2821

SPECIFICATIONS FOR

CLOSURE OF CELL NO. 3
OF LANDFILL AREA 5

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CANNON AIR FORCE BASE, NEW MEXICO

MARCH 1989

F29605- 89-C0009

F29605-89 B0010

CANNON AIR FORCE BASE PROJECT 86-0056

Approved Lucy Daugherty Date 89 Mar 22

CAFB 036

Attachment 3

CLOSURE OF CELL NO. 3 LANDFILL AREA 5

CANNON AFB, NEW MEXICO

ERRATA CORRECTION TO SPECIFICATION

CORRECTION TO SPECIFICATIONS: PAGE 1A-16, 4th line from the bottom, the word PROCTECTION is misspelled, the correct spelling is PROTECTION.

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CLOSURE OF CELL NO. 3 OF LANDFILL AREA 5
CANNON AFB, NEW MEXICO

BIDDING SCHEDULE

ITEM	DESCRIPTION	QUANTITY	UNIT		AMOUNT ($)
1	General Site Work and All Other Items Not Included in Items Listed Below (See Note 5).	Job	L.S.		_____
2	Final Cover System including 36-mil Polymeric Liner, Geotextile Filter, Mounding, Filter Sand, Protective Soil Layer, Vegetative Cover, and PVC Venting System. This also includes Construction and Performance of all QC/QA work on 24 x 12-foot Test Cap (See Note 6).	Job	L.S.		_____
		ESTIMATED QUANTITIES	UNIT	UNIT PRICE	AMOUNT
3	Supply and Install 15-in Rectangular Concrete Gutter Drain (See Note 7).	1,000	LF	_____	_____
4	Construction of Tail-end Drainage Ditch including Supplying and Placing Rock as a Riprap Protection (See Note 8).	100	LF	_____	_____
5	Construction of 12-in-Wide Earthen Dike including seeding (See Note 9).	1,000	LF	_____	_____
6	Supply and Install 5-Strand Barbed Wire Fence, including 8-ft-Wide Gate and 34 Caution Signs (See Note 10).	850	LF	_____	_____
	TOTAL AMOUNT				$_____

Notes:

1. Quantities indicated in the Bidding Schedule are estimated only, and the respective unit prices will prevail in the event of an overrun or underrun up to 10%.

2. Bid prices must be entered for all items of the schedule. Total amount bids submitted without bid prices being entered on individual items will be rejected. Extensions will be subject to verification by the Government. In case of variation between the unit prices and the extensions, the unit prices will be considered the bid. In case of variation between the individual bid item prices and the total amount, the individual bid prices will be considered the bid.

3. A modification to a bid that provides for a single adjustment to the total amount bid should state the application of the price adjustment to each respective unit price and lumo sum price affected. If the modification is not so apportioned, the single adjustment will be applied to Item No. 1 in the bidding schedule.

4. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in the contract clauses.

5. Bidding Schedule, Item No. 1.

   5.1 This includes the mobilization of all equipment, tools, and appurtenances staffed and ready to perform the work. Mobilization also includes delivery of materials and supplies needed for initiation of the work, but not included in the contract estimate and paid for elsewhere. The provision and installation of Contractor-required facilities including buildings, trailers for various activities, worker breakrooms and lunchrooms, and storage sheds, and Contractor-required services including telephones, connections for electricity and water, and sanitary facilities are also included under mobilization.

   5.2 This includes disbandment of all equipment, tools, appurtenances, and labor mobilized for performance of work in this contract. Project closeout includes general requirements in preparation for final acceptance, e.g., final payment, normal termination of the contract, acceptance of work, and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified under individual units. All requirements in any other clauses dealing with completion time, acceptance, and final closeout shall also be applicable to this item.

   5.3 The provision of safety equipment and protective clothing if needed for persons on site, including maintenance of equipment on a daily basis; replacement of disposable equipment, as required; replacement or decontamination of equipment and/or clothing; drumming of discarded equipment and/or clothing; disposal of all contaminated, discarded personal safety equipment and protec-

Notes: (Continued)

tive clothing; disposal of all other discarded equipment or clothing in an approved hazardous waste disposal facility; disposal of contaminated liquids from decontamination processes; disposal of any contaminated soil excavated during removal of temporary site facilities; and all other activities or costs not paid under other items. This also includes disposal of clothing and equipment generated by the Contracting Officer. The safety equipment required is specified in Section ID - Emergency Response and Work Safety Procedures.

5.4 Operating costs during closure activities, including the costs of the following: utilities personnel and materials for spill cleanup; personnel needed to conduct the required monitoring and dust control activities; and all other operating project startup and site service costs not provided under other items.

5.5 Construction conferences, meetings, negotiations, and other contractual obligations such as manifest and other document preparation, recordkeeping, etc., not included and paid for elsewhere in the contract, are included under Bid Item No. 1 - General Site Work.

5.6 Work includes acquisition of all required insurance, payment and performance bonds, and permits required for completion of this project in compliance with all local, State, and Federal laws that have jurisdiction over the work.

5.7 Cost of all photographs and permanent signs as required by Section IA, Paragraph 9 - Signs, Project Records, and Photographs, is included.

5.8 It is intended that the natural resources within the project boundaries and outside the limits of permanent work performed shall be preserved in their existing condition or shall be restored, if damaged, to an equivalent of the existing condition, as approved by the Contracting Officer upon completion of the work. This shall include protection of existing waterways, ditches, roads, footpaths, fences, land resources, fish and wildlife resources, and erosion and sediment control measures, and the cost shall be included in Bid Item No. 1.

5.9 The Contractor shall pick up, place in containers, and transport off the site, off base all waste, and shall dispose of it in a manner that complies with applicable Federal, State, and local requirements. This cost shall be included in Item No. 1 of the bidding schedule.

Notes: (Continued)

5.10 Sewage shall be disposed of through the public sanitary sewage system. In the absence of such a system, chemical toilets or comparably effective units shall be used and wastes periodically emptied. The Contractor shall regularly inspect the sanitary conditions of the "porta potties" and rectify faults or make improvements if required. Include the cost in Bid Item No. 1.

5.11 Pest control and elimination of odors are included in Bid Item No. 1.

5.12 This includes provision of specific security measures (temporary lights, fencing, services, etc.) that the Contractor deems appropriate to protect the materials and work. This also includes temporary signs erected at locations directed by the Contracting Officer, and the cost is included in Bid Item No. 1.

5.13 General site work items will not be measured.

5.14 Progressive payment for general work will be made at the lump sum price, Bid Item No. 1 in the schedule, depending on the percentage of work completed by the Contractor and accepted by the Contracting Officer. Payment shall be full compensation for furnishing all insurance, bonds, permits, and other services in this item. All work not included and paid for elsewhere in this contract will be paid under Bid Item No. 1 - General Site Work.

6. Bidding Schedule, Item No. 2.

6.1 This includes compaction of existing subgrade, fine finishing surface, mounding with selected clayey soil, supplying and installing geotextile filter fabric, filtering sand and 36-mil polymeric membrane, forming of protective soil layer with common borrow, vegetative cover, and grass to grade and line indicated on drawings and as specified in Section 2B - Final Cover. This also includes construction and performance of all QC/QA work on the 24 x 12-foot Test Cap.

6.2 Works in Bid Item No. 2 will not be measured.

6.3 Progressive payment for final cover system will be made at the lump sum price, Bid Item No. 2 in the schedule, depending on the percentage of work completed by the Contractor and accepted by the Contracting Officer. Payment shall be full compensation for all supplies and services in this item.

7. Bidding Schedule, Item No. 3.

7.1 This includes all labor, materials, and equipment required in supplying and installing 15-in rectangular precast concrete gutter drain to the line and grade indicated on drawings and as specified in Section 2C - Drainage System.

Notes: (Continued)

7.2 Work in Bid Item No. 3 will be measured in linear feet. Payment will be full compensation for supplying and erecting the gutter drain as per Section 2C of these specifications.

8. Bidding Schedule, Item No. 4.

8.1 This includes formation of a tail-end drainage ditch to lead storm water from gutter drains to existing swale as per Section 2C - Drainage System. This also includes supplying and placing 9- to 12-in rocks to a length of 50 feet at the beginning of the tail-end ditch as a riprap protection.

8.2 Tail-end drainage ditch will be measured in linear feet. Payment will be full compensation for constructing the ditch as per Section 2C of these specifications.

9. Bidding Schedule, Item No. 5.

9.1 This includes borrowing, selected clayey soil, hauling, placing, compacting, seeding, and forming a perimeter dike of 12-in wide top, one on one slope, and 18-in average height as per Section 2D - Diking.

9.2 The dike will be measured in linear feet, and payment will be full compensation for constructing the dike to meet the requirements in Section 2D of these specifications.

10. Bidding Schedule, Item No. 6.

10.1 This includes material, labor, and equipment required for erecting a five-strand barbed wire fence around final cover of Cell No. 3 in Landfill Area 5 as per Section 2E - Fencing. This also includes supplying and installing 8-foot-wide gate.

10.2 Barbed wire fence will be measured in linear feet. No separate payment will be made for the gate or the 34 caution signs. Payment will be full compensation for all works connected with the erection of the fence as per Section 2E of these specifications.

PLANT AND EQUIPMENT SCHEDULE

ANNEX 1

Available Plant To Be Used*

No.	Type	Capacity	Manufacturer	Age and Condition	Location

NOTE: * Provide separate table for each type of equipment used for excavation, concrete handling, material handling, etc. Use separate line for each item. Use additional pages if necessary. Do not repeat equipment listed separately on other AX pages, such as transporters.

ENG Form 1619-R

1 May 1959

ANNEX 2

LANDFILL FOR NONHAZARDOUS MATERIALS

FACILITY NAME, ADDRESS, AND STATE PERMIT NO. _____

_____

_____

_____

FACILITY LOCATION: _____

_____

NAME OF RESPONSIBLE CONTACT FOR THE FACILITY: _____

_____

_____

TELEPHONE NUMBER OF CONTACT: _____

SPECIFY TYPES, QUANTITY, AND CONCENTRATIONS OF WASTE FROM THE PROJECT SITE THAT SHALL BE HANDLED BY THIS FACILITY: _____

_____

_____

INCLUDE A CERTIFICATION THAT THE FACILITY HOLDS VALID APPLICABLE PERMITS FOR ALL ACTIVITIES PROPOSED FOR THAT FACILITY: _____

_____

_____

_____

APPROVAL FROM THE APPROPRIATE STATE REGULATORY AGENCY, BEFORE DISPOSAL TAKES PLACE, FOR DISPOSAL OF PROPOSED WASTES AT THE FACILITY: _____

_____

_____

UNIT OF MEASURE AND METHOD FOR MEASURING QUANTITIES UTILIZED AT FACILITY FOR ACCOUNTING OF ALL DELIVERIES, DISPOSAL, AND/OR TREATMENT: _____

_____

_____

NOTES:

1. Attach letter of intent/commitment from facility to accept the type, quantity, and concentration of wastes for the duration of the contract as specified.

2. One required for each landfill.

ANNEX 3

APPROVED SOLID WASTE LANDFILL FOR HAZARDOUS MATERIALS

FACILITY NAME, ADDRESS, AND STATE PERMIT NO. _____

_____

_____

_____

FACILITY LOCATION: _____

_____

NAME OF RESPONSIBLE CONTACT FOR THE FACILITY: _____

_____

_____

TELEPHONE NUMBER OF CONTACT: _____

SPECIFY TYPES, QUANTITY, AND CONCENTRATIONS OF WASTE FROM THE PROJECT SITE THAT SHALL BE HANDLED BY THIS FACILITY: _____

_____

_____

INCLUDE A CERTIFICATION THAT THE FACILITY HOLDS VALID APPLICABLE PERMITS FOR ALL ACTIVITIES PROPOSED FOR THAT FACILITY: _____

_____

_____

_____

APPROVAL FROM THE APPROPRIATE STATE REGULATORY AGENCY, BEFORE DISPOSAL TAKES PLACE, FOR DISPOSAL OF PROPOSED WASTES AT THE FACILITY: _____

_____

_____

UNIT OF MEASURE AND METHOD FOR MEASURING QUANTITIES UTILIZED AT FACILITY FOR ACCOUNTING OF ALL DELIVERIES, DISPOSAL, AND/OR TREATMENT: _____

_____

_____

NOTES:

1. Attach letter of intent/commitment from facility to accept the type, quantity, and concentration of wastes for the duration of the contract as specified.

2. One required for each landfill.

ANNEX 4

APPROVED INCINERATOR OR TREATMENT FACILITY FOR HAZARDOUS MATERIALS

FACILITY NAME, ADDRESS, AND STATE PERMIT NO. _____

_____

_____

_____

FACILITY LOCATION: _____

_____

NAME OF RESPONSIBLE CONTACT FOR THE FACILITY: _____

_____

_____

TELEPHONE NUMBER OF CONTACT: _____

SPECIFY TYPES, QUANTITY, AND CONCENTRATIONS OF WASTE FROM THE PROJECT SITE THAT SHALL BE HANDLED BY THIS FACILITY: _____

_____

_____

INCLUDE A CERTIFICATION THAT THE FACILITY HOLDS VALID APPLICABLE PERMITS FOR ALL ACTIVITIES PROPOSED FOR THAT FACILITY: _____

_____

_____

_____

APPROVAL FROM THE APPROPRIATE STATE REGULATORY AGENCY, BEFORE INCINERATION TAKES PLACE, FOR INCINERATION OR TREATMENT AND DISPOSAL OF PROPOSED WASTES AT THE FACILITY: _____

_____

_____

UNIT OF MEASURE AND METHOD FOR MEASURING QUANTITIES UTILIZED AT FACILITY FOR ACCOUNTING OF ALL DELIVERIES, DISPOSAL, AND/OR TREATMENT: _____

_____

_____

NOTES:

1. Attach letter of intent/commitment from facility to accept the type, quantity, and concentration of wastes for the duration of the contract as specified.

2. One required for each facility.

ANNEX 5

TRANSPORTER

NAME AND EPA IDENTIFICATION NO. AND STATE LICENSE NO. _____

_____

_____

ICC LICENSE NO. AND OTHERS AS APPLICABLE (FOR EXAMPLE, OTHER STATE WASTE):

_____

_____

_____

ADDRESS: _____

_____

_____

_____

TELEPHONE NUMBER OF CONTACT: _____

SPECIFY TYPES, QUANTITY, AND CONCENTRATIONS OF WASTES TO BE HANDLED BY THIS TRANSPORTER: _____

_____

_____

LIST OF TYPES AND SIZES OF ALL VEHICLES AND EQUIPMENT AVAILABLE FOR USE FOR THE DURATION OF THIS CONTRACT FOR EACH TYPE OF WASTE MATERIAL: _____

_____

_____

_____

_____

_____

_____

_____

_____

NOTE: One required for each type of waste to be transported.

ANNEX 6

CERTIFICATION OF REQUIRED INSURANCE

1) Workmen's Compensation and Employer's Liability Insurance (Work to be Performed at a Hazardous Waste Site)

Insurance Agency, Name, Address:

Insuring Agency Contact, Name, Telephone:

Policy Identification Number:

Amount of Policy Coverage: $

Attach a certificate or written statement verifying the above-required insurance from the issuing agency. The policy shall be effective for the whole period of the contract and shall be extended in the event the contract period is prolonged. The policies evidencing required insurance shall contain the endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such instances shall not be effective for such period as may be prescribed by the laws of the State in which this contract is to be performed and in no event less than thirty (30) days after written notice thereof to the Contracting Officer.

2) General Liability Insurance (Work to be Performed at a Hazardous Waste Site)

Insurance Agency, Name, Address:

Insuring Agency Contact, Name, Telephone:

Policy Identification Number:

Amount of Policy Coverage: $

Attach a certificate or written statement verifying the above-required insurance from the issuing agency. The policy shall be effective for the whole period of the contract and shall be extended in the event the contract period is prolonged. The policies evidencing required insurance shall contain the endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such instances shall not be effective for such period as may be prescribed by the laws of the State in which this contract is to be performed and in no event less than thirty (30) days after written notice thereof to the Contracting Officer.

3) Automobile Liability Insurance for Bodily Injury (Work to be Performed at a Hazardous Waste Site)

Insurance Agency, Name, Address:

Insuring Agency Contact, Name, Telephone:

Policy Identification Number:

Amount of Policy Coverage: $

Attach a certificate or written statement verifying the above-required insurance from the issuing agency. The policy shall be effective for the whole period of the contract and shall be extended in the event the contract period is prolonged. The policies evidencing required insurance shall contain the endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such instances shall not be effective for such period as may be prescribed by the laws of the State in which this contract is to be performed and in no event less than thirty (30) days after written notice thereof to the Contracting Officer.

4) Property Damage (Work to be performed at a Hazardous Waste Site)

Insurance Agency, Name, Address:

Insuring Agency Contact, Name, Telephone:

Policy Identification Number:

Amount of Policy Coverage: $

Attach a certificate or written statement verifying the above-required insurance from the issuing agency. The policy shall be effective for the whole period of the contract and shall be extended in the event the contract period is prolonged. The policies evidencing required insurance shall contain the endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such instances shall not be effective for such period as may be prescribed by the laws of the State in which this contract is to be performed and in no event less than thirty (30) days after written notice thereof to the Contracting Officer.

ANNEX 7

CONTRACTOR'S QUALIFICATIONS

1) Experience Relevant to the Proposed Project:

2) References and List of Hazardous Waste Management activities and Other Projects Handled:

PROJECT NAME	CONTACT	TELEPHONE

3) Brief Description of How Project Goals Will Be Accomplished (Specialized Staff, Equipment, Management, etc.)

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 1A

SPECIAL CLAUSES

INDEX

1. Physical Data
2. Temporary Sanitary Facilities
3. Temporary Water
4. Utility Service Interruptions
5. Quantity Surveys
6. Identification of Employees
7. Contractor Quality Control (CQC)
8. Daily Work Schedules
9. Signs, Project Records, and Photographs
10. Onsite Project Superintendent

1. PHYSICAL DATA. Information and data furnished or referred to in the following sections are for general information only, and the Government may not be held liable for any interpretation or conclusions drawn therefrom by the Contractor.

1.1 WEATHER. Weather conditions shall have been investigated by the Contractor, to determine the hazards likely to arise therefrom and to identify prevailing winds. Complete weather records and reports may be obtained from the local U.S. Weather Bureau. (See Appendix B - Local Climatological Data.)

1.2 ACCESS ROUTES. Transportation facilities shall have been investigated by the Contractor to determine the existence of access highways and railroad facilities. See Drawing Number 1 - Cannon AFB Location and Index for more information.

2. TEMPORARY SANITARY FACILITIES. All sanitary facilities shall be of the chemical toilet type. The Contractor shall provide the sanitary facilities in compliance with State and local regulations. Due to inaccessibility of sanitary sewers in the area, all sanitary wastes shall be collected and removed off base from the sites in an appropriate manner.

3. TEMPORARY WATER. The Contractor shall provide a temporary water supply for work and decontamination purposes. A temporary water storage tank may be necessary.

4. UTILITY SERVICE INTERRUPTIONS. The Contractor shall submit written notification not less than five (5) days in advance of each interruption of each utility service to or within existing buildings and facilities being used by others. No single outage shall exceed four (4) hours unless approved in writing. The time and duration of all outages shall be coordinated with Base Civil Engineering, the using agency, and the Contracting Officer.

5. QUANTITY SURVEYS.

5.1 The Contractor shall make such surveys and computations as are necessary to determine the quantity 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 quantity of work performed or finally in place. Unless waived by the Contracting Officer in each specific case, quantity surveys by the Contractor shall be made under the direction of the Contracting Officer.

5.2 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 these records shall be promptly furnished in ring binders to the Contracting Officer at the site of the work, and will be used by the Contracting Officer to the extent necessary in determining the proper amounts of progress and final payments. All information will be the property of the government and shall be turned over to the Contracting Officer at the completion of the contract.

6. IDENTIFICATION OF EMPLOYEES. The Contractor shall furnish to each employee and require each employee engaged in the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall be immediately 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 en-

try. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

7. CONTRACTOR QUALITY CONTROL (CQC). The Contractor shall provide and maintain an effective Quality Control organization and program to perform inspections, tests, and retesting of work, including that of his subcontractors, to ensure compliance with the contract provisions.

7.1 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 the work 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 performance of the Quality Control function stipulated in various sections of these specifications and drawings.

7.2 PRECONSTRUCTION PLANNING.

7.2.1 Requirements. Within ten (10) calendar days after receipt of the Notice to Proceed, or at the Preconstruction Planning Meeting, the Contractor shall submit to the Contracting Officer, in addition to requirements stipulated elsewhere in these specifications, an outline or draft of the items listed below. The Contractor will not be authorized to work in the hazardous waste area until all required items are received and approved by the Contracting Officer. The contractor referring to the schedule of Material Submittals (TAC from 249) at the end of Section 1A, shall also prepare a Schedule of Material Submittals indicating due dates and the date the contractor proposes to submit them.

a. Submittal List;

b. Contractor's Organization and Quality Control Program;

c. Work Plan and Schedule;

d. Contractor's Facility Layout Plan; and

e. Health, Emergency Response, Safety, Fire Protection, Decontamination, and Environmental Protection Plan (HESFDEP).

7.2.1.1 The above documents shall be submitted in six copies. Each document shall accompany a separate AF Form 3000 (see attached forms at end of this section). Each submittal shall be complete and give sufficient detail to readily determine compliance with the contract requirements. Prior to submittal, all items shall be checked by the Contractor's Quality Control Supervisory Engineer (CQCSE), and shall bear his signature on a stamp certifying that the accompanying submittal complies with the contract requirements.

7.2.2 Preconstruction Planning Meeting. Within ten (10) calendar days after the date he receives the Notice to Proceed, and prior to starting onsite operations, the Contractor shall meet with the Contracting Officer and discuss the Quality Control requirements. The Contractor's proposed programs, plans, and other documents listed in paragraph 7.2.1 will be reviewed, and the meeting will develop mutual understanding relative to details of the system, including the personnel, facilities, and forms to be used for the inspections, tests, and system administration. No change in the approved plan shall be implemented without written concurrence by the Contracting Officer. The Contractor shall be represented at the meeting by a responsible officer of the firm, the Onsite Project Superintendent, CQCSE, and such other personnel as the Contractor may deem necessary.

7.3 CONTRACTOR'S PROPOSED QUALITY CONTROL PROGRAM. The Contractor's proposed written Quality Control Program shall include as a minimum:

7.3.1 The CQC organization in chart form.

7.3.2 Names, numbers, and qualifications of personnel to be used for this purpose.

7.3.3 Authority and responsibilities of all Quality Control personnel.

7.3.4 Schedule of use of inspection personnel by types and phase of work.

7.3.5 Method of performing, documenting, and enforcing quality control operations of both prime and subcontract work, including inspection and testing.

7.3.6 A copy of a letter of direction to the CQCSE outlining his duties and responsibilities, and signed by a responsible officer of the firm, including a copy of CQCSE appointment letter.

7.4 CONTROL OF ONSITE OPERATION. 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 such tests. The Contractor shall comply with all Federal, State, local, and Cannon Air Force Base safety and fire codes and regulations.

7.4.1 Preparatory Inspections. Preparatory inspections shall be performed before beginning each feature of work on any onsite operation. Preparatory inspections for the applicable feature of work shall include (1) review of submittal requirements and all other contract requirements with the foremen or supervisors directly responsible for the performance of the work; (2) a check to assure that provisions have been made for required field control testing; (3) examination of the work area to ascertain if all preliminary work has been completed; (4) verification of all field dimensions to advise the Contracting Officer of any discrepancies; and (5) performance of a physical examination of materials and equipment to ensure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand.

7.4.2 Initial Inspection. 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.

7.4.3 Followup Inspections. Followup inspections shall be performed continuously as any particular feature of work progresses to ensure compliance with contract requirements, including control testing, until completion of that feature of the work.

7.4.4 Safety Inspections. The Contractor shall perform daily safety inspections of the job site and the work in progress to ensure compliance with occupational health and safety requirements of the contract. Daily Quality Control Reports 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.

7.4.4.1 A Safety and Fire Protection Plan shall be developed and submitted to the Contracting Officer within 10 calendar days of the date of Notice of Award as per paragraph 7.2.1, item e. The Contractor shall periodically update this plan.

7.5 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:

7.5.1 The Contractor's Quality Control Supervisory Engineer (CQCSE). The CQCSE shall be an approved, qualified engineer or technician whose sole responsibility is to ensure compliance with the contract plans and specifications. This person shall demonstrate the ability to correctly perform his required duties to the satisfaction of the Contracting Officer, shall be physically present at the project site whenever work is in progress, and shall be in charge of the Contractor's Quality Control program for this project. The CQCSE or his authorized assistants shall review and modify or correct as needed all of the Contractor's submittals for approval, and the submittals shall be approved before they are forwarded to the Contracting Officer.

7.5.2 The CQCSE shall be appointed by a letter addressed to him and signed by an officer of the firm. This letter shall detail the CQCSE's authority and responsibility to act for the Contractor.

7.5.3 The CQCSE shall be given full cooperation by all technicians on the Contractor's staff to ensure that the CQC program is carried out.

7.6 TESTING LABORATORY AND EQUIPMENT. As specified in Section 1D, the Contractor shall determine the necessity of monitoring requirements. The Contractor shall either provide an onsite laboratory with analytical instrumentation and qualified chemists/technicians or (at his option) employ an offsite laboratory to perform all sampling and testing if the job demands analytical work. The laboratory shall be accepted by EPA, licensed in the local State in which the laboratory is located, technically acceptable to the State of New Mexico, and capable of guaranteeing the requirements on Quality Assurance (EPA SW 846) on different tests and analyses to be carried out under this contract. The laboratory analyzing air samples shall be accredited by American Industrial Hygiene Association (AIHA) and licensed in the local State. In addition, laboratories to be employed must be inspected and approved by the Contracting Officer. Sample turnaround time must be less than ten (10) days for solid/liquid samples and forty-eight (48) hours for air samples. The Contracting Officer may inspect the laboratory, examine analytical data, and provide performance audit samples to be analyzed by the laboratory as a check on performance.

7.7 REPORTING. All inspections and test results shall be recorded daily. Any significant quality assurance problems shall be reported in writing to the Contracting Officer with corrective action taken and final solution within three (3) working days (sooner if safety problems are involved).

7.7.1 Daily Submittals. The attached sample Quality Control Daily Report form (see pages at end of this section) shall be reproduced and fully executed to show all inspections and tests, and shall be submitted to the Contracting Officer's representative on the first workday following the date covered by the report. The Quality Control Daily Report shall include (or be attached to) results of chemical analysis and quality control tests.

7.7.2 Results of Tests. Triplicate copies of complete results of tests shall be submitted not later than ten (10) calendar days after the test is performed.

7.8 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. 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 any of the contract clauses.

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

7.10 PROGRESS MEETINGS. Progress meetings shall be held a minimum of once per week, with additional meetings as required, if requested by the Contracting Officer.

8. DAILY WORK SCHEDULES. To 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 daily work schedule for the next 2-week period. Required temporary utility services, time and duration of interruptions, and protection of adjoining areas shall be included within the Contractor's proposed 2-week work schedule. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings.

8.1 FORM OF SCHEDULE. Prepare schedules in the form of a bar chart with separate horizontal bar for each work activity or operation and a horizontal time scale to identify the first workday of each week unless otherwise approved by the Contracting Officer.

8.2 CONTENT OF SCHEDULE. Show the complete sequence of work by activity. Show the dates for the beginning and completion of each major element of work, including the following as a minimum: project startup, sampling, laboratory services, site preparation, construction of final cover systems, fences, and project closeout.

8.3 PROGRESS REVISIONS. Indicate progress of each activity to date of submission. Show changes since previous submission of schedules. Provide a narrative report as needed to define problem areas, anticipated delays, impact on the schedule, corrective action recommended, and the effect of changes on schedules of subcontractors.

8.4 SUBMISSIONS. Submit initial schedules within five (5) days and revised schedules within fifteen (15) days (in triplicate) of Notice to Proceed. The Contracting Officer will review schedules and return them within ten (10) days of receipt. If the schedules were rejected by the Contracting Officer, the Contractor shall resubmit the schedules within seven (7) days after return of review copy.

9. SIGNS, PROJECT RECORDS, AND PHOTOGRAPHS. Project signs are not required. See Sections 1D - Emergency Response and Work Safety Procedures, and 2E - Fencing for other safety signs. The Contractor shall maintain at the site, in clean, dry, legible condition, and in good order, for the Contracting Officer's use, a copy of the documents listed in paragraph 9.1. The progress and condition of the site shall also be recorded by the Contractor photographically and submitted to the Contracting Officer as per paragraph 9.2.

9.1 DOCUMENTS TO BE MAINTAINED ONSITE.

9.1.1 Drawings, specifications, addenda, modifications to contract, and the Contracting Officer's written field orders.

9.1.2 Field test records, photographs, analytical test results, emergency response reports, meteorological records, and Contractor Quality Control Daily Report.

9.1.3 Manifest documents, permits, and truck load tickets.

9.1.4 List of custody documents, air monitoring reports, and other items as may be required by the Contracting Officer.

9.2 PHOTOGRAPHS.

9.2.1 Approximately 4 photographs showing the actual site condition at the beginning of work, 16 photographs showing various activities of the project as the work progresses, and 2 photographs taken at project closeout shall be provided. Additional photographs shall be taken to record condition of adjacent cells if needed.

9.2.2 All photographs shall be 3-1/2- by 5-inch commercial quality color prints. They shall be submitted in two sets enclosed back to back in a double-faced plastic sleeve punched to fit a standard three-ring binder.

9.2.3 Photographs shall show an information box at a convenient place with the following information:

LANDFILL AREA 5, CELL NO. 3 CLOSURE
CANNON AFB, NEW MEXICO

Project Number: 86-0056
Designer: HMTC, Rockville, Maryland
Contractor:_____
Photograph No:_____ Date:_____
Description:_____

10. ONSITE PROJECT SUPERINTENDENT. The individual selected by the Contractor as the onsite project superintendent shall be qualified with a minimum of three (3) years' experience as a project superintendent and shall have supervised at least one project requiring the establishment of a worker safety and health program. He also shall have at least one (1) year of experience in projects involving construction of a final cover system for a hazardous waste landfill.

(A person with bachelor's degree in Civil Engineering and professional registration may have minimum 1-year experience as a project superintendent or project manager and 1-year experience in a project dealing with construction of a final cover system for a hazardous waste landfill.)

HAZARDOUS WASTE CLEANUP

CANNON AIR FORCE BASE, NEW MEXICO

CONTRACTOR QUALITY CONTROL DAILY REPORT

REPORT NO. _____ CONTRACT NO. _____ DATE _____

LOCATION OF WORK: _____

DESCRIPTION: _____

WEATHER: _____ PRECIPITATION: _____ INCHES TEMP: MIN _____ MAX _____

OTHER: _____

_____

1. Work Performed Today by Prime Contractor (Include Plant and Labor Breakdown): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. Work Performed Today by Subcontractors (Include Plant and Labor Breakdown):

_____

_____

_____

_____

_____

_____

_____

_____

3. List Specific Inspection Performed and Results of These Inspections (Include Corrective Actions): _____

_____

_____

_____

_____

4. List Type and Location of Tests Performed and Results of These Tests:

_____

_____

_____

_____

5. Verbal Instructions Received from Government Personnel on Operation Deficiencies or Retesting Required: _____

_____

_____

_____

6. Safety Violations Observed and Actions Taken: _____

_____

_____

7. Remarks: _____

_____

_____

_____

_____

_____

_____

8. CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the prime Contractor and each subcontractor and have determined that all materials, equipment, and workmanship are in strict compliance with the designs and specifications except as may be noted above.

_____

Contractor's Quality Control Supervisory Engineer (CQCSE)

MATERIAL APPROVAL SUBMITTAL

(See instructions on reverse)

FORM APPROVED
OMB NO. 0704-0038

TO: *(Contracting Officer)*	FROM: *(Contractor)*	DATE
CONTRACT NUMBER	SUBMISSION NUMBER	SUBMITTAL ☐ NEW ☐ RESUBMITTAL
PREVIOUS SUBMISSION NUMBER	PROJECT NUMBER	

TO BE COMPLETED BY CONTRACTOR			FOR GOVERNMENT USE ONLY			
ITEM NO.	SPECIFICATION SECTION/ PARA NO./DRAWING NO.	DESCRIPTION OF MATERIAL *(Include Type, Model Number, Catalog Number, Mfg., etc.)*	APPROVED	DISAPPROVED	SEE REVERSE	INITIAL

BY COMPLETING THIS FORM, THE UNDERSIGNED CONTRACTOR CERTIFIES THAT THE MATERIAL COMPLIES WITH ALL SPECIFICATIONS OF SUBJECT CONTRACT.

DATE	TYPE OR PRINT NAME AND TITLE	SIGNATURE

FOR GOVERNMENT USE ONLY

TO: *(Base Civil Engineering Officer)*

For Evaluation and Action.

DATE	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO: *AF Contracting Officer)*

Recommend ☐ Approval ☐ Disapproval as Indicated Above and Subject to Any Applicable Comments on the Reverse

DATE	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO: *(Contractor)*

☐ Approved ☐ Disapproved as Indicated Above and Subject to Any Applicable Comments on the Reverse Side. Request Resubmittal on Disapproved Items Within _____ Days of Date Shown Below.

DATE	TYPE OR PRINT NAME AND GRADE	SIGNATURE

AF FORM AUG 83 3000 PREVIOUS EDITION WILL BE USED.

COMMENTS

(Number to correspond with applicable Item Number on reverse)

INSTRUCTIONS TO CONTRACTORS

1. The term "material" is defined as articles, supplies, raw materials, equipment, parts, components, and end items that are to be incorporated into the work required by the contract.

2. This form is to be used by contractors for submitting Shop Drawings, Equipment Data, Manufacturer's Literature and Certificates and Samples of Materials to the Government for approval in accordance with the provisions of this contract. Unless otherwise specified, it is to be prepared in 4 copies, signed, and provided to the contracting officer with appropriate attachments.

3. Item(s) to be approved will be clearly tabbed or identified. Data pertaining to item(s) to be approved will be clearly identified or tabbed, particularly where documents are voluminous, in order to properly evaluate the materials or articles to be incorporated in the work. Each attachment will be numbered to correspond with the item number shown on the face of this form.

4. Requests submitted shall be numbered consecutively, by contract, in the space entitled "Submission No." This number, in addition to the Contract No., will be used to identify each Material Approval Submittal. Resubmissions will be indicated in the appropriate block and the insertion of previous submission number and date in addition to a new submission number. A single submission should be used for all work of a section of the specifications, but in NO instance should the submission include work for more than one (1) contract. Submittals requiring priority handling will be submitted by separate submittal using the form and so marked across the face of the form.

5. This material Approval Submittal is not valid unless it is signed by the contracting officer. This approval is required as called for by the contracting officer under the terms of this contract.

* U.S.G.P.O. 1983 -380-979/919

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Utility Service Interruptions	1A:4	4	atleast 5 days before each interruption				
Preconstruction							
Planning Outline:							
-Submittal List	1A:7.2.1	4	within 10 days of NTP				
-Contractor's X	1A:7.2.1	4	within 10 days of NTP	6/29/89	7/05/89	7/15/89	
Organization & X				6/29/89	7/05/89	7/15/89	
QC Program X				6/29/89	7/05/89	7/15/89	
-Work Plan & Schedule	1A:7.2.1, 8, 8.4	4	within 10 days of NTP				
-Contractor's Facility	1A:7.2.1	4	within 10 days of NTP				
Layout Plan							
-Health, Emergency	1A:7.2.1, 7.4.4.1	4	within 10 days of NTP				
Response, Safety,	1C:2.1, 4, 11	4	within 10 days of NTP				
Fire Proctection,	1D:1.4, 12.1	4	prior to commence-				
Decontamination, &			ment of any work				
Environmental Pro-	1D:1.4.3, 12.1	4	prior to commence-				
tection Plan (HESFDEP)			ment of phase work				

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Preconstruction							
Planning Outline							
(continued):							
-HESFDEP	1D:5, 12.1	4	prior to commence-				
			ment of work				
	1D:5.3.1	4	prior to commence-				
			ment of work				
	1D:5.4.1	4	prior to excavation				
			operations				
	1D:5.4.9	4	within 48 hrs				
	1D:5.4.10	4	daily				
	1D:5.5.1, 12.1	4	prior to commence-				
			ment of work				
	1D:7, 12.2	4	prior to commence-				
			ment of work				
	1D:9.3, 12.1	4	weekly				
	1D:9.6, 12.1	4	before employee				
			returns				

TAC FORM C 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

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PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Preconstruction							
Planning Outline							
(continued):							
-HESFDEP	1D:10,12.1	4	prior to commence-				
			ment of work				
	1D:12.3	4	at completion of				
			work				
Lab Results:							
-Solid/Liquid	1A:7.6, 7.7.2	4	within 10 days of				
			sampling				
-Air Samples	1A:7.6, 7.7.2	4	within 48 hrs of				
			sampling				
QC Daily Report	1A:7.7.1	4	daily				
Photographs	1A:9.2	4	throughout duration				
			of project				

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.	PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Survey Report	1C:1.4	4	prior to start of				
			onsite activity				
Local Emergency	1C:5	4	within 10 days of NTP				
Contacts List							
Corrective Action	1C:11	4	immediately after				
(if any) Proposal			CO's notification				
Temporary Roads, Exca-	1C:11	4	within 10 days of NTP				
vations & Ramps Layout							
Proposal							
Spill Report	1C:11	4	immediately				
Special Project	1E:3.1	4	within 10 days of NTP				
Procedures							

TAC FORM C 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.	PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FOR-WARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Testing Laboratory	1F:1.2	4	atleast 30 days prior				
Details			to use of laboratory				
Facility Inspection	1F:1.3.1	4	prior to use of				
Report			laboratory				
Approval Request for	2A:6	4	atleast 10 days be-				
Temporary Facilities			fore commencement of				
			work				
Facility Layout Plan	2A:6	4	at Preconstruction				
			Meeting				
Test Cap Layout Plan	2B:1.1	4	before execution				
and Inspection Methods							

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

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Construction/Inspection	2B:1.1.2.4	4	before execution				
Record Book for Test Cap							
and Final Cover							
QA/QC Report on Test Cap	2B:1.1.2.5	4	before execution				
Soil Test Results	2B:3.1	4	before moving soil				
Geotextile Filter Fabric	2B:4.2.1	4	before purchasing				
Details & Test Results			fabric				
Sand Sample with Lab	2B:5.2.5	4	before purchasing				
Analysis Results			sand				
Vent Pipe Joint Details	2B:6.2.7	4	prior to installation				
			of venting system				

TAC FORM 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

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Raw Materials Document-	2B:7.1.2	4	before purchasing				
ation for Polymeric			membrane				
Membrane Liner							
QC Documentation for	2B:7.1.5.1	4	prior to shipment				
Polymeric Membrane			of liner				
Liner							
Layout Pattern for	2B:7.3	4	before manufacturing				
Membrane Panels							
Test Reports on Vegeta-	2B:8.2	4	before purchasing				
tion Supporting Soil			soil				
Test Reports on Seed,	2B:9	4	before execution				
Fertilizer, Soil Condi-							
tioner, Fumigant, Mulch,							
Hydraulic Mulch							

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

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ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FOR-WARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Manufacturer's Warranty:							
-Geotextile Filter Fabric	2B:10.1	4	before payment is made				
-Polymeric Membrane Liner	2B:10.2	4	before payment is made				
Installation Contractor's Guarantee	2B:10.3	4	before payment is made				
Certification of Final Cover System	2B:10.3	4	before payment is made				
Manufacturer's Certifications:							
-Gutter Drain	2C:4	4	prior to construction of drainage system				

TAC FORM D 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Manufacturer's Certifications (continued):							
-Rubble	2C:4	4	prior to construction of drainage system				
Samples:							
-Gutter Drain	2C:4	4	prior to construction of drainage system				
-Rubble	2C:4	4	prior to construction of drainage system				

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.	PROJECT NO.

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ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Manufacturer's Certification of Fencing System	2E:3.4	4	prior to installation of fencing system				
Certification & Color Samples of Coating & Painting Materials	2E:3.4.1	4	prior to installation of fencing system				
Request for CO's Inspection	2F:2.1	4	after substantial completion of each work				
Last Progress-Payment Request	2F:2.1.2	4	before CO's inspection				
Record Drawings	2F:2.1.3	4	before CO's inspection				

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FORWARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Final Project Photos	2F:2.1.3	4	before CO's inspection				
Final Recorded Info.	2F:2.1.3	4	before CO's inspection				
Closeout Plan for all Open Deviations or Nonconformances	2F:2.1.6	4	before CO's inspection				
Final Punch List	2F:3.1.2	4	before requesting final inspection				
Final Meter Readings (if any)	2F:3.1.3	4	before requesting final inspection				
Final Medical Report	2F:3.1.5	4	before requesting final inspection				

TAC FORM DEC 78 249 (PREVIOUS EDITION WILL BE USED)

SCHEDULE OF MATERIAL SUBMITTALS

CONTRACT NO.

PROJECT NO.

TO BE COMPLETED BY PROJECT ENGINEER			TO BE COMPLETED BY CONTRACT ADMINISTRATOR				
ITEM OR DESCRIPTION OF ITEM	CONTRACT REFERENCE	NO. OF COPIES REQ'D	REQUIRED DATE/TIME OF SUBMITTALS AFTER AWARD. BRIEF AT PRECONFERENCE.	DATE LGC RECEIVED	DATE FOR-WARDED TO DE	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED OF APPROVAL/DISAPPROVAL
Record Specifications	2F:4.3	4	after all modifica-				
			tion markups				
Miscellaneous Records	2F:4.4	4	before substantial				
			completion				
ESTIMATED DAILY USAGE QUANITIES FOR BID ITEMS 3, 4, 5 and 6.	BS-1 ITEMS 3 - 6	4	DAILY				

TAC FORM DEC 249 (PREVIOUS EDITION WILL BE USED)

SECTION 1B

SUMMARY OF WORK

INDEX

1. Background
2. Description of the Project
3. Work Included
4. Site Contents

1. BACKGROUND.

1.1 GENERAL. Cannon Air Force Base (CAFB) is a U.S. Air Force installation assigned to the Tactical Air Command. Cell No. 3 of Sanitary Landfill Area 5 has been contaminated with hazardous wastes. The cell was in operation in 1981 and was then closed in the same year. CAFB has decided to reinforce the existing cap of this cell with a polymeric membrane and to close the cell permanently and thereby restrict any escape of wastes or their constituents. The closure will be performed under the interim facility hazardous waste regulations of the State of New Mexico.

1.2 LOCATION. CAFB is in Curry County, New Mexico, approximately 7 miles west of the city of Clovis on Route 60. CAFB, located in the Southern High Plains section of the Great Plains physiographic region, occupies approximately 4,320 acres.

1.3 SITE LOCATION. Landfill Area 5 is at the southeast corner of CAFB. Cell No. 3 is within Landfill Area 5 between Cell Nos. 2 and 4 to the west and east, respectively. The cells are separated by a distance of 32 feet. Cell No. 3 is approximately 39 feet wide and 330 feet long, and sits on top of a caliche layer at a depth of roughly 20 feet. Cell No. 6 lies approximately 70 feet north of Cell No. 3, and open barren land flanks the southern perimeter of Cell No. 3. Elevations at CAFB range from 4,327 feet above mean sea level (msl) at the northwest corner to 4,260 feet above msl at the southeast corner where Landfill Area 5 is located.

1.4 SITE HISTORY. According to an Installation Restoration Program Record Search conducted by CH2M Hill in August 1983, municipal wastes, have been land disposed at CAFB while the base was in operation from 1942 to 1978 and industrial wastes were land disposed from 1942 to 1984. Presently Landfill Area 5 is being used for disposal of construction debris and tree limbs only. According to the record search, the current site, Cell No. 3, was excavated, operated, and closed in 1981. It is believed that about 9,000 pounds of hazardous wastes such as oils, solvents, paints, and pesticide containers were disposed in Cell No. 3 in 1981 and capped with an approximately 2-foot layer of unclassified soil. No hazardous wastes were allowed to be land disposed in this landfill after June 1981.

1.4.1 In January 1985, CAFB conducted a site investigation of Cell No. 3 by boring a 9-inch diameter hole and extracting samples. The two boreholes were drilled to a depth of 40 feet at the northern and southern ends of Cell No. 3, and samples were extracted at depths of 10, 15, 20, 25, 30, and 40 feet and analyzed. No volatile or organic solvents were detected in this analysis (see Appendix C for detail results of the core sample analyses).

1.4.2 CAFB also installed four groundwater monitoring wells near Landfill Area 5 from December 1984 to January 1985 and conducted groundwater monitoring and chemical analyses. Laboratory analyses indicate that background levels of groundwater constituents have not significantly increased in the vicinity of Cell No. 3.

2. DESCRIPTION OF THE PROJECT.

2.1 General requirements of the project include environmental protection, reports, schedules, photographs, security, construction quality control, and regulatory compliance.

2.2 Site work of the project includes soil excavation, hauling, installation of a polymeric membrane liner, placement of soil and compaction, fencing, and diking.

3. WORK INCLUDED.

3.1 FINAL COVER. This includes preparing the subgrade for the polymeric membrane liner, mounding the surface to direct rainwater toward the edge of the cover, installing PVC vent pipes, blanketting with sand, installing a geotextile filter fabric and the polymeric membrane, and covering with common earth to protect the membrane from weathering.

3.2 TEST CAP. This includes construction of a 24-foot-long by 12-foot-wide test cap on the site near the full-sized cap (final cover), using the same methods, equipment, and materials as those used to construct the final cover. Each element of the test cap shall be constructed prior to construction of the same element in the final cover, then cored and/or tested for uniformity and effective permeability to evaluate actual construction procedures. See Section 2B Subparagraph 1.1 - Quality Assurance/Quality Control for more details of evaluation procedures.

3.3 DRAINAGE SYSTEM. This system consists of a 15-inch-high earthen dike to counter surface water flowing toward the final cover and a 15-inch diameter, precast concrete semicircular gutter drain to collect runoff from the final cover and lead it to the existing swale via a tail-end ditch. The upstream end of the tail-end ditch will be lined with riprap to protect it from erosion.

3.4 FENCING. To isolate Cell No. 3, a five-strand barbed wire fence will be constructed around the final cover. The fence will have an 8-foot-wide gate at one side to allow access to the site for maintenance purposes.

3.5 PLAN OF OPERATION. The Contractor shall develop a workable plan for construction of the final cover and other components. Prior to any operation, this plan shall be forwarded to the Contracting Officer for his approval. The project shall be phased so that operations will not interfere with each other and will meet the set time targets. The Contractor shall verify permit requirements from the State of New Mexico for erection of the facility.

3.6 SITE PREPARATION. Site activities include preparation of ground for temporary facilities that will be used for personnel needs and storage; preparation of decontamination areas; and construction and maintenance of ramps, access roads, parking areas, utilities, and various additional facilities.

3.7 SAFETY AND SECURITY. The Contractor and any subcontractors shall regularly review health and safety procedures and environmental protection requirements with all personnel. The Contractor shall be responsible for his personal belongings and for Cannon AFB security requirements. Protection of the excavation and adjacent structures also shall be the responsibility of the Contractor.

3.8 DEMOBILIZATION AND PROJECT CLOSEOUT. The Contractor shall be responsible for demobilizing the crew and machinery and closing the project in accordance with the requirements in Section 2F - Demobilization and Project Closeout.

4. SITE CONTENTS. The following information is furnished to the Contractor for guidance purposes only.

4.1 CONTENTS. This project involves working on top of a landfill trench believed to contain hazardous wastes. The trench has been excavated, maintained, and capped with a 2-foot-thick unclassified soil layer by CAFB following guidelines in its manual "Sanitary Landfill - Design Construction and Operation, 1976." But the Contractor must evaluate the prevailing conditions carefully and take appropriate actions to protect people and environment from safety hazards.

4.2 CHEMICALS BURIED. Analysis of the two core samples taken in January 1985 indicates the presence of chromium, lead, arsenic, tin, and mercury above detectable limits in various concentrations (see Appendix C for details of the analytical results). No volatile substances were detected at the two core samples, even though volatile substances such as methyl ethyl ketone, toluene, methyl isobutyl ketone, cyclohexane, xylene, and ethylene glycol monobutyl

ether were reported to have been disposed of in Cell No. 3 in the form of waste oils, solvents, paints, paint removers, and paint thinners.

4.2.1 Because of their quantity, concentration, and physical, chemical, or toxicological characteristics, the buried wastes may cause serious illness or pose substantial hazard to human health or the environment if improperly handled or contacted.

SECTION 1C

ENVIRONMENTAL PROTECTION

INDEX

1. Introduction
2. Work Included
3. Equipment Required
4. Spill Control Plan
5. Local Emergency Contacts
6. Disposal
7. Burning
8. Dust Control
9. Maintenance of Pollution Control Facilities During Operation
10. Postoperation Cleanup or Removal
11. Submittals

1. INTRODUCTION.

1.1 This section describes the Contractor's responsibilities and obligations to provide for protection from hazardous waste and chemical accidents and spills. The potential for accumulated long-term effects even from seemingly small incidents can be considerably grave, and all spills shall be regarded as critical regardless of size. No matter where a spill incident occurs, some "local" jurisdiction (municipal, State, and Federal land management) has an obligation to protect the public and the environment. The Contractor must be familiar with the local regulations regarding spills. Environmental Protection shall include maintaining the integrity of air, water, land, and natural resources and ensuring protection against toxic and conventional contaminants, noise, and other pollutants.

1.2 The Contractor shall have on his staff a trained team capable of dealing with a spill. Free training for personnel is usually available from the U.S. EPA, State environmental agencies, or a fire marshal or fire academy.

1.3 All spills occurring during the construction of this project must be reported to the respective authorities, and the Contractor shall bear all costs

and liabilities that may arise due to an accident or a spill outside the construction site. If hazardous waste or hazardous waste constituents are discharged, the Contractor shall take appropriate, immediate action (including notifications) to protect human health and the environment.

1.4 Prior to the start of any onsite activities, the Contractor and the Contracting Officer shall make a joint conditions survey. The Contractor shall prepare a brief report of the existing conditions of the base roads he will use and of the vegetative areas and structures immediately adjacent to the Contractor's operating areas. This report will be signed by both the Contracting Officer and Contractor upon mutual agreement as to its accuracy and completeness.

2. WORK INCLUDED.

2.1 The Contractor shall develop, implement, maintain, supervise, and be responsible for a comprehensive Spill Control Plan as a part of Health, Emergency Response, Safety, Fire Protection, Decontamination, and Environmental Protection Plan (HESFDEP) for the work site.

2.2 The Contractor shall provide methods, means, and facilities required to prevent contamination of soil, water, atmosphere, and previously uncontaminated structures, equipment, or material by the discharge of any waste from spills due to the Contractor's operations.

2.3 The Contractor shall provide equipment and personnel for emergency measures required to contain any spills and to remove spilled materials and soils or liquids that become contaminated due to spills. This collected spill material shall be properly containerized and disposed of in accordance with regulations.

2.4 The Contractor shall provide equipment and personnel to perform decontamination measures that may be required to remove spills from previously uncontaminated structures, equipment, or material. Decontamination residues must be containerized and disposed of in accordance with regulations.

2.5 The Contractor shall construct suitable protection (e.g., fences, barricades) around excavations to prevent all personnel and animals from falling into the excavations.

3. EQUIPMENT REQUIRED. The following is a list of equipment and materials required for spill control. The Contractor shall keep in stock, readily available for emergency use, sufficient materials and equipment to cover, as a minimum, a spill of two 55-gallon drums of contaminant.

- o Noncombustible, nonorganic absorbent/solidifier materials, such as "SorbaSet" or equivalent and sand.
- o Front-end loader (optional).
- o Drums (55-gallon, U.S. DOT 17-E or 17-H) approved for containment of hazardous wastes.
- o Shovels.
- o Equipment for decontamination of tools and equipment (steam cleaning is required).
- o Lime to neutralize any residual acid.

4. SPILL CONTROL PLAN.

4.1 If a spill occurs, the Contractor shall take the following actions:

- o Notify the Contracting Officer and all applicable regulatory agencies.
- o Take immediate measures to control and contain the spill within the site boundaries. This shall include the following:
  - Keep unnecessary people away; isolate hazardous area and deny entry.
  - Do not allow anyone to touch spilled material.
  - Stay upwind; keep out of low areas.
  - Allow no flares, smoking, or flames in hazard area.
  - Keep combustibles away from the spilled material.
  - Other actions as needed.

- Ensure that all personnel involved in spill cleanup are at level of personal protection determined by the Contractor's Industrial Hygienist. (See Section 1D - Emergency Response and Work Safety Procedures.)

4.2 The Contractor shall implement the following spill control actions:

4.2.1 Small dry spills: Shovel contaminated materials into dry containers and cover; label container as to contents, and dispose of properly.

4.2.2 Small liquid spills: Absorb with noncombustible, nonorganic absorbent material. Place contaminated soil into a container; cover, label, and dispose of properly off base.

4.2.3 Locate and identify spill on Contractor's copy of drawings, and provide copy of drawings to the Contracting Officer at the completion of work.

4.3 Decontamination procedures will be required after cleanup to eliminate traces of the substance spilled or to reduce the traces to an acceptable level. Complete cleanup shall require removal of contaminated soils. Personal protective equipment, including respirators, safety glasses, hardhats, and gloves shall be decontaminated by appropriate cleaning methods. Washing facilities shall be provided for personnel decontamination. All contaminated materials that cannot be decontaminated, including disposable clothing, solvents, garments, soil, and wood, must be properly containerized, labeled, and disposed of in accordance with regulations.

4.4 The Contractor or his onsite representative must file a written report immediately with the Contracting Officer and with the regulatory authorities in accordance with provisions of 49 CFR 171.15.

4.5 Under the sponsorship of the Chemical Manufacturers Association, 2501 M Street NW, Washington, DC 20037, the Chemical Transportation Emergency Center (CHEMTREC) provides basic chemical information on a 24-hour basis. The CHEMTREC telephone number is 800-424-9300.

5. LOCAL EMERGENCY CONTACTS. The Contractor shall determine and maintain at the site a list of the telephone numbers and names of the persons to be contacted at the following local agencies during an emergency:

- o Police station;
- o Fire station;
- o Ambulance;
- o Hospital; and
- o Emergency medical service.

6. DISPOSAL. In compliance with Federal, State, and local regulations that require protection of the environment from mishandling and mismanagement of waste disposal practices, any waste material dumped by the Contractor in an authorized and/or unauthorized area and/or causing any form of contamination shall be removed and the area(s) restored to its (their) original condition(s) at the time specified by the Contracting Officer and at the Contractor's expense. Open burning shall not be used as a means to dispose of any waste products. All costs and liabilities due to illegal or mishandled activities must be borne by the Contractor.

6.1 HAZARDOUS WASTE. Disposal practices used must avoid any potential for ground or surface water contamination and shall follow the requirements for loading, hauling, transportation, and disposal specified by Federal, State, and local regulatory authorities. If a spill occurs and contaminates the ground, all contaminated soil shall be excavated, disposed of, and replaced with suitable fill material, and the area shall be compacted, all at the expense of the Contractor. All contaminated debris shall be disposed of off site in an EPA-approved disposal area. Transport vehicles shall be designed to prevent spills and contamination of the environment. Any liabilities that might occur during transportation are the responsibility of the Contractor.

6.2 NONHAZARDOUS WASTE. All nonhazardous waste products generated by Contractor operations shall be removed at least once each week from the site and shall be disposed of in a licensed sanitary landfill or in a liquid industrial waste disposal site.

7. BURNING. Air pollution restrictions applicable to this project are as follows: Material shall not be burned on Government premises. If the Contractor elects to dispose of waste materials off Government premises by incineration, he shall make his own arrangements for the incineration area and shall conform to all Federal, State, and local regulations. No open burning will be allowed.

8. DUST CONTROL. The Contractor shall maintain all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas, and 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 and (nontoxic) chemical treatment shall be used.

9. MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING OPERATION. During the life of this contract, the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. During the operation period, the Contractor shall conduct frequent training sessions on environmental protection. The curricula shall include methods of detecting and avoiding pollution; familiarity with pollution standards, both statutory and contractual; and procedures to prevent and correct environmental pollution. The Contracting Officer must have access to the training curricula and schedule, and the Contractor shall maintain appropriate documentation that such training has been accomplished.

10. POSTOPERATION CLEANUP OR REMOVAL. The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, remove all signs of temporary operation facilities, such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess materials, and other vestiges of operation prior to final acceptance of the work. The disturbed areas shall be graded and filled, and the entire area seeded or paved as required.

11. SUBMITTALS. The list of required submittals to the Contracting Officer covering environmental protection consists of:

- Environmental Pollution Control Plan as a part of HESFDEP - submitted within 10 days after Notice to Proceed;
- Corrective Action (if any) Proposal - submitted immediately after receiving Contracting Officer's notification of such action;
- Temporary Roads, Excavations and Ramps Layout Proposal - submitted within 10 days after Notice to Proceed; and
- Notice of any spills showing exact location of spill.

SECTION 1D

EMERGENCY RESPONSE AND WORK SAFETY PROCEDURES

INDEX

1. General
2. Staff and Qualifications
3. Work Stages
4. Work Zones
5. Personal Protective Equipment Program
6. Employee Training
7. Emergency Response Plan
8. Prohibitions
9. Logs and Reports
10. Identification and Control
11. Signs
12. Submittals

1. GENERAL.

1.1 PURPOSE AND BACKGROUND. This section describes the minimum health, safety, and emergency response requirements for this project. Using this section as a guideline, the Contractor shall develop a detailed Health, Emergency Response, Safety, Fire Protection, Decontamination, and Environmental Protection Plan (HESFDEP). The program must establish in detail the procedures necessary for protecting the worker and others from the hazards associated with the closure of Cell No. 3 of Landfill Area 5 at Cannon Air Force Base (CAFB) New Mexico.

1.2 PRECONSTRUCTION PLANNING MEETING. The Contracting Officer will review and discuss the safety and emergency response requirements, as well as the planning and administrative requirements of the overall HESFDEP, at the preconstruction planning meeting. See Section 1A - Special Clauses, paragraph 7.2, for further details.

1.3 HEALTH AND SAFETY PROGRAM. The Health and Safety Program for this project shall be based on the requirements of the OSHA Standards for General Industry, 29 CFR 1910 (including the interim final rule, Hazardous Waste Opera-

tions and Emergency Response), the Construction Industry, 29 CFR 1926, and/or the EPA Standard Operating Safety Guides, November 1984, whichever provides the greatest degree of protection.

1.4 ACCIDENT PREVENTION PROGRAM. As part of the HESFDEP, the Contractor shall submit a proposed Accident Prevention Program (Emergency Response, Fire Protection, Decontamination, etc.) that will be followed by Contractor and subcontractor personnel, including supervisory staff, during performance of the work.

1.4.1 Requirements. The program shall be developed only after a careful analysis of the work involved and shall be tailored specifically to the conditions of the project. The Contractor's proposed Accident Prevention Program shall conform to the requirements of subparagraph 1.3 of this section.

1.4.2 Accident Prevention Outline. The Contractor's Accident Prevention Program shall address, as a minimum, the following items:

- Responsibility;
- Accountability;
- Subcontractor supervision;
- Employee orientation and training;
- Safety meetings;
- Fire prevention, suppression, and protection;
- Air monitoring;
- Accident investigation and reporting;
- Mechanical equipment inspection;
- Housekeeping and sanitation;
- First aid and medical facilities; and
- Phase safety planning.

1.4.3 Phase Safety Planning. As a supplement to the required basic Accident Prevention Program, the Contractor shall prepare a safety plan for each phase of the work. A phase is defined as an operation involving work that

represents hazards not experienced in previous operations or work to be performed by a new subcontractor. Each phase safety plan shall include, but not be limited to, a description of the work, probable hazards related to that work, and precautionary measures to be taken to reduce or eliminate each particular hazard. The actual work on each phase will not be permitted to proceed until the phase safety plan is found to be acceptable by the Contracting Officer.

2. STAFF AND QUALIFICATIONS.

2.1 STAFF.

2.1.1 Certified Safety Professional. The Contractor must provide the services of a Certified Safety Professional (CSP) who shall be on site and shall be responsible for the implementation and enforcement of the Health and Safety Program. The qualifications and experience of the Contractor's health and safety personnel shall be subject to review by the Contracting Officer. If the Contracting Officer determines that personnel assigned are not providing adequate health and safety controls, the Contractor shall obtain the services of additional health and safety personnel at no additional cost to the Government.

2.1.2 Certified Industrial Hygienist. The Contractor must provide the services of a Certified Industrial Hygienist (CIH) who shall work in coordination and consultation with the CSP and be responsible for the initial content and implementation of the personal protective equipment program, employee training program, and air monitoring plan.

2.2 QUALIFICATIONS.

2.2.1 Certified Safety Professional. The CSP shall have worked in health and safety for a minimum of 5 years in an industry with hazards similar to those anticipated on this project (e.g., excavation, potential exposure to hazardous substances). The CSP shall have a sound working knowledge of State (i.e., New Mexico) and Federal occupational health and safety regulations, and

formal training in occupational health and safety. The individual's name and work experience shall be submitted to the Contracting Officer for approval prior to commencement of work at the site.

2.2.2 Certified Industrial Hygienist. The Industrial Hygienist shall be certified by the American Board of Industrial Hygiene (ABIH) and have a minimum of 5 years' working experience in safety and health in an industry with hazards similar to those anticipated on this project (e.g., excavation, potential exposure to hazardous substances, and hazardous waste disposal). He/she shall have demonstrable expertise in air monitoring techniques and in the development and implementation of respiratory protective programs suitable for working in atmospheres that are either chronically or acutely dangerous to health. In addition, the CIH shall have a sound working knowledge of State (i.e., New Mexico) and Federal occupational health and safety regulations, and formal training in occupational health and safety. The individual's name and work experience shall be submitted to the Contracting Officer for approval prior to commencement of work at the site.

2.3 AUTHORITY. The CSP shall have the right to correct, command, and determine courses of action on all health and safety measures.

2.4 RESPONSIBILITY. The CSP shall answer for all activities and results with regard to health and safety. In addition to responsibilities in paragraph 2.1.2, the CIH shall be responsible for developing procedures for heat-stress monitoring of employees working in protective clothing or respiratory protection when ambient temperatures reach or exceed 75°F. Work-rest schedules shall be adjusted accordingly. Cold stress, although not generally considered a problem above 10°F for properly dressed workers, should also be addressed by the CIH. The Contractor's proposed work-rest schedule shall be submitted to the Contracting Officer for approval.

3. WORK STAGES.

Work stages shall be established to ensure that each employee is properly equipped with the personal protective equipment needed to safely complete his/

her task (see paragraph 5 - Personal Protective Equipment Program). The stages are defined as follows:

3.1 STAGE I. Preparation of subgrade, root picking, smooth finishing, and compaction of existing cap of Cell No. 3 of Landfill Area 5.

3.2 STAGE II. Excavation, loading, transportation, placement, compaction, and grading of various soil layers in the final cover, including installation of polymeric membrane, geotextile fabric, and PVC venting system.

3.3 STAGE III. Construction of ditches, dikes, and fences.

4. WORK ZONES. Work zones shall be established to contain contamination within the smallest area possible. The Contractor shall ensure that each employee is trained in the use of the proper personal protective equipment for the area or zone in which he/she is to work. Zone requirements shall conform to the EPA Standard Operating Safety Guides, November 1984.

4.1 EXCLUSION ZONE. The Exclusion Zone will require different levels of protective equipment depending on the exposure potentials. The required protective equipment for use by personnel working or entering the Exclusion Zone is specified in paragraph 5 - Personal Protective Equipment Program.

4.2 CONTAMINATION REDUCTION ZONE. This area shall be established as a buffer between the Exclusion Zone and the Support Zone. The decontamination facilities for all equipment, including personal protective equipment, shall be located within the Contamination Reduction Zone for this site. Containers shall be provided for proper disposal of used clothing. Emergency equipment, such as self-contained breathing apparatus, emergency showers, and eyewash facilities, must be located in this zone. The personal protective equipment required for use by personnel working in this area is specified in paragraph 5 - Personal Protective Equipment Program.

4.3 SUPPORT ZONE. The Support Zone shall include the remaining "clean" areas of the job site. Change rooms, lunch and break supplies, and equipment storage and maintenance areas shall be located in this area. Eating, smoking,

and drinking will be allowed only in this area.

5. PERSONAL PROTECTIVE EQUIPMENT PROGRAM. Construction operations under this contract will require work in hazardous environments. The Contractor shall ensure adequate protection for all onsite employees. The Contractor shall establish and maintain a complete program as part of the HESFDEP for all personnel visiting or working at the site, including support for five Government employees at any time they may be required to monitor the Contractor's work. The Contractor must have evidence of medical review for ability to wear respirators and must provide for selection, fit, and testing as required in 29 CFR 1910.134 and ANSI 288.2 (1980). The Contractor shall submit the details of the program for acceptance as part of the HESFDEP.

5.1 PROGRAM ELEMENTS. The Contractor's Personal Protective Equipment Program shall provide protection against exposure to hazardous substances identified at the site. See Appendix C for chemicals detected at this site. The program shall include the following elements as a minimum and shall be approved by the Contracting Officer before work commences:

- Medical surveillance;
- Industrial hygiene support;
- Employee training;
- Complete respiratory program;
- Eye protection;
- Skin protection;
- Emergency provisions;
- Record keeping and reporting;
- Personnel and equipment decontamination; and
- Fire protection.

5.2 PROGRAM REQUIREMENTS. The Contractor shall provide all personal protective equipment. This equipment must provide protection against any hazardous substance identified on site. The intent of the program is to provide a level of worker protection appropriate to the exposure.

5.3 EQUIPMENT TYPES. The personal protective equipment shall provide hearing, respiratory, skin, and eye protection for personnel during each phase of work.

5.3.1 Respiratory Protection. The Contractor shall prepare a written respiratory protection program in accordance with OSHA 29 CFR 1910.134. Respiratory protection devices shall be provided, inspected, and maintained by the Contractor. Individuals shall be properly fitted with their own breathing devices. The cartridge and filter shall be changed at the beginning of each 8-hour work shift or more frequently as necessary. A procedure shall be established for ensuring daily cleaning, maintenance, and change of filters.

5.3.2 Personal Protective Equipment. All required protective equipment shall be provided and maintained by the Contractor. This equipment includes, but is not limited to, eyewash/shower equipment, emergency showers, respirators, explosionproof equipment, first-aid kits, fire blankets, fire extinguishers, protective clothing, hardhats, and signs. All equipment shall conform to requirements of the American Industrial Hygiene Association (AIHA), NIOSH, National Safety Council, and OSHA.

5.4 EQUIPMENT REQUIREMENTS. Levels of protection for personnel involved in site work will be based on U.S. EPA-specified levels of protection, levels A, B, C, and D. The Contractor's CSP, in coordination with the CIH, shall evaluate the various work activities and air monitoring results and shall determine what protection is warranted.

5.4.1 The Contractor shall provide the Contracting Officer with a detailed personal air monitoring plan for the additional protection of workers. This plan shall be prepared by the Contractor's CIH as part of the Health and Safety Program Submittal (see Section 1A, paragraph 7.2), and shall comply with applicable State of New Mexico regulations, OSHA Instruction CPL 2-2.208 (March 30, 1984), and NIOSH Manual of Analytical Methods (2nd Ed., 1981, and/or 3rd Ed., 1984 and 1985, Supplement No. 84-100). The Contractor shall submit the Air Monitoring Plan prior to any excavation operations. The Contractor shall report any need for change and any unexpected events to the Contracting Officer

and obtain his approval for proposed actions. It is important to ensure that personnel are protected against exposure to any of the potentially dangerous and toxic chemicals present.

5.4.2 Personal and area samples for benzene, toluene, and other chemicals present shall be taken during work operations near the hazardous landfill. In addition, air sampling must be performed to identify other components to which workers may be exposed.

5.4.3 Monitoring for air contaminants must be performed during construction of the final cover. Since the contaminants have not been fully identified, sampling shall be conducted to (1) determine the workplace concentration of the known or suspected materials, particularly benzene and toluene; and (2) identify the unknown materials in the workplace air. The latter type of sampling must be performed at the start of construction operations, and a variety of sample media shall be used to identify the classes of airborne contaminants and their concentrations. Level C protection must be worn during the initial sampling. Levels of protection for subsequent sampling shall be based on initial analytical results and on the Certified Industrial Hygienists's Assessment of potential for exposure.

5.4.4 At least one personal sample and one area sample shall be taken in the immediate work area. In addition, an area sample shall be taken in the Exclusion Zone surrounding the work area, and an area sample shall be taken in the Contamination Reduction Zone. When area samples are collected, the sample collection device shall be placed 60 to 66 inches above ground level. The CIH shall determine the best location for sampling. Short-Term Exposure Limit (STEL) samples shall be taken at appropriate intervals, as determined by the CIH, to ensure that set STELs are not exceeded.

5.4.5 The level of respiratory protection required shall be adjusted based on the analytical results obtained from the samples.

5.4.6 Direct reading instruments shall be used daily during the final cover construction. These instruments shall be operated by individuals ex-

perienced in the use, calibration, operating principles, and limitations of such instruments.

5.4.7 The Contractor shall employ a CIH, who shall establish the protocol for all air monitoring. The Contractor shall ensure that experienced personnel perform the monitoring, and that appropriate equipment and methods are utilized. The Contractor shall provide monitoring equipment and the necessary engineering controls and/or personal protective equipment for the employees' protection. All sampling shall be done in accordance with OSHA and EPA regulations.

5.4.8 Samples shall be collected and analyzed as prescribed in the NIOSH Manual of Analytical Methods. All chemical analyses shall be performed by a laboratory accredited by the AIHA.

5.4.9 All monitoring results, with the exception of direct reading instrument results, shall be reported to the Contracting Officer in a timely fashion, within 48 hours. The results shall be reported on specific forms developed by the Contractor. The air monitoring report forms must include the following information:

- Date of sample;
- Name of person conducting sampling;
- Calibration record of equipment used;
- Sampling method (NIOSH);
- Description of process/operation;
- Type of sample (personal/area);
- Time and duration of sample;
- Location and height of sample;
- Distance from source;
- Weather conditions;
- Name and job of person sampled;
- Personal protective equipment worn;
- Name of laboratory performing analysis;
- Date of analysis;

- Name of person performing analysis;
- Method of analysis;
- Result of analysis;
- Type of filter used;
- Air temperature; and
- Barometric pressure.

5.4.10 A daily log shall be maintained for recording of direct reading instrument measurements. The log must contain the following information:

- Name of person(s) operating the direct reading monitors;
- Type of calibration method used before and after every use;
- Field observations, such as weather conditions during sampling periods;
- Activity taking place during monitoring;
- Results of monitoring; and
- Duration of test.

Direct reading results shall be reported to the Contracting Officer on a daily basis.

5.5 HANDLING PRECAUTIONS. The CIH, together with other responsible personnel of the Contractor's organization, shall personally examine and evaluate the prevailing onsite conditions and determine the handling precautions needed for construction of a final cover on top of the hazardous waste landfill. The determined handling precautions must include safety and occupational health aspects promulgated by OSHA under 29 CFR 1910.1000. Disposal operations must meet requirements of U.S. EPA Regulations under 40 CFR, Part 165. Storage, handling, and disposal of any other wastes determined to be hazardous must meet the applicable sections of the Resource Conservation and Recovery Act (RCRA), 40 CFR, Parts 260-265.

5.5.1 The Contractor shall provide detailed specifications and precautions for the safe operation of work in his HESFDEP. Protection shall be provided in accordance with OSHA 29 CFR 1926, Subpart E, or 29 CFR 1910, Subpart I.

5.6 MEDICAL SURVEILLANCE. The OSHA Hazardous Waste Operations and Emergency Response Rule requires a Medical Surveillance Program for employees engaged in hazardous waste operations where it is medically prudent. The medical examinations must be made available to employees who may be required to wear respirators or who may be exposed to substances in excess of OSHA limits. The Contractor shall utilize the services of a licensed occupational health physician to provide the medical examinations and surveillance specified herein. The name and qualifications of this physician shall be provided to the Contracting Officer prior to commencement of work at the site.

5.6.1 Medical Examinations. The Contractor shall provide to employees selected for the Medical Surveillance Program, or make available at his cost, medical examinations relative to exposure to identified hazardous chemicals before employees participate in onsite operations and at the conclusion of the work. The Contractor's physician shall also provide a medical certification that each employee is fit for employment on the job and can wear the necessary respiratory protection. Medical examinations shall include a medical history and work history, physical examination that includes vital signs and an evaluation of all major organ systems, audiogram and vision screening, chest x-ray to be performed no more frequently than every 4 years (except when otherwise indicated), electrocardiogram (EKG) for individuals over 35 years of age, complete blood count (CBC), blood chemistry screen (SMAC 23-test survey), urinalysis, and pulmonary function test, which includes forced expiratory volume (capacity) at 1 second (FEV_1) and forced vital capacity (FVC). All medical examination results shall be forwarded to the Contracting Officer for record keeping. If a detrimental condition is determined, the Contractor must immediately inform the affected employee, the CSP, and the Contracting Officer.

5.6.2 This evaluation shall be repeated as indicated by substandard performance or evidence of particular stress or chemical exposure that is demonstrated by injury or time-loss illness on the part of the worker.

5.6.3 If employment is terminated for an individual prior to completion of the contract, an examination shall be given.

6. EMPLOYEE TRAINING.

6.1 INITIAL TRAINING. The CSP, with support from the CIH, shall be responsible for providing occupational hazard training to all employees prior to the commencement of work. This training shall include the following as a minimum:

6.1.1 Basic construction safety emphasizing the hazards on this site.

6.1.2 Acute and chronic effects of substances identified at the site. See Section 1B - Summary of Work and Appendix "C", for more details about the waste.

6.1.3 Requirements for personal protection and their effectiveness and limitations.

6.1.4 Selection, fitting, use, and limitations of respirators, including as a minimum the following:

- o Criteria for respirator selection;
- o Donning techniques for respirators;
- o Use of emergency respirators; and
- o Eyeglasses and contact lenses and limitations.

6.2 FOLLOWUP TRAINING. Followup training shall be provided by the Health and Safety Specialist at least weekly and prior to each change in phase of work. The CSP shall also provide initial training for replacement employees.

6.3 RECORDS. The Contractor shall keep a record of all training periods, documenting date and acceptance. The Contractor shall also maintain a record of each employee's performance evaluation pertinent to use of personal protective equipment.

7. EMERGENCY RESPONSE PLAN.

7.1 The Contractor shall develop a site Emergency Response Plan. This plan shall include, as a minimum, the following:

- o Fire explosion provisions;
- o Emergency spill control;
- o First aid and emergency medical treatment;
- o Communications; and
- o Site evacuation.

7.2 The Contractor shall be responsible for notifying the physician, ambulance service, and fire department of any site hazards before the start of work. The following information from the Emergency Response Plan shall be summarized and posted in the Contractor's trailers:

- o Contractor physician name, address, and telephone number;
- o Ambulance service and fire department telephone number;
- o Detailed, written instructions, including a map that describe the location and route to the cleanup site and route to the nearest hospital;
- o Location of emergency shower/eyewash stations;
- o Location of self-contained breathing devices;
- o Location of fire stations or fire extinguishers and procedures in case of potential or actual fire or explosion;
- o Specific procedure for handling personnel with excessive exposure to chemicals or contaminated soil; and
- o Procedure for prompt notification of Contracting Officer and appropriate Federal and State regulatory agencies.

7.3 EMERGENCY EYEWASH. Portable eyewash units shall be provided for activities involving the handling of acidic supernatant, sludge, or other materials that may be hazardous to the eyes. These units must be able to flush both eyes simultaneously for a minimum of 15 minutes and be of the variety that maintains suitably temperate water. These units shall be provided close to the work area and protected from possible contamination.

7.4 EMERGENCY MEDICAL CARE. The Contractor shall prearrange for emergency medical care services at a nearby medical facility. The staff at the facility shall be advised of emergency routes to the site, potential medical emergencies that might occur, and possible contamination of the patient's clothing or skin with specific chemicals.

7.5 COMMUNICATION SYSTEM. The Contractor shall provide a communication system as a part of the health and emergency services.

8. PROHIBITIONS. The following are expressly forbidden while working with suspected toxic and flammable chemicals:

- Eating, smoking, chewing tobacco, chewing gum, drinking;
- Working when ill;
- Entering areas or spaces in which toxic or explosive conditions may exist without performing required testing and/or using proper personal protective equipment;
- Conducting onsite operations without offsite backup personnel immediately available; and
- Wearing beards and long sideburns that inhibit the use of personal protective equipment. Facial hair, facial features, and/or eyeglasses shall not interfere with the sealing surface or function of respirators.

9. LOGS AND REPORTS. The Contractor shall maintain logs and reports covering the implementation of the Personal Protective Equipment Program. The format shall be developed by the Contractor to include training logs, daily logs, weekly reports, and a closeout report to the satisfaction of the Contracting Officer, and these must be accessible to him as requested.

9.1 TRAINING LOGS. The training logs shall include data on both initial training and refresher training such as the following:

- Employee's name (attendance check);
- Time allocation in training session:
  - Topics covered,

- Materials used,
- Equipment demonstrated,
- Equipment practice for each employee,
- Respirator performance evaluation,
- Prohibitions covered,
- Buddy system explanation; and,

o Date and place of training.

9.2 DAILY LOGS. Daily logs shall include the following as a minimum:

o Date, time, and weather;

o Area (site-specific) checked;

o Employees in a particular area;

o Equipment used by employees;

o Protective clothing worn by employees;

o Protective devices used by employees and area assignment of employees; and

o CSP signature.

9.3 WEEKLY REPORTS. Weekly reports shall include the following as a minimum:

o A summary sheet covering the types of work being done;

o Reports of any of the following incidents:

- Nonuse of protective devices in an area where required,
- Nonuse of protective clothing,
- Disregard of buddy system,
- Disregard of eating, smoking, and chewing regulations in prohibited areas,
- Instances of job-related injuries or illnesses and corrective measures taken to avoid repetition of accidents;

- o CSP signature;
- o Copies of daily logs; and
- o Copies of injury-related medical certificates.

9.4 CLOSEOUT REPORT. At the completion of work, the Contractor shall submit a closeout report. The report shall include:

- o Final physical/medical and decontamination certification;
- o Procedures and techniques used to decontaminate;
  - Equipment and vehicles,
  - Shower facility,
  - Portable chemical toilets, etc.; and
- o Signature of the Project Superintendent and the CSP, and the date of each signature.

The report shall be submitted to the Contracting Officer prior to final acceptance of the work.

9.5 EMPLOYER OBLIGATION. The Contractor shall be aware that Federal laws, such as OSHA 29 CFR 1910, Subpart C, require that chemical exposure records and/or medical records be maintained by the employer for a specified length of time after termination of the exposure.

9.6 TIME-LOSS ILLNESS. Any employee who develops a time-loss illness or injury during the period of the contract must be evaluated by the Contractor's physician. The supervisor must be provided with a written statement, signed by the physician, indicating the employee's fitness before the employee is allowed to reenter the work site. A copy of the written statement shall be submitted to the Contracting Officer.

10. IDENTIFICATION AND CONTROL.

10.1 GENERAL. A check-in and check-out system shall be used to assure personnel control, and a record of each employee and piece of equipment is to

be maintained for each specific work area. The format shall be submitted as part of the Health and Safety Program.

10.2 BUDDY SYSTEM. The work conducted during any phase shall be scheduled to ensure that no employee works alone.

11. SIGNS. The Contractor shall post the following signs in locations approved by the Contracting Officer:

11.1 Signs shall be posted as required by OSHA regulations on the fence surrounding the area or zone where contamination does or could occur, indicating that it is a hazardous area and that unauthorized entry is prohibited.

11.2 Signs shall be posted directing all visitors to the authorized entrance or security point.

11.3 Signs stating "No Smoking or Open Flames" shall be posted in the area immediately adjacent to any area or zone where contamination with flammable materials does or could occur.

11.4 Temporary fences or barricades shall be used to prevent any person not equipped with the prescribed safety equipment from entering the exclusion zone and also to protect any person or animal from falling into the excavation. The location of the fence shall be decided by the CSP and approved by the Contracting Officer.

12. SUBMITTALS. The following items form a list of the submittals that represent a prerequisite for work to be performed in the hazardous waste area. They shall be presented at the specified times to the Contracting Officer for approval. See paragraph 7.2 of Section 1A - Special Clauses.

12.1 HEALTH AND SAFETY PLAN.

- o Accident Prevention Program - submitted prior to commencement of any work;
- o Safety Plan for each phase of work performed - submitted prior to commencement of work on that phase;

- Detailed Specifications and Precautions for the safe handling of wastes - submitted prior to commencement of work;

- Personal Protective Equipment Program - submitted prior to commencement of work; program includes details of employee training, emergency response, decontamination, medical surveillance, etc.; see paragraph 5.1 for list of elements;

- Reports covering the implementation of the Personal Protective Equipment Program - submitted weekly;

- Identification and Control - submitted prior to commencement of work;

- Work-Rest Schedules - submitted prior to commencement of work and adjusted as required thereafter; and

- Time Loss-Illness-Physician Report - submitted before allowing an employee to return to the site after a time-loss illness or injury during the period of the contract.

12.2 EMERGENCY RESPONSE PLAN. This plan must be submitted to the Contracting Officer prior to commencement of work on site. See Section 1D, paragraph 7.1 for elements.

12.3 CLOSEOUT REPORT. This report shall be submitted at the completion of work. See Section 1D, paragraph 9.4 for elements.

SECTION 1E

REGULATORY REQUIREMENTS AND SPECIAL PROJECT PROCEDURES

INDEX

1. Scope

2. Requirements

3. Special Procedures

1. SCOPE. This section covers the regulatory requirements and special project procedures for conducting the work.

2. REQUIREMENTS. The Contractor shall conduct all work involved in this project in accordance with appropriate Federal and State (New Mexico) regulations and laws and those of local governments and Cannon Air Force Base (CAFB).

2.1 REGULATIONS. The Contractor shall consider the following regulations as the minimum requirements for conducting the work involved and shall be familiar with these regulations.

2.1.1 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). The Contractor shall be familiar with the provisions of RCRA of 8 November 1984 including subsequent amendments.

- o 40 CFR, Part 260. Hazardous Waste Management System: General;
- o 40 CFR, Part 261. Identification and Listing of Hazardous Waste;
- o 40 CFR, Part 262. Standards Applicable to Generators of Hazardous Waste;
- o 40 CFR, Part 263. Standards Applicable to Transporters of Hazardous Waste;
- o 40 CFR, Part 264. Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities;

- o 40 CFR, Part 265. Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities; and

- o 40 CFR, Parts 240-257. Nonhazardous Solid Wastes.

2.1.2 TOXIC SUBSTANCE CONTROL ACT. 40 CFR, Part 761.

2.1.3 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARD. 29 CFR, Part 1910.

2.1.4 HAZARDOUS MATERIALS REQUIREMENTS. Department of Transportation, 49 CFR, Subchapter C, Parts 171-179.

2.1.5 NEW MEXICO ADMINISTRATIVE RULES AND REGULATIONS. Any local restrictions regarding work in areas of hazardous materials (e.g., State, county, and city fire departments and police department).

- o New Mexico Hazardous Waste Management Regulations (HWMR-4), Section 206.

2.2 EXECUTION. The Contractor shall observe the procedures as identified within these regulations, as well as other appropriate regulations and laws, in conducting the work outlined. The Contractor shall be responsible for alerting the proper State and local agencies of the nature and timing of activities that will be occurring at the work site. Prior coordination with CAFB is required.

3. SPECIAL PROCEDURES.

3.1 Special project procedures are required of the Contractor due to the potentially hazardous nature of the work. The Contractor shall submit six copies of a detailed plan to implement these procedures within 10 days of contract award. The procedures shall be submitted to the Contracting Officer for approval. The procedures, complete with all comments addressed, shall be made a part of the contract documents before the Contracting Officer issues a Notice to Proceed with the work.

3.2 The Contractor shall implement and maintain these procedures at the appropriate time prior to and during performance of the work.

3.3 These special project procedures are described in the following sections:

- Section 1A - Special Clauses;
- Section 1C - Environmental Protection;
- Section 1D - Emergency Response and Work Safety Procedures;
- Section 2B - Final Cover; and
- Section 2F - Demobilization and Project Closeout.

3.4 The information and criteria in these sections are provided to acquaint the Contractor with the data accumulated to date and to act as a guide to the Contractor for preparing the special project procedures. The Contractor is solely responsible for the content and implementation of all special project procedures.

SECTION 1F

ANALYTICAL WORK PROCEDURES

INDEX

1. General
2. Sampling
3. Laboratory Testing
4. Field Testing

1. GENERAL.

1.1 DESCRIPTION. In addition to the air monitoring and other analytical work carried out per Section 1D of these specifications, sampling and analytical testing for this project include laboratory testing or field testing of soil (for soil grain properties, maximum dry density, field density, etc.), polymeric membrane, geotextile filter fabric, and other elements of the final cover and test cap system stipulated in Section 2B of these specifications. This section deals only with analytical work of components of the final cover, the test cap, and the dike.

1.2 JOB CONDITIONS. All soil sampling, laboratory analytical work, and field testing shall be performed by qualified individuals affiliated with an approved independent laboratory. The Contractor shall submit the name of the testing laboratory to the Contracting Officer for approval no less than 30 days before the date the testing laboratory is to be used by the Contractor.

1.3 QUALIFICATIONS OF TESTING LABORATORY. The Contractor's testing laboratory shall satisfy "Recommended Requirements for Independent Laboratory Qualifications," published by the American Council of Independent Laboratories.

1.3.1 The Contractor shall submit a copy of the facility inspection report made by the Materials Reference Laboratory of the National Bureau of Standards during the most recent inspection, with a memorandum of remedies of any reported deficiencies.

2. SAMPLING.

2.1 Sampling shall be performed under the supervision of a qualified professional according to the stipulated test procedure in Section 2B.

2.2 Soil boring and sampling methods shall conform to generally accepted engineering practices.

3. LABORATORY TESTING.

3.1 Laboratory testing shall be performed by qualified persons under the supervision of a professional having experience in the analytical work required.

3.2 Laboratory procedures shall conform to the methods specified elsewhere in this document.

3.3 If no method is specified for a required test, the Contractor may select a method generally used in the industry and obtain the Contracting Officer's approval before using the method.

4. FIELD TESTING.

4.1 Field testing shall be performed by a qualified technician.

4.2 Field testing methods shall conform to those specified for respective work elsewhere in this document.

DIVISION 2

SITE WORK

SECTION 2A

TEMPORARY FACILITIES, SITE PREPARATION, AND MAINTENANCE

INDEX

1. General
2. Execution
3. Site Construction
4. Maintenance
5. Measurement and Payment
6. Submittals

1. GENERAL. This section covers the initial and supplementary work that will be required in the construction of a final cover to Cell No. 3 of Landfill Area 5 at Cannon Air Force Base (CAFB). Other related sections are Section 1C - Environmental Protection, and Section 2B - Final Cover. It is the Contractor's responsibility to protect any existing features from damage during site operations. Any such damage shall be repaired immediately at Contractor's cost.

2. EXECUTION.

2.1 Remove only vegetation and other items interfering with execution of contract work, and reseed or replant them at the end of the project.

2.2 Fill depressions caused by clearing and grubbing operations with soil materials that are the same as the adjacent soil materials.

2.3 Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

2.4 Debris resulting from site cleaning shall not be deposited on or in any type of water body or wetland.

2.5 Temporary buildings, storage sheds, decontamination pads, shops, and offices shall be erected by the Contractor according to the approved Layout Plan (see Section 1A, paragraph 7.2) and shall be built with labor and materials furnished and removed at the end of the project by the Contractor without

expense to the Government. The Contractor shall obtain an AF103 construction permit from CAFB prior to any operations. CAFB will show the Contractor any underground utilities that may interfere with the work at the time of the Construction Permit application.

2.6 When materials are transported, vehicles shall not be loaded beyond the capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation.

2.7 When it is necessary to cross drainage ditches, curbing, or sidewalks, protection against damage shall be provided by the Contractor, and any damaged roads, curbings, drainage ditches, or sidewalks shall be repaired at the expense of the Contractor.

3. SITE CONSTRUCTION.

3.1 All construction shall be executed in conformance with rules and regulations of any Federal, State, local, CAFB, or other authority that has jurisdiction over the matter.

3.2 All buildings, trailers, sheds, and decontamination pads shall be located in areas shown in drawings or in areas authorized by the Contracting Officer.

3.3 All Contractor's temporary constructions, including utilities, shall be removed upon completion of contract work.

3.4 The Contractor shall erect temporary barricades around work zone areas.

3.5 The Contractor shall erect signs according to regulations at locations directed by the Contracting Officer, keep signs clean, legible, and securely mounted for the duration of the contract, and then remove them from the site (see Section 1D - Emergency Response and Work Safety Procedures) unless otherwise directed by the Contracting Officer.

4. MAINTENANCE.

4.1 The decontamination area shall be washed down daily to remove sediments. Sediments shall be dealt with, collected, containerized, and disposed of in a manner similar to that used for disposal of other contaminated material at Contractor's expense.

4.2 The loading docks, roads, ramps, and other supporting works shall be maintained to prevent any adverse environmental conditions.

4.3 Spills shall be contained and collected as specified in Section 1C - Environmental Protection.

5. MEASUREMENT AND PAYMENT.

5.1 Work in this section will not be measured.

5.2 Payment for work in this section will be made at the lump sum price, Bid Item No. 1 in the schedule.

6. SUBMITTALS. The following submittals must be presented to the Contracting Officer for approval at least 10 days prior to commencement of work:

- Approval Requests for any temporary buildings, storage sheds, decontamination pads, shops, and offices; and
- Contractor's Facility Layout Plan (Contractor's field offices and other facilities) - Submit at the Preconstruction Meeting.

SECTION 2B

FINAL COVER

INDEX

1. Scope
2. Subgrade Preparation
3. Mounding
4. Geotextile Filter Fabric
5. Sand Filter
6. PVC Venting Pipes
7. Polymeric Membrane Liner
8. Protective Cover
9. Vegetation
10. Warranty

1. SCOPE. A final cover on top of the existing cap of Cell No. 3 will be installed to permanently seal the cell to preclude and restrict any escape of waste or its constituents from the cell below. The final cover will also serve to prevent passage of surface or subsurface fluids and gases including surface runoff through its substance.

1.1 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC). Adequate quality control of materials and workmanship is a critical aspect of liner installation. The final cover must be placed by a specialized Contractor who has trained personnel in proper field placement and in seaming techniques that have been acquired through installation experience and consultation with the liner fabricators and manufacturers.

1.1.1 TEST CAP. The Contractor shall construct a 24-foot-long by 12-foot-wide test cap on an area shown by the Contracting Officer following grades and lines indicated on Drawing Sheet 4 of 5 - Final Cover Cross Section. Same methods, equipment, and materials specified for the final cover also shall be used in the construction of the test cap. Each element of the test cap shall be constructed, cored, and tested for uniformity and effective permeability before construction of the same element in the final cover.

1.1.1.1 The test cap (fill) shall be constructed following procedures outlined in EPA Technical Guidance Document "Construction Quality Assurance for Hazardous Waste Land Disposal facilities" (EPA/530-SW-86-031). Tests of this cap shall be capable of verifying the adequacy of materials, design, equipment, and construction procedures. The Contractor and the Contracting Officers Representative or the government asignee must document all observations and test results carefully in a dedicated construction/inspection record book following the guidelines of the Construction Quality Assurance Plan for this project.

1.1.1.2 During construction of the test cap, the inspection procedures listed below shall be adhered to:

EARTH WORK CONSTRUCTION INSPECTION METHODS

FACTORS TO BE INSPECTED	INSPECTION METHODS	TEST METHOD REFERENCE
Coverage	Observation	Not Applicable (NA)
Thickness	Surveying: measurement	NA
Clod size	Observation	NA
Tying together of lifts	Observation	NA
Slope	Surveying	NA
Installation of protect-tive cover	Observation	NA
Soil type (index proper-ties)	Particle size analysis Atterberg limits	ASTM D422-63 ASTM D4318-84
Moisture-density	Modified proctor	ASTM D1557-78
Permeability	Flow of water	ASTM D2434-68(74)el
In-Place Density	Compaction of soil	ASTM D1556 or D2167

1.1.2 FINAL COVER. The minimum Moisture/Density Test frequencies of the final cover components shall be as indicated in the table below unless

they are specified differently in the specific subsections dealing with the component.

COMPONENT	MOISTURE/DENSITY TEST FREQUENCY
Mass Earthworks (embankments, dikes)	1 per 1,000 yd^3
Earth Linings	1 per 500 yd^3
Hand-tamped Backfill	1 per 100 to 200 yd^3
Minimum per Shift (mass earthwork)	1
Doubtful Areas (inspector's discretion)	1

1.1.2.1 During construction of the final cover, the following inspection procedures shall be used to ensure that the final cover is constructed according to specifications:

- removal of roots, rocks, rubbish, or off-spec soil from the cover materials;
- identification of changes in soil characteristics necessitating a change in construction specifications;
- adequate spreading of materials to obtain complete coverage and the specified loose lift thickness;
- adequate clod size reduction of cover materials;
- adequate spreading and incorporation of any certified amendments to obtain the specified amount uniformly in the amended cover material;
- adequate spreading and incorporation of water to obtain full penetration through clods and uniform distribution of the specified water content;
- procedures to be followed to adjust the soil moisture content in the event of a significant prolonged rain during construction;
- prevention of significant water loss before and after compaction;

- use of compaction equipment of the same type, configuration, and weight;

- use of the same equipment speed and number of equipment passes for compaction;

- uniformity of coverage by compaction equipment, especially at fill edges, in equipment turn-around areas, and at the tops and bottoms of slopes;

- consistent achievement of the specified soil density/water content/compactive effort throughout each completed lift;

- use of methods sufficient to tie the soil lifts together;

- achievement of sufficient soil strength to maintain stable sidewalls and to supply a stable base for supporting overlying materials;

- application of water to prevent desiccation of soil material between the installation of lifts or after completion of the cover (where necessary);

- prevention of accidental damage of installed portions of the cover by equipment traffic;

- the low permeability layer shall be inspected for cracks, holes, defects, or any other features that may increase its field permeability. All defective areas shall be removed and repaired. If the underlying foundation is defective (soft or wet), then this material shall also be removed and recompacted. Excavated areas shall be repaired by the method verified during test cap construction. Special attention shall be paid to the final inspections of the sidewall and bottom slopes, cap coverage, and cap thickness. The completed cap (final cover) shall be protected from desiccation, erosion, and freezing immediately following completion of the uppermost lift;

- all seams made in the synthetic liner shall be constructed in accordance with the manufacturer's specifications. Similar seams shall be made in the test cap and subject to testing to determine adequacy of the seal; and

- climatic conditions shall also be monitored to be sure that they do not adversely affect the compaction process and cause variabilities in the permeation rate of the final cap.

1.1.2.2 QA/QC program shall be conducted to ensure that the following non-specification conditions are prevented or, if they should inadvertently occur, that they are detected and corrected:

- regions of higher-than-specified permeability caused by the use of unspecified materials, inadequate moisture control, insufficient compactive effort, failure to fill test holes properly, or construction during periods of freezing temperature;
- less-than-specified thickness or coverage from failure to observe, monitor, and control soil placement and compaction operations;
- partings between lifts from failure to scarify and control moisture in adjacent lifts;
- leaks around designed cover penetrations resulting from improper sealing and compaction; and
- erosion or desiccation from failure to provide protective cover when construction is interrupted or after cap completion.

1.1.2.3 In order to ensure that the final cover is constructed per design specifications, the same methodologies and equipment shall be used in all phases of final construction. During construction, the following parameters shall be closely observed and followed:

- construction of the cap shall use the same soil material, design specifications, equipment, and procedures used in constructing the test fill; and
- all applicable parts of the QA/QC test requirements shall be followed precisely to monitor and document cap construction and testing.

1.1.2.4 Inspection personnel shall monitor and thoroughly document construction of the cap. Test cap documentation will be extremely important because it will verify all data involved in facility construction and provide a complete description of the construction equipment and procedures used during final cover construction. As construction of the cover

proceeds, all procedures use in constructing the test cap shall be closely adhered to and documented in a dedicated construction/inspection record book.

1.1.2.5 Upon completion of the closure a written report shall be prepared and submitted to the Contracting Officer. This report shall summarize the QA/QC actions and report fully all observations and accumulated data. A copy of this report will be submitted to the Environmental Improvement Division of the New Mexico Health and Environment Department.

1.2 SOIL. All required soil for mounding, subgrade preparation, and construction of the protective layer of the final cover shall be borrowed from an area outside the Cannon Air Force Base (CAFB) premises. No borrow areas exist within CAFB.

1.2.1 Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.2.2 The Contractor shall borrow sand for the filter layer from an approved pit outside CAFB premises.

1.3 PRECAUTIONS. According to the Installation Restoration Program Records Search conducted by CH2M Hill in August 1983, various hazardous wastes have been disposed in Cell No. 3 of Landfill Area 5. Section 1B (Summary of Work) and Appendix C (Core Sample Results) show the details of waste and the possible health hazards that may be encountered due to contact with the waste. The Contractor shall take all precautions stipulated in Section 1D (Emergency Response and Work Safety Procedures) before carrying out his operations at this site, and shall bear all responsibilities and liabilities that may arise due to any negligence on his part.

1.3.1 Air monitoring and level of safety to the workers shall be determined by the Contractor's Certified Safety Professional and Certified Industrial Hygienist before any work is begun in the hazardous area.

2. SUBGRADE PREPARATION. The quality and integrity of the subgrade are important for satisfactory performance of the final cover. Inadequate subgrade preparation will cause the final cover to fail. The existing cap over Cell No. 3 is believed to be composed of a 2-foot-thick compacted layer of selected soil. This cap was built in 1981 by CAFB, following guidelines in their manual "Sanitary Landfill - Design Construction and Operation, 1976."

2.1 PREPARATION. The Contractor shall manually uproot and remove all vegetation on the top of the existing cap before any operations. He shall then examine the condition of the cap, noting areas of subsidence, cracks, erosions, potholes, etc. All noted damage to the existing cap shall be remedied by filling and hand compacting with selected clayey soil having properties indicated in subparagraph 3.1 of this section.

2.1.1 Scarify the existing cap surface carefully, picking up all projecting objects such as roots, pointed rocks, and debris.

2.1.2 Apply a suitable herbicide or sterilant to control any vegetative growth prior to replacement of the mounding soil.

3. MOUNDING. Mounding is carried out to obtain a proper base for the flexible liner and to render a slope that will direct all runoff toward the edge of the final cover into the concrete gutter drain. Mounding layer will also act as a low permeable clay liner to supplement the functions of the flexible liner.

3.1 PROPERTIES. The soil for mounding and subgrade shall meet the following requirements. The Contractor shall submit test results to the Contracting Officer to prove that the selected soil meets these requirements and obtain approval before moving soil. Do not use clays of higher percentage of Montmorillonite..

3.1.1 These soils shall be fine-grained, containing little or no coarse-grained materials, and the minimum amount of clay-size-particles (less than 2 μm) shall be 25% to 28% by weight. Particle size analysis shall be

conducted using ASTM D422-63 and the Atterberg limit tested using ASTM D4318-84 methods.

3.1.2 These clays shall be inorganic, of low to high plasticity bearing the group symbol "CL" or "CH" under the Unified Soil Classification (Airfield) System, or belong to AASHTO groups A-4, A-6, or A-7, and they shall have a liquid limit between and 35 and 60.

3.1.3 These soils and clays shall have a permeability value, K = EE-6 cm/sec (or less) as determined by ASTM D2434 Method.

3.2 LINE AND LEVEL. Drawing No. 3 - Final Cover Plan, and Drawing No. 4 - Final Cover Cross Section, show the details of the thicknesses, lengths, and grades of the mounding layer. The Contractor shall build the mounding layer to the levels and line indicated in Drawing Nos. 3 and 4.

3.3 PLACEMENT AND COMPACTION. The mounding layer shall be built with selected clayey soil meeting the properties in subparagraph 3.1, taking precautions to free the soil of roots, seeds, sharp objects, stones, etc. The mounding layer shall be constructed in 4-inch lifts; each layer shall be compacted to 90% maximum dry density deduced via the modified Proctor Test (ASTM D1557; AASHTO T-180). The subgrade shall be inspected for any seeds, roots, or vegetation that may still be active; these shall be destroyed before the mounding soil is placed. See Subsection 1.1 QA/QC report.

3.3.1 In-place density tests shall be carried out for each 4-inch compacted layer, using ASTM D1556 or D2167 or AASHTO T147 to check whether the layers are compacted properly.

3.3.2 After each layer of mounding soil is compacted, a team of men/women shall scour and remove all projecting rocks or debris and tamp down any soil that can be manually disaggregated and spread.

3.3.3 The final layer of the mounding shall be fine finished with rollers and drags; soil additions shall bridge surface irregularities.

4. GEOTEXTILE FILTER FABRIC. The purpose of the geotextile filter fabric in this design is to provide an underlining to the sand filter to prevent penetration of sand into the underlying mounding soil and to provide gas release into the sand filter and polyvinyl chloride (PVC) venting system.

4.1 FABRIC. A nonwoven, needle-punched polypropylene (or equivalent) geotextile to meet the following properties shall be furnished and installed by the Contractor to the lines and levels indicated on Drawing Nos. 3 and 4. The geotextile shall be custom sized, in the largest size possible, to fit the layout pattern of the cover and shall be of uniform thickness and surface texture. It shall remain wrapped and protected from moisture and ultraviolet light until the time of installation.

4.2 PROPERTIES. When tested by indicated methods, the geotextile fabric shall conform to the properties indicated in the following table. The fabric shall have 30 years of excellent aging and weathering characteristics and shall be resistant to mold, fungi, mildew, and compounds in clayey soil and methane.

PROPERTY	TEST METHOD	LIMIT (Minimum)
Thickness	ASTM D1777	60 mil
Tensile Strength	ASTM D1682	130 lb
Elongation	ASTM D1682	40%
Abrasion Resistance	ASTM D1175	50 lb
Trapezoidal Tear Strength	ASTM D2263	50 lb
Burst Strength	ASTM D751/Mullen Burst Test	225 psi
Puncture Strength	ASTM D751	70 lb
Permeability	Falling Head	0.3 cm/sec
Equivalent Opening Size	CW-02215, U.S. Sieve	60

4.2.1 The Contractor shall submit test results, lapping, joining, and seaming details, and a sample of the fabric to the Contracting Officer and shall seek his approval before purchasing the fabric.

4.3 PLACEMENT AND ANCHORING. The geotextile fabric shall be placed on top of the mounding layer in a regular pattern conforming to the shape of the final cover, as indicated in the drawings, to minimize cutting and wastage and shall have a minimum 5% slack in each direction.

4.3.1 Edges and ends of the geotextile shall, where jointed, overlap by 18 inches.

4.3.2 The geotextile filter fabric shall be covered with a sand filter layer within 48 hours of its exposure to sun.

4.3.3 Upon placement of the filter sand, the geotextile filter fabric shall be anchored in the same trench located at the edge of the final cover together with the polymeric fabric. The anchor trench shall be a minimum of 12 inches wide by 18 inches deep.

5. SAND FILTER. A sandy layer is provided in the final cover to act as a cushion and a protective cover for the overlying polymeric membrane and to allow passage of gases that may be emitted via the wastes in the cell toward the PVC venting pipes.

5.1 PROPERTIES. Sand shall conform to the requirements of ASTM-C33, fine aggregate, except for gradation, which shall be as follows:

5.1.1 Gradation shall be:

SIEVE SIZE	PERCENT PASSING
3/8-inch	100
No. 4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10

5.1.2 Saturated hydraulic conductivity of sand shall be minimum 1 x 10^{-2} cm/sec.

5.1.3 The sand shall be free of any seeds, roots, or vegetative growth.

5.2 PLACEMENT AND COMPACTION. The sand filter shall be placed with a backhoe located outside the lined area. The sand shall be spread from a pile and kept at the maximum thickness indicated in the drawings.

5.2.1 Sand filter layer shall be placed to the lines and levels indicated in Drawing Nos. 3 and 4.

5.2.2 The moisture content of the sand shall be kept at or below optimum moisture content so that sand compacts with minimum efforts.

5.2.3 Sand shall be hand compacted to 90% maximum dry density, using a vibrating plate or equivalent.

5.2.4 Precautions shall be taken not to damage the geotextile filter fabric during sand filter placement operations.

5.2.5 Sample of sand and results of laboratory analysis, certifying that the sand meets the requirements in subparagraph 5.1, shall be submitted to the Contracting Officer, and his approval shall be obtained before the sand is purchased.

6. PVC VENTING PIPES. The presence or absence of domestic waste or organic matter in the Cell No. 3 is uncertain. However, a venting system is provided in the final cover as a safety measure to release gas that may accumulate under the polymeric liner owing to decomposition of organics or to any other condition such as emission of natural gas or air drawn from neighboring soils as a result of water table fluctuation.

6.1 PROPERTIES. Perforated PVC 4-inch-diameter pipes and fittings of schedule 40 or SDR 35 shall be used in the venting system.

6.2 INSTALLATION. Perforated horizontal PVC pipes shall be wrapped with one layer of geotextile filter fabric throughout their entire length before they are placed in the final cover. Pipes shall be joined with manufacturer-recommended sealant cements and then placed to rest horizontally on the geotextile filter fabric, longitudinally at the crown of the final cover.

6.2.1 Three nonperforated vertical PVC vent pipes shall be connected to the horizontal perforated pipes at 100 feet apart by properly fitted tees

as indicated in Drawing No. 4 - Final Cover Cross Section, and in Drawing No. 5 - Miscellaneous Details.

6.2.2 The vertical vent pipes shall be secured to the polymeric membrane; membrane manufacturer-recommended sealing boots, sealants, and procedures shall be used to ensure watertight condition around the vertical pipe where it is surrounded by the membrane.

6.2.3 Each vertical pipe shall extend 1 foot above the final cover-protective layer surface.

6.2.4 Each vertical vent pipe shall be fitted with an inverted "U" or a "J" bend at the end, and the end opening shall be protected with a perforated cap.

6.2.5 Horizontal perforated pipe ends shall also be capped with perforated sealed caps.

6.2.6 To avoid rotation of the pipes, two 3-foot-long PVC pipe anchor legs, extending to either side of the crown, shall be jointed to the horizontal vent pipe by a double PVC tee at two convenient locations, approximately 300 feet apart.

6.2.7 The Contractor shall submit details of his method and procedure of providing a watertight joint of the vertical vent pipes with the polymeric membrane for approval of the Contracting Officer before the venting system is installed.

7. POLYMERIC MEMBRANE LINER. Polymeric liner is the most important element in the final cover system that prevents the potentially polluting waste constituents from leaving the cell and entering the surface water into the cell. For the cover system to perform satisfactorily, proper installation of the selected liner over the prepared surface is critical.

7.1 PROPERTIES. Polymeric membrane shall have the characteristics outlined below:

- o Leakproof when properly installed and utilized;
- o Flexible over a temperature range of 15 °F to 95 °F and conformity to the cover irregularities;
- o A minimum of 30 years of excellent aging and weathering characteristics;
- o Resistant to mold, fungi, and mildew, and to attack from sulfuric acid (10 to 50%) and compounds of chromium, lead, arsenic, tin, and mercury;
- o Resistant to puncture, tearing, or other kinds of mechanical damage during installation;
- o Made of thermoplastics, thermoplastic elastomers, or elastomeric materials, such as Hypalon, CPE, or Neoprene;
- o The lining shall be manufactured totally by calendaring, with each ply of rubber laminated to the next ply through the openings in the scrim weave to produce a pinhole-free construction;
- o The reinforcing fabric shall have a 10 x 10 plain weave, 1,000-warp/1,000-fill denier construction;
- o The single ply of reinforcing fabric shall be totally encapsulated within two plies of rubber, giving a three-ply construction of nominal 36-mil thickness; and
- o Exposed fabrics or indication of delamination will not be permitted.

7.1.1 Polymeric membrane shall conform to the following conditions:

PROPERTY	TEST METHOD	LIMIT
Thickness	ASTM D751/D412	36 ± 5 mil (or more)
Fabric Burst Strength	ASTM D751/Mullen Test	200 lb
Membrane Burst Strength	ASTM D751/Mullen Test	150 lb
Accelerated Weathering	Federal Test Method CCC-7-191	70%

PROPERTY	TEST METHOD	LIMIT
Permeability	ASTM E96	2.1 perm-mils, maximum ($K = 10^{-10}$ cm/sec minimum)
Puncture Resistance	ASTM D751	50 lb
Modular of Elasticity	ASTM D882	61,000 psi, minimum
Retention Efficiency	VTM-51-79	90% minimum
Hardness	ASTM D676/1415/2240	50 minimum
Hydrostatic Resistance	ASTM D751	250 psi
Resistance to Water	ASTM D471	+ 10% maximum
Tear Resistance (Initial)	ASTM D751	80 lb
Tensile Strength	ASTM D412	1,300 psi
Elongation at Break	ASTM D412	200 to 600%
Bonded Seam Strength	ASTM D751	160 lb
Ply Adhesion	ASTM D413/4437	7 pounds/inch width

7.1.2 The Contractor shall submit to Contracting Officer documentation to confirm that the raw materials comply with the manufacturer's product properties and performance requirements, with respect to Density Melt Flow Index, Relative Solute Viscosity for Hypalon, percent volatile components for Hypalon, and percent carbon black.

7.1.3 All raw materials used in the production of the membrane, including additives and reinforcing materials, must be manufactured under the vendor's quality control/quality assurance program, and a certification indicating that they meet the specified performance shall be submitted to the Contracting Officer before the membrane is purchased.

7.1.4 The compounding ingredients used in producing membrane liner shall be first quality, virgin materials, providing durable and effective formulation for liner application. Clean rework materials containing encapsula-

tion scrim or other fibrous materials shall not be used in the manufacture of the polymeric liner.

7.1.5 All factory seams shall be 100 percent nondestructively tested, using methods prescribed in subparagraph 7.3.6, prior to shipping.

7.1.5.1 All quality control documentation, including test results, rejected seams, and repairs, shall be submitted to the Contracting Officer for his review before shipment.

7.2 TRANSPORTATION AND STORAGE. The polymeric membrane liner shall be shipped in rolls or folded on pallets.

7.2.1 When rolls are used, the membrane liner shall be protected with some type of covering material such as a thick sheet of the shipped membrane material.

7.2.2 When the membrane is folded on pallets, it shall be placed on heavy cardboard or wooden crates before shipment.

7.2.3 The roll or pallet of shipped membrane shall be marked to show the following minimum information:

- Name of manufacturer/fabricator;
- Product type;
- Product thickness;
- Manufacturing batch code;
- Date of manufacture;
- Length and width;
- Panel number or placement according to the design layout pattern; and
- Direction for unrolling or unfolding the membrane.

7.2.4 The shipped materials shall be the same as those used for the test results and samples when submitted and approved.

7.2.5 No material having punctures, tears, exposure damage, blockings, crumbling, or damage from inadequate packing support or bad handling will be accepted for use in the final cover.

7.2.6 Onsite storage of the membrane shall be in a secure area with provisions for shelter from adverse weather, and the storage period shall be as brief as possible.

7.3 PLACEMENT AND ANCHORING. The Contractor shall submit to the Contracting Officer, before manufacturing and factory seaming the panels, a layout pattern for placement of membrane panels in the cover system. The layout pattern shall show each panel designated with a unique number and shall have the least possible amount of field seams.

7.3.1 An authorized representative of the specialized installation Contractor shall inspect the bedding on which the liner will be installed and shall certify in writing that the surface on which the lining is to be placed is acceptable.

7.3.1.1 No installation of the lining shall commence until the certificate is submitted to the Contracting Officer. All unacceptable areas, such as undulations, low spots, holes, and crevices, shall be filled up with the bedding materials and compacted before the certificate is issued.

7.3.2 No more membrane than can be seamed in 1 day shall be unrolled, and all loose ends shall be secured against windlift at the end of each workday.

7.3.3 The Contractor shall take all steps necessary to keep the receiving surface in acceptable condition until installation of the membrane has been completed, and the placement of the lining shall be done strictly according to the approved layout pattern.

7.3.4 A minimum 5 percent slack in the membrane shall be allowed in each direction and shall be evenly distributed throughout the area of the final cover.

7.3.5 All factory seams shall have a minimum bonded overlap of 3 inches, and the field seams shall have a burden overlap of at least 6 inches.

7.3.6 Tests shall be conducted on all finished seams, overlays, and patches for peel, shear, and flex fatigue as per ASTM D413, Method Type 1; ASTM D751; ASTM D816, Method B (modified); ASTM D882, Method A (modified); ASTM D1876; or by air lance, vacuum, and bubble testing.

7.3.7 The Contractor shall comply with manufacturer's recommendations in installing the liner, shall protect the liner from damage and weakening effects, and shall observe weather conditions, i.e., temperature, humidity, precipitation, and wind, to ensure that they are acceptable for membrane placement and field seaming.

7.3.8 The anchor trench shall be excavated to the dimensions indicated in drawings, and trench corners shall be rounded to prevent stressing the membrane.

7.3.8.1 Backfilling of the anchor trench shall be done as soon as possible and shall be compacted, taking care not to damage the liner.

7.3.9 The liner shall be laid to the grade and line as indicated in drawings and shall extend up to the gutter drain as shown in Drawing No. 3 - Final Cover.

7.3.10 Any defective fabrications shall be removed immediately and replaced with good quality material and workmanship.

7.3.11 Upon completion of liner installation and seam testing, but prior to placement of the upper protective soil layer, the liner shall be thoroughly inspected by the specialized Contractor.

7.3.12 If any damaged areas are identified, they shall be marked and patched, using approved repair methods, and the repaired areas shall be nondestructively tested to ensure that they do not leak.

7.3.13 Vent pipes projecting through the membrane shall be sealed against leaks by using approved sealants and boots.

8. PROTECTIVE COVER. The protective layer, designed to protect the underlying layers from mechanical, climatic, and sun damage, shall be placed as soon as possible after the polymeric membrane liner is installed.

8.1 SOIL MATERIAL. The soil material (common borrow) shall be excavated from the borrow areas outside. No borrow areas exist within CAFB premises.

8.1.1 The soil material shall be free of rocks, sticks, seeds, and other items that could damage the membrane.

8.2 VEGETATION SUPPORTING SOIL. The upper 12 inches of the protective cover shall be composed of fertile, natural friable soil suitable for growing plants. It shall contain considerable amount of decomposed natural organic matter, finely divided and readily discernible by visual inspection, but in no case less than 2 percent by weight. It shall be able to support vegatation without the need for continuing application of fertilizer, irrigation, or other materials to ensure viability. It shall be a mixture of humus, sand, and silt or clay. It shall be reasonably free from subsoil contents clay lumps. brush, weeds, stones larger than 1 inch in diameter, stalks, roots, and other materials harmful or toxic to growth.

8.2.1 The Contractor shall submit sufficient evidence to the Contracting Officer regarding the suitability of the soil for the intended use. This shall include test reports attesting to the following, as applicable:

- pH range from 5 to 8;
- Soil salinity by measure of soluble salts not to exceed 500 ppm;

- Nitrogen, phosphorus, potash, and other nutrients; percent available;
- Alkalinity;
- Sodium content;
- Porosity; and
- Soil texture (10-30 percent clay, 10-60 percent sand, and 30-70 percent silt).

8.3 PLACEMENT AND COMPACTION. The protective cover shall be placed from a pile with a backhoe or any other equipment that can reach the flexible liner center from outside the lined area. No heavy equipment shall travel on the flexible liner.

8.3.1 Soil material shall be placed to the line and grade indicated in the drawings, and all objectionable items, such as roots, rocks, and seeds, shall be picked up and removed by a constantly attending root picker while the material is being placed.

8.3.2 The protective layer shall be placed in 4-inch layers and be hand compacted with a vibrating plate or similar equipment to a maximum dry density of approximately 80 to 90 percent; utmost care shall be taken not to cause any damage to the underlying polymeric membrane.

8.3.3 The exposed surface of the protective cover shall be finished smooth, with a uniform gradient from the crown to the bottom gutter drain without any depressions, cracks, or undulations.

8.3.3.1 The finished surface shall be tested before seeding, using a 10-foot-long straight edge, applied parallel with and at right angles to the centerline of the cover, and tolerance shall not exceed 1/2 inch.

9. VEGETATION. The vegetation shall be composed of a mixture of perennial grass that readily thrives in Cannon AFB And needs little maintenance.

9.1 SEED. Seed shall be state-certified seed of the latest season's crop and shall bear the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed-seed content, and inert material. Seed shall be labeled in conformance with U.S. Dept. of Agriculture rules and regulation under the Federal Seed Act and applicable state seed laws. Onsite seed mixing shall be done only in the presence of the Contracting Officer. Seed mixture shall be proportioned by weight as follows:

Name	Percent By Wt.	Min. Percent Purity	Min. Percent Germ.	Max. Percent Weed Seed
BLUE GRAMA, Bouteloua gracilis 'Lovington' or "Hachita'	17	98	85	0.50
SEDIOATS GRAMA, Bouteloua curtipendula 'El Reno'	35	98	85	0.50
BUFFALO GRASS, Buchloe dactyloides 'Texoka'	35	98	70	0.50
BERMUDA GRASS, Cynodon dactylon	9	98	70	0.10
ALKALI SACATON, Sprobolus airoides	4	98	90	0.15

9.2 FERTILIZER. Fertilizer shall conform to FS O-F-241, Type 1, Level B and shall bear the manufacturer's guaranteed statement of analysis. Fertilizer shall be commercial grade, free flowing, and uniform in composition. Granular fertilizer shall contain a minimum percentage by weight of 5 nitrogen, 10 available phosphoric acid, and 5 potash.

9.3 SOIL CONDITIONERS. Acceptable soil conditioners shall be as follows:

- Peat shall be derived from a fresh-water site and shall conform to FS-Q-P-166 and/or ASTM-D20607;
- Peat shall be shredded and granulated to pass a 1/2-inch mesh secrren;
- Peat shall be conditioned in a storage pile at least 6 months after excavation;

- Sand shall be clean and free of toxic materials;
- Perlite shall conform to NBS PS 23.
- Vermiculite shall be horticultural grade and free of toxic materials; and
- Rotted sawdust shall have 7.5 pounds of nitrogen added uniformly to each cubic yard and shall be free of chips, stones, sticks, soil, and toxic substances.

9.4 FUMIGANT. Soil fumigant shall be 97 percent methyl bromide and 3 percent chloropicrin. In applying fumigant, adequate precautions shall be taken against health risks; high concentrations of fumigant can produce fatal pulmonary edema, narcosis, CNS depression, and kidney injuries.

9.5 WATER. Water shall not contain any elements toxic and hazardous to plant life.

9.6 ORGANIC MULCHES. Organic mulches shall be free of foreign substances, have suitable pH levels, and have nitrogen contents of 1.2 to 1.5 percent. Organic mulches shall be any of the following:

- Straw shall be stalks from oats, wheat, rye, barley, or rice that is free from noxious weeds or objectionable material; and
- Hay shall be of herbaceous mowings, free from noxious weeds or objectionable materials.

9.7 HYDRAULIC MULCHING. Hydraulic mulching shall consist of a mixture of wood fiber mulch, grass seeds, fertilizer and/or other additives with water. Constituents of hydraulic mulch shall conform to the requirements specified for individual materials. The mulch materials shall consist of virgin wood fibers devoid of any growth or germination-inhibiting factors. Fibers shall not be produced from recycled materials such as sawdust, paper, cardboard, or residues from pulp and paper plants. Upon application the mulch shall form a blotter-like mat covering the ground. The dye used shall be biodegradable and not inhibiting to plant growth.

9.7.1 The wood fiber mulch shall conform to the following consistencies:

- o Moisture content, 7-12 percent;
- o Organic matter content, 98-100 percent;
- o Ash content, 0.6-1.0 percent O.D. basis;
- o pH range, 3.5-5.0; and
- o Water holding capacity, 1000 grams per 100 grams of fiber.

9.8 EXECUTION. Seeding shall be accomplished only after vegetation supporting soils are brought to finished grade.

9.8.1 FERTILIZERS. Fertilizers in dry form and ground limestone, if required, shall be spread separately. Fertilizer shall provide minimum 1.0 lb of actual nitrogen per 1000 sq. ft. of lawn area, and shall be incorporated in one operation. Hand-operated seeding devices may be used when seed, fertilizer, and ground limestone are applied in dry forms. Generally, hand-operated seeders shall be used only on areas which are inaccessible to a mechanical seeder.

9.8.2 SEED APPLICATION. Seed shall be applied by approved sowing equipment at the rate of 9 lbs pr 1000 square feet following the methods stipulated below:

- o One half of the seed shall be sown in one direction, and the remainder shall be sown at right angles to the first sowing;
- o The seed shall be covered to an average depth of 1/8 inch by means of spike-tooth harrow, cultipacker, or other approved device;
- o Mulch shall be evenly spread 1-1/2 inches thick, loose measurement (minimum 2.5 tons per acre);
- o Mulch shall be anchored by either a mulch tiller, asphalt emulsion, twine, or netting;
- o Newly seeded areas shall be watered and kept moist until new grass is established; and

- o 70 percent of the soil field capacity shall be maintained by regular watering.

9.8.3 SOIL TREATMENT. Areas requiring soil fumigation or pesticides shall be treated according to the manufacturer's recommendations.

9.8.4 HYDRAULIC MULCHING. Hydraulic mulching shall be mixed in standard hydraulic mulching equipment to form a homogeneous slurry. Hydraulic mulching slurry shall be sprayed, under pressure, uniformly over the soil surface at 2000 lbs. per acre. The hydraulic mulching equipment shall contain a continuous agitating system that keeps all materials in uniform suspension throughout the mixing and distribution cycle.

9.8.5 PLANTING. Planting shall be done within the following time periods:

- o Seeds shall be sown from March to May for spring planting;
- o Seeds shall be sown from August to October for fall planting;
- o Planting shall not be done when the ground is frozen, snow covered, or in unsatisfactory condition for planting;
- o If special conditions exist that may warrant a variance from above a written request shall be submitted to the Contracting Officer stating the special conditions and proposed variance.

9.8.6 RECONDITIONING. Recondition existing vegetation covered areas damaged by Contractor's operations, including storage of materials and equipment. Recondition existing vegetation covered areas where minor regrading is necessary. Provide fertilizer, seed, and soil amendments as specified for new seeding and as required to provide a satisfactorily reconditioned area. Provide new soil to fill low spots. Remove weeds, excess waste materials, and debris when mowing. Remove diseased or unsatisfactory seeded areas; do not bury into soil.

9.8.7 LAWN ESTABLISHMENT. The lawn establishment period shall be in effect until the lawn has been mowed three times. The Contractor shall be responsible for the establishment and proper care of a stand of grass over the entire seeded area. The Contractor shall provide the following maintenance: mowing, removal of excess clippings, eradicating weeds, watering, fertilizing, overseeding, or any other operations necessary for the growth of grass. The seeded area shall be mowed to a height of 1-3/4 inches whenever the average height of grass becomes 2-1/2 inches.

9.8.8 FINAL ACCEPTANCE. Final inspection and acceptance will be at the end of the lawn establishment period. Final acceptance will be based on a satisfactory stand of turf as defined in paragraph 9.8.7. Prior to final acceptance and after the third mowing, the Contractor shall apply 1 pound per 1000 square feet of slow release nitrogen fertilizer; the formula for this application shall be 5N-10 P-5K.

10. WARRANTY. In addition to the manufacturer's literature on the geotextile filter fabric and polymeric membrane liner, the Contractor shall provide the Contracting Officer with the following documentation. No payment will be made by the Government until the documents are submitted and accepted by the Contracting Officer.

10.1 Manufacturer's warranty on geotextile filter fabric, indicating that it has 30 years of excellent aging and weathering characteristics.

10.2 Manufacturer's warranty on polymeric membrane liner, indicating that it has 30 years of excellent aging and weathering characteristics.

10.3 Installation Contractor's guarantee of construction and workmanship and certification that the final cover system has been constructed according to the designs, specifications, and industrial standards and is free of any damage, leaks, or other defects to provide a leakproof cover system. This certification must bear the signature and the seal of a professional engineer registered in the State of New Mexico.

SECTION 2C

DRAINAGE SYSTEM

INDEX

1. General
2. Products
3. Construction
4. Submittals

1. GENERAL. This drainage system will protect the final cover against erosion and scouring, and will collect runoff and lead the collected water into an existing swale. The swale is situated at a distance approximately 60 feet southeast of Cell No. 3. The drainage system is composed of a 15-inch-deep rectangular gutter drain around the perimeter of the final cover that terminates in a tail-end ditch. The tail-end ditch will be provided with a riprap protection and will connect the gutter drain with the existing swale.

2. PRODUCTS. The materials in the drainage system shall meet the following requirements.

2.1 PRECAST CONCRETE GUTTER DRAIN. The Contractor shall provide standard reinforced precast concrete drains of the type used previously and successfully on other projects and for similar applications. The drains shall be cast to the dimensions and details shown on Drawing No. 5 - Miscellaneous Details, shall have a minimum 28-day compressive strength of 4,000 psi, and shall be reinforced for excellent crack control in flexture.

2.1.1 If the drain units are not readily available in the market, they may be cast off site or in situ at the Contractor's convenience, or replaced with an equivalent of the same structural strength with the permission of the Contracting Officer.

2.1.2 All concrete work shall comply with the requirements of ACI 301, 304, 311, and 318. Concrete units shall have a minimum 28-day compressive strength of 4,000 psi and shall be reinforced with welded wire fabric 6 x 6 - W4 x W4.

2.1.3 Ready mix concrete shall comply with requirements of ASTM C94.

2.1.4 Precast concrete shall comply with ASTM A497, A185, A82, C33, and C150 and with ACI 304, 305, 306, 318, 512, and 525.

2.1.5 The Contractor shall use cement type I or II to meet ASTM C150; aggregates to meet ASTM C33; welded wire fabric to meet ASTM A185; and clear, fresh, and drinkable water in the manufacture of the drain units.

2.2 RUBBLE. Rubble for the riprap shall be blasted or crushed granite, basalt, diorite, rhyolite, or andesite rocks.

2.2.1 Rocks shall be 6 to 12 inches in a randomly mixed size.

2.2.2 Rocks shall be free of soft, friable pieces and of other deleterious matter.

3. CONSTRUCTION. The drainage system shall conform to the lines and levels indicated on drawings. Due consideration shall be given to variation of site conditions, and the layout may be modified to suit the exact site conditions with the approval of the Contracting Officer.

3.1 The precast concrete gutter drains shall be underlain with the polymeric membrane liner extending from the final cover.

3.2 All drain units shall be properly grouted or sealed, using industry-accepted materials to render watertight connections between units.

3.3 If cast in situ, the gutter drains shall be cast monolithically, allowing thermal movement joints to at least 100-foot intervals, and the joints shall be sealed with proper, durable fillers.

3.4 The drainage system shall be sloped to a uniform gradient as indicated in drawings and shall have no areas that will allow water to stagnate.

3.5 A tail-end ditch shall be constructed to have a parabolic cross-section of average top width of 24 inches and a depth of about 18 inches.

3.6 The tail-end ditch shall be gradually graded to lead water from gutter drains to the existing swale at the southeast portion of Cell No. 3.

3.7 The tail-end ditch shall be paved with rubble to a distance of 50 feet from the beginning of the ditch to provide a riprap protection.

3.8 Rubble shall be uniformly distributed over the area to be paved and shall have no void spaces in between.

4. SUBMITTALS. The Contractor shall submit samples of gutter drain and rubble together with manufacturer's certifications to the Contracting Officer, and shall obtain his approval before constructing the drainage system.

SECTION 2D

DIKING

INDEX

1. Scope

2. Soil

3. Placement and Compaction

1. SCOPE. An earthen dike is to be provided around the periphery of the final cover to retain runoff water from the cover area within its boundaries and to baffle water from other areas so that water running in will not damage the final cover system.

2. SOIL. Inorganic clayey soil meeting the requirements in Section 2B - Final Cover, subparagraph 3.1, shall be used in construction of the dike.

2.1 The soil material shall be free of roots, rocks larger than 2 inches, and other deleterious matter.

3. PLACEMENT AND COMPACTION. The receiving surface shall be cleaned of vegetation, roots, and other harmful matter before the soil is placed. Any holes, low areas, and crevices shall be filled with earth and well compacted.

3.1 Soil is to be placed in 5-inch-thick layers (lifts) to the line and side slope as indicated in drawings.

3.2 Each layer shall be compacted to obtain 95 percent of the maximum dry density, following ASTM D698 or AASHTO T-99 methods.

3.3 In-place density tests shall be conducted for each 5-inch layer of soil following methods prescribed in ASTM D1556, D2167, or AASHTO T147. At least two tests shall be conducted on each 5-inch layer of soil.

3.4 The exposed top and the sides of the dike shall be finished smooth to have an even texture free of cracks, loose spots, and settlements.

3.5 Corners of the dikes shall be rounded to give a smooth curve, and the ends shall be gradually tapered into the edges of the tail-end ditch.

3.6 Grass shall be planted on the dike to prevent erosion.

3.6.1 All conditions stipulated in Section 2B, Subsections 8.2 and 9.0 shall apply for seeding the dike, except the thickness of vegetation supporting soil shall be approximately 4 inches.

SECTION 2E

FENCING

INDEX

1. Description of Work
2. Product
3. Construction
4. Caution Sign

1. DESCRIPTION OF WORK. A five-strand barbed wire fence is provided with a 8-foot-wide gate around the final cover to control access or indiscriminate crossing of the cover area, and to delineate the buried hazardous waste Cell No. 3 from the other cells in Landfill Area 5.

1.1 Upon completion of the fence erection, two caution signs, (one in English and one in Spanish) shall be fastened to the fence gate to prohibit unauthorized entry into the site. Thirty-two caution signs (16 in English and 16 in Spanish) shall be fastened to the fence at intervals not greater than 50 feet apart.

1.2 Selection of the barbed wire, fabric, gate, posts, and accessories shall be at the Contractor's option. Only one type of fabric, posts, and barbed wire shall be used on the fence.

2. PRODUCT. All products shall conform to the following standards.

2.1 BARBED WIRE. Galvanized steel barbed wire (15-1/2-gauge), complying with Federal Specifications (FS) RR-F-221G/Gen and RR-F-221/1A.

2.2 GATE. Double swing, 8-foot-wide, zinc-coated and/or aluminum-coated gate, made of steel and chain-link fabric complete with latches, stops, hinges, keepers, and accessories to meet FS RR-F-191/2B.

2.3 POSTS AND RAILS. Galvanized steel (2-inch diameter) end, corner, pull and line posts, and brace rails to comply with FS RR-F-191/2B. Posts and rails shall have the same finish as the gate.

2.4 ACCESSORIES. Accessories include caps, rail and brace ends, wire ties and clips, brace bands, tension bands, tension bars, 7-gauge tension wires, 5/16-inch truss rods, barbed wire attaching clips, and miscellaneous small parts.

2.4.1 All accessories shall conform to the requirements in FS RR-F-191 and 221. Accessories shall have the same finish as the posts.

2.5 CONCRETE. Concrete shall consist of Portland cement complying with ASTM C 150, aggregates complying with ASTM C 33, and clean water. Aggregates shall be mixed to obtain concrete with 28-day design compressive strength of 3,000 psi, using a minimum of five 94-pound bags of cement, 1-inch maximum aggregate, 3-inch maximum slump, and 2 to 4 percent entrained air.

2.6 CHAIN AND LOCK. Provide for the gate, 2-foot chain, and a strong padlock (Yale, Master, Smith, or equivalent), conforming to FS FF-C-271, Type 1, Grade C, Class 2, 3/4 by 1-1/2-inch links.

3. CONSTRUCTION. Fence construction shall not begin before the final cover, gutter drain, and dike are completed with finish elevations, unless otherwise permitted by the Contracting Officer.

3.1 EXCAVATION. Footings for the posts shall be excavated to the minimum dimensions shown on drawings. Maximum distance between fence posts shall be 10 feet. The spacing and the footing dimensions shall be modified according to the ground condition and the type of member installed in the footing.

3.1.1 Soil shall be uniformly spread from excavations, adjacent to the fence line or on adjacent areas of the site, as directed by the Contracting Officer.

3.2 SETTING POSTS IN CONCRETE. Loose and foreign materials are to be removed from sides and bottoms of holes; moisten soil before placing concrete.

3.2.1 Center and align post in holes to the dimensions shown in drawings.

3.2.2 Place concrete around posts in a continuous pour, and vibrate or tamp for consolidation. Check each post for vertical, top, and horizontal alignment, and securely hold in position during placement and finishing operations.

3.2.3 Trowel-finish tops of footings, and slope or dome to direct water away from posts. Set keeps, stops, sleeves, and other accessories into concrete as required.

3.2.4 Keep exposed concrete surfaces moist for at least 7 days after placement, or cure with acceptable methods.

3.3 ERECTION. Allow concrete to attain at least 75 percent of its 28-day compressive strength before any items are attached to the posts. Do not hang gates or tension the wires until the concrete has attained its full design strength.

3.3.1 Posts with drive anchors shall be driven into undisturbed ground, using methods that avoid damage to the posts. After driving, excavate around the post, the minimum amount necessary to install the drive anchor, in accordance with the manufacturer's recommendations.

3.3.2 Install braces so that posts are plumb when diagonal rod is under tension.

3.3.3 Install tension wires, tensioning the wire until no sag is visible between posts.

3.3.4 Install barbed wires in prefabricated holes, starting at 6 inches above ground; the wires shall be parallel, running 10 inches apart (see drawings for details).

3.3.5 Install gates plumb, level, and secure for full opening without interference.

3.3.6 Install ground-set items of the gate in concrete for anchorage, as recommended by the fence manufacturer.

3.3.7 Adjust hardware of the gate for smooth operation, and lubricate where necessary.

3.3.8 Ensure that all welded joints are shop welded prior to application of finish coat and installation.

3.4 SUBMITTALS. Manufacturers' certificates, attesting compliance with the specifications, are to be provided.

3.4.1 Color samples for coating and painting materials, and certification to testify that painting is done to meet the requirements of Steel Structure Painting Manual (Structural Steel Painting Council), are to be submitted.

4. CAUTION SIGN. The Contractor shall fabricate the caution signs, as indicated in Drawing No. 5 - Miscellaneous Details, and securely fasten the signs to the fence gate and the fence to avoid interference with other gate accessories. The signs
shall be fabricated to conform with the requirements of OSHA 1910.145, Specifications for Accident Prevention Signs and Tags.

4.1 MATERIALS. Caution signs shall be constructed of butyrate plastic backed with 20-gauge galvanized steel plate for rigidity and unsupported use.

4.1.1 Provide minimum of four grommets or eyelets of 1/4-inch diameter, at the four corners for easy mounting, complete with mounting hardware.

4.1.2 The signs shall be 14 by 20 inches in size.

4.2 WORDING. Each sign shall state the following, in English and Spanish, to meet OSHA requirements.

4.2.1 English:

"DANGER
UNAUTHORIZED
PERSONS
KEEP OUT"

4.2.2 Spanish:

"PELIGRO
SOLAMENTE
PERSONAS CON
AUTORIZACION"

4.3 COLORS. The signs shall have a TAC-brown* borderline about 1/2-inch thick, and "Danger" and "Peligro" words in white on a TAC-brown* oval background with a white margin surrounded by a black rectangle. The rest of the words shall be in black, on a white background.

4.4 MOUNTING. The two signs shall be mounted securely by steel clips, bolts, nuts, and washers to each leaf of the gate so that they will not be loosened by the wind and rain.

4.5 MEASUREMENT AND PAYMENT. No separate measurements or payments will be made for the signs. The cost of caution signs shall be included in Item 6 of the Bidding Schedule, at the unit price per foot of the fence.

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*Color specifications are available with the Contracting Officer.

SECTION 2F

DEMOBILIZATION AND PROJECT CLOSEOUT

INDEX

1. Definition

2. Prerequisites for Substantial Completion

3. Prerequisites for Final Acceptance

4. Record Document Submittals

5. Final Cleaning

6. Measurement and Payment

1. DEFINITION. Project closeout requirements are defined to include the general requirements preliminary to final acceptance, e.g., final decontamination of staging areas and decontamination facilities; reassembly of existing features (to remain), such as underground utility lines removed by the Contractor to perform his work; settling of utility bills, if any exist; final payment; warranties and guarantees for polymeric liner and fabric; and similar actions evidencing completion of the work. The time of closeout is recognized to be directly related to "substantial completion," and therefore may be either a single time period for the entire project or a series of time periods for individual parts of the project that have been certified as substantially complete at different dates. The time variation shall be applicable to other provisions of this section, regardless of whether it results from "phase completion" originally specified by the contract documents or is subsequently agreed upon.

2. PREREQUISITES FOR SUBSTANTIAL COMPLETION. The requirements hereinafter specified are in addition to General Requirements in Division 1 and other sections of these specifications.

2.1 Prior to requesting the Contracting Officer's inspection for certification of substantial completion, the Contractor shall complete the following and list known exceptions (if any) in his request:

2.1.1 Provide substantial completion notification, with a list of items yet to be completed or corrected.

2.1.2 Submit last progress-payment request, complete with associated releases, consents, and supports.

2.1.3 Submit record drawings, final project photographs, damage or settlement survey, property survey, and similar final recorded information.

2.1.4 Discontinue and remove from the project site temporary facilities and services, along with construction tools and facilities, markups, and similar elements.

2.1.5 Complete the final cleaning.

2.1.6 Submit copies and a list of all deviations or nonconformances currently in effect for which closeout action is required. Prepare and submit a detailed plan to close out all open deviations or nonconformances.

3. PREREQUISITES FOR FINAL ACCEPTANCE. The requirements hereinafter specified are in addition to General Requirements in Division 1 and other sections of these specifications.

3.1 Prior to requesting final inspection for certification of final acceptance and final payment, the Contractor shall complete the following and list known exceptions (if any) in his request:

3.1.2 Submit certified copy of the Contracting Officer's final punchlist of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed, and dated by the Contracting Officer.

3.1.3 Submit final meter readings, if any, for utilities and similar data as of the time of substantial completion, and assume responsibility for corresponding elements of the work.

3.1.4 Complete submittal of all record documents.

3.1.5 Subject Contractor's employees who were engaged in this project to a medical test and submit reports to the Contracting Officer, if this was necessitated during the evaluation of the site conditions by the Contractor's Certified Safety Professional and the Certified Industrial Hygienist (see subparagraph 5.5 of Section 1D for more details).

4. RECORD DOCUMENT SUBMITTALS.

4.1 GENERAL. The Contractor shall protect record documents and original drawings from deterioration and loss in a secure, fire-resistant location, and shall provide access to record documents and original drawings for the Contracting Officer's inspection during normal working hours.

4.2 RECORD DRAWINGS. Field changes, amendments, and alterations to the contract documents and drawings shall not be made on the originals but on a separate set of the contract documents and drawings. All field changes, amendments, or alterations shall be marked with a red erasable pencil, showing the condition fully and accurately. The Contractor shall mark up new information that is recognized to be of importance, but was for some reason not shown on any of the contract drawings, and shall note related change order numbers where applicable. Contract documents and records shall be bound with durable paper cover sheets, with suitable titles, dates, and other identification printed on the cover of each set.

4.3 RECORD SPECIFICATIONS. During the progress of the work, the Contractor shall maintain one copy of the specifications, including addenda, change orders, and similar modifications issued in printed form during contract operations. The Contractor shall mark up variations between the actual work and the specifications and modifications, selection of options, and similar information on work that is concealed or cannot otherwise be readily discerned, and shall note related record and drawing information and product data where applicable. Upon completion of markup, specifications shall be submitted to the Contracting Officer for record.

4.4 MISCELLANEOUS RECORD SUBMITTALS. Immediately prior to the time(s) of substantial completion, the Contractor shall complete miscellaneous records and place in good order, properly identified, and bound or filed and ready for continued use. Records shall be submitted to the Contracting Officer.

5. FINAL CLEANING.

5.1 CLEANING STANDARDS. The Contractor shall provide final cleaning of the work at the time indicated. The following are examples, but not limitations, of the cleaning standards required.

5.1.1 The Contractor shall disconnect all utility services installed and/or used by the Contractor.

5.1.2 The Contractor shall clean the project site (yard and grounds), including landscape development areas, of litter and foreign substances. The Contractor shall sweep paved areas to a broom-clean condition and remove stains, petrochemical spills, and other foreign deposits. The Contractor shall rake grounds that are neither planted nor paved to a smooth, even-textured surface.

5.2 TIME OF FINAL CLEANING. Final cleaning shall follow the Contracting Officer's certification of "substantial completion," and shall immediately precede "final acceptance" inspection.

5.3 REMOVAL OF PROTECTION. Except as otherwise indicated or requested by the Contracting Officer, the Contractor shall remove temporary protective devices and facilities installed to protect previously completed work for the remainder of the contract period.

5.4 COMPLIANCES. The Contractor shall comply with safety standards and governing regulations for cleaning operations. Waste materials shall not be burned at the site, debris or excess materials shall not be buried on the property, and volatile or other harmful or dangerous materials shall not be discharged into drainage systems. Waste materials shall be removed from the site and disposed of in accordance with the requirements of these specifications.

5.5 DECONTAMINATED VEHICLES AND CONTRACTOR EQUIPMENT. These shall be inspected and approved by the Contracting Officer prior to removal from the project site. All decontaminated facilities shall be properly disposed of off base.

5.5.1 The construction of the cap over the landfill shall be planned such that there may be only a limited contact between construction equipment and the waste mass. The following steps must be taken to decontaminate equipment:

- as much as possible of the waste and/or contaminated soil clinging to the equpment after contact shall be removed and redeposited within the landfill, such that it can be covered by the cap; and

- tools and/or equipment contacting the waste or contaminated soil shall be taken to an on-base area where they will be steam cleaned on an impervious catchment apron with the wash waters collected, tested, and properly disposed of.

6. MEASUREMENT AND PAYMENT. This work will not be measured, and no separate payment will be made. All costs shall be included in Item No. 1 of the Bidding Schedule.

APPENDICES

APPENDIX A

DEFINITIONS AND ABBREVIATIONS

APPENDIX A

DEFINITIONS AND ABBREVIATIONS

1. DEFINITIONS.

The following definitions, in addition to those contained in the General Requirements, shall apply to the work of this contract.

Air Lance:	A device used to test, in the field, the integrity of field seams in plastic sheeting.
Analysis:	The determination of the nature of proportion of one or more constituents of a substance, whether separated out or not.
Anchor Trench:	A ditch on which the edges of a plastic sheet are buried to hold it in place or to anchor the sheet.
Boot:	A bellows-type covering to exclude dust, dirt, moisture, etc., from a flexible joint.
Chlorinated Polyethylene (CPE):	Family of polymers produced by chemical reaction of chlorine on the linear backbone chain of polyethylene.
Chlorosulfonated Polyethylene (CSPE):	Family of polymers produced by polyethyl-reacting with chlorine and sulfur dioxide. ASTM designation is CSM.
Clayey Soil:	Soil material containing sand, clay, and silt in decreasing proportions, respectively (e.g., 50% sand, 40% clay, and 10% silt). See Section 2B, Subsection 3.0 for specific clay for final cover.
Common Soil/Common Borrow:	The unconsolidated natural surface material present above bedrock formed by in-place weathering of bedrock or placed by the wind, water, or gravity.
Compaction:	Compression of a mass to decrease its volume or the thickness of a layer by reduction of voids.

Contamination: A substance or substances that renders a body of water, soil, etc., impure, unclean, or corrupt by contact.

Contamination Reduction Zone The transition zone between the Exclusion Zone and the Support Zone. It serves as a buffer zone to assure that the clean area (Support Zone) will not be contaminated.

Contract Documents: The owner-contractor agreement, the conditions of the contract (general, supplementary, and other conditions); the drawings; the specifications; all addenda issued prior to, and all modifications issued after, execution of the contract; and any items that may be specifically stipulated as being included in the contract documents.

Contracting Officer (CO): The individual authorized by the Federal Government to enter into, administer, and make changes to this contract and to make related determinations and findings on behalf of the Government. This includes a duly appointed successor or an authorized representative of the Contracting Officer (CO) acting within the limits of his authority.

Decontamination Facility: The passageway through which personnel may enter and leave the Exclusion Zone.

Denier: A unit used in the textile industry to indicate the fineness of continuous filaments. Fineness in deniers equals the mass in grams of 9,000-meter length of a filament.

Exclusion Zone: The area or zone by which contamination does or could occur. All people entering the Exclusion Zone must wear the prescribed levels of protection.

Final Cover: The cover material that is applied at the end of the useful life of a disposal site and represents the permanently exposed final surface of the fill.

Geotextile: A textile fabric, such as filter fabric, used in civil engineering applications.

Hazardous Waste:	Any solid waste that is ignitable, corrosive, reactive, or toxic and may pose a substantial or potential hazard to human health and safety or to the environment when improperly managed.
Impermeable:	Not permitting passage of a fluid or a gas through its substance.
Incineration:	The process by which waste volume is reduced by combustion in a controlled manner, the primary purpose of which is to thermally break down hazardous waste.
Lift:	An applied and/or compacted layer of soil.
Membrane:	A continuous sheet of material, such as polymeric sheeting.
Monitoring:	The use of direct and indirect reading field instrumentation to provide information regarding the levels of gases, vapors, particulates, and fumes that are being generated during remedial action. Monitoring shall be conducted to evaluate employee exposures to toxic materials and and work area monitoring as well as the offsite migration of airborne contaminants.
Onsite Personnel:	The Government personnel, Contractor, and State and Federal representatives.
Permeability:	The capacity of a porous medium to conduct or transmit fluids.
Pollutant:	A substance or material that degrades the quality of, or, directly or indirectly, presents a hazard to all or any of the following sectors of the environment: water, groundwater, air, soil, plants, wildlife, or people.
Polymeric Liner:	A plastic or rubber sheeting.
Regulated Substance:	Any substance defined in Section 101 (14) of CERCLA (but not including any substance regulated as a hazardous waste under subtitle C), and petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure (60 °F and 14.7 pounds per square inch absolute).

Runoff:	That portion of precipitation or irrigation water that drains from an area as surface flow.
Sanitary Landfill:	A site where solid waste is disposed of on land in a manner that protects the environment by spreading the waste into thin layers, compacting it to the smallest practical volume, and then covering it with soil by the end of the working day.
Scrim:	A woven, open mesh reinforcing fabric made from continuous filament yarn. Used in the reinforcement of polymeric sheeting.
Subgrade:	The foundation or supporting soil layer.
Treatment:	Any method, technique, or process that changes the physical, chemical, or biological composition of any hazardous waste and renders it nonhazardous or safer for transport, capable of recovery and/or storage, or reduced in volume.

2. ABBREVIATIONS.

The following abbreviations are used in this document.

AASHTO:	American Association of State Highway and Transportation Officials
ABIH	American Board of Industrial Hygiene
ACI:	American Concrete Institute
ACIL:	American Council of Independent Laboratories
AFB:	Air Force Base
AIHA:	American Industrial Hygiene Association
ANSI:	American National Standards Institute
API:	American Petroleum Institute
ASTM:	American Society for Testing and Materials
BAT:	Best available technology
CAFB:	Cannon Air Force Base, New Mexico

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CIH: Certified Industrial Hygienist

CSP: Certified Safety Professional

CQCSE: Contractor's Quality Control Supervisory Engineer

DOT: U.S. Department of Transportation

EID: Environmental Improvement Division, Health and Environment Department, New Mexico

EPA: U.S. Environmental Protection Agency

FM: Factory Mutual Engineering Corporation

FS: Federal Specifications (General Services Administration)

GC/MS: Gas chromatography/mass spectrometry

HESFDEP: Health, Emergency Response, Safety, Fire Protection, Decontamination, and Environmental Protection Plan

HMTC: Hazardous Materials Technical Center

HWMR: Hazardous Waste Management Regulations (New Mexico)

LEL: Lower explosive limit

MIL: Military Standardization Documents (U.S. Department of Defense)

NBS: National Bureau of Standards (U.S. Department of Commerce)

NFPA: National Fire Protection Association

NIOSH: National Institute of Occupational Safety and Health

NM: New Mexico

OSHA: Occupational Safety and Health Administration (U.S. Department of Labor)

OVD: Organic Vapor Detector

PAT: Proficiency Testing Program

PEL: Permissible exposure limit

pH: A numerical designation of relative acidity and alkalinity

ppb:	parts per billion
ppm:	parts per million
PS:	Product Standards of NBS
RCRA	Resource Conservation and Recovery Act
RIFS:	Remedial Investigation and Feasibility Study
STEL:	Short-term exposure limit
TLV:	Threshold limit value
TOL:	Threshold odor limit
TSCA:	Toxic Substances Control Act
U.S.:	United States
USC:	United Soil Classification
WRC:	Waste Resources Council

APPENDIX B

LOCAL CLIMATOLOGICAL
AND
GEOLOGICAL DATA

APPENDIX B

LOCAL CLIMATOLOGICAL DATA*

CONDITION	CITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NORMAL TEMPERATURE °F	Albuquerque	34.8	39.4	46.2	55.1	64.3	74.5	78.8	76.1	69.0	57.4	44.0	35.6
	Clayton	33.0	36.4	41.4	51.0	60.1	69.9	74.2	72.3	64.8	54.7	41.7	35.5
	Roswell	41.4	45.9	52.8	61.9	70.3	79.8	81.4	79.2	72.3	61.7	49.1	42.5
	Lubbock, TX	38.8	42.6	50.2	60.3	69.0	77.6	79.8	77.9	71.2	61.0	48.5	41.5
NORMAL PRECIPITATION INCHES	Albuquerque	0.41	0.40	0.52	0.40	0.46	0.51	1.30	1.51	0.85	0.86	0.38	0.52
	Clayton	0.27	0.28	0.59	1.05	2.23	1.74	2.53	2.43	1.48	0.75	0.48	0.29
	Roswell	0.24	0.28	0.27	0.37	0.77	0.91	1.38	2.17	1.72	0.99	0.33	0.27
	Lubbock, TX	0.38	0.57	0.90	1.08	2.59	2.81	2.34	2.20	2.06	1.81	0.59	0.43
AVERAGE SNOWFALL INCHES	Albuquerque	02.5	02.0	02.0	00.5	0.00	0.00	0.00	0.00	0.00	0.00	01.1	02.6
	Clayton	03.4	03.2	04.7	01.9	00.3	00.0	00.0	00.0	00.1	00.5	02.8	03.3
	Roswell	02.9	02.5	01.3	00.3	00.0	00.0	00.0	00.0	00.0	00.2	01.6	02.7
	Lubbock, TX	02.6	03.2	01.7	00.2	0.00	0.00	0.00	0.00	00.0	00.2	01.3	01.7

* Extracted from "Comparative Climatic Data for the United States" - National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 1984.

B-1

GEOLOGICAL DATA*

The color of the surface soil ranges from brown to reddish brown in the Amarillo loams, through yellowish red in the loamy fine sands. The color of the subsoil ranges from dark reddish brown in some areas of Amarillo loam to yellowish red in the loamy fine sands.

Amarillo soils cover over 90 percent of Cannon AFB. Typical permeabilities are moderate and range from 1×10^{-3} to 4×10^{-4} cm/sec.

Other soil associations occurring at Cannon AFB, primarily in the vicinity of playa "lakes," include Clovis soils, Mansker soils, and Potter soils. Together, these soil types account for less than 10 percent of the area at Cannon AFB. The Soil Conservation Service (SCS) describes these soils as follows.

Clovis Soils. These soils generally occur in small areas within broader areas of Amarillo soils. They occupy the upper margins of many of the draws and playas. The Clovis soils are similar to the Amarillo, but the chalky zone occurs at shallower depths (16 to 36 inches), and in many places the profile is not so well developed. In Curry County, the Clovis series is represented by three soil types; they are Clovis loam, Clovis fine sandy loam, and Clovis loamy fine sand. The Clovis loams resemble the thin solum phases of the Pullman loams, except for weaker structural development in the B horizon.

Mansker Soils. Mansker soils are strongly calcareous. They normally occupy the slopes of draws and playas. However, small, nearly level to gently sloping areas occur within larger areas of Pullman, Amarillo, and Clovis soils. The Mansker soils are extensive throughout Curry County. They have formed where the upper part of some other soil has been lost through erosion, and the strongly calcareous substratum has been exposed. These soils show very little profile development.

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* Extracted from "Closure and Post Closure Plans for Landfill Trench at Cannon Air Force Base," Final Draft date - 1 July 1985 by HMTC.

Potter Soils. The Potter soils are shallow and strongly calcareous. They overlie hard, consolidated caliche. The degree of cementation in the caliche varies. In some places, the caliche resembles limestone; in others, it consists of lime-cemented pebbles and nodules. The material from which these soils developed was mainly weathered caliche, but it was intermixed with wind-deposited materials. The Potter soils occur throughout the county, normally in areas of less than 100 acres. In many places, they are closely associated with the Mansker soils.

Permeability of all three soil types is toward the lower end of the range typical for the Amarillo soils.

At Cannon AFB, the soil layer is underlaid by a fairly thick (approximately 25 feet) caliche layer which is part of the Ogallala Formation. This caliche varies in depth and thickness across the base. Geologic logs indicate that caliche occurs as shallow as 2 feet below the surface and is up to 54 feet in thickness. Observations made at the current landfill operation (not the trench addressed in this report) indicate that the top of the caliche layer is approximately 5 feet below the surface and becomes harder with depth. In fact, at a depth of approximately 15 feet, heavy-duty earth-moving equipment could not penetrate the caliche.

Although there are no specific boring data for the landfill area, boring data do exist for much of the base, especially the northwest region of the base. Some inferences about boring data at the landfill are made by the Department of the Air Force Tactical Air Command, Cannon AFB, New Mexico, in their publication entitled, "Sanitary Landfill--Design, Construction and Operation," 15 December 1976:

> "Site Soils. No soils tests have been made at the landfill site; however, the uniformity of soil conditions in the area and on the base allow for fairly accurate prediction of site soil conditions from other soil borings. Inspection of the existing 16-foot deep trench verifies the textural classification expected--loamy fine sand or fine sandy loam underlain by sandy clay loam and light sandy clay loam with caliche pockets.. Under the Unified Soil Classification System (USCS), the predominate soils are SC, CL, or combinations of them with some areas of SM or ML and a few pockets of GP, GL, GC, and caliche."

Of particular interest is the frequent occurrence of clay in the boring profiles (uses Type CL). Examination of the profiles reveals that approximately 70 percent of the 191 borings taken show clay in the top 10 feet of the borings. The profile chart describes the clay as inorganic clay of low to medium plasticity. Since a final cover exhibiting low permeability is desired, soils that could construct an occlusive barrier to infiltration are most valuable for the construction of the barrier layer. Table 4 shows that clays, especially colloidal clay, will afford the best possible protection from infiltration, as demonstrated by their very low permeability coefficients.

The final cover must be no more permeable than any bottom liner system or natural subsoils present. In the case of this particular landfill, the underlying material is caliche. While it is generally understood that caliche is very impermeable, a question arises as to the complete occlusive properties of large expanses of caliche. On the basis of available data and field experience, the caliche occurring at the landfill site is probably young in nature and not entirely cemented. This would lead to the belief that the caliche formations here would exhibit some permeability, albeit low. While caliche in and of itself can be very impermeable, one would expect that a large expanse of the material would exhibit many fractures due to its relative hardness and brittle characteristics if mature, and incomplete cementation if young. Hence, while the material itself is very impermeable, these fractures would afford avenues for some percolation to occur.

The following is a description of caliche that is characteristic of the Central High Plains region of New Mexico where Cannon AFB is located; which supports these conclusions (New Mexico State Highway Department, "Geology and Aggregate Resources, District 11," 1972).

> "Many geologists believe that the Central High Plains and the Llano Estacado are universally underlaid by caliche deposits, but anyone who has had an occasion to explore this hypothesis on the working end of a jack-hammer will disagree, at least about the top 25 to 50 feet. Nevertheless, exposures along the escarpment indicate that some form of caliche does exist below a large part of these surfaces. The stages of development of these caliche profiles will vary from very youthful to late in maturity. As previously mentioned, some of the profiles may be over one million years old. Some of the older

profiles have undergone attacks from solution and weathering and, therefore, can be expected to be extremely discontinuous across the plain. Although these surfaces have remained quite stable for hundreds of thousands of years, aggradation and degradation have continued at a slow, steady pace. The result, considering the climatic fluctuations of the past one million years, has been degradation and recementation of the profiles on the windward and uphill side of the plains and aggradation on the lee side of the plains, the rock-house type structure being more common in older profiles, and lamination more common in younger profiles. Perhaps this helps explain the variation in soundness, loss, and Los Angeles abrasion test values from different locations across the plains or even within a local pit area."

Therefore, on the basis of available data, a final cover, properly constructed and employing a barrier layer composed of compacted clays of low to medium plasticity (available on base), should provide the necessary degree of impermeability (10^{-7} cm/sec) for this landfill.

Precipitation statistics further support the contention that the clays available on base would be adequate for use in the barrier layer. The annual net precipitation is approximately minus 55 inches per year (mean annual precipitation minus mean annual evapotranspiration). The Phase I report states that a low potential for contaminant migration exists at Cannon AFB, due primarily to: (1) depth to groundwater, (2) low precipitation, (3) high evapotranspiration rate, and (4) the occurrence of a very low permeability caliche layer under most of the base. In other words, very little precipitation is available for infiltration, and what little does infiltrate is impeded first by the cap and then by the caliche before it begins a descent of over 200 feet to the aquifer system.

APPENDIX C

CORE SAMPLE RESULTS*

* Extracted from "Closure and Post Closure Plans for Landfill Trench at Cannon Air Force Base" - Final Draft of 1 July 1985, by HMTC.

APPENDIX C
CORE SAMPLE RESULTS

Two 9-inch diameter cores of 40-foot depth were removed from the landfill trench on January 22, 1985. Six samples from each core (depths of 10, 15, 20, 25 30, and 40 feet) were analyzed for chromium, lead, arsenic, tin, mercury, and volatile organics. The metals analyses were accomplished by nitric acid digestion/atomic adsorption spectroscopy and the volatile organics were analyzed using gas chromatograph mass spectrometry. Table C-1 summarizes the composite results of these analyses.

Table C-1. Core Analyses

Constituent	Concentration (ppm)	Detection Limit (ppm)
Chromium	14 - 36	0.005
Lead	0.2 - 10.5	0.001
Arsenic	3.70 - 9.61	0.002
Tin	0.5 - 2.0	0.002
Mercury	0.04 - 0.68	0.002
Volatile Organics	< 0.01	0.01

Volatile organics are insignificant in this landfill trench because they are of a low enough concentration at all depths that they are not identified at a 10 ppb detection limit. Effectively, there are no volatile organics available to ever contaminate groundwater. The metal levels appear to be high in these analytical results, but this is not significant because the lowest levels of the value ranges are reached at the 40-foot depth. Very little would be available to groundwater which is 280 feet deeper still (i.e., groundwater is 320 feet below the surface at Cannon AFB). Having been retrieved by using

nitric acid, the metals concentrations are also much higher than they would be if the landfill trench contents were ever contacted with surface or groundwater. Metals and their salts do not ionize in water of neutral pH as readily as they do in nitric acid.

APPENDIX D

INVENTORY OF HAZARDOUS WASTE IN CELL NO. 3*

* Extracted from "Closure and Post Closure Plans for Landfill Trench at Cannon Air Force Base" - Final Draft of 1 July 1985, by HMTC.

APPENDIX D
INVENTORY OF HAZARDOUS WASTE IN CELL NO. 3

Landfill No. 5 began operation in 1968 and is in current use. The site is located in the southeast corner of the base and covers approximately 30 acres. Trench No. 3, the specific trench for which this closure plan is applicable, was closed in 1981. The trench covers an area of approximate dimensions 14,000 square feet.

Materials received at this landfill in 1981 are similar to those received at the former base landfills and include domestic solid waste, waste oils and solvents, paints, paint removers and thinners, pesticide containers, empty cans, and general construction debris. Materials from drums were generally deposited on absorbent materials placed in the trench. The drums were then reclaimed for reuse.

From 1968 to about 1972, wastes were burned and then buried in trenches. Since 1972, the standard procedure has been direct burial of the wastes in trenches. There are 11 covered trenches at the site. A twelfth trench was open and in use at the time of the Phase I records search and site visit. Trenches were generally excavated 18 to 20 feet deep, with trench bottoms into the underlying caliche layer.

Boring data support the assertion that none of the hazardous waste is containerized within trench No. 3. Site interviews with Cannon AFB officials also support this assertion. No volatile or organic solvents were detected in the analysis of the boring data. The estimated maximum inventory of hazardous waste in trench No. 3 is shown in Table D-1 as follows:

Table D-1. Hazardous Waste Inventory

Hazardous Waste	Percent	Amount in Pounds
Methyl ethyl ketone	39.6	3,564
Toluene	43.4	3,906
Methyl isobutyl ketone	10.4	936
Cyclohexanone	2.4	216
Xylene	1.6	144
Ethylene glycol monobutyl ether	1.6	144
Lead	0.6	54
Chromate	0.4	36

TO VIEW THE MAP AND/OR MAPS WITH THIS DOCUMENT, PLEASE CALL THE HAZARDOUS WASTE BUREAU AT 505-476-6000 TO MAKE AN APPOINTMENT