, wetting, or drying required to obtain a moisture content between 1 percent below and 4 percent above optimum for cohesive soils or as required to facilitate compaction without bulking for cohesionless soils along with the rolling of the subgrade to obtain proper compaction. All unsuitable material for embankment shall be removed and replaced with suitable material. All boulders or ledge stone encountered in the excavation shall be removed or broken off to a depth of not less than 6 inches below the subgrade. resulting area and all other low sections, holes, or depressions shall be brought to the required grade with suitable material and the entire subgrade shaped to line, grade and cross section and thoroughly compacted as herein provided. Contractor should proceed cautiously during preliminary grading to minimize potential damage to encountered drums. Drums are to be removed as they are Air monitoring is required during this activity (ref. encountered. Section 01460).

13.2.2. Spot Subgrade Reinforcement. The use of spot subgrade reinforcement material shall be at the direction of and subject to the approval of the Contracting Officer. Unsuitable subgrade materials shall be removed, the bottom of the resulting excavation shaped uniformly and compacted firmly to the density specified for subgrade, and the required provisions for adequate drainage shall be made. The subgrade reinforcement material shall then be placed in the prepared excavation, in layers of not more than 8 inches, which shall be spread and rammed until level with the surrounding subgrade surface. The voids shall then be filled with necessary finer selected material and the area rolled, or tamped if inaccessible to the roller. The filling and rolling or tamping shall be continued until the entire mass is thoroughly compacted to not less than the density of the surrounding or adjacent areas. The surface shall be finished to conform accurately to the grade and cross section shown on the drawings.

13.3. TESTS FOR AND CONTROL OF DENSITY.

13.3.1. Sampling and Testing. All quality control sampling and testing shall be performed by the Contractor in accordance with paragraph: CONTRACTOR QUALITY CONTROL of SECTION: SPECIAL CLAUSES and as specified herein.

13.3.2. Density-Moisture Determinations. Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with the requirements of ASTM D 1557, Method B, C, or D, except that a mechanical tamper may be used provided the results are correlated with those obtained with the referenced hand tamper. Samples shall be representative of the materials to be placed. An optimum moisture-density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for compaction. The above testing shall include Atterberg limits, grain size determinations and specific gravity. A copy of these tests shall be furnished to the Contracting Officer with the construction quality control daily report.

13.3.3. Density Control. The Contractor shall adequately control his compaction operations by tests made in accordance with any of the following methods: ASTM D 1556, ASTM D 2167, or ASTM D 2922 and ASTM D 3017 to insure placement of materials within the limits of densities specified. The Contractor shall obtain a service permit to use radiation producing machinery or radioactive materials in accordance with SECTION 01460: SAFETY, HEALTH AND EMERGENCY RESPONSE REQUIREMENTS. When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph "Calibration" of ASTM D 2922. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with the density calibration checks as The calibration checks of both the density and described in ASTM D 3017. moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every 10 tests performed according to ASTM D 2922 for correlation of test results. One test shall be made for each 3,000 sq. yds. or less for each layer of specified depth, except areas to receive pavements, for which one test shall be made for each 1,000 sq. yds. or less for each layer. Additional tests shall be made as necessary. All test results shall be made available to the Contracting Officer. Acceptance tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such tests for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

14. SPECIAL CONSIDERATIONS FOR EMBANKMENTS 14.1. GENERAL.

14.1.1. CLEARING. All clearing and grubbing work shall be completed at least 300 feet in advance of levee embankment construction. *(In locations where work on drainage structures is performed prior to levee construction, all clearing and grubbing shall be completed in advance for at least 100 feet in both directions from the structure, measured along the levee center line.)

14.1.2. SUBMITTALS. The CONTRACTOR will be required to submit a Surface Flow Bypass Plan for Improvements to Marshall's Run. As a minimum, the Plan shall address:

- sequence of work;
- number of bypass set-ups;
- size and type of bypass pump(s);
- amounts of bypass piping; and
- bypass system maintenance and operation.

14.2. EMBANKMENT FOUNDATION PREPARATION.

14.2.1. Groundwater. All earthwork, foundation concrete placement, and channel construction should be performed in-the-dry. Because excavations will be advanced near and below observed groundwater levels, it is anticipated that some type of pumped subsurface dewatering system will be necessary. It is cautioned that the soils at this site will contain significant quantities of fine-grained material, and that they will be sensitive to disturbance. Bearing grades, therefore, should be kept free of water, shod be subjected to a minimum amount of construction traffic, should be left exposed no longer than necessary, and should not be permitted to freeze. Contractor shall maintain the water level 12-inches below fill for construction of the FRB and Marshall's Run earthen

berms. Groundwater will be maintained at least 12-inches below fill at all times during construction. Payment for groundwater pumping shall be included in Bid Item 8 - FRB and Drainage Improvements.

Contractor shall submit a Dewatering Plan for Improvement to Marshall's Run.

As a minimum, the Plan shall address:

number of dewatering set-ups;

number of well points;

disposal of pumped groundwater;

compliance with applicable permits and local ordinances; and

ground water pumping system maintenance.

14.2.2. Use of Existing Materials. The existing fill materials may generally be left in place beneath embankments, the realigned stream channel, and the side-discharge weir. Any fill materials beneath the concrete control structure or box culverts, however, should be removed and replaced with compacted embankment fill.

surface topsoil. Any loose, soft, wet, frozen, organic or otherwise unsuitable materials shall be removed and replaced with compacted embankment fill. Following clearing, test pits and other similar cavities or depressions shall be broken down, where so directed, to flatten out the slopes. Immediately prior to the placement of embankment of fill material, the entire earth surface on or against which fill is to be placed shall be thoroughly broken to a depth of six (6) inches and the area to be occupied by the levee proper shall be compacted in accordance with the provisions of Paragraph: Embankment Construction. Compaction of the prepared foundation in areas to be occupied by berms or at locations where uncompacted fill is to be placed will not be required. If for any cause this broken surface, or other surface that is to receive fill, becomes compacted in such a manner that, in the opinion of the Contracting Officer, a plane of seepage or weakness might be induced, it shall be thoroughly broken before the depositing of material thereon. All scarifying and breaking of ground surface shall be done parallel to the center line of the levee.

All of the foregoing work shall be completed at least 200 feet in advance

of the embankment construction.

14.2.4. Drainage. The foundation receiving fill, and all partially completed fill shall be kept thoroughly drained.

14.2.5. Frozen Ground. No fill shall be placed upon frozen ground.

14.3. EMBANKMENT MATERIALS. The embankment shall be constructed of earth obtained from off site borrow areas. Depending on the presence or absence of an adjacent low-permeability channel lining, embankment fill shall consist of inorganic material conforming to the following gradational limits:

Sieve Size	Percent Finer L <u>Lined</u>	y Weight <u>Unlined</u>
3 in.	100	100
No. 4	, 30-70	30-70
No. 200	0-50	12-50

14.3.1. Wet Material. If, in the opinion of the Contracting Officer, the material in the borrow areas for any reason becomes too wet to permit placement as semicompacted fill as specified in paragraph 14.4.1, the wet materials may be placed as uncompacted fill as specified in paragraph 14.4.2.

- 14.3.2. Frozen Materials. under no circumstances shall frozen earth, snow, or ice be placed in the levee. The Contracting Officer may require the wasting of frozen material in order that construction may proceed.
 - 14.4. EMBANKMENT CONSTRUCTION
- 14.4.1. Semicompacted Fill. When, in the opinion of the Contracting Officer, the material used in constructing the levee is dry enough to permit layer construction, the method of placement shall be the semicompacted fill method hereinafter outlined. Materials shall be placed or spread in layers not more than eight (8) inches in thickness prior to compaction. Layers shall be started full out to the slope stakes and shall be carried substantially horizontal with sufficient crown or slope to provide satisfactory drainage during construction. When, in the opinion of the Contracting Officer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to the satisfaction of the Contracting Officer before the succeeding layer is placed thereon.
- 14.4.1.1. Moisture Control. In general, it is the intent of these specifications to secure an embankment having the maximum density obtainable with the natural moisture content of the embankment materials. However, if in the opinion of the Contracting Officer, the material is too dry for proper compaction, the Contractor will be required to pre-wet the material in the borrow area or to uniformly distribute sufficient moisture in each layer before rolling to permit the desired compaction.
- 14.4.1.2. Rolling Operations. When the moisture content and conditions of the spread layers are satisfactory, each layer shall be compacted by not less than four (4) complete passes of a tamper-type roller or by not less than two (2) complete passes of a rubber-tired roller. If tamping rollers are used in tandem not more than two rollers in tandem will be permitted and in such case, one trip of the tandem rollers over any surface will be considered as two (2) passes. When tamping rollers are used in tandem the tamper foot spacing shall be offset so that the circumferential rows on the rear drums are in line with the mid-pint of the circumferential rows on the forward drums. Each pass of the tamping roller shall overlap the proceeding or adjacent pass by not less than one (1) foot. Portions of the embankment which the roller cannot reach for any reason shall be compacted by any approved method to the density of the surrounding embankment.
- 14.4.2. Uncompacted Fill. Any section of embankment constructed of excessively wet material, approved for placement as uncompacted fill under the circumstances described in Paragraph 14.3.1 once started shall be completed to It will, however, be permissible to place uncompacted fill on grade. semicompacted fill base, in which event the allowance for shrinkage for each type of fill shall be as specified in Paragraph 14.8.1. Uncompacted fill shall be placed in approximately horizontal layers not exceeding three (3) feet in The layers so placed shall be spread, distributed, and otherwise manipulated during placement to the extent that individual loads of material deposited on the fill will not remain intact and large open voids in the fill will be eliminated. Appreciable drying of materials between lifts or the inclusion of dry materials in uncompacted fill will in no case be permitted and the Contractor may be required to add water to the material to obtain suitable moisture content.
- 14.4.3. Compaction. Embankment fills shall be compacted to at least 90 percent of maximum dry density, as determined by ASTM D 1557 (latest edition).

14.5. CROSS SECTIONS AND ZONING OF MATERIALS

14.5.1. Standard Levee Sections. Unless otherwise specified, the dimensions, slopes, and zoning of materials shall conform to the applicable "Standard Levee Sections" shown on the drawings.

14.5.2. Zoning of Materials.

(1) In general the levee section should be homogeneous. However, where materials of varying permeabilities are encountered in the borrow areas the more impervious material shall be placed toward the riverward slope and the more pervious material toward the landslide slope.

14.6. DITCHES AND DEPRESSION. All sloughs, old pits, ditches, or depressions beyond the limits of the levee and/or berm foundation within the permanent rights-of-way, when required by the Contracting Officer, be filled to the natural surface of the ground with approved embankment fill material. The material for the fill shall be placed in layers or lifts not to exceed 8 inches in thickness and the only compaction required will be that obtained by the necessary spreading and dumping operations, except that the equipment shall be so operated that the tracks are distributed evenly over the surface of each lift.

14.7. BACKFILL AT DRAINAGE STRUCTURE. After the completion of the installation of the drainage structures and the removal of all debris, the excavated area shall be backfilled with embankment fill for the unlined channel, for any fill beneath or within 10 feet of the FRB central structure or box culverts. The materials shall conform to the requirements for the materials as specified in Paragraphs 14.3. The material shall be so placed and compacted as to obtain a density of not less than 95 percent of the maximum dry density, as determined by ASTM D 1557 (latest edition).

14.8. GRADE TOLERANCES AND SHRINKAGE ALLOWANCES. All semicompacted levees shall be constructed to the net grade and cross section shown on the drawings.

- 14.8.1. Shrinkage Allowance. At locations where uncompacted fill is authorized or ordered by the Contracting Officer, the fill shall be overbuilt to a gross section allowing for anticipated shrinkage. the crest width and base width of the gross section shall remain unchanged from the widths of the net section.
- (1) A shrinkage allowance of fifteen (15) percent shall be placed above the net grade shown on the drawings for that portion of the levee constructed by the uncompacted fill method.
- 14.9. SLIDES. In the event of the sliding of any part of the levee during its construction, or after its completion, but prior to its acceptance, the Contractor shall, upon written order of the Contracting Officer, cut out and remove the slide from the levee and then rebuild that portion of the levee. In case the slide is caused through fault of the Contractor, the foregoing operations shall be performed without cost to the Government.
- 15. TOPSOIL PLACING. All ground areas disturbed by construction under this contract and not built over, paved or otherwise surfaced shall be topsoiled.
- 15.1. CLEARING. Prior to placing topsoil, vegetation shall be removed from the area and the ground surface cleared of all other materials that would hinder proper grading, tillage or subsequent maintenance operations.
- 15.2. GRADING. Previously constructed grades shall be repaired if necessary so that the areas to be topsoiled shall conform to the section indicated on the drawings upon completion of topsoil placement.
- 15.3. TILLAGE. Subsequent to the above grading, the areas to be topsoiled shall be thoroughly scarified by approved means to a depth of at least 3 inches for bonding of topsoil with subsoil. The work shall be performed only during

0285-33-2/CD

- periods when beneficial results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Contracting Officer and shall be resumed only when directed. Undulations or irregularities in the surface that would interfere with further construction operations or maintenance shall be leveled before the next specified operation.
- 15.4. PLACING TOPSOIL. The topsoil shall be uniformly distributed on the designated areas and evenly spread in 2 lifts to a minimum thickness of 12 inches. The spreading shall be performed in such manner that planting can proceed with little additional soil preparation or tillage. The surface resulting from topsoiling shall meet the finish surface requirements specified in the following paragraph: FINISHED EXCAVATION, FILLS AND EMBANKMENTS. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or the proposed planting.
- 16. FINISHED EXCAVATION, FILLS AND EMBANKMENTS. All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. The finished surface shall be not more than 0.15 foot above or below the established grade or approved cross section and shall be free of depressed areas where water would pond. All ditches shall be finished so as to drain readily. The surface of embankments or excavated areas for road construction or other areas to be paved on which a base course or pavement is to be placed shall not vary more than 0.05 foot from the established grade and approved cross section.
- 17. SUBGRADE AND EMBANKMENT PROTECTION. During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along the subgrade shall be maintained in such manner as to drain effectively at all times. Where ruts occur in the subgrade, the subgrade shall be brought to grade, reshaped if required, and recompacted prior to the placing of surfacing. The storage or stockpiling of materials on the subgrade will not be permitted. No surfacing shall be laid until the subgrade has been checked and approved, and in no case shall any surfacing be placed on a muddy subgrade or on one containing frost.
- 18. EXISTING MANHOLES, VALVE BOXES, OR INLETS. All manholes, valve boxes and vaults, inlets and monitoring wells of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications.

ZERO ACCIDENTS

SECTION 02212 EXCAVATION, HANDLING AND DISPOSAL OF DRUMMED AND CONTAMINATED MATERIALS

INDEX

- **SCOPE** 5. INTERIM WASTE AND DRUM ACCUMULA-1. 2. DEFINITION TION
- 3. SUBMITTALS PROGRAM 6. DRUM SAMPLING AND ANALYTICAL 4. HANDLING OF DRUMMED AND CONTAMINATED PROGRAM
- MATERIALS DISPOSAL OF EXCAVATED MATERIALS 7.
- **SCOPE.** This section covers the Contractor's requirements for materials, equipment, and personnel associated with excavating, handling and disposal of drums containing hazardous materials encountered during construction activities. All activities conducted under this section shall be in accordance with SECTION: SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS, and the Contractor's approved Safety, Health, and Emergency Response Plan (SHERP).
- **DEFINITION.** For this project, hazardous materials are identified as any soils, solid waste materials, debris, liquid, sludge, or any other substance which meets any of the following requirements.
- Material around a drum is or appears to have been contained in or is a portion of a drum that was used during previous disposal within the landfill.
- The drummed material exhibits any reading above background levels
- when monitored with a direct reading total organics analyzing instrument.
 2.3. Any material exhibiting RCRA hazardous characteristics including: ignitability, reactivity, corrosivity, and TCLP toxicity.

SUBMITTALS 3.

3.1 CATEGORY I.

- 3.1.1 The Contractor shall submit for approval a written Drum and Contaminated Materials Handling Plan. The Drum and Contaminated Materials Handling Plan shall address, at a minimum:
- 3.1.1.1. Methods and equipment used for exhuming drums encountered during site preparation.
- 3.1.1.2. Methods and equipment proposed for removal, loading, and handling of drums and associated contaminated materials.
- Storage provisions for drums and associated 3.1.1.3. contaminated materials including specified areas to be excavated and used for
- drum staging. 3.1.1.4. Security provisions for drums and associated contaminated materials.
 - 3.1.1.5. Protocol for sampling contents of buried drums.
 - 3.1.1.6. Protocol for sampling contents of

materials.

- 3.1.1.7. Waste identification methods (e.g., labeling, marking containers) and procedures for identification and tracking.
- 3.1.1.8. Provisions for ensuring separation of incompati-

ble materials.

0285-33-2/CD

3.1.1.9. Protocol for overpacking damaged or bulging

drums.

3.1.1.10. Location of and construction methods for waste staging and storage areas.

3.1.1.11. Location of onsite waste disposal areas.

3.1.1.12. Provisions for minimizing offsite contamination associated with temporary storage of drums and contaminated materials onsite.

3.1.1.13. Location and names of offsite disposal

facilities.

3.1.1.14. Manifesting procedures including applicable land

ban notices.

3.1.1.15. Special safety precautions. The Drum and Contaminated Materials Handling Plan shall be developed in strict adherence with other Contractor generated plans (e.g., SHERP, CQCP, Spill Control Plan) and with all relevant and appropriate Federal, State, and local regulations associated with contaminated materials handling and disposal. The Drum and Contaminated Materials Handling Plan shall be submitted to the Contracting Officer concurrently with the Safety, Health, and Emergency Response Plan (SHERP). Sections of the Materials Handling Plan may refer directly to the SHERP.

3.1.1.16. On-site and off-site laboratory QA/QC plans. Include the name of off-site laboratory and a written commitment to provide analytical services for drum sample, soil sample, and air sample analyses.

3.1.1.17. Plans for handling liquids accumulated in bermed areas or from leaking drums.

3.1.1.18. Drum Sampling and Analytical Program (see Paragraph 6.0).

4. HANDLING OF DRUMMED AND CONTAMINATED MATERIALS.

DRUM EXCAVATION AND HANDLING. Prior to removing drums from the excavation area, visual assessment shall be made to define the integrity of the drums and any potential hazards. The contractor shall place leaking, damaged drums in overpacks and move from the work area to the preliminary staging area located next to the work place. Drums not requiring special handling shall be moved to the preliminary staging area also. If buried drums and containers are damaged in place or during removal and materials are released, the contractor shall collect those materials to the maximum extent possible practical and place the released materials in clean drums. The contractor shall log all drums and photograph any identification or markings on the drums prior to transporting the drums to the on-site drum accumulation area. A drum is considered empty if all wastes have been removed by using practices commonly employed to remove materials and no more than one inch of residue remain on the bottom of the drum, or no more than three percent by weight of the total capacity of the drum remains in the This applies to drums less than 100 gallons in size. Drums containing solidified slag will not require sampling and analysis.

Drum screening for compatibility and stability shall be done at the preliminary staging area. Additional drum sampling can be done at the on-site accumulation area. The Contractor shall indicate on a Site Plan the general location of all drums excavated during grading operations.

In general, drum excavation will proceed from the downwind end of the area towards the upwind end. The excavation area will be monitored for volatile organic vapors using a flame ionization detector (FID), and/or a photoionization detector (PID). At this time a COE representative may also log materials and collect samples for chemical analysis. The Contractor's foreman will direct the

Contractor's personnel and equipment during the drum excavation. Other personnel, with the exception of the COE representative will stand clear of the immediate area during the drum excavation. All work will proceed in a slow controlled manner so as to minimize the potential dangers associated with excavation and extraction of buried drums or other forms of waste materials.

All drum excavation work shall be conducted in accordance with OSHA interim standard, 29 CFR 1910.120, (Hazardous Waste Site Operation and Emergency

Response).

- **4.2. OTHER SITE ACTIVITIES.** Contaminated materials may also be encountered in other site activities. Specifically, contaminated materials are expected to be encountered during:
 - a. Preliminary site grading.
 - b. Grubbing of tree stumps.
 - c. Removal of onsite debris.
 - d. Use of decontamination facilities.

This list is not complete. It is possible that contaminated materials may be encountered in any activity associated with this project. These activities exhibit the greatest likelihood of encountering contaminated materials.

- 4.2.1 SOILS AND SOLID WASTE HANDLING. All on-site bulk excavated soils and solid wastes shall be disposed under the topsoil cap. The Contractor is not required to characterize bulk excavated soils during site grading operations. The Contractor shall prevent erosion and offsite sedimentation of bulk soils and solid wastes in accordance with Section: ENVIRONMENTAL PROTECTION. Any contaminated materials encountered after placement of the topsoil layer of the cap shall be disposed of offsite in accordance with appropriate disposal regulations. Storage areas for these materials shall be lined and have covers.
- 5.0 INTERIM WASTE AND DRUM ACCUMULATION. The Contractor will be required to construct an interim on-site waste and drum accumulation area in a USACE-approved location for temporary storage. This area shall be lined and bermed to prevent possible off-site migration of contaminants and secured by a chain-link security fence and lockable gate. The storage area will also be sloped to a sump with a sump pump connected to a skid-mounted storage tank situated inside the storage area. At a minimum, this area will have capacity to accumulate up to 100 overpack drums stacked two high on wooden pallets. Non-overpacked drums shall be stacked one high on pallets.

Following removal and off-site disposal of all wastes from the interim waste and drum accumulation area, the Contractor shall close this area. This closure

shall include removal of berms and security fencing.

- 5.1 LABORATORY REQUIREMENTS. All laboratory procedures on and off-site must be approved by USACE prior to implementation by the Contractor. This includes on-site compatibility testing, additional on-site analyses utilizing GC or GC/MS instruments, and any off-site analyses.

 5.1.1. The Contractor must notify the USACE Contracting Officer to
- request that the USACE laboratory validation process be initiated for each onsite or offsite laboratory that the Contractor proposes to use for chemical analysis of any Millcreek project samples. The laboratory must undergo a validation process prior to providing analytical services for this phase of the Millcreek project in accordance with SECTION: CHEMICAL QUALITY MANAGEMENT. The Contractor shall be aware that the laboratory evaluation process can be time consuming. To ensure that the laboratory evaluation procedure does not cause a delay in the

project schedule, the Contractor shall become familiar with the Contractor laboratory requirements and the laboratory validation timetable guidelines described in detail in SECTION: CHEMICAL QUALITY MANAGEMENT.

6.0 DRUM SAMPLING AND ANALYTICAL PROGRAM.

6.1. GENERAL. All sampling of liquids and solid materials from excavated drums shall be performed by the Contractor. Sampling procedures shall be in accordance with procedures set forth in the USEPA document EPA/600/2-86/013 "Drum Handling Procedures at Hazardous Waste Sites." The Contractor shall provide all sample containers and be responsible for sample collection, packing, preservation and transport. The Contractor shall maintain field log documentation of all drum sampling and chain of custody of sample handling.

6.2. FIELD QA/QC SAMPLES. Split samples (or duplicate samples for volatiles) shall be made available to the USACE on-site representative or representatives of regulatory agencies upon request. Analytical methods to be used and frequency of field QA/QC samples shall be determined during the laboratory validation process. The collection frequency of field QA/QC samples for analysis by the respective USACE QA laboratory and the Contractor's laboratory shall be in accordance with the Field QA/QC Program described in

SECTION: CHEMICAL QUALITY MANAGEMENT.

6.3. SAMPLING AND ANALYTICAL PROGRAM OBJECTIVES. The Contractor shall include in the Drum and Contaminated Materials Handling Plan a detailed, site-specific sampling and analytical program for excavated drums. The objective of this plan shall be to characterize the wastes as required to:

field screen excavated drums and contaminated soils for staging using appropriate instrumentation and field screening test kit;

 determine waste compatibility to insure safe drum staging and segregation, waste bulking, or recontainerization;

determine if drummed material is hazardous;

determine treatment and disposal requirements;

- allow transportation of wastes in accordance with regulatory requirements; and

identify potential RCRA permitted disposal facilities.

- 6.4. HAZARDOUS WASTE DETERMINATION. Except for hazardous waste determination, the referenced drum handling procedures list all necessary parameters to be tested for to achieve the above objectives. Hazardous waste shall be characterized by the following:
 - TCLP: metals, volatiles, semi-volatiles, pesticides,

herbicides; and

 RCRA characteristics including corrosivity, ignitability and reactivity.

This analytical program shall be structured to provide data in a time frame that will allow expedient removal, off-site transportation and disposal of drums.

6.5. DRUM SAMPLING AND ANALYTICAL PROGRAM. All sampling and analytical procedures shall be performed in accordance with USEPA approved protocols. As a minimum, the Contractor's sampling and analytical program to be described in the Drum and Contaminated Materials Handling Plan shall address:

sample identification and tracking procedures;

waste compatibility testing procedures, protocols and analytical parameters;

waste segregation criteria;

waste sample collection procedures and methodology;

- information necessary to complete waste disposal application

requirements for disposal facility;

- schedule of all activities including typical sample analysis response times (RCRA and disposal characterization), assessment of treatment/disposal options, waste consolidation if appropriate, and offsite disposal;

analytical methods to be used and frequency of QA/QC samples shall

be determined during the laboratory validation process;

determination of sample schedules;

- methods and procedures for sampling and analysis of drums containing heterogeneous wastes (i.e., sample jars, refuse, miscellaneous wastes).
- 6.6. DATA RÉPORTING. The results of all analytical testing performed by the Contractor shall be made available to the USACE immediately upon completion of final data reports. All analytical data shall be made available to the USACE within 30 days of sampling and at least 14 days prior to transportation of wastes offsite.
- 6.7 OWNERSHIP OF EQUIPMENT. All chemical monitoring and testing equipment used to achieve the objectives of the sampling and analytical program shall become the property of the USACE at the completion of the project.

7. DISPOSAL OF EXCAVATED MATERIALS.

- 7.1 ON-SITE DISPOSAL. With the exception of drums containing hazardous materials and wastes that have been bulk excavated subsequent to placement of the topsoil layer of the cap, excavated materials are to be disposed of on-site and covered by the topsoil cap. Wastes shall be deposited in lifts not to exceed six inches, with the exception of drums containing solidified slag, which will be buried intact. The location of on-site drum waste disposal on the site shall be proposed by the Contractor as part of the Contractor's Drum and Contaminated Materials Handling Plan.
- 7.2 OFFSITE DISPOSAL. All drums containing materials characterized as hazardous materials or wastes that do not meet the requirements of paragraph: ON-SITE DISPOSAL are to be disposed of offsite in an approved disposal facility. All drums containing materials characterized as hazardous material to be disposed offsite shall be disposed of in accordance with RCRA approved methods. Prior to selection of disposal facility, the candidate facility must submit compliance status reports, the name and location of the Contractor's selected disposal facility(s), and copies of all offsite disposal manifests to the Contracting Officer as part of the Drum and Contaminated Materials Handling Plan.

7.3 INCIDENTAL WASTE DISPOSAL.

- 7.3.1. Waste materials generated by construction activities resulting outside the Exclusion Zone and Contamination Reduction Zone shall be considered as uncontaminated solid wastes to be disposed of offsite. The following list includes typical waste streams which shall be disposed of offsite:
 - a. Office waste.
 - b. Lunch room waste.
 - c. Concrete formwork.
 - d. Material and equipment packing.
 - e. Crate.
 - f. Steel scrap.
 - g. Containers.
 - h. Wasted concrete.

Any materials taken offsite shall be handled in accordance with applicable RCRA regulations.

- 7.3.2. Waste materials generated by construction activities resulting within the Exclusion Zone and Contamination Reduction Zone shall be considered as contaminated solid wastes and shall be disposed of in accordance with paragraphs 7.1 and 7.2.
- 7.3.3. All waste materials associated with site grubbing shall be chipped in accordance with SECTION: CLEARING AND GRUBBING and shall be placed and compacted in accordance with the Contractor's Drum and Contaminated Materials Handling Plan in one 3-inch lift.

8. STAGING AREAS.

- 8.1 STAGING AREA. A preliminary drum staging area shall be located adjacent to the area being excavated. This area is used for the preliminary assessment of excavated drums.
- 8.2 COVERING AND SPILL CONTROL. The contractor shall keep all drums and other waste material covered to minimize precipitation coming in contact with waste material.

ZERO ACCIDENTS

SECTION 02215 GEOTEXTILE USED AS FILTERS

INDEX

1.	SCOPE	SHIPMENT AND STORAGE	
2.	APPLICABLE PUBLICATIONS	6. INSTALLATION OF GEOTEXTIL	.E
3.	SUBMITTALS	* 7. MEASUREMENT AND PAYMENT	
4.	MATERIALS	ATTACHMENT: TABLE 1 - "PHYSIC	AL
		STRENGTH REQUIREMENTS"	

* Not used

- 1. SCOPE. The work provided for herein consists of furnishing all plant, labor, material, and equipment and performing all operations required for furnishing, hauling and placing the geotextile, complete, as specified herein and shown on the contract drawings, and maintaining the geotextile until placement of the granular drainage material, bedding material and/or riprap cover completed and accepted.
- 2. APPLICABLE PUBLICATIONS: The following publications of the current issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

2.1. American Society for Testing and Materials (ASTM):

D	123-85	Terminology Relating to Textiles Materials
D	1117-80	Non woven Fabrics (Trapezoidal Tear Test)
D	1682-64	Breaking Load and Elongation of Textile Fabrics (Rev 1975)
D	1683-81	Failure in Sewn Seams of Woven Fabrics
D	3787-80a	Bursting Strength of Knitted Goods: Constant-Rate-of Traverse (CRT), Ball Burst Test
D	3884-80	Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
D	4491-85	Test Methods for Water Permeability of Geotextiles by Permitivity

- 3. SUBMITTALS: In accordance with SECTION: SPECIAL CLAUSES, the Contractor shall submit the following items required by this section:
 - 3.1. Category I: None

3.2.3.2. Category II:

3.2.1. Samples (para 4.1)

3.2.2. Manufacturers Literature

3.2.3. Mill Certificate or Affidavit

4. MATERIALS:

4.1. Geotextile: The geotextile shall be a (non-woven) pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall provide an Equivalent Opening Size (EOS) no finer than the U. S. Standard Sieve No. 120 and no coarser than the U. S. Standard Sieve No. 70.

The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments resistant to deterioration due to ultra-violet and heat exposure. The geotextile shall conform to the physical strength requirements in Table No. 1. The geotextile should be fixed so that the yarns will retain their relative position with respect to each other. The edges of the geotextile shall be finished to prevent the outer yarn from pulling away from the geotextile. (The geotextile shall be manufactured into a width not less than 10 feet.)

If requested by the Contracting Officer, the Contractor shall provide to the Government geotextile samples for testing to determine compliance with any or all of the requirements in this specification. When samples are to be provided, they shall be submitted a minimum of 60 days prior to the beginning of installation of the same geotextile material.

- 4.2. Seams: Sewing of seams is optional. If seams are not sewn, geotextile panels shall have a minimum overlap of 12 inches. The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be bonded by cementing or by heat. The sheets of geotextile shall be attached at the factory or another approved location to form sections not less than 10 feet wide. Seams shall be tested in accordance with method ASTM D 1683, using 1 inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90 percent of the required tensile strength (Table 1) of the unaged geotextile in any principal direction.
- 4.3. Acceptance Requirements: All brands of geotextile and all seams to be used shall be accepted on the following basis. The Contractor shall furnish the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification.
- **4.4.** Temporary Pins: Temporary securing pins shall be 3/16 inch in diameter, of steel, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of no less than 1.5 inches.
- 5. SHIPMENT AND STORAGE: During all periods of shipment and storage, the geotextile shall be protected from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust and debris. To the extent

possible, the geotextile shall be maintained wrapped in a heavy duty protective covering.

6. INSTALLATION OF GEOTEXTILE: The geotextile shall be placed in the manner and at the locations shown on the drawings. At the time of installation, geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The surface to receive geotextile shall be prepared to a relatively smooth condition free of obstructions, depressions, debris, and soft or low density pockets of material. The geotextile shall be placed with the long dimension parallel to the centerline of the channel or trench and shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The strips shall be placed to provide a minimum width of 6 inches of overlap for each joint.

The geotextile shall be placed by rolling a continuous length down the slope of the embankments. No horizontal seams shall be allowed on the geotextile.

Temporary pinning of the textile to help hold it in place until the bedding layer or riprap is placed shall be allowed. The temporary pins shall be removed as the bedding] or riprap is placed to relieve high tensile stress which may occur during placement of material on the geotextile.

The placement procedure requires that the length of the geotextile be approximately 15 percent greater than the slope length. The Contractor shall adjust the actual length of the geotextile used based on initial installation experience.

Additional pins regardless of location shall be installed as necessary to prevent any slippage of the geotextile. The geotextile shall be placed so that the upstream/upper strip of geotextile will overlap the downstream/next lower strip. Each securing pin shall be pushed through the geotextile until the washer bears against the geotextile and secures it firmly to the foundation. geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of filter materials, bedding materials or riprap shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 7 days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage due to the placement of riprap or other materials by limiting the height of drop of the material to less than 1 foot or by placing a cushioning layer of sand on top of the geotextile before dumping the material. Before placement of riprap, the Contractor shall demonstrate that the placement technique will prevent damage to the geotextile.

7. MEASUREMENT AND PAYMENT: Not used.

**Acceptable Test Results	350 pound minimum in any principle direction.	145 pounds per inch.	200 pound minimum.	700 pounds per square inch	55 pound minimum Residual Breaking Load in any principal direction.	110 pounds minimum in any principal directive.	The permitivity of the Geotextile shall be greater than 0.8 per second (0.8 sec ⁻¹)	
Test Procedure	ASTM D4632-86 Grab Tensile Elongation Method	ASTM D 4595-86 Wide Width Strip Tensile	ASTM D 4833 Puncture Resistance Test with Ring Clamp except polished steel ball replaced with a 5/16 inch diameter solid steel cylinder with a hemispherical tip centered within the ring clamp.	ASTM D 3786-87 Mullen Burst Test	ASTM D 3884 Rotary Platform, Double Head Method; rubber-base abrasive wheels equal to CS-17 "Calibrase" by Taber Instrument Co.; 1 kilogram load per wheel; 1000 revolutions, determine residual breaking load.	ASTM D 4533 Trapezoidal Tear Strength	ASTM D 4491 Test Methods for Water Permeability of Geotextiles By Permitivity.	
Physical Property	Tensile Strength +(unaged geotextile)		Puncture Strength +(unaged geotextile)		Abrasion Resistance	Tear Strength	Geotextile Permeability (KG)	

Acceptable test results strengths may be reduced 50 percent for geotextile to be used in drainage trenches, beneath concrete slabs or to be cushioned from rock placement by a layer of sand or by zero drop height placement. *

Unaged geotextile is defined as geotextile in the condition received from the manufacturer or distributor.

ZERO ACCIDENTS

SECTION 02221 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

INDEX

1.	APPLICABLE PUBLICATIONS		5.	SPECIAL REQUIREMENTS
2.	DEFINITIONS		6.	TESTING
3.	EXCAVATION	*	7.	PAVEMENT AND WALK REMOVAL
4.	BACKFILLING		-	AND REPLACEMENT

* NOT USED

PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1. AMERICAN WOOD PREŠERVER'S BUREAU (AWPB) STANDARD.

LP-22 Softwood Lumber, Timber and Plywood Pressure

		Treated with Water Borne Preservatives for
	-	Ground Contact Use (Rev. March 1980)
1.2.	AMERICAN SOCIETY I	FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS.
	D 1556-82	Density of Soil In Place by the Sand-Cone Method
	D 1557-78	Moisture-Density Relations of Soils and
		Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18-inch (457 mm) Drop
	D 2487-85	Classification of Soils for Engineering Purposes
	D 2922-81	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
	D 3017-78	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
	E 548-84	Preparation of Criteria for Use in Evaluation of Testing Laboratories and Inspection Bodies

2. DEFINITIONS.

- 2.1. SUITABLE MATERIALS. Suitable materials shall consist of any material not included in the unsuitable materials definition.
- 2.2. UNSUITABLE MATERIALS. Unsuitable materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches, and materials classified in ASTM D 2487 as MH, PT, OH, and OL. Unsuitable materials also include landfill material, refuse material, debris from previous construction and materials too soft to properly support utility pipe, conduit, or appurtenance structures. Otherwise suitable material which is unsuitable due to excess moisture content will not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials.

- 2.3. COHESIONLESS AND COHESIVE MATERIALS. Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.
 - 2.4. ROCK. Not Used.
- 2.5. SELECT GRANULAR MATERIAL. Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall not contain more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1-inch sieve, with a maximum allowable aggregate size of 1 inch or the maximum size recommended by the pipe manufacturer, whichever is smaller, unless otherwise specified.
- 2.6. DEGREE OF COMPACTION. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

PART 2 - EXECUTION

- **EXCAVATION.** Excavation of every description and of whatever substances encountered shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material defined as rock in paragraph DEFINITIONS. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material suitable for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides or cave-ins. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes, or other approved methods. The stockpiles shall also be protected from contamination with unsuitable excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material. If the Contractor fails to protect the stockpiles and any material becomes unsatisfactory as a result, such material, if directed, shall be removed and replaced with satisfactory on-site or imported material from approved sources at no additional cost to the Government. Excavated material not required or not satisfactory for backfill shall be disposed of in graded areas as fill shown on the drawings. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING at no additional cost to the Government.
- 3.1. TRENCH EXCAVATION. The trench below the top of the pipe shall not be excavated wider than the outside diameter of the pipe plus 24 inches for pipes of less than 24 inch inside diameter and no wider than the outside diameter of the pipe plus 36 inches for larger sizes. Where trench widths are exceeded, redesign using stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government. Trench walls below the top of the pipe shall be vertical or may be sloped as allowed by the pipe manufacturer's installation manual. Trench walls above the top of pipe may be sloped or widened as necessary for the proper performance of the work.

"NOT USED

3.1.1. Bottom Preparation / Trench bottoms shall be over excavated to allow the installation of granular bedding as detailed on the drawings.

3.1.2. Removal of Rock. Where rock is encountered in the bottom of the trench; such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in paragraph.

BACKFILING.

3.1.3. Removal of Unsuitable Material. Where unsuitable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING. When removal of unsuitable material is required due to the fault or neglect of the Contractor in his performance of work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.2. EXCAVATION FOR APPURTENANCES. Excavation for manholes or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Loose disintegrated rock and thin strata shall be removed. Removal of unsuitable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

- DEWATERING. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed, therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result. All excavations for concrete structures or trenches which extend down to or below ground water shall be dewatered by lowering and keeping the ground water level beneath such excavations 12 inches or more below the bottom of the excavation. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property. Dewatering water will be disposed of into on-site depressions. The Contractor shall maintain a depression(s) in fill areas for disposal of decon and dewatering water. The depression(s) shall be maintained until dewatering water and decon water disposal is no longer required. The depressions shall be backfilled with select fill to water level and off-site fill to subgrade levels.
- 3.4. SHEETING AND SHORING. Except where banks are cut back on a stable slope, excavation for structures and trenches shall be sheeted, braced, and shored, as necessary, to prevent caving or sliding, to provide protection for workmen and the work, and to provide protection for existing structures and facilities. Sheeting, bracing, and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure, and shall be rigid, maintaining shape and position under all circumstances.
- 4. BACKFILLING. Backfill material shall consist of suitable material. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless

0285-33-2/CD

soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

- TRENCH BACKFILL. Trenches shall be backfilled to the grade shown. 4.1. The trench shall not be backfilled until all specified tests are performed.
 - 4.1.1. Not Used.
- Replacement of Unsuitable Material. Unsuitable material 4.1.2. removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.
- Bedding. Bedding shall conform to the details shown on 4.1.3. the drawings and specified below. Material shall be deposited in 6 inch loose layers and compacted with approved methods to at least 95 percent maximum density. Care shall be taken to ensure thorough compaction of the fill under the pipe haunches. Bedding shall consist of select granular material.

Class B Bedding. Class B bedding shall be 4.1.3.1. used for all gravity sewer lines.

4.1.3.2. Class C Bedding. Class C bedding shall be used for all pressure pipe. A maximum allowable aggregate size of 1/2 inch shall be used for all plastic pressure pipe, ductile, or cast iron pipe.

- Initial Backfill shall consist of suitable materials with 4.1.4. a maximum stone size not exceeding the limits shown on the drawings. Initial backfill shall be placed in 6-inch loose thickness layers and compacted to at least 90 percent of maximum density at moisture contents that will facilitate compaction in granular materials and shall be within -1 and +4 percent of optimum for all other materials. Initial backfill shall be placed to a height of at least 1 foot above the top of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.
- Final Backfill. The remainder of the trench, except for 4.1.5. special materials for roadways, railroads and airfields, shall be backfilled with suitable material. Backfill material shall be deposited and compacted as follows:
- 4.1.5.1. Roadways. Backfill below the elevation at which the special requirements given in SECTION: GRADING shall be placed in 6-inch layers compacted to 95 percent maximum density. Backfill shall be placed up to the elevation of the base course in 6-inch layers and compacted to 95 percent maximum density. Water flooding or jetting methods of compaction will not be permitted.
- Sidewalks, Turfed or Seeded Areas and Miscellaneous On-site derived fill shall be compacted with a minimum of three (3) passes using a 10,000-lb vibrating drum or sheepsfoot compactor. All off-site fill will be compacted to 90% of the Standard Proctor density. Surcharge loads from compaction and construction equipment, and fill placed to achieve desired grades will promote primary settlement, if any, of loosely compacted subfill. Should settlement occur during grading/filling operations, the Contractor will be required to place additional fill in settled area to achieve desired grades. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.
- 4.2. BACKFILL FOR APPURTENANCES. After the manhole or similar structure has been constructed and the concrete has been allowed to cure for 3 days, backfill shall be placed in such a manner that the structure will not

be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be placed in such a manner as to prevent eccentric loading and excessive stress on the structure.

SPECIAL REQUIREMENTS. Special requirements for both excavation and back-

fill relating to the specific utilities are as follows:

WATER LINES. A temporary water line for the decontamination pad will be required. Trenches shall be of a depth to provide a minimum cover of 5 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

TESTING. Testing shall be the responsibility of the Contractor and shall

be performed at no additional cost to the Government.

- DETERMINATION OF DENSITY. Density tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. Approval of testing facilities shall be based on compliance with ASTM E 548, and no work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained for each lift. One test shall be made for each 200 linear feet or less for each layer of specified depth, except areas to receive pavements, for which one test shall be made for each 100 linear feet or less. Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D 1557, Method B, C, or D. A mechanical tamper may be used, provided the results are correlated with those obtained by the referenced hand tamper. Field in-place density shall be determined in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in paragraph "Calibration" of ASTM D 2922. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gages shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gages shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every ten tests performed according to ASTM D 2922 for correlation of test results. Copies of calibration curves and results of calibration tests shall be furnished to the Contracting Officer within 24 hours of conclusion of the tests. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.
- 7. PAVEMENT AND WALK REMOVAL AND REPLACEMENT. Not used.

ZERO ACCIDENTS

SECTION 02222 GABION MATTRESSES

INDEX

1. SCOPE

MATERIALS

2. GENERAL

4. INSTALLATION

SCOPE.

1.1 Contractor shall furnish and place gabion mattresses at the locations indicated on the drawings.

1.2 Gabions shall be manufactured in such a manner that their sides, ends, lid and partition panels can be assembled to form rectangular units of the specified dimensions, and as shown.

1.3 Gabions shall be of a single unit construction. Front, base, back and lid shall be woven into a single unit. Ends and partition panels shall be factory connected to the base.

GENERAL.

- 2.1 Gabion mattress shall conform to the following typical dimensions $6'W \times 9'$ to $12'L \times 12"$ thick. Partition panels shall be spaced no greater than 3 feet apart.
- 2.2 Mesh openings shall be hexagonal in shape with $2 \frac{1}{2}$ " x $3 \frac{1}{4}$ " nominal mesh.
- 2.3 Mesh joints shall be flexible and triple twisted to prevent unravelling.
- 2.4 All perimeter edges of the mesh forming the gabion shall be securely selvedged so that the joints obtained have at least the same strength as the wire mesh itself.
- 2.5 All dimensions are subject to tolerance limit of $\pm 3\%$ or manufacturer's specified sizes.

3. MATERIALS.

- 3.1 Galvanized steel wire shall be in accordance with the following.
- 3.1.1 Mesh Wire. The diameter of the steel wire mesh shall be U.S. Steel Wire Gage No. 11 after galvanization.
- 3.1.2 Selvedge Wire. The diameter of the selvedge wire, running through all the edges (perimeter wire), shall be U.S. Steel Wire Gage No. 10 after galvanization.
- 3.1.3 Lacing Wire. The diameter of the wire, necessary for assembling and lacing the gabion units, shall be U.S. Steel Wire Gage No. 13 after galvanization.
- 3.2 All wire gauges are subject to a tolerance of $\pm 2.50\%$ of the manufacturer's stated specifications.
- 3.3 Tensile strength of all wire used for manufacturing gabion mattresses and lacing wire shall range from 60,000 to 85,000 psi in accordance with Federal Specifications (QQ-W-461g, Class 3).
- **3.4** Load Test and Elongation Test shall be conducted in accordance with Federal Specifications (QQ-W-461g, Class 3).

0285-33-2/CD

02222-1

3.5 Steel wire used shall be galvanized having a minimum amount of zinc coating of 0.80 oz/sq.ft. of wire, complying with Federal Specification (QQ-W-461g, Class 3).

4. INSTALLATION.

4.1 GABION MATTRESS ASSEMBLY.

- 4.1.1 Gabions shall be supplied folded flat, ties in pairs and packed in bundles. Single gabions shall be removed from the bundle, unfolded flat on the ground and all kinks and bends flattened.
- 4.1.2 Contractor shall assemble each gabion unit individually by erecting the sides (front and back), ends and partition panels ensuring that all creases are in the correct position and the tops of all sides level.

4.1.3 The Contractor shall lace the four corners of the gabion unit first, followed by the edges or internal partition panels to the sides.

4.1.4 The lacing procedure consists of cutting a length of lacing wire (approximately 1-1/2 times the distance to be laced - not to exceed five feet). Secure the wire terminal at the corner by looping and twisting, then proceed to lace with alternating single and double loops at approximately five inch intervals. Securely fasten the other lacing wire terminal.

4.2 GABION MATTRESS INSTALLATION.

- 4.2.1 Assembled gabion units shall be carried to the job site and placed in their proper location. For structural integrity, all adjoining empty gabion mattresses shall be laced along the perimeter of their contact surfaces in order to obtain a monolithic mattress.
- 4.2.2 While under tension, gabion joints shall be carefully controlled against possible unravelling.
- 4.2.3 Gabion mattresses shall be filled with clean, hard, durable field or cobble stone, four to eight inches in size, or as approved by the Contracting Officer. Stones shall be free from soft rock, debris and soil.
- 4.2.4 Care shall be taken when placing fill material to assure that the sheathing on gabion mattresses will not be broken or damaged.
- 4.2.5 The cells in any row shall be filled in stages so that local deformation may be avoided.
- **4.2.6** Along all exposed gabion faces, the outer layer of stone shall be carefully placed and packed by hand, in order to ensure proper alignment and a neat, compact, square appearance.
- 4.2.7 The last layer of stone shall be leveled with the top of the gabion to allow proper closing of the lid and provide an even surface.
- 4.2.8 Well packed filling without undue bulging, and secure lacing, is essential in all structures.
- **4.2.9** Lids shall be stretched tight over the filling, using bars or lid closing tools, until the lid meets the perimeter edges or front and end panels.
- **4.2.10** Lids shall then be tightly laced along all edges, ends and diaphragm(s) in the same manner as described hereinbefore for assembling.
- 4.2.11 Where shown on the Drawings or otherwise directed by the Contracting Officer, gabion mesh shall be cut, folded and wired together to suit existing site conditions. Mesh must be cleanly cut and surplus mesh cut out completely, or folded back and neatly wired to an adjacent gabion face. Cut edges of mesh shall be securely laced together with lacing wire in the manner described above for assembling.

ZERO ACCIDENTS

SECTION 02223 RIPRAP AND BEDDING MATERIAL

INDEX

- 1. SCOPE
- 2. SUBMITTALS

- 3. DELIVERY, STORAGE AND HANDLING
- 4. MATERIALS
- 1. SCOPE. CONTRACTOR shall furnish all labor, equipment and materials necessary to place a protective covering of well-graded stone on drainage channels indicated on the drawings.
- 2. SUBMITTALS.
 - 2.1. CATEGORY I. None.
 - 2.2. CATEGORY II. Certificates of Compliance.
- 3. **DELIVERY, STORAGE AND HANDLING.** All aggregates shall be delivered and stored in such a manner and location to prevent contamination with sediment or debris. Stockpiles shall be clear of construction activities and contaminated materials handling areas.

4. MATERIALS.

4.1. Riprap shall consist of stones shaped as nearly as practicable in the form of right angular prism. Riprap shall have a d_{50} valve of 3-inches, and shall conform to the following gradation requirements:

Stone Size	Percent Lighter <u>by Weight</u>
5 inches 3 inches	100 35 - 55
Smaller than No. 10 Sieve	0 - 10

4.2. The gradation of materials furnished for use as riprap will be accepted or rejected based on a visual examination of the material by the Contracting Engineer. Material shall contain less than 20 percent of stones with a ratio of maximum-to-minimum dimension greater than three, and a sufficient amount of stones smaller than the average stone size to fill the spaces between the larger stones.

Gradation for a 12" riprap layer is:

 $\begin{array}{lll} d_{100} & & 10 - 26 \text{ lbs} \\ d_{50} & & 5 - 11 \text{ lbs} \\ d_{15} & & 2 - 5 \text{ lbs} \end{array}$

, io.,

4.3. Bedding material shall consist of crushed gravel or stone and shall conform to the following gradation requirements:

<u>Sieve Size</u>	Percent of Total by Weight
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

4.4. A woven geotextile shall be placed under the bedding material and riprap. See SECTION: GEOTEXTILES USED AS FILTERS for material specifications.

5. PLACING

5.1. Minimum total thickness of the riprap layer shall be nine inches (9") and the minimum total thickness of the bedding layer shall be three inches (3").

5.2. The stones shall be placed so that the weight of the stone is carried by the underlying material and not by the adjacent stones. On slopes, the largest of stones shall be at the bottom. Riprap shall be of proper size to form a compact solid blanket to protect the slopes.

5.3. The ground surface on which the stone riprap is to be placed shall be free of brush, trees, stumps, and other objectionable material and shall be dressed to a smooth surface. All soft or spongy material shall be removed to the depth specified or as directed by the Contract Officer and replaced with select

granular fill material and compacted in an approved manner.

- 5.4. Where soft or spongy material exists, it shall be removed to a depth of six inches (6") and replaced with bedding material. The bedding material shall be placed upon the prepared area to a minimum depth of six inches (6") using methods which will not cause segregation of the particle sizes. Bedding material shall be select granular fill as specified under Section 2D5. Bedding material that has become contaminated by natural soils or other materials shall be removed and replaced with uncontaminated bedding material at the Contractor's expense.
- **5.5.** Geotextile underlayment shall be installed and anchored in accordance with manufacturer's recommendations.
- **5.6.** Riprap shall be placed in a manner that will produce a reasonably well-graded mass of stone with smaller stone fragments filling the space between the larger ones, so as to result in the minimum practicable percentage of voids.
- 5.7. Riprap placed shall be in conformance with the lines, grades, and thicknesses shown on the plans.
- 5.8. Riprap used for bank or channel protection shall be placed to its full course thickness in one operation, unless other wise directed by the Contract Officer, and in such manner that the underlying material will not be displaced or worked into the layer of stone filling.
- **5.9.** Placement of stone upon firm subgrade or finished bedding material shall be carefully controlled to avoid disruption and damage to the layer of bedding material.
- **5.10.** The stone shall be so placed and distributed that there will be no pockets of uniform size material.
- 5.11. The desired distribution of the various sizes of stone throughout the mass shall be obtained by selective loading of the material at the quarry or

other source; by controlled dumping of successive loads during the final placing; or by other methods of placement which will produce the specified results.

5.12. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to secure the specified results.

0285-33-2/CD

02223-3